Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
How recreational farm operators use dynamic capabilities to respond to COVID-19 pandemic

Chih Yu Hsiao,*, Chao Lin Tuan

a Department of Tropical Agriculture and International Cooperation, National Pingtung University of Science and Technology, Taiwan
b Department of Agribusiness Management, National Pingtung University of Science and Technology, Taiwan

ARTICLE INFO

Keywords:
COVID-19 pandemic
Recreational farm
Dynamic capabilities
Adaptive strategy

ABSTRACT

The outbreak of the COVID-19 Pandemic has devastated economic activities around the world. The tourism industry is facing severe challenges, such as reduced tourist flow and the lack of tourist consumption at destinations. Recreational farms are one of the business types of agricultural tourism in Taiwan and have the characteristics of small and medium-sized agriculture businesses. The operator is facing an uncertain environment in the epidemic market, and the operator’s dynamic capability is considered to be effective in coping with the current environment. In this study, 20 selected recreational farms were interviewed to explore how operators use dynamic capabilities to make responses. The results show that recreational farms have the three elements of dynamic capabilities: sense, seize, and transform, to change farm marketing channels and develop new products or services to respond to the new market. Recreational farm operators adopted resource optimization, computerization, and cost control strategies to respond to the market.

Management implications: A successful implementation of recreational farm offers requires

- the reallocation of resources,
- the planning of new products and services, and
- the improvement of service processes to create new business and to address additional target groups.

The COVID-19 pandemic forces a systematic positioning or repositioning of the business.

1. Introduction

COVID-19 Pandemic has affected 194 countries worldwide since its outbreak in 2020. The pandemic has changed the direction of global industrial development and people’s lifestyles, resulting in a reduction in labor and productivity in industries and a disruption in the international division of labor. For the tourism industry, which relies on the flow of people, the impact will be even stronger. In Taiwan, the new epidemic of Coronavirus resurfaced in May 2021, and Taiwan Center for Decease Control (CDC) announced a Level III alert on May 19, and closed the country to foreign tourists, again affecting the development of the tourism industry.

In 1985, agritourism emerged as a legal norm in Italy. Agritourism is considered a subset of rural tourism (Phillips et al., 2010) and is a business model that meets the needs of rural tourists to promote sustainable rural development. From a farm operation perspective, the development of agritourism is also an innovative strategy for diversification and can effectively increase farm profitability (De Rosa et al., 2019). Agritourism has developed differently around the world depending on the local agricultural structure, rural development, and tourist demand in the market (Arru et al., 2019; Schilling et al., 2016; Streifenneder, 2016; Tew and Barbieri, 2012). Phillips et al. (2010) collected literature to illustrate that agritourism is a working farm-based tourism activity that meets the leisure and educational objectives of tourists. Flanigan et al. (2014) used Phillips et al.’s (2010) classification as a basis for compiling the experience of developing agritourism in Scotland and classifying it by product properties to identify agritourism activities on working farms. Streifenneder (2016) more specifically defines agritourism as tourism activities within the working farm, while Chase et al. (2018) define agritourism as tourism activities that are...
deeply connected to agriculture and focused on the working farm. Agritourism has the characteristic of occurring in rural areas where a range of tourism activities take place and working farms spend their holidays (Sznajder, 2009).

For this reason, most of the farms that are capable of hosting tourists provide food and accommodation, which are the main sources of income for agritourism operators (Arru et al., 2019; Tuan, 2020). "Recreational agriculture" is the official term developed in Taiwan in 1992. Recreational agriculture in Taiwan is a business model that utilizes agricultural, ecological, landscape, and cultural resources to provide visitors with food, accommodation, recreation, entertainment, and shopping (Tuan, 2020). Recreational farms, on the other hand, are working farms that practice recreational agriculture. This study combines the definitions and characteristics of agritourism and recreational agriculture development, both of which provide a range of activities for tourists in rural areas to meet their needs for leisure experiences. In terms of farm operations, recreational farms in Taiwan and agritourism are also strategies for diversifying farm operations. Farms provide services such as meals, visits, and agricultural product processing to increase diversified farm revenue (Streifenneder, 2016; Tuan, 2020).

Recreational agriculture has the characteristics of both the agricultural and tourism industry. Recreational agriculture uses agricultural production, lifestyle, and ecological resources to develop agricultural processing products and design experience activities to attract tourists to visit and consume on the farm. As such, the recreational farms provide products and services, including farm-produced agricultural products and direct sales, agricultural products processed through physical processing or biotechnology, and farms that provide leisure and recreational space for tourists and experiential activities. In summary, the profit structure of recreational agriculture includes primary industry (agricultural products), secondary industry (processed products), and tertiary industry (leisure experience services) (Tuan, 2020). Recreational agriculture in Taiwan can be discussed in two directions: first, recreational farms based on farms, and second, recreational agriculture areas based on countryside tourism platforms.

The development period of recreational farm operations in Taiwan. In the early phase, fewer operators participated, tourism facilities were less complete, and operators devoted less time to tourism activities, mostly focusing on production activities, providing fruit picking, simple meals, and accommodation (Chase, 2019; Tuan, 2020), and even treating leisure service work as work that exceeded their original workload. Second, better-developed recreational farms have expanded their capacity for food and accommodation services to increase nonfarm income, and have invested in market-oriented agricultural production programs to promote product diversification (Flanagan et al., 2015), and finally have flourished, with operators spending more time on innovative content for tourism activities (Tuan, 2020).

Taiwan is a small and densely populated region with similar characteristics of regional agricultural resources, and 347 recreational farms have been developed so far. According to the Council of Agriculture of the Executive Yuan, 25.86 million people will participate in agricultural tourism in 2020, creating an output value of $10.2 billion (Council of Agriculture of the Executive Yuan, 2021). In the face of the rapidly changing environment of the consumer market and the mature development of the recreational farming industry, the primary issue for recreational farm operators is how to make use of on-farm resources, design experiential activities, and create new businesses. Until now, agribusiness is operating in a very high-risk world, where the environment is increasing volatility, uncertain, complex, and ambiguous (VUCA). The traditional way of business (using resources to gain a competitive position) will neglect the importance of competence and limit the development of agribusiness. In short, successful recreational farm operations can respond to environmental changes while rapidly adjusting resource allocation to provide products or services demanded by tourists to maintain farm diversification income, which is the core feature of farm diversification operations (Tooner and Wilson, 2015). Most of the recreational farms are operated mainly by small and medium-sized enterprises. The management ability of the decision-maker determines the success of the recreational farm operation model.

This study reviewed the past research on recreational agriculture can be divided into two major aspects: first, research on consumer market environment, the second is recreational agriculture resources. In terms of market environment research, the research focuses on recreational agriculture’s response to market demands, such as developing experience marketing strategies (Chen et al., 1997), experience marketing and customer satisfaction (Su, 2005; Wu and Liang, 2009), and experience activities and relationship marketing (Chang, 2013). In recent years, to satisfy the changing market environment and consumer needs, experience activities have been developed into two types: environmental education experience activities that focus on environmental protection (Lin, 2015), and food and agriculture education experience activities that are based on food safety and food culture (Tuan, 2020; Tung and Tsai, 2016; Yen, 2018).

For resources dimension of recreational agriculture includes the relationship between resources and management strategies (Chen, 2011; Fang, 1997), landscape resources and recreational farming operation (Yeh, 1998), and the design of experiential activity projects and recreational farming operation based on resources (Chang, 2005; Chen and Chen, 2019). Tuan (2020) used the resource-based theory as the basis to create the value, rarity, imperfect limitability, and non-substitutability of farm resources based on their production, living, ecological, and life characteristics, and used the concept of experience economy to construct the recreational farm operating model. The concept of the experience economy is used to construct the operating model of recreational farms, creating an "Endowment" for the operating model. The study of recreational agriculture has already been developed based on the application of resources and the design of experience activities. However, in the face of the ever-changing market for recreational farm business, it is still very rare to discuss how operators should appropriately allocate farm resources, strengthen resource characteristics, and extend product characteristics to secondary and tertiary tiers.

