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Network embeddedness, entrepreneurial bricolage, and family farm sustainability

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Family farm sustainability is an essential guarantee for increasing the resilience of food systems. Based on the network embeddedness theory and entrepreneurial bricolage theory, an exploratory longitudinal case study was adopted. The value-creating behaviors of family farms in different entrepreneurial periods were described and a process model of family farms sustainability with network embeddedness and entrepreneurial bricolage was constructed. The study revealed that family farms faced resource constraints such as shortage of element resources, insufficient market resources and lack of knowledge resources during the induction, start-up, and growth periods, respectively. In order to overcome resource constraints in different entrepreneurial periods, family farms employed multiple network embeddedness ways including relational embeddedness, structural embeddedness and cognitive embeddedness to seek help from actors in the rural social network. Family farms embedded in multiple networks used the entrepreneurial bricolage strategy of “element bricolage – market bricolage – institutional bricolage” to continuously acquire production elements, improve brand awareness, optimize processing techniques and promote the convergence of three industries. Family farms benefited from a win-win result with actors through network embeddedness and entrepreneurial bricolage, and created economic, social and ecological values eventually. The study offers fresh insights into the dynamics of rural entrepreneurship.

KEYWORDS

network embeddedness, entrepreneurial bricolage, family farms, sustainability, rural entrepreneurship

1 Introduction

Family farms, as the main force of new agricultural business (Wu et al., 2023), can support rural revitalization, food system sustainability and the common prosperity of farmers and rural areas (Chen et al., 2022). To promote family farms, the Chinese government issued a series of policy documents supporting family farm entrepreneurship. By the end of 2023, family farms surpassed 4 million in China. Although the scale of family farms in China has increased with strong policy support (Yu et al., 2023), the shortage of market information, labor, capital, land and other resources is becoming increasingly prominent (Chen et al., 2022). Most new family farms fail to develop into inheritable, viable and repeatable enterprises (Li et al., 2022; Nandi et al., 2022). Thus, overcoming resource constraints has emerged as a significant issue that many family farms need to address.

For many family farms, network embeddedness is a crucial means of gaining access to resources (Adro and Franco, 2020; Volpato et al., 2022). It has been shown that family farms

may be embedded in various social networks to share and exchange resources at different stages of their life cycle (Swagemakers et al., 2019). In their early life, the farmer frequently has low-cost access to entrepreneurial knowledge, human capital, financial support and emotional support from “family members” (Si et al., 2019; Kurland and McCaffrey, 2020). To obtain more heterogeneous complementary resources, developing family farms must cooperate with farmers, consumers, research institutions, governments, banks, and agricultural suppliers (Björklund and Johansson, 2020). In the process of interacting with these actors, family farms’ network embeddedness is also influenced by agricultural policies, local culture and rural ethics (Methorst et al., 2017). Family farms can improve their chances of obtaining resources if they are embedded in various social networks promptly and form effective interaction patterns (Fisher, 2013; Ochago et al., 2023). However, the existing literature has not yet developed an in-depth analysis of the dynamics of network embeddedness in family farms (Benítez et al., 2020).

In fact, whether resources obtained by network embeddedness can be transformed into essential resources and core competencies for family farm sustainability, depends on the level of bricoleurs (Makadok, 2001; Grivins et al., 2017). Entrepreneurial bricolage emphasizes the integration and reuse of redundant or unused resources through iterative trial-and-error employing available resources (Baker and Nelson, 2005; Kleine-Stegemann et al., 2022; Baier-Fuentes et al., 2023). Clever farmers integrated fragmented, abandoned and seemingly useless technologies, techniques and knowledge selectively rather than waiting for the correct resources (Casey et al., 2022). By repairing, assembling or utilizing these resources, family farms not only increase the resource allocation efficiency, but also generate new heterogeneous values (Mayaux et al., 2022). However, existing studies mainly emphasized the importance of entrepreneurial bricolage, ignoring the process of family farm sustainability through entrepreneurial bricolage in different social networks.

To address research question, an exploratory longitudinal analysis of two typical cases in Hunan Province, China was conducted. In different periods of entrepreneurship, both family farms proactively embedded themselves in a variety of social networks to seek help from actors and acquired essential resources through entrepreneurial bricolage, ultimately creating multiple values. Therefore, it could be theoretically revelatory to study the family farm sustainability.