With the development of recreational agriculture in Taiwan has reached a mature phase, and the market uncertainty caused by COVID-19, there is still a gap in academic research on how recreational farm operators should respond to the environment and design new business models. A well-developed recreational farm can capture the growing demand of tourists, segment the visitor base, and provide a further source of income for the farm (Tew and BarBieri, 2012; Arru et al., 2019). For example, in 2010, Taiwan issued the "Environmental Education Act". Sensing the policy changes, the operators of the Flying Cow Farm reviewed their environment and the knowledge and abilities of their employees, applied for environmental education areas, and designed environmental education activities based on the characteristics of tourists. In response to this policy, Toucheng Farm not only designs environmental education activities, but also farm to fork education experiences that are tailored to the farm’s ingredients, and constantly adjusts its operations as the environment changes. In the face of the new situation caused by the rapid changes in the market as a result of the COVID-19 pandemic, operators’ sense of the market environment, their knowledge of farm resources, properly changing their revenue structure, and creating new products or services that meet the post-pandemic market to respond this change have become subjects that operators of recreational farms in Taiwan should consider with utmost urgency.

Decision making by the operator is critical in a difficult market environment (Budhwar, Cummings, 2020). For SMEs in particular, operators can only use their limited resources and cash to survive the business crisis caused by environmental changes (Shankar, 2020). Most recreational farms in Taiwan are small and medium-sized enterprises (SMEs), and operators have several jobs. Faced with a significant decline in the tourist market, the revenue structure of recreational farms is bound to change, and operators must be aware of environmental changes to reconsider their resources, reformulate their marketing
processes, design their business model, and reorganize their revenue structure to maintain effective farm operations (Tuan, 2020).

In recent years, many scholars have demonstrated that dynamic capabilities enable enterprises to survive rapid changes in the environment (Eisenhardt and Martin, 2000). Dynamic Capabilities are rooted in a firm’s ability to realign resources, reorganize processes, and create new products in response to changing market conditions (Teece, 1997; 2012). The three key competency action frameworks are Sensing, Seizing, and Transforming, which helps explore how recreational farms can use existing resources to reallocate and build ‘niches’ where there are opportunities in an uncertain environment (Jose Carlos, 2011). To develop post-epidemic responses to leisure farming and to create new business opportunities for leisure farms (Bierly and Chakrabarti, 1996).

The purpose of this paper is to explore how recreational farm operators use dynamic capabilities to cope with their operations. Based on the characteristics of the recreational farm (agriculture, forestry, fishery, and animal husbandry), 20 representative recreational farms were selected to explore how recreational farm operators use their dynamic capabilities to adjust their recreational farm management strategies in the face of the COVID-19 Pandemic as followed:

1. How to farm operators can use their dynamic capabilities to build coping strategies in the face of the COVID-19 Pandemic.
2. How farm operators can use their perception capabilities to adjust their recreational farm operations in the light of the COVID-19 Pandemic.
3. How farm operators can use their seizure capabilities to reallocate recreational farm resources in the event of COVID-19 Pandemic.
4. How farm operators can use their ability to change and develop new products or processes to cope with the COVID-19 Pandemic.

2. Literature review

2.1. The effect of COVID-19 pandemic on recreational agriculture

Recreational farm operation combines the characteristics of agricultural operating and tourism.

2.1.1. Effect of COVID-19 pandemic on agricultural operations

Various studies confirm the direct impact of the COVID-19 Pandemic on agricultural operations in terms of direct loss of agricultural labor (Jãmbor et al., 2020). After that, the agricultural labor force was unable to hire enough workers and the production decreased significantly, resulting in higher commodity prices, as in the case of Brazil in the second half of 2020 when the epidemic caused a shortage of workers in soybean production and increased soybean prices due to the severity of the epidemic (Maldonado-Guzman et al., 2019); an epidemic outbreak in the United States in 2020 due to a reduction in the agricultural labor force, resulting in an imbalance in food supply and demand prices, such as higher prices for corn and soybeans in the Midwest (Schmitkey et al., 2020); and the recent India 2021 outbreak, which resulted in higher agricultural prices for cotton and rice. The outbreak also reflects the vulnerability of the food supply chain, such as the failure to deliver food on time and to load containers (Weersink and Fulton, 2020).

Although the epidemic is well controlled in Taiwan, the agricultural operations and food supply chain are still under influence. Therefore, the Council of Agriculture of the Executive Yuan of Taiwan focuses on the principle of ensuring safe food production and proposes relevant subsidies. For the agricultural production and food sector, subsidies are provided for production machinery, agricultural product processing, agricultural product quality and safety testing, agricultural product packaging materials, and agricultural product distribution and marketing activities. For the fisheries sector, subsidies are provided for improving the breeding environment, subsidies for fish processing products, subsidies for delaying breeding, and subsidies for quality inspection of fishery products. The livestock sector provides meat processing subsidies, breeding subsidies, and subsidies for innovative management (Circular economy) models (Council of Agriculture, Executive Yuan, 2018).

2.1.2. Effect of COVID-19 pandemic on tourism operations

The impact of the Newcastle pneumonia epidemic on the tourism industry, such as transportation, airlines, hotels, B&Bs, and travel agencies, has been dramatic as it has changed the way of life for the population. Physical interventions such as country closures, reduced cross-country movement, social distancing, closure of enclosed recreational facilities, and cancellation or postponement of events (Gostling et al., 2021) were used in the early stages of the outbreak, limiting tourist movements and reducing the willingness of tourists to travel (Kock et al., 2020), which will undoubtedly have the greatest impact on the tourism industry. However, for countries with well-controlled epidemics, the development of in-depth domestic tourism is seen as a solution to mitigate the impact of the epidemic on the tourism industry (Feng, 2020; Arora & Sharma, 2021).

The assistance provided by the Taiwan government to the tourism industry such as financing revolving loans and interest subsidies, salary subsidies, training for the tourism industry, and operational assistance and subsidies for restaurants, hotels, and B&Bs. In short, the Taiwan government’s relief for the tourism industry is in three directions: reducing operating costs, manpower training, and improving cash flow.

2.1.3. Effect of COVID-19 pandemic on recreational farm

Recreational farms in Taiwan have characteristics of both agriculture and tourism and are mostly operated by small and medium-sized enterprises (Tuan, 2020). Most recreational farms do not maintain appropriate financial levels. Therefore, under the impact of the COVID-19 Pandemic, recreational farms are vulnerable to operational impacts, forcing recreational farms to temporarily close their operations and lay off employees, and sowing uncertainty for future operational recovery (Bartik et al., 2020).

The Council of Agriculture of the Executive Yuan of Taiwan has divided subsidies for recreational farms into five areas: farm site improvement and service innovation, field improvement and service innovation, development of agricultural tour companions or agricultural experience products, incentive tourism, and interest subsidies for new and old loans.

Other regulations related to the relief and recovery of recreational agriculture include the following: 1. Recreational agriculture incentive tourism regulations; 2. operating principles for loan interest subsidies for recreational farms with operational difficulties due to severe and specific infectious pneumonia; 3. application principles for agricultural experience activities and companion development guidance incentive programs; and 4. application principles for recreational farm site improvement and service innovation incentive programs.

This study summarizes the impact of the new pneumonia epidemic on agriculture, tourism, and leisure farm operations, as well as the corresponding measures. This paper concludes that the epidemic will affect the revenue structure of recreational farms. The decrease in agricultural labor leads to a decrease in the production capacity of agricultural products and a decrease in the efficiency of food transportation and marketing, which also affects the processing capacity of agricultural products. The Taiwan government’s measures for recreational farms can be divided into two directions. The direction of opening sources includes the development of souvenirs, agricultural experience activity, and incentives for tourists to travel to agriculture, while the direction of cutting costs focuses on improving facilities, service innovation, and loan interest subsidies.

2.2. Recreational farm

Agritourism is broadly defined as a subtitle of rural tourism (Phillips et al., 2010), and is the provision of recreational services by farms for
tourists to spend their holidays at the farm (Sznajder et al., 2009). The
definition of agritourism by many scholars is very diverse, with different
interpretations depending on the development of the region. European
scholars consider agrotourism as activities that are directly linked to the
farm, such as fruit picking, food and beverage, and accommodation on
the farm (Phillips et al., 2010; Flanigan et al., 2014; Streifeneder, 2016;
Santeramo and Barbieri, 2017). Scholars in the United States have
diversified tourism activities by separating activities from farms into
core and related activities (Chase et al., 2018). Agritourism is also seen
as a business model that links agricultural production, processing, and
tourism, attracting tourists to the farm and generating diversified farm
income through education and entertainment. In short, farms can pro-
vide fruit picking, food and beverage, and accommodation services to
attract tourists for vacation (Arru et al., 2021; Tuan, 2020). Taiwan’s
recreational farms make use of resources, landscape, ecology, and cul-
ture to design experiential activities and provide dining and accommo-
dation services to attract tourists to vacation on farms. Their business
model is broadly in line with that of European and American agricul-
tural tourism. This study argues that Taiwan’s recreational farms have the
characteristics of agritourism, which is a demonstration of diversified
farm management strategies, and that farms can develop new farm ac-
tivities through resource allocation and reconstruct new business
models to increase farm income (De Rosa et al., 2019; Hitt et al., 2011;
Tew and Barbieri, 2012; Schilling et al.).

The recreational farm is a type of business operation in Taiwan’s
agricultural tourism industry, known as agrotourism in foreign countries.
It is also a form of agricultural business operation that is regulated by the
government, and its business strategy is closely related to government
policies. Recreational farm operators can evaluate their business type
and combine it with government measures to further innovate and
develop new businesses or products.

According to the definitions of agritourism and recreational agri-
culture, both family and working farms adopt agricultural structuring
strategies to initiate new activities to increase income. Farm operators
are influenced by the internal and external push and pull factors of the
changing agricultural production structure and the development
framework of rural areas, and they adopt diverse farm management
strategies (Streifeneder, 2016; Tuan, 2020). Most recreational farms in
Taiwan are family farms or small farms are regulated by the govern-
ment. Most Taiwanese recreational farm operators are often multi-
tasking, not only coping with agricultural production but also
responding to the environment and making the right decisions at all
times. There are two main types of leisure farms in Taiwan that use
agricultural resources to design activities to meet the needs of visitors.
According to Chase et al. (2018), farm activities are divided into core
activities and derivative activities. Core activities include farm tours,
farm meals, farm camping and lodging, farm festivals, and farm har-
esting activities. Derivative activities include eco-tours, scenic tours,
food and farming education, environmental education, outdoor adventure,
outdoor wedding, and cultural and creative experiences. Market-driven activities will promote the use of safe farming practices
that meet market demands and indirectly increase job opportunities.

2.2.1. Recreational farm operation and development

Recreational farms are “agricultural operation sites that make use of
rural landscapes, natural ecology, and environmental resources to
combine agriculture, forestry, fishery and animal husbandry production,
agricultural operation activities, rural culture, and farming life to pro-
vide leisure for the nationals and enhance their experience of agriculture
and farming.” (Council of Agriculture, Executive Yuan, 2018). In short,
recreational farms are operated based on agricultural, landscape, cul-
tural, and ecological resources to design experiential activities that will
satisfy tourists and lead to profits for the operator (Tuan, 2020) (Fig. 1).

This study applied the model of recreational farm operation pro-
posed by Tuan (2020) to hypothesize how recreational farm operations
should respond and change when the environment changes. Recrea-
tional farms are market-oriented, and the needs of the market environ-
ment become an important part of recreational farm operators’
decision-making. At the agricultural level, agricultural production is
based on consumer demand, and consumers demand safe farming, so
farms must adopt environmentally-friendly farming or organic farming
methods to attract consumers to buy. The COVID-19 pandemic has
caused changes in production and access, such as a reduction in the
agricultural labor force, a reduction in consumer access options, or the
adoption of online purchasing behavior. Consumers cannot accept the
same way of traveling, and farms must make good use of resources to
develop new activities or products to attract tourists. Recreational farms
are based on agricultural production and marketing, developing agri-
cultural processing products, and then extending the experience and
other functions, constituting a business model that integrates primary,
secondary, and tertiary industries (Chen, 2011; Tuan, 2020).

As a result, the operation of recreational farms is similar to that of
small and medium-sized enterprises in that the philosophy and capa-
bilities of the operators have a profound impact on decision-making
(Carniel and Dalle, 2020). In the face of the post-COVID-19 pandemic
environment, operators must use their dynamic capabilities to allocate
resources and adjust production processes and channels to respond to
market changes.

Until May 2021, there were 347 recreational farms in Taiwan, led by
59 in Miaoli County, 54 in Yilan County, and 40 in Pingtung County. The

---

**Fig. 1.** Recreational agriculture operating ModelSource: Tuan (2020).
number of recreational farms is closely related to the population of urban areas, and most recreational farms are concentrated around the population of urban areas. The Taipei urban area (including Taipei, New Taipei, and Keelung), which has the largest population in Taiwan, has 112 recreational farms (including Taoyuan and Yilan); the Taichung urban area (including Taichung, Changhua, and Nantou) has 87 recreational farms; and the Kaohsiung urban area (including Kaohsiung and Pingtung) has a total of 53 recreational farms. In this study, 20 recreational farms were selected based on industry development and market size, with the majority in northern Taiwan (Taipei, New Taipei, Yilan, Taoyuan, Hsinchu, and Miaoli) (Fig. 2).

2.2.2. The revenue structure of recreational farms

The revenue structure of recreational farms can be divided into three levels: direct sales of agricultural products, processing of agricultural products, and on-farm experience activities. The farm produces fresh agricultural products, processes them, and uses the farm’s characteristics and experiential activities to attract visitors to the farm.

In terms of direct sales to farm products. In the early phase of the outbreak, most consumers were reluctant to visit farms, so the sales channel for farm produce changed to an online channel, and consumers turned to online platforms for shopping and consumption (Chang and Meyerhoefer, 2020). In the form of fruit and vegetable boxes, they are sold through farmers’ associations and their online platforms. Agricultural processing revenue is less affected by the epidemic in Taiwan. Revenue from farm experience activities was most affected by the epidemic and relied entirely on human traffic at this level. Selmi (2020) investigated the extent to which Italian agritourism operators were affected by the outbreak of the COVID-19 pandemic and found that 86% of agritourism operators experienced a significant drop in revenue due to a decrease in direct marketing of agricultural products and a decrease in tourist arrivals. Jones (2020) describes the 80% drop in revenue from tourism activities on her ranch after the outbreak of COVID-19.

In summary, to discuss the impact of the COVID-19 pandemic on recreational farms, it is necessary to understand the revenue structure and operation type of recreational farms. The revenue structure of recreational farms comes from the direct marketing and distribution of agricultural products from the primary sector, the processing and utilization of agricultural products from the secondary sector, and the recreational experience activities from the tertiary sector. Recreational farms make use of agricultural, cultural, scenic, and ecological resources, their wide fields, and a variety of experiential activities to attract tourists to experience consumption. Recreational farms can be categorized into six types of operation: agricultural experience, fishery experience, forestry experience, fishery experience, ecological experience, and cultural experience (Tuan, 2020).

2.3. Dynamic capabilities

2.3.1. The definition of dynamic capabilities

In strategic business management, scholars have contributed to exploring how dynamic capabilities can respond to the environment and help firms create and maintain competitive advantage (Arndt et al., 2017; Teece, 2018), establishing that enterprise apply dynamic capabilities to adjust internal management structures such as knowledge management, product development, strategy formulation, research and development, refining management skills, human resource allocation (Helfat and Peteraf, 2015; Teece, 2018; Tuan, 2020) to gain competitive advantage. Dynamic capabilities have been identified as a way for enterprises to construct, integrate, and reallocate resources to gain competitive advantage under highly interactive situations between enterprises and the environment (Teece et al., 1997; Teece, 2014). A zero-level capability can maintain short-term survival and profitability, while a dynamic capability is a higher capacity that can modify or create a zero-level capability to gain the long-term advantage. In short, while normal capabilities can transform an enterprise’s internal processes, dynamic capabilities can create new products or services that can provide a competitive advantage in an unknown market environment.
The framework of dynamic capabilities was first proposed by (Teece et al., 1997), which is composed of Sensing, Seizing, and Transforming, arguing that firms possess these three capabilities, i.e., they can examine the market environment and reconfigure resources to respond to the rapidly changing market environment (Arend, 2014; Eikenboom and Jong, 2019). The changes in the market environment and new lifestyles after the pandemic have been less discussed by scholars in the past (Beech and Anseel, 2020). In the face of the sudden market changes caused by the COVID-19 pandemic, operators need to identify market needs at the right time (Farooq, 2019), as the epidemic creates new opportunities and threats in the market, forcing changes in business practices, reallocation of resources in a short period and finding business positioning in new opportunities to maintain a competitive advantage in the market (Woldesenbet et al., 2012; Teece and Leith, 2016).