2 Background

2.1 Family farm sustainability

Family farm sustainability was not only a mean that can prosper the rural economy, but also a new development model that protected the natural environment and social culture and promoted fair competition within the agricultural industry (Barbieri, 2013). Whether a family farm can achieve sustainability is determined by many individual, organizational, and external factors (Glover and Reay, 2015). Individually speaking, the flexibility and inventiveness of rural producers were characteristics that strengthen family farm sustainability (Darnhofer et al., 2010). New entrants in family farming realized sustainability by means of creative use of local resources, inventive management and non-agricultural expertise (Grüner and

Konzett, 2024). Regarding organizational elements, family farm was a unique type of organization made up of ecological, technical and social relations (Darnhofer et al., 2016). The relationships that family farms built and reshaped over time contributed to their sustainability (Jaafar et al., 2023). In particular, vertical relationships, horizontal relationships, relationships with government institutions and relationships with knowledge-intensive institutions played a substantial role in promoting the survival and development of organic farms (Sáenz et al., 2024). From the external environment, resource endowment and traditional knowledge had a profound impact on family farm sustainability. Dogliotti et al. (2006) found a strong impact of agricultural resource endowment on possibilities for family farm sustainability, as well as synergy between labor, land and irrigated area on resource-use efficiency at farm scale. According to Šūmane et al. (2018), informal farmer knowledge and learning practices were critical for strengthening family farm sustainability and agricultural resilience.

The efficiency assessments of family farm sustainability can use an indicator system that integrates economic, social and ecological values (Brasileiro-Assing et al., 2022; Damke et al., 2022; Savian et al., 2023). Economic value covered financial growth, resource utilization and organizational stability of family farms, expressed as the final income from all production and business activities, efficiency of utilizing production elements and resisting risks (Savickienė and Miceikienė, 2018; Micu et al., 2022). Social value was expressed as the contribution of family farms in promoting the local economy, reducing social inequality and increasing the protection of local customs and crafts, including empowerment, equitable inclusion and spiritual culture (Paskewitz, 2021). Ecological value related to natural resources, environmental pollution and biodiversity (Chmieliński et al., 2022), expressed in the extent to which family farms conserved soil organic matter, reduced energy consumption and pollution levels (Buendía et al., 2023; Lairez et al., 2023), and used agricultural technologies that can reduce carbon emissions (Godoy-Durán et al., 2017; Yu et al., 2023).

2.2 Network embeddedness

Network embeddedness refers to embeddedness economic behaviors of individuals or organizations in social relations and cultural structures, originating from the embeddedness theory and social network theory (Burt and Soda, 2021). The most classical analytical frameworks of network embeddedness theory are the relational embeddedness and structural embeddedness (Granovetter, 1985). Relational embeddedness means that subjects are embedded into each other’s relationship through interaction, including strong relational embeddedness and weak relational embeddedness (Lin et al., 2009). Structural embeddedness means that the amount of information a focal firm obtains from the network depends mainly on its location and number of members in the network (Mazzola et al., 2015). Scholars agreed that network embeddedness was not only a connection relation, but also a dynamic evolutionary process that had a profound impact on the economic behavior of firms (e.g., Simsek et al., 2003; Ter Wal et al., 2016).

To overcome resource constraints, family farms need to embed different social networks at different stages of entrepreneurship (Fisher, 2013; Ochago et al., 2023). Baumann et al. (2023) pointed out

that network embeddedness in family farms involved not only two interrelated subjects, the farmer and family farm, but also other subjects in rural social networks. The network organization formed by family farms joining cooperatives can encourage family farms to further leverage their scale advantages, reduce transaction costs, and thus share the value-added benefits of the agricultural industry chain (Ochago et al., 2023). By embedding in the rural entrepreneurial ecosystem, family farms can form a long-term stable resource exchange mechanism and shared values and norms with other actors to create multiple values jointly (Methorst et al., 2017; Björklund and Johansson, 2020), thus realizing intergenerational inheritance (Schwabe et al., 2022). Especially in China's relational society, resource-poor family farms can only obtain entrepreneurial resources by embedding themselves in various social networks (Si et al., 2019). Based on prior research, family farm network embeddedness was defined that family farms established connections with subjects in rural social networks to obtain their resource support and social identity.

2.3 Entrepreneurial bricolage

The term “entrepreneurial bricolage” was initially proposed by Baker and Nelson (2005), referring to the behavior of entrepreneurs who used existing resources at hand to discover new opportunities and solve new problems creatively. Factors such as an individual's prior experience and social network, firms' development stage and social capital, and external resource constraints, had a significant impact on entrepreneurial bricolage (Baker and Nelson, 2005; Steffens et al., 2023). Entrepreneurial bricolage can be categorized into element bricolage, market bricolage and institutional bricolage (Baker and Nelson, 2005; Mayaux et al., 2022). Element bricolage was the act of transforming forgotten, seemingly useless and nonstandard material, skills or labor into production elements (Baker and Nelson, 2005). Market bricolage was the act of using existing or unused resource to meet the new needs, or needs of marginalized customers (Grivins et al., 2017). Institutional bricolage was the act of firms that intentionally or unintentionally used whatever materials and resources available to assemble or reshape institutional arrangements (Suhardiman and Scurrah, 2021). Entrepreneurial bricolage implied that enterprises reconfigured undervalued, redundant and discarded resources, which facilitated their competitiveness and multiple value creation (Steffens et al., 2023).

Family farm development is rich in entrepreneurial bricolage practices (Casey et al., 2022). According to Grivins et al. (2017), entrepreneurial bricolage on family farms was a dynamic and practice-oriented concept that described the process by which matter was constantly being rediscovered and redefined. Based on a dynamic perspective, Suhardiman and Scurrah (2021) explained the process by which family farms used institutional bricolage to creatively reshape land use plans to manage risks and allocated resources for the benefit of themselves and society. Yachin and Ioannides (2020) found that farmers could make full use of undervalued resources to provide flexible production factors for family farms, thereby increasing the ability to create value. Based on the concept of sustainability, family farm entrepreneurial bricolage

was defined that family farms creatively integrated and utilized entrepreneurial resources such as technology, labor, capital, markets and institutions to achieve sustainable development.

3 Methodology

3.1 Research design

To better understand the mechanism of family farm sustainability in Chinese context, a longitudinal dual-case-study approach (Yin, 2018) was selected for this study. The cases selected were Tianxige Family Farm (hereinafter referred to as Tianxige) and Qiyuan Family Eco-Farm (hereinafter referred to as Qiyuan). Tianxige is in Lianmeng Village, Chenjiazui Town, Anxiang County, Changde City, Hunan Province, owned by Nie Tianxige, whose business scope includes rice seed research and development, rice cultivation, rice processing, e-commerce, etc. Qiyuan locates in Duijiang Village, Ketou Town, Xinhua County, Loudi City, Hunan Province, owned by Wang Liyun, with the business scope of planting, processing, and selling fruit and edible mushroom, as well as breeding and selling poultry, aquatic products and silkworms. The entrepreneurial stages of both family farms were divided into induction, start-up, and growth periods (see Figure 1). The stage before the registration of the family farms was divided into induction period. The stage of seeking survival after the registration was divided into start-up period. The stage of pursuing rapid development was divided into growth period.

There were four main reasons for case selection. Both the cases were typical actively embedded themselves in the local social network and used entrepreneurial bricolage to achieve sustainable development. The cases satisfied the principle of theoretical sampling. Both family farms' business income, social influence and brand effect were all in the leading position in their counties. Moreover, the cases were rich in content which covered their different development stages, and the data was available. In-depth interviews can be conducted through academic affiliation, and a wealth of secondary information can be acquired online.

3.2 Data collection

According to the iterative cycle of data collection, data analysis and documentary dialog in case studies (Hyett et al., 2014), the data collection was divided into four stages: (a) Collected documentary information. To get a preliminary understanding of cases' basic information, their documents were collected through public information and news reports. (b) Conducted fieldwork. From 2017 to 2023, our team members followed the interview outline to interview the farmers, managers or laborers. (c) Analyzed interview documents. Interview recordings were translated into documents within 24h, and memos were written timely. (d) Executed a follow-up survey. Keeping in touch with the interviewees to master the latest development of the family farms, the evidence chain was completed. The detailed data information is shown in Table 1.

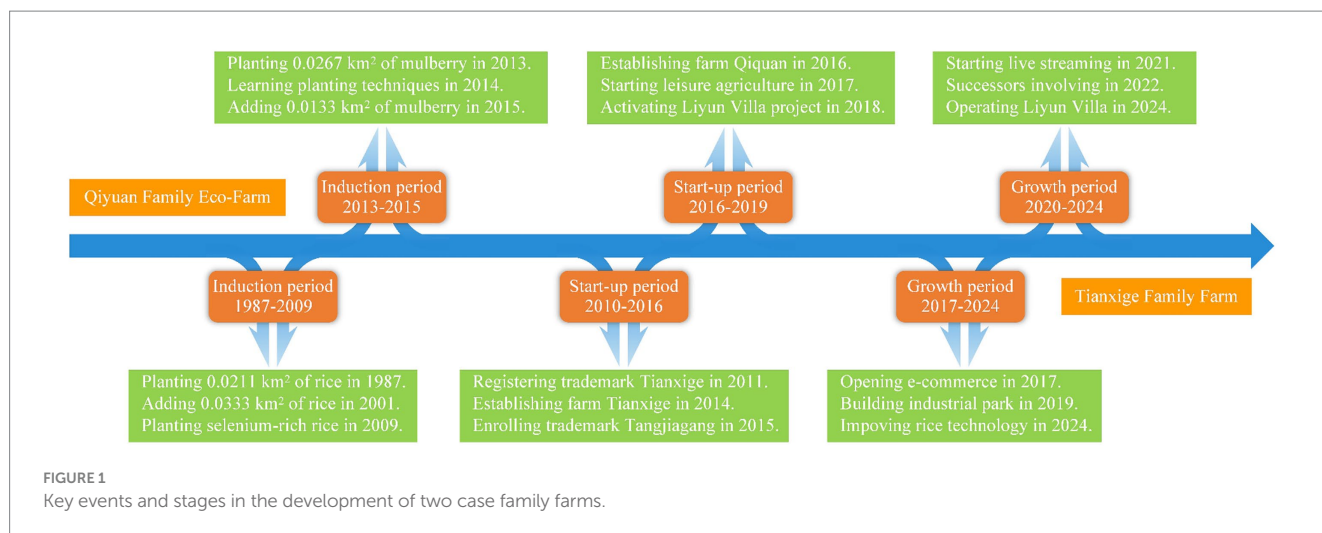


TABLE 1 Records of data collection of the family farms in case study.