In summary, dynamic capabilities respond effectively to a rapidly changing environment and bring innovative business models to operations, preserving the company’s sustainable advantage and changing its vision and value in response to the market.

2.3.2. Dynamic capabilities on the Covid-19 pandemic

The term VUCA was coined by the U.S. Army in the 1990s to describe the uncertainty of the environment, a shorthand way for operators to face changes in environmental conditions (Shoemaker et al., 2018). In the environment of VUCA, business strategies are unique, and operators need to have sufficient market awareness, understand the results of market changes, identify the characteristics and connections of intrinsic resources, develop various coping strategies, and identify relevant opportunities to develop strategies in the environment (Shoemaker et al., 2018). The normative capabilities that enterprises have in standing environments can only sustain the short term profitability and are not sufficient to cope with sudden environmental changes (Winter, 2003; Teece, 2018), such as the COVID-19 pandemic, blocking interpersonal movement, and changing shopping behavior from market to online purchases.

The change in business and revenue structure caused by the impact of the COVID-19 has shaped a significant market opportunity, forcing operators to seek new business models (Battisti and Deakins, 2017). The dynamic capabilities of firms enable them to enter new markets, seek opportunities within opportunities, deploy their resources to respond to market demands, and create a competitive advantage that cannot be imitated (Teece and Leith, 2016; Sabai and Ho, 2018). Flexibility allows companies to be more resilient by devising alternative strategies in an uncertain environment. The composition of these dynamic capabilities is related to the operator’s level of knowledge of the environment (Maldonado-Guzmán et al., 2019), and dynamic capabilities can help operators integrate their internal technologies, businesses, and business strategies in complex environments (Verbeke, 2020).

Kalemli-Ozcan et al., (2020) examined the causes of SME closure in 17 countries and found that the outbreak of the COVID-19 pandemic was an important cause of SME closure. SMEs with limited resources and time to adjust quickly to the business impact of the outbreak, such as cash flow shortages and reduced workforce (Liguori and Pittz, 2020), are more likely to fail if they have insufficient cash flow, corporate resilience, or strategic flexibility (La et al., 2020; Papadopoulos et al., 2020; Syriopoulou et al., 2021).

Therefore, the dynamic capabilities of operators under the COVID-19 market environment, operators need to have sufficient market sensing, seizing, and transforming capabilities to develop a unique strategy for the enterprise to maintain the competitive advantage, and then generate revenue.

2.3.3. Dynamic capabilities in recreational farm

To review the previous studies on the dynamic capabilities of recreational farms, Chang et al. (2006) used a case study to investigate the dynamic capabilities of recreational farms involved in market sensitivity, knowledge attraction, organizational coordination, integration ability, and network connectivity. Research on the dynamic capabilities of recreational farms in Taiwan is still scarce. Dias et al. (2021) examined how to improve the environmental and financial performance of small-scale vineyards through entrepreneurial orientation, dynamic capabilities, and environmental sustainability commitments. The study found that farms perceive changes in the market environment through improved research and development and knowledge training. For example, operators respond to high market demand for environmental awareness by improving research and development and adopting environmentally-friendly farming practices. Nieves and Haller (2014) explored the relationship between dynamic capabilities and environmental change in the hotel industry, finding that existing skills and knowledge help operators develop dynamic capabilities and create, change, expand, and reallocate resources to adapt to changing resource environments.

Therefore, this study defines the dynamic capabilities of recreational farms based on Teece et al. (1997) dynamic capabilities framework, incorporates the industrial characteristics of recreational farms, and defines how recreational farms can respond to the market environment, reallocate resources, create new products or services, and change their business model under the impact of the COVID-19, to turn the operation of recreational farms into a risk-free operation.

3. Methodology

3.1. Research framework and definition

This paper adopts a qualitative approach (Creswell et al., 2007), which can provide researchers with in-depth and insightful information at a specific point in time (Pratt, 2009). Using interpretive research (Lukka and Modell, 2010), the results of in-depth interviews with key informed individuals and discussion of rarely known facts reveal the complex phenomena and details of COVID-19 from a non-quantitative perspective (Strauss and Corbin, 2003). Therefore, in the face of the uncertainty brought about by the impact of the COVID-19, researchers were able to gain first-hand insight into the impact on companies through in-depth interviews.

To enhance the validity of the in-depth interviews, semi-structured interviews were conducted to develop an interview protocol and interview recreational farm operators. Triangulation of the three elements of dynamic capabilities and the strategies and practices used to address the COVID-19 market during the interview. The farm operators provided very detailed COVID-19 response strategies during the two repeated interviews (Hussein, 2009). To enhance the credibility of the qualitative
study, the interviewer was the author of this paper, Professor Tuan Chao-Lin is the Department of Agricultural Business Administration at National Pingtung University of Science and Technology, who was formerly the president of the Taiwan Recreational Farming Association and has long been a counselor of recreational farms in Taiwan and is acquainted with recreational farm operators. The recreational farm operators were interviewed at their farms.

Recreational agriculture has been developed in Taiwan for more than 20 years and is mature in terms of the industry life cycle. Integrating the characteristics of agritourism and recreational farming, farm operators are defined as using farm resources to provide food and accommodation activities for tourists to stay (Farm 10, Farm 16 do not provide the accommodation service). Most of the recreational farm operators selected for this study had been operating for more than 15 years and were working farms that had already established a deep understanding of recreational agriculture. Two of the recreational farms (Farm 10 and Farm 11) had been in operation for less than 15 years because the years of operation were calculated based on the number of years they had been in operation since they were regulated, and these two farms had been involved in agritourism activities before that. The themes include Rice, Organic Vegetable, Flower, Alpine Fruit, Vanilla, Pomelo, Cocoa, Water plant, Clams, Pasture, Dairy cattle, and others. and others (Bamboo, Animal, Mask in special painting).

In this study, 20 recreational farm operators were selected, which are the president, farm manager, manager, or CEO. The interview process is 2 h in each interview. The interview period is from April 2 to May 15, 2020. The interviewees are listed Table 1

Qualitative data analysis is an ongoing process of iterative work that consists of three activity processes, research data reduction, data presentation, and summarization (Mishon, 2006).

3.3. The interview outline

The outline was divided into four parts, firstly, to understand the operational structure of Recreational farms, and secondly, to understand the ability to sense, seize, and transform. Sensing capabilities measured the number of visitors to the farm, its revenue structure, and its knowledge of resources.

The capability to seize measures the farm’s resource allocation and the extent to which it actively applies for subsidies. Transformation capabilities measure the farm’s response strategies to the epidemic (Table 2).

In this section, 20 interviews were coded and recorded, followed by participant observations, and operators’ online marketing content, from which useful information was derived on how farm operators are using dynamic capabilities to break out of the COVID-19 pandemic market.

4. Findings

4.1. The revenue structure of recreational farms before COVID-19 pandemic

4.1.1. Agricultural products direct marketing revenue ratio

Revenue structure of the 20 recreational farms. The three farms with direct sales of agricultural products accounting for more than 50% of total revenue were Farm10 (Mandarin orchids, Vanda orchids, and

---

**Table 1**

The Interviewee background.

| Code | Year | Position       | Theme          | Food service | Accommodation service | Time            |
|------|------|----------------|----------------|--------------|------------------------|-----------------|
| FARM1 | 33   | CEO            | Rice           | ✔            | ✓                      | May 8, 2020     |
| FARM2 | 33   | CEO            | Fruit          | ✔            | ✓                      | May 8, 2020     |
| FARM3 | 32   | CEO            | Pomelo         | ✔            | ✓                      | May 8, 2020     |
| FARM4 | 15   | General Manager | Vanilla       | ✓            | ✓                      | Apr. 24, 2020   |
| FARM5 | 25   | Manager        | Organic vegetable | ✔   | ✓                      | Apr. 24, 2020   |
| FARM6 | 30   | Manager        | Alpine Fruit   | ✔            | ✓                      | Apr. 24, 2020   |
| FARM7 | 30   | Manager        | Flower         | ✔            | ✓                      | Apr. 24, 2020   |
| FARM8 | 20   | CEO            | Flower         | ✔            | ✓                      | Apr. 11, 2020   |
| FARM9 | 30   | Manager        | Flower         | ✔            | ✓                      | Apr. 24, 2020   |
| FARM10| 6    | General Manager | Flower        | ✔            | ✓                      | Apr. 10, 2020   |
| FARM11| 9    | Manager        | Cocoa          | ✔            | ✓                      | Apr. 10, 2020   |
| FARM12| 26   | Manager        | Dairy cattle   | ✔            | ✓                      | Apr. 2, 2020    |
| FARM13| 33   | Manager        | Pasture        | ✔            | ✓                      | Apr. 10, 2020   |
| FARM14| 40   | Manager        | Dairy cattle   | ✔            | ✓                      | Apr. 17, 2020   |
| FARM15| 45   | Manager        | Dairy cattle   | ✔            | ✓                      | Apr. 17, 2020   |
| FARM16| 20   | General Manager | Clams         | ✓            | ✓                      | Apr. 17, 2020   |
| FARM17| 15   | Manager        | Bamboo         | ✔            | ✓                      | May 5, 2020     |
| FARM18| 16   | Manager        | Water plant    | ✓            | ✓                      | Apr. 3, 2020    |
| FARM19| 17   | Manager        | Animal         | ✔            | ✓                      | Apr. 25, 2020   |
| FARM20| 22   | Manager        | Mask in special painting | ✔ | ✓ | May 5, 2020 |
Table 2
Interview outline.

| Concept                           | Outline                                                                 | Reference     |
|-----------------------------------|-------------------------------------------------------------------------|---------------|
| Background information of the operator | What is the percentage of your farm’s total revenue for each of the primary, secondary, and tertiary industries products or services? | C.L. Tuan (2020) |
| Operator Sensing capability        | 1. To what extent were your farm’s visitor numbers and operating revenues affected compared to the same period in previous years? | Teece et al. (1997) |
| Operator Seizing capability        | 1. How can your farm allocate resources to break through the difficulties and create new business? | Teece et al. (1997) |
| Operator Transform capability      | 1. What strategy has been taken by your farm in response to the outbreak? | Teece et al. (1997) |

Kidney orchids), Farm15 (fresh milk), and Farm 9 (flower seedlings), in the following rankings. Next, nine farms had direct sales of agricultural products accounting for 10%-49% of their total revenue, and finally, eight farms had direct sales of agricultural products accounting for less than 9% of their total revenue.

4.1.2. Agricultural processed product revenue ratio
Farm 17 (bamboo charcoal and tea) accounts for more than 70% of total farm revenue, followed by Farm 7 (40%), Farm 16 (33%), and Farm 8 (30%). Farm 7 and Farm 8 focus on the production of essential oils, while Farm 16 focuses on biotech processed products from Shell. The leisure farms with higher processed product revenues are mainly engaged in the deep processing of agricultural products, which has formed a high technological advantage.

Agricultural processed products accounted for less than 29% of the total revenue of 15 farms, five of which did not develop agricultural processed products, including Farm 9, Farm 10, Farm 19, and Farm 20.

4.1.3. Agricultural service and experience activity revenue ratio
There were 16 farms whose recreational experience service revenue accounted for more than 50% of the total revenue. Among them, Farm 1, Farm 2, Farm 13, Farm 14, and Farm 19 accounted for more than 90% of the total revenue. Most of the agricultural products and processed goods produced by these farms are provided to the farms for use as experiential materials, so their revenue is classified as leisure experience services.

4.2. Operator sensing capabilities
Operators’ capacity to sense the impact of the COVID-19 on recreational farm business and their ability to sense the changes. The interviews revealed that the operators of the 20 recreational farms had a deep awareness of the business structure of recreational farms affected by the new COVID-19. The average number of tourists to the 20 recreational farms interviewed decreased by 61%, and the business income decreased by 48%.

4.2.1. The degree of decrease in the rate of tourists visiting recreational farms
The results showed that the number of tourists at the 20 recreational farms decreased by 80% or more in 9 cases, 60–79% in 1 case, 40–59% in 3 cases, 20–39% in 3 cases, and 19% or less in 3 cases. The average decrease in the rate of tourists was 61%.

4.2.2. The degree of decrease in the rate of revenue
The results showed that for the 20 recreational farms, revenue decreased by 80% or more in 3 farms, 60–79% or more in 4 farms, 40–59% in 5 farms, 20–39% in 3 farms, and 19% or less in 4 farms. Overall, operating revenue was reduced by 48% due to the COVID-19. The decrease in operating income was significantly lower than the decrease in the number of tourists (61%), because the recreational farms were able to maintain their agricultural production and agricultural processing businesses to meet basic consumer needs, and were not completely affected by the decrease in the number of tourists, so they were able to stabilize their operations.

4.2.3. Impact on direct marketing revenues as identified by operators
The results showed that 20 recreational farm operators considered that the degree of influence of direct marketing of agricultural products depended on the attributes of the recreational farms and the degree of connection between direct marketing, processing, and recreational experience services.

Farm 5, where the farm products are organic vegetables, is a daily necessity for consumers, and the existing distribution channels also provide sales channels for vegetable boxes in addition to leisure farm consumption. Farm 19 does not produce agricultural products, so it is not affected. On the other hand, Farm 10 is an export product, so the reduction in the revenue structure of agricultural products will have a significant impact.

Farm 7 and Farm 8 use farm flowers to make essential oils, Farm 11 uses cocoa to make raw chocolate, Farm 6 uses blueberries and kiwis to make jam, Farm 17 uses tea leaves and bamboo to make tea and bamboo charcoal, Farm 2, Farm 15 and Farm 14 use raw milk and milk to make charcoal and other processed products. Farm 2, Farm 15, and Farm 14 make milk from raw milk, so they do not affect the revenue from direct sales of agricultural products. In addition, agricultural products are provided for use as experiential materials. The farm products revenue mix is reduced for Farm 1, Farm 14, Farm 2, Farm 4, and Farm 13, while Farm 16 is slightly affected.

4.2.4. Impact on agricultural processed product revenues as identified by operators
The results showed that the nine recreational farms with higher revenues from agricultural processing products, such as Farm 7 and Farm 8, which produce protective lotions and essential oils with health effects, and Farm 11, which produces chocolates for tourists to consume for their spiritual healing needs, showed a negative growth due to the COVID-19. As a result of the epidemic, most of the processed products are sold on-site, so Farm 12 and Farm 13 are more affected. Farm 6, Farm 15, Farm 16, and Farm 17 are the four farms that have remained stable and unaffected by the COVID-19.

The five recreational farms indicated that their processed products did not account for a high percentage of their income and were not significantly affected (Farm 1, Farm 2, Farm 3, Farm 4, Farm 14), while the five recreational farms indicated that they had no secondary production (Farm 5, Farm 9, Farm 10, Farm 19, Farm 20).

4.2.5. Impact on agricultural service and experience activities revenues as identified by operators
Farm 8 has responded to market changes by launching COVID-19 prevention products such as protective lotions and essential oils and...
solving them through online platforms, resulting in an average 63% decrease in revenue. The company’s revenue grew by 30% against the trend.

Comparing the industrial characteristics of the 20 recreational farms, recreational farms with an agricultural experience theme and recreational farms with a livestock experience theme performed better than recreational farms with an agricultural experience theme (74%) in terms of the degree of impact on the decrease in revenue from the three products of recreational farms.

4.3. Operator seizing capabilities

4.3.1. Reconfiguration of resource

Reallocating resources and allocate them from internal resources of the services.

4.3.2. Applied for government subsidies

The result revealed that 20 recreational farms generally sense the impact of the COVID-19 outbreak. They also organized their resources to develop new business opportunities. The recreational farms perceived the post-epidemic market and identified the following opportunities.

(1) Take advantage of the farm’s environmental and landscape resources to design environmental education activities to meet the post-epidemic market’s demand for health treatment.

(2) Use farm resources to develop home beautification experience activities.

(3) Utilize farm resources to develop anti-epidemic processing products, such as protective hand creams or flower designs for hand gifts.

(4) Develop an information-based sales platform and combine farm products to develop “COVID-19 prevention kits” to increase product sales channels.