Family farm	Interview materials	Media reports	Government documents	Academic papers	Trademark or patent	Farmers' response
Tianxige	5 transcripts	64 articles	23 articles	4 articles	6 trademarks	Wechat
Qiyuan	6 transcripts	67 articles	10 articles	2 articles	1 trademark and 7 patents	Wechat, Weibo, Tiktok

3.3 Data analysis

Grounded theory was selected as the analysis method. Since there is no evidence from previous studies on the relationship between network embeddedness, entrepreneurial bricolage and family farm sustainability, the grounded theory helps to explore the relationship. NVivo12 was used to conduct open coding, axial coding and selective coding.

3.3.1 Open coding

First, according to the initials of their names, Tianxige and Qiyuan were coded as T and Q. Second, according to the initials of entrepreneurial stages, the induction, start-up, and growth stages were coded as I, S and G. Third, the materials collected from T were labeled as concepts, while relevant concepts were classified as subcategories. Fourth, a progressive coding approach was used to expand the concepts and subcategories by following the same procedure of open coding the information from Q. The results are indicated in Table 2.

3.3.2 Axial coding

According to the causal logic, subcategories were summarized as four core categories, including resource constraints, network embeddedness, entrepreneurial bricolage and family farm value creation (Table 3).

3.3.3 Selective coding

The key point of selective coding is to find the “story line” that describes the logical relationship between the core categories and subcategories (Boeije, 2002; Saunders et al., 2018). The core category identified was the mechanism of family farm sustainability. It described the causal relationship that family farms created multiple

values by embedding different social networks and adopting differentiated entrepreneurial bricolage strategies when subject to resource constraints.

3.3.4 Theoretical saturation test

To test whether theoretical saturation was reached, the data collected from the follow-up survey was coded. The results showed that the four core categories described their attributes and dimensions in detail, and no new concepts or relationships emerged. Moreover, the mechanism provided a clear explanation of how family farms achieved sustainability through network embeddedness and entrepreneurial bricolage with no obvious gaps. Therefore, this article passed the theoretical saturation test.

4 Findings

4.1 The induction period: network embeddedness, element bricolage and family farm sustainability

At this stage, case family farmers mainly faced a shortage of element resources. The Lianmeng Village, where Tianxige is located, has traditional rice cultivation methods and lacks integrated irrigation water sources and equipment as well as agricultural talents. Local young residents chose to go out to work, resulting in a shortage of agricultural labor. Nie Tianxi said in an interview:

“I could only contract 0.0333 square kilometers of farmland in the village to grow rice in 2001. Due to the low yield and crop prices, I can only make a living after taxes and fees.”

TABLE 2 Open coding of the family farms in case study (partial).

Labeling		Conceptualization	Categorization
Code	Typical data of the cases	Concepts	Sub-categories
TI4	Most young men in rural areas go out to work, making it difficult to hire laborers for Tianxige.	Rural labor outflow	Shortage of element resources
QI9	Because of limited funds, Qiyuan has only built 4 mulberry greenhouses.	Insufficient capital	
TS4	Nie Tianxi, found the produce lacked market impact, although registering the trademark.	Not well-known brand	Insufficient market resources
QS8	Wang Long, the Qiyuan manager, was worried that oversupply led to vicious competition.	Single marketing channel	
TG10	Tianxige lacked experience in using rural culture to promote rice industry development.	Lack construction plan	Lack of knowledge resources
QG9	It is still a problem for Qiyuan to build a complete industry chain of mulberry and fig.	Lack development model	
TI6	Nie Tianxi invited agricultural technicians to teach him in person.	Social embeddedness	Relational embeddedness
QI23	Wang Liyun, the Qiyuan owner, persuaded his brother to return home to start a business.	Using kindships	
TS21	Due to joining the association, Nie Tianxi got the opportunity of an exploratory trip to Taiwan.	Joining association	Structural embeddedness
QS24	Qiyuan signed a strategic agreement with Hunan Tao Lin Yuan Wine Co.	Getting cooperation	
TG12	Tianxige builds a first-class brand by promoting the rice industry through rice culture.	Exploring rice culture	Cognitive embeddedness
QG24	Wang Long's success changed villagers' prejudice against returning home to start businesses.	Breaking prejudices	
TI15	Tianxige converts idle motors into pumping machines to solve the issue of water shortage.	Material bricolage	Element bricolage
QI31	Qiyuan attracts farmers to grow mulberry by using their land and capital as initial shares.	Financial bricolage	
TS36	Tianxige signed order forms with the purchasing company	Signing order form	Market bricolage
QS46	Qiyuan has developed a series of products such as dried mulberries, noodles, and patties.	Product diversification	
TG29	Nie Tianxi takes the lead in changing the planting pattern.	Changing old model	Institutional bricolage
QG38	Qiyuan was approved to set up industry standards for fig cultivation in Hunan Province.	Establishing standards	
TI24	The price of "Tianxige" selenium-rich rice can be four times higher than that of ordinary rice.	Increasing unit price	Economic value
QI29	Wang Liyun introduced figs, also belonging to the mulberry family, from Zhejiang.	Increasing business scope	
QG38	Qiyuan establishes an industrial system integrating planting, processing and cultural tourism.	Integrating industries	
TS47	Tianxige buys 1,370 t of villagers' rice by order each year, increasing their income by ¥550,000.	Improving income	Social value
TG46	Promoting the "Tangjiagang" rice culture has become the mission of Nie Tianxige.	Spreading the rice culture	
QI31	Qiyuan has developed mulberry and fig into two special industries in Xinhua County.	Revitalizing agro-industry	Ecological value
TG51	Tianxige adopts the rice and duck farming model and cultivates ecological rice with high quality.	Realizing eco-agriculture	
QS75	Wang Liyun feeds poultry under mulberry trees and silkworm manure is used as fertilizer.	Realizing resource cycle	

In the coding symbol XYn, X indicates the initials of family farm's name, Y indicates the initials of the period, and n indicates the nth coding segment in the data of the farm, e.g., TI1 refers to the first coding segment in the data of induction period of Tianxige.

Xinhua County, where the Qiyuan is located, has little support for agricultural infrastructure development, entrepreneurial subsidies and rural talent training. Wang Liyun had limited funds and energy.

Therefore, the farm was under pressure from both human and financial resources. In addition, Wang Liyun and her husband, Yang Weining, went out to work after graduating from high school. They

did not understand the complicated local land relations. Villagers and village cadres took skeptical attitude towards their entrepreneurial activities, which made land transfer quite difficult.

In order to overcome the above resource constraints, the case family farms improved access to element resources through relational embeddedness, structural embeddedness and cognitive embeddedness. At the age of 16, with the support of his entire family, Nie Tianxi acquired the right to operate 0.0211 square kilometers of farmland. To learn about high-quality rice cultivation, planting and protection techniques, he visited Yan Songgui, the chief expert in selenium-rich rice in Hunan Province, and asked agricultural technicians to teach him in person. Through the introduction of local acquaintances, he met many domestic rice experts. In 2008, Nie Tianxi, as a locally famous grain farmer, was selected by the Changde City Agricultural Education Office for 3 months of training at the China Farmers University. And farmer Wang Liyun actively mobilized her family members to start a business together after carefully analyzing the business environment in Xinhua County. Yang Weiping, a farm technician, said:

“My wife, Wang Liyun, believed the nutritional value, quick outcome and good outlook of mulberry, while no one planted it in our hometown, so she asked me and her brother, Wang Long, to go home to start our own business.”

When the fruit was ripe, Wang Liyun and her husband invited their friends to pick and advertise. Wang Liyun also joined the Rural Women Wealth Leaders Association organized by Xinhua County Women Federation. She reported the problem of insufficient funds for entrepreneurship to Zhong Yingzi, the president of Xinhua County Women Federation, and then obtained financial support of more than ¥500,000.

With the support of multiple social networks, the case family farms skillfully integrated and utilized key resources such as natural, physical, human, technical and financial resources through elemental bricolage. In the Tianxige, Nie Tianxi organized grain farmers to transform dry land into paddy fields and called on villagers to use idle motors to pump water, solving the problem of water shortage in rice fields. He arranged the rice sowing period reasonably, and hired local poor residents to help with the work, reducing manpower shortages effectively. He hired agronomists as technical advisors and learned technology from high-yielding rice farmers, improving the benefits of rice cultivation. Besides, he skillfully used the crowd funding model to solve the problem of insufficient entrepreneurial funds.

For Qiyuan, Wang Liyun obtained a technical support from the Hunan Sericulture Research Institute and other institutions through acquaintances, learning techniques of mulberry fruit breeding, cultivation and grafting. Wang Long, the farm manager, used equity financing to attract the attention of local investors and absorbed business capital through the alumni of Fudan University, reducing the financial risk. He also called on villagers to become shareholders of the farm with their land and capital. In addition, Qiyuan transformed old unused houses in the village into venues for entertaining customers to make up the material shortage.