In summarized, operators of 20 recreational farms are examining their farm resources and, in response to market demand for epidemic prevention and keeping with their environmental advantages, are improving their revenue from direct sales of agricultural products, agricultural product processing, and leisure agriculture experience services.

4.3. Operator seizing capabilities

Operator Capture Capability provides operators with the ability to reallocate resources and allocate them from internal resources of the recreational farm and government subsidies.

4.3.1. Reconfiguration of resource

The results found that the 20 recreational farms reconfigured their internal resources for recreational farms in response to changes in the epidemic as follows.

(1) Strengthening agricultural resources, arranging the park, and holding thematic special exhibitions. (Farm 7, Farm 8)

(2) Deepen agricultural resources and develop epidemic-proof processing products and epidemic-proof food and beverage vacuum packs. (Farm 1, Farm 7, Farm 8, Farm 16)

(3) Apply ecological and environmental resources, develop horticultural therapy activities and environmental education courses. (Farm 1)

(4) Apply landscape resources, develop epidemic prevention standards, and develop outdoor wedding markets. (Farm 10)

(5) Strengthen information application, expand sales channels for agricultural products (e.g., vegetable boxes, epidemic prevention boxes), and online experiential activities and courses (e.g., environmental education, flower gardening courses) to increase opportunities for consumer interaction. (Farm 1, Farm 3, Farm 5, Farm 11)

(6) Reduce manpower expenditures and reduce the number of work-study students employed. (Farm 2, Farm 4)

4.3.2. Applied for government subsidies

The result revealed that 20 recreational farms used government support measures to stabilize their business difficulties after the epidemic.

Among them, 20 recreational farms applied for wage subsidies to maintain the livelihood of their employees; 18 operators applied for improving the software and hardware facilities of recreational farms to enhance the quality of services; 18 operators applied for the agricultural tourism e-ticket system to increase the exposure rate of tourists; 17 operators applied for developing innovative agricultural experience projects and developing special agricultural companion awards. In terms of cash flow applications, 11 operators’ applications were for leisure farm project loans and 6 operators’ applications were for old loan subsidies.

In summarized, most of the 20 recreational farm operators demonstrated their ability to seize opportunities, and most were able to evaluate their internal resources and consider the post-epidemic market to develop new products or services featuring epidemic prevention, health, and health care. As market channels change, they apply information platforms to maintain or develop consumer markets. In the process of developing new products or services, we use various government subsidies to reduce development costs.

4.4. Operator transform capabilities

Operators’ capability to transform is the ability to develop new products or marketing channels. The results showed that 19 operators reallocated their resources to meet the post-epidemic market, developing new products, experiencing events, or using information platforms to market their products.

1. Develop new products.

(1) Farm 7 (hand cream and essential oil for epidemic prevention).

(2) Farm 8 (hand cream, essential oil, forest gift box)

(3) Farm 16 (Shell cooking space pack).

(4) Farm 1 (Wild ginger flower dumpling, chef’s home cooking combination cooking kit).

(5) Farm 9 (develop fine passion fruit accompanying gift).

(6) Farm 10 (Wenxin Lan companion gift box).

(7) Farm 18 (wood carving pen).

(8) Farm 20 (egg gift box).

2. Development of new activities

(1) Farm 1 (Blue magpie, flyfire ecology experience, environmental education experience, gardening therapy experience).

(2) Farm 5 (post-epidemic kiln control package, outdoor teaching).

(3) Farm 7 (Theme-based flower exhibition).

(4) Farm 17 (bamboo charcoal themed tour - bamboo charcoal fun).

(5) Farm 10 (Outdoor Wedding).

(6) Farm 12 (Dairy Farming Education).

3. Application of online platform to expand marketing channels

(1) 20 recreational farms operate Facebook to introduce farms and maintain consumer adhesion.

(2) Farm 18 operates a shrimp skin shopping platform to market wood carving pens.

(3) Farm 1 applied online audio-visual teaching to design environmental education experience courses.

(4) Farm 8 Leisure Farm revamped its “Forest Selection” platform and updated its products.

(5) Farm 11 uses online platforms and Facebook to update farm status and build farm brand value.

5. Results and discussion

This study aims at how recreational farm operators apply dynamic competency thinking to respond to changes in the post-epidemic market environment. 20 recreational farm operators can fully utilize their
We believe that recreational farm operators have the seizing capability to effectively reorganize resources. Examples of such practices include deepening resources to develop new products, strengthening environmental management to meet environmental objectives, using the farm’s internal ecological and environmental resources to design outdoor experiences, and using online platforms to increase product access and customer retention. However, with the development of new businesses, recreational farm operators actively seek government policy support, such as subsidies for service facilities on the farm, online sales platforms, the development of new experiential activities, and interest subsidies for capital loans.

With the uncertainty of the COVID-19 market, recreational farm operators have developed new products and business activities after internal and external resource allocation. New product development focuses on ingredients in vacuum packages, essential oils, and souvenirs, with the main focus on safe ingredients and epidemic prevention to meet consumer demand. New activities include outdoor experiences, ecological experiences, farm to fork education, and environmental education. These activities focus on clean farm environments and compliance with epidemic prevention regulations to meet consumer demand for outdoor activities. Some farm operators are also expanding their channels and making them online to increase the exposure of new products.

Therefore, the research framework established in this paper suggests that recreational farm operators should fully grasp their resources, gather market niches, anticipate market and product development, allocate internal resources, and apply government subsidies to reduce the cost and risk of developing new businesses. We have developed and implemented strategies to address these needs. We believe that the external environment can fully influence normative capabilities (McElWee, 2006), and the performance of normative capabilities will not match the post-epidemic market. At this point, the farm’s operational strategy becomes more heterogeneous, with changes in resources, mission, cognition, and organization (Helfat and Peteraf, 2015), and therefore requires dynamic capabilities to reorganize normative capabilities (Winter, 2003), renew them, and innovate the original operational structure (Egger, 2012; Wang et al., 2015). The dynamic capabilities of sensing the external environment, focusing on opportunities and organizational changes, and changing operating models for long-term profitability are three capabilities that need to be firmly based on the farm’s environment and strategy to deal with them faster than competitors (Teece et al., 2018; Schoemaker et al., 2018). This study is structured to show how recreational farm operators can apply the three elements of dynamic capabilities: sense, seize, and transform, and develop adaptive strategies to meet the post-market. 20 recreational farm operators provided sufficient information to offer changing business models for other operators’ consideration.

5.1. Operators’ sense of capability to adjust recreational farm operations

Firstly, in terms of the sensitivity of the recreational farms, the 20 recreational farms interviewed were able to effectively sense the decrease in their revenue and analyze the impact of the farm’s revenue structure. This is in line with Schoemaker et al., (2018) which states that in the VUCA environment, operators need to have the right awareness of the market. Recreational farm operators can effectively manage company resources, plan carefully, and realize potential advantages to maintain performance (Hitt et al., 2011; Sirmon et al., 2008).

Sensing capability is the operator’s personal ability to correctly analyze, and filter future opportunities. For recreational farm operations, the ability of the operator to analyze its resources, functions, discern impending changes in the market environment, and respond quickly (Eikeelenboom and de Jong, 2019). Operators were forced to make many response decisions in the context of the COVID-19, and it became clear that the traditional business practices of the past were unable to meet the health and safety needs of the post-COVID-19 market.

Parks and Kim (2013) illustrated that in the face of unprecedented environmental shocks, companies learned from the external environment and reallocated resources to meet market demand. For example, in the early stages of the epidemic, the farm operator in Farm 1 sensed a significant drop in tourists and adjusted the business content of the recreational farm, adopting emergency measures such as experiential activities or informational courses, and providing vacuum packs for food and beverage. Farm 2 operators suspended accommodation operations and reduced temporary manpower recruitment as a contingency measure. The operators of Farm 7 and Farm 8 have adopted emergency measures such as producing anti-epidemic essential oils and hand lotions to meet market demand and mitigate the impact of the epidemic. These farm operators can quickly use their capabilities to gauge the current market conditions and propose responses (Ridova et al., 2009). The ability of farms to be sensitive will allow them to respond effectively to turbulent market conditions.