Through network embeddedness and element bricolage, the case family farms created economic and social value. In Tianxige, the price of selenium-rich rice can be four times of ordinary rice, and the planting revenue of selenium-rich rice was 20% higher than that of

conventional rice. Nie Tianxi shared his technology to neighbor farmers for free, increasing their production and income a lot. The machine control team he set up provided crop pest control services for neighboring grain farmers, saving ¥1.3 million a year in plant-protecting-related expenses. Qiyuan output of mulberry fruit because of good taste, attracted many people to buy, and got a high reputation. This farm helped more than 200 poor residents through direct assistance, industrial development and employment, increasing their annual income by more than ¥20,000. Wang Liyun also encouraged villagers to plant mulberry fruits, making the mulberry fruit industry a new local economic growth point.

Overall, during the induction period, the family farmers in both cases carried out production activities of special agricultural products based on local natural resource endowments, but faced problems such as inadequate infrastructure, rural labor outflow, talent shortage and entrepreneurial capital lacks. In order to break the resource constraints, they not only made full use of strong relationships such as family members (kinship), teachers and classmates (schooling) and local acquaintances (geography) to seek material and emotional support, but also embedded in the fringe of the rural social network to gain people's trust, achieving a preliminary understanding of the local cultivation practices and business environment. They then integrated and utilized the resources of material, manpower and financial resources through entrepreneurship bricolage, ultimately improving the operational efficiency and promoting the local economic growth.

4.2 The start-up period: network embeddedness, market bricolage and family farm sustainability

At this stage, case family farmers faced the problem of insufficient market resources. During this period, people's demand for high-quality rice was increasing. Nie Tianxi analyzed:

“Only to create a rice trademark and brand, we can make consumers eat without any doubt.”

Although Tianxige registered 2 trademarks of “Tianxige” and “Tangjiagang”, it only had a single product and lacked promotion, resulting in people not familiar with the brand. In Qiyuan, the agricultural products lacked food safety certification, and consumers could only pick and sell mulberry fruits on the ground, making it difficult to attract new customers increasingly. In addition, the surrounding villagers started large-scale planting, and thus mulberry became oversupplied, resulting in the old customers gradually lost. Wang Long, the farm manager, said:

“Now we must establish a brand through the industrialization and larger scale of agricultural products to expand the market scale and business scope.”

In order to overcome the above resource constraints, the case family farms improved access to market resources through relational embeddedness, structural embeddedness and cognitive embeddedness. In 2016, Nie Tianxi, as a director of the Hunan Province Selenium-rich Industry Association, got the opportunity to

study brand marketing of agricultural products in Taiwan. Subsequently, Tianxige began to pay attention to the quality of rice seeds, and worked with technical experts from Anxiang County Agricultural Bureau to develop standardized operating procedures for rice and duck farming. It in turn became the Changde City Selenium-rich Rice Ecological Planting Pilot Program base. Nie Tianxi actively invited rice experts, government leaders, literati, teachers and students, and retired cadres to visit his family farm, thus collecting a large number of technical improvement programs and brand building opinions.

As for Qiyuan, it introduced zero-additive drying technology from the Academy of Agricultural Sciences and established a strategic alliance with neighbor growers to unify mulberry fruit technology, management, processing and sales norms, avoiding vicious price competition. Moreover, it not only was approved as a demonstration base for mulberry fruit planting, but also built the brand of “Liyun Villa” with the university together, and thus obtained more development opportunities. Moreover, Wang Liyun strived to be the vice president of Xinhua County Agricultural Products Market Association to grasp the market information.

With the support of multiple social networks, case family farms created novel products, services and models through market bricolage, and increased brand influence through cross-border cooperation. Tianxige promoted green planting methods, deep-processed selenium-rich rice into colorful sweet wine, red patties and special rice flour, and improved its service level with the help of platforms such as Taobao, Wechat, Nongchouhui and Tiktok, meeting people’s green consumption demand. To create “Tangjiagang” ecological rice brand, Tianxige not only set up product distribution points, but also participated in agricultural expositions.

Qiyuan established a traceability system for quality of agricultural products, so that mulberry noodles, patties, fruit wine, jam and dried fruits could be certified by The Green Food and ISO9001 International Quality System, satisfying the public’s need for green fruits. It also organized activities such as mulberry picking festival, art festival and provided services of picking customization, expanding sales channels. In addition, Qiyuan reached a cooperation intention to develop mulberry fruit wine with Hunan Taolin Garden Wine Co., Ltd., carried out agricultural projects with Changsha Xiaoxiang Huatian Hotel, and made a marketing cooperation with Yiwu Market Group and Hangzhou E-commerce live broadcasting base.

Through network embeddedness and market bricolage, the case family farm created economic, social and ecological value. In 2014, “Tianxige” gift rice was exported to Beijing, Shanghai, Jiangsu and Southeast Asian countries through the e-commerce platform. Its annual net income was more than ¥300,000. In the same year, Tianxige established 0.3787 square kilometers of poverty alleviation industrial base in Tangjiagang Village. It also promoted advanced practical technologies such as green fertilizer planting in winter, soil formula fertilization, green pest prevention and controlled, and recycled all the agricultural waste, reducing surface pollution. Qiyuan had a gross income of more than ¥4 million (profit: more than ¥1.4 million) in 2016, and the gross income of ¥5.7 million (profit: ¥1.7 million) in 2017. It encouraged more than 150 surrounding villagers to grow mulberry and figs, increasing the average income of each villager more than ¥6,000, which greatly contributed to local development of the mulberry fruit industry. Qiyuan also adopted the

business model of mulberry-based fishponds, promoting the intensive use of natural resources and helping three-dimensional agricultural development.