5.2. Operators seize the ability to properly allocate resources

In the post-COVID-19 market environment, the envisioned product and service planning requires the reallocation of resources. In line with new product planning, the dynamic capabilities of 20 field operators can appropriately adjust internal structures such as knowledge management, product development, strategy formulation, research and development, refinement of management skills, and human resource allocation to gain competitive advantage (Helfat and Peteraf, 2015; Schoemaker et al., 2018). Among the three concepts of dynamic capabilities, it is clear that market sensing capability alone is not sufficient to deal with the threats of a volatile environment, and that seizing new opportunities in the market and reallocating resources will enable firms to effectively deal with a volatile environment (Schoemaker et al., 2018). In other words, the ability to sense the market environment, reallocate internal resources, and seize new market opportunities is necessary for an operator to develop an adaptive strategy. In the whole interview process, the operator’s ability to seize is divided into two parts, one is to appropriately allocate resources and adopt a flexible approach to diversify the functions of existing resources, such as organizing special exhibitions with agricultural themes, developing processed products with epidemic prevention themes, experiential activities and courses related to ecological environment protection, and expanding online platforms to increase sales channels. These approaches demonstrate the agility of operators to respond to COVID-19 operations and to effectively cope with internal and external environmental changes (Ghezzi and Cavallo, 2020).

The second is to apply for government subsidies to reduce the barriers to innovation in recreational farm operations or to mitigate operational losses on recreational farms. For example, 18 of the 20 recreational farms applied for e-tickets, and 17 operators chose innovative agricultural experience programs. It is interesting to note that most recreational farm operators have chosen to make their products or services available online to meet the needs of their customers (Loss and Crave, 2011).

The COVID-19 pandemic is seen as a long-term crisis. The pandemic
has brought about a change in consumer demand, with most people purchasing online. Research has shown that 20 recreational farm operators have chosen to build long-term, positive relationships with their customers online, actively interacting with them, building strong relationships, and fostering customer loyalty (Wierenga et al., 2018). This kind of customer loyalty will bring appropriate revenue to the leisure farms to compensate for the tourist that cannot visit the farms. In short, the 20 recreational farm operators have been able to allocate their resources flexibly. The changing environment has forced them to use resources in other ways and to use alternative resources to expand their businesses.

5.3. Operator transformation capabilities enable recreational farm operations to respond effectively

Operators are reallocating resources, planning new products and services, and improving service processes to create new business models in an unknown environment (Teece et al., 1997). The COVID-19 pandemic has changed the way all businesses operate and do business, and for recreational farms, the reduction in tourists has had a significant impact on their operations (Nielsen and Lassen, 2012). In this turbulent environment, businesses must reposition themselves to balance their desired goals with current conditions. The study found that 19 of the 20 recreational farm operators were able to respond to new market demands by developing new products or experiences in response to the post-epidemic market. For products, operators developed hand creams, essential oils, and other biotechnology products to enhance their epidemic prevention capabilities. The activities include thematic exhibitions, outdoor weddings, outdoor education, environmental education, and food and agriculture education. The marketing channels include the development of fresh produce e-commerce channels such as "vegetable boxes" and "fruit boxes", and home delivery products such as "space-packed meals" to meet the rise of the "home economy" in the market. Therefore, the ability of operators to transform can effectively promote farm innovation in response to changes in the turbulent market environment (Bass, 1991).

5.4. Adaptive strategies for recreational farms

Recreational farms have been able to respond to the business environment of the post-epidemic market through a dynamic ability to innovate their internal resources and operations. The study found that 20 recreational farm operators adopted the following adaptive strategies.

5.4.1. Resource optimization strategy

The resources are effectively optimized to design new products or activities. For example, Farm 1 uses blue magpies and fireflies to design environmental education courses, Farm 7 uses seasonal flowers to hold themed exhibitions and develop anti-epidemic products, Farm 8 develops anti-epidemic oils and hand creams, Farm 10 uses flowers and for recreational farms, the reduction in tourists has had a significant impact on their operations (Nielsen and Lassen, 2012). In this turbulent environment, businesses must reposition themselves to balance their desired goals with current conditions. The study found that 19 of the 20 recreational farm operators were able to respond to new market demands by developing new products or experiences in response to the post-epidemic market. For products, operators developed hand creams, essential oils, and other biotechnology products to enhance their epidemic prevention capabilities. The activities include thematic exhibitions, outdoor weddings, outdoor education, environmental education, and food and agriculture education. The marketing channels include the development of fresh produce e-commerce channels such as "vegetable boxes" and "fruit boxes", and home delivery products such as "space-packed meals" to meet the rise of the "home economy" in the market. Therefore, the ability of operators to transform can effectively promote farm innovation in response to changes in the turbulent market environment (Bass, 1991).

5.4.2. E-commerce strategy

Products and activities can be operated online platform. For example, Farm 1 offers an online shopping platform and courses. Farm 2 uses biodiversity resources to interact with consumers through an online platform. Farm 18 develops wood carving pens, and Farm 16 develops dining space bags. Farm 20 develops egg gift boxes, Farm 18 develops wood carving pens, and Farm 16 develops dining space packs, etc.

5.4.3. Cost control strategy

Operators can effectively review the effectiveness of their resources and reduce expenses. For example, the operator of Farm 1 has switched to a part-time system for manpower used. Farm 2 reduced the number of rooms. Farm 5 has reduced the number of employees required to clean the park. Farm 6 has computerized its operating income and expenses to reduce personnel costs and improve operational accuracy.

6. Conclusion

This study focuses on how recreational farm operators respond to the COVID-19 pandemic. From 20 studies of recreational farm operators, it was found that operator dynamic capabilities were effective in coping with the impact of the COVID-19 pandemic. Teece et al. (1997) argue that the dynamic capabilities concept of perceiving, capturing, and changing capabilities was seen as a way to address current problems in the market. Companies are constantly reinventing their business models to respond to changes in the market environment (Spigel, 2017).

Therefore, we hope to provide recreational farm operators with a reference on how they interpreted the COVID-19 pandemic and how they responded to the epidemic so that they can smoothly overcome the impact of the COVID-19 pandemic.

6.1. Management implication

6.1.1. Operators should be sensitive to the market change

Recreational farms in Taiwan are mainly small and medium-sized enterprises, and the decisions of operators often determine the success or failure of their operations. The uncertainty of the post-epidemic market environment makes it even more difficult for recreational farm operators to make decisions. Therefore, operators need to cultivate market sensitivity through education and training, news, newspapers, and consultation with competitors in the business and constantly explore new opportunities and needs in the market to anticipate future operational obstacles so that they can develop new business opportunities and activities to deal with the impact of the market.

6.1.2. The operator should allocate farm resources

Operators must have the ability to coordinate the allocation and scheduling of resources on their farms. Although the existing operating model is based on a resource-based view, it is carefully planned to enhance the competitive advantage and performance of the business. However, the task objectives and resources used to develop a response strategy are different from the original operating model. Therefore, resource allocation and scheduling is indispensable competency for operators, and it is an action that operators can take to effectively manage farm resources (Hitt et al., 2011). In this process, operators need to coordinate the new business model through internal resource heterogeneity, supplementation, and personnel knowledge and experience to avoid negative outcomes (Chirico et al., 2011).

6.1.3. Operators need to be well aware of government policy

The business type of recreational farms in Taiwan is permitted by the government to operate legally in rural areas. Therefore, operators need to be well aware of government policies, understand the content of government policies, and match them with new businesses or activities to improve performance or reduce development costs.

6.1.4. Operators should develop new products or activities and change their business model

Recreational farm operators in Taiwan need to maintain a creative mindset and face the uncertainty of the post-epidemic market environment and need to be brave enough to break through and make innovative business models. Dynamic capabilities provide recreational farm operators with research concepts to develop their businesses and activities. By examining dynamic capabilities, operators can reflect on the new products and services they can offer to keep their farms competitive.
6.2. Government implication

6.2.1. Government needs to develop a environmental sensitivity of recreational farm operators

Recreational farmers are well aware of the impact of the new coronavirus pneumonia. However, due to the small- and medium-sized business type of recreational farm operators, most of them are still very much restricted in their ability to gather information about the market environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2.2. Government policy needs to improve the operating foundations of recreational farms

There are three directions to improve the adaptation strategies for recreational farms in the post-pandemic market: optimization of resources, e-commerce, and cost control strategies. Current government policy is still focused on improving service facilities, followed by lowering interest rates on loans and developing experiential activities. Future government policy is intended to move in these three directions, including resource development, expansion of electronic processes, and reduction of operating costs.

6.3. Limitation

This study adopts a qualitative approach to gain insight into the phenomenon and to extract management implications. However, this paper still has research limitations, such as the inability to provide quantitative answers. Future research should be conducted in other countries or regions to see if operators can respond in the same way. Second, this study focuses on Taiwan, where the leisure farm business model is slightly different from that of other advanced countries, and cannot fully address the problems encountered by agritourism operators in other countries. Therefore, future research should examine the relationship between leisure farm operators’ business models and the COVID-19 pandemic, and understand the differences in operators’ decision-making to provide more appropriate business practices.

Authorship statement

Conception and design of study: Chao Lin Tuan, Acquisition of data: Chao Lin Tuan Analysis and/or interpretation of data: Chih Yu Hsiao. Drafting the manuscript: Chih Yu Hsiao

Revising the manuscript critically for important intellectual content: Chih Yu Hsiao

References

Arend, R. J. (2014). Entrepreneurship and dynamic capabilities: How firm age and size affect the capability enhancement-SME performance relationship. Small Business Economics, 42(1), 33-57.

Arndt, F., Pierce, L., & Teece, D. (2017). The behavioral and evolutionary roots of business models and the environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2. Government implication

6.2.1. Government needs to develop a environmental sensitivity of recreational farm operators

Recreational farmers are well aware of the impact of the new coronavirus pneumonia. However, due to the small- and medium-sized business type of recreational farm operators, most of them are still very much restricted in their ability to gather information about the market environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2.2. Government policy needs to improve the operating foundations of recreational farms

There are three directions to improve the adaptation strategies for recreational farms in the post-pandemic market: optimization of resources, e-commerce, and cost control strategies. Current government policy is still focused on improving service facilities, followed by lowering interest rates on loans and developing experiential activities. Future government policy is intended to move in these three directions, including resource development, expansion of electronic processes, and reduction of operating costs.

6.3. Limitation

This study adopts a qualitative approach to gain insight into the phenomenon and to extract management implications. However, this paper still has research limitations, such as the inability to provide quantitative answers. Future research should be conducted in other countries or regions to see if operators can respond in the same way. Second, this study focuses on Taiwan, where the leisure farm business model is slightly different from that of other advanced countries, and cannot fully address the problems encountered by agritourism operators in other countries. Therefore, future research should examine the relationship between leisure farm operators’ business models and the COVID-19 pandemic, and understand the differences in operators’ decision-making to provide more appropriate business practices.

Authorship statement

Conception and design of study: Chao Lin Tuan, Acquisition of data: Chao Lin Tuan Analysis and/or interpretation of data: Chih Yu Hsiao. Drafting the manuscript: Chih Yu Hsiao

Revising the manuscript critically for important intellectual content: Chih Yu Hsiao

References

Arend, R. J. (2014). Entrepreneurship and dynamic capabilities: How firm age and size affect the capability enhancement-SME performance relationship. Small Business Economics, 42(1), 33-57.

Arndt, F., Pierce, L., & Teece, D. (2017). The behavioral and evolutionary roots of business models and the environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2. Government implication

6.2.1. Government needs to develop a environmental sensitivity of recreational farm operators

Recreational farmers are well aware of the impact of the new coronavirus pneumonia. However, due to the small- and medium-sized business type of recreational farm operators, most of them are still very much restricted in their ability to gather information about the market environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2.2. Government policy needs to improve the operating foundations of recreational farms

There are three directions to improve the adaptation strategies for recreational farms in the post-pandemic market: optimization of resources, e-commerce, and cost control strategies. Current government policy is still focused on improving service facilities, followed by lowering interest rates on loans and developing experiential activities. Future government policy is intended to move in these three directions, including resource development, expansion of electronic processes, and reduction of operating costs.

6.3. Limitation

This study adopts a qualitative approach to gain insight into the phenomenon and to extract management implications. However, this paper still has research limitations, such as the inability to provide quantitative answers. Future research should be conducted in other countries or regions to see if operators can respond in the same way. Second, this study focuses on Taiwan, where the leisure farm business model is slightly different from that of other advanced countries, and cannot fully address the problems encountered by agritourism operators in other countries. Therefore, future research should examine the relationship between leisure farm operators’ business models and the COVID-19 pandemic, and understand the differences in operators’ decision-making to provide more appropriate business practices.

Authorship statement

Conception and design of study: Chao Lin Tuan, Acquisition of data: Chao Lin Tuan Analysis and/or interpretation of data: Chih Yu Hsiao. Drafting the manuscript: Chih Yu Hsiao

Revising the manuscript critically for important intellectual content: Chih Yu Hsiao

References

Arend, R. J. (2014). Entrepreneurship and dynamic capabilities: How firm age and size affect the capability enhancement-SME performance relationship. Small Business Economics, 42(1), 33-57.

Arndt, F., Pierce, L., & Teece, D. (2017). The behavioral and evolutionary roots of business models and the environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2. Government implication

6.2.1. Government needs to develop a environmental sensitivity of recreational farm operators

Recreational farmers are well aware of the impact of the new coronavirus pneumonia. However, due to the small- and medium-sized business type of recreational farm operators, most of them are still very much restricted in their ability to gather information about the market environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2.2. Government policy needs to improve the operating foundations of recreational farms

There are three directions to improve the adaptation strategies for recreational farms in the post-pandemic market: optimization of resources, e-commerce, and cost control strategies. Current government policy is still focused on improving service facilities, followed by lowering interest rates on loans and developing experiential activities. Future government policy is intended to move in these three directions, including resource development, expansion of electronic processes, and reduction of operating costs.

6.3. Limitation

This study adopts a qualitative approach to gain insight into the phenomenon and to extract management implications. However, this paper still has research limitations, such as the inability to provide quantitative answers. Future research should be conducted in other countries or regions to see if operators can respond in the same way. Second, this study focuses on Taiwan, where the leisure farm business model is slightly different from that of other advanced countries, and cannot fully address the problems encountered by agritourism operators in other countries. Therefore, future research should examine the relationship between leisure farm operators’ business models and the COVID-19 pandemic, and understand the differences in operators’ decision-making to provide more appropriate business practices.

Authorship statement

Conception and design of study: Chao Lin Tuan, Acquisition of data: Chao Lin Tuan Analysis and/or interpretation of data: Chih Yu Hsiao. Drafting the manuscript: Chih Yu Hsiao

Revising the manuscript critically for important intellectual content: Chih Yu Hsiao

References

Arend, R. J. (2014). Entrepreneurship and dynamic capabilities: How firm age and size affect the capability enhancement-SME performance relationship. Small Business Economics, 42(1), 33-57.

Arndt, F., Pierce, L., & Teece, D. (2017). The behavioral and evolutionary roots of business models and the environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2. Government implication

6.2.1. Government needs to develop a environmental sensitivity of recreational farm operators

Recreational farmers are well aware of the impact of the new coronavirus pneumonia. However, due to the small- and medium-sized business type of recreational farm operators, most of them are still very much restricted in their ability to gather information about the market environment. Most of the operators are still very much prevented from collecting information about the market environment. The government can hold regular educational workshops and invite experts and academics to farms to provide operators with market information and farm business diagnoses to find new operating niches.

6.2.2. Government policy needs to improve the operating foundations of recreational farms

There are three directions to improve the adaptation strategies for recreational farms in the post-pandemic market: optimization of resources, e-commerce, and cost control strategies. Current government policy is still focused on improving service facilities, followed by lowering interest rates on loans and developing experiential activities. Future government policy is intended to move in these three directions, including resource development, expansion of electronic processes, and reduction of operating costs.

6.3. Limitation

This study adopts a qualitative approach to gain insight into the phenomenon and to extract management implications. However, this paper still has research limitations, such as the inability to provide quantitative answers. Future research should be conducted in other countries or regions to see if operators can respond in the same way. Second, this study focuses on Taiwan, where the leisure farm business model is slightly different from that of other advanced countries, and cannot fully address the problems encountered by agritourism operators in other countries. Therefore, future research should examine the relationship between leisure farm operators’ business models and the COVID-19 pandemic, and understand the differences in operators’ decision-making to provide more appropriate business practices.