Overall, during the start-up period, the two case family farms tried to adopt new technologies and explored the road of agricultural brand building, but faced problems such as low brand awareness, single marketing channel and homogenized competition. In order to break the resource constraints, they not only made full use of universities (academic edge), government departments (political edge), industry associations (industry edge) and other strong relations to seek technical and brand guidance, but also embedded in the rural social network more central position to obtain entrepreneurial information, achieving in-depth understanding and adaptive learning industry norms. They then created new products and met customer demand through entrepreneurial bricolage, and ultimately enhanced brand impact, increased farmers’ income and contributed to the development of three-dimensional agriculture.

4.3 The growth period: network embeddedness, institutional bricolage and family farm sustainability

At this stage, case family farmers faced the problem of insufficient knowledge resources. With the increasing demand for rural leisure tourism and cultural experience, Nie Tianxi said:

“We should integrate ecology, technology, characteristics, brand and culture, using rice culture to promote the development of agricultural tourism industry.”

Tianxige lacked solutions for the integration of agri-tourism and the development of rural cultural industries, making it difficult to carry out effective brand extension. In order to arrange the production elements of different parts of the industry chain more efficiently and concentrate resources to the high-value part, Qiyuan must coordinate the whole industry chain of mulberry and fig growing, processing, e-commerce and leisure tourism. However, it lacked experience in brand operation and solutions for the convergence of the three industries. Wang Long, the farm manager, said:

“We are developing the whole industry chain around mulberry and fig, and supporting the development of eco-tourism, but how to promote the specific still need explore.”

In order to overcome the above resource constraints, the case family farms improved access to knowledge resources through relational embeddedness, structural embeddedness and cognitive embeddedness. Tianxige gathered a large group of agricultural experts to establish a traceability system of rice quality and safety, becoming a local pioneer in practicing the concept of food safety. It also called on country squires to set up the Tangjiagang Rice Culture Gallery, forming a common value of fine craftsmanship and self-improvement with the neighboring farmers. Nie Tianxi said:

“I want to not only grow ecological grains with good taste and nutrition, but also fully explore the rice culture.”

Qiyuan attracted and led surrounding farmers and agricultural organizations with win-win concepts to participate in the development of mulberry and fig industry through providing seeds, technology and guaranteed purchase. It also used hometown relationships to learn experience from Hangzhou in the development of rural guest house to build Liyun Villa, which in turn built a tourist area with the theme of mulberry culture. Wang Long, the farm manager, said:

“I hope Liyun Villa will become a place for folks to relax and show their talents, but also inherit and promote the culture of agriculture and mulberry, then enhancing villagers’ cultural confidence.”

With the support of multiple social networks, case family farm accelerated the development of rural special industries and the layout of the entire industrial chain through institutional bricolage, promoting the symbiotic development of upstream and downstream industrial chain subjects. Tianxige was one of the first farms applying agricultural technology to the whole process of ecological rice production, changing the farming practices of overly relied on chemical fertilizers and pesticides. Tianxige also integrated traditional farming cultural elements in the packaging design of agricultural products, effectively solving the problem of brand extension.

In Qiyuan, the manager Wang Long not only invited agricultural experts to make long-term planning for the whole industrial chain project of mulberry, but also tried to implement the reform of the equity system by providing technical guidance, policy consultation, marketing system building and other services in exchange for shares in surrounding farms, cooperatives and agricultural companies, breaking through the development bottleneck. In addition, Qiyuan improved the interest linkage mechanism between itself and farmers by adopting various ways such as pooling of land, signing orders, employment assistance and contract traceable management.

Through network embeddedness and institutional bricolage, case family farms created more economic, social and ecological value. “Tangjiagang” rice of Tianxige became a sub-brand of Changde fragrant rice national landmark while Tangjiagang Rice Culture Corridor promoted the long-term development of rural tourism and the revitalization of rice culture. Tianxige improved the efficiency of comprehensive utilization of livestock and poultry farming waste, enhanced the resilience of the fields, and guaranteed the production safety of food. Qiyuan insisted on manual weeding, organic fertilization and bio-pesticides, and basically established an industrial system integrating mulberry and fig planting, processing and cultural tourism. Its mulberry wine was even exported to Southeast Asian countries through the “Belt and Road” with the help of an e-commerce platform. The bad culture of gambling in the past was swept away, and Duijiang Village became a famous “special fruit village”.

Overall, during the growth period, the two case family farms responded to the national strategy of rural revitalization and the requirements of common prosperity. They chose to take the road of three-product integration development. However, the construction of modern agricultural industry had differences and complexity and lacked successful experience, they faced problems such as the lack of rural characteristic industry construction program and whole industry chain development model. In order to break the resource constraints, they not only made full use of research institutes (academic edge), village sages (rural edge), like-minded people (interesting edge) and other weak relationships to obtain

heterogeneous information and knowledge, but also embedded in the core of the rural social network to obtain market appeal. They skillfully enriched the brand connotation with the help of the local folk culture, and then changed the industry practice through the entrepreneurial bricolage, ultimately realizing brand extension, rural culture prosperity and rural ecological environment improvement.

5 Discussion

5.1 Resource base for family farm sustainability

The development of family farms requires a certain resource base (Björklund and Johansson, 2020). From the resource-based theory, family farms sustainability is actually a process of identifying, integrating and allocating internal and external resources (Makadok, 2001; Schwabe et al., 2022). If family farms are able to effectively manage and bundle valuable, rare, inimitable and irreplaceable resources, these resources will create sustainable competitive advantages for family farms (Suess-Reyes and Fuetsch, 2016). From an enterprise life cycle perspective, family farms have different resource demands at different development stages.

In the induction period, family farms carry out entrepreneurial activities based on local resource endowment, but lack tangible resources such as policy, manpower, finance and places. Tianxige confronted with challenges including poor soil conditions, the exodus of rural labor force and a shortage of agricultural talent. Qiyuan faced weak policy support, a lack of entrepreneurial funds and difficulties in the transfer of land. In the start-up period, they conduct brand building activities, but lack market tools and channels. Tianxige’s new brands had limited market influence, while Qiyuan faced the constraints of product homogenization competition. In the growth period, they consider the integration of tertiary industries but lack intangible resources such as knowledge and experience in developing the whole industry chain. Tianxige did not have the rural characteristic industry construction knowledge, and Qiyuan lacked the whole industry chain development experience.

The case study shows that both case family farms rely on local resource advantages to develop special planting industries, but are constrained by the shortage of element resources, insufficient market resources and lack of knowledge resources in the induction, start-up, and growth stages, respectively. Therefore, family farms should obtain more key resources from outside based on making full use of their own resources.

5.2 Multiple network embeddedness for family farm sustainability

Family farms can utilize elements at low cost through network relationships, and occupy network positions that are conducive to communication and cooperation with different actors (Baumann et al., 2023). Their behavior is influenced by the shared culture, norm, and values in the network.

In the induction period, family farms enter the edge rural social network through strong relationships including kinship, schooling

and geography to understand the local production characteristics. Nie Tianxi used personal relationships to learn rice cultivation practices, and Wang Liyun mobilized family to start a business together. In the start-up period, family farms occupy the centre rural social network through stronger relationships including academic edge, political edge and industry edge to grasp the industry information. Tianxige joined the Selenium-rich Industry Association to formulate three-dimensional planting and raising procedures, and Qiyuan built agricultural brands with universities. In the growth period, family farms enter the core rural social network through strong relationships including academic edge, rural edge and interesting edge to inherit and innovate the excellent traditional rural culture. Tianxige built a rice culture corridor with villagers, and Qiyuan innovated the culture of agriculture and mulberry farming with farmers.

The case study shows that network embeddedness in family farms includes relational embeddedness, structural embeddedness and cognitive embeddedness. These network embeddedness patterns show a dynamic change from strong to weak relationships, from the edge to the core of rural social networks, and from initialized to deeper perceptions. Strong relationships can help family farms to obtain material and emotional support (Adro and Franco, 2020), but lead to resource homogenization (Kurland and McCaffrey, 2020). Therefore, they need to obtain new resource through weak relationships (Schwabe et al., 2022). Strong relationships can help family farms enter the peripheral position of rural social networks too (Mincyte, 2023). As a result of improved business models, family farms gradually occupy the core rural social network to obtain more entrepreneurial opportunities (Wilson and Tonner, 2020; Ochago et al., 2023). With the diversification of network relationships, family farms learn about local production characteristics, industry norms and traditional customs, thus inheriting and innovating local culture (Schwabe et al., 2022).

5.3 Evolution of entrepreneurial bricolage for family farm sustainability

In the induction period, family farms adopt element bricolage, and utilized key resources such as natural, physical, human, technical and financial resources to ensure survival. Tianxige transformed dry land into paddy fields, hired technical consultants, and recruited manpower from the locals through twinning aid. Qiyuan transformed an old house into a venue for entertaining customers, got technical help through acquaintances, and used equity financing to raise start-up funds.

In the start-up period, they adopt market bricolage, focusing on existing resources outside the organization, to improve product heterogeneity and brand awareness. In order to meet the demand for environmentally friendly consumption, Tianxige promoted green cultivation of selenium-enriched grains and innovated its marketing strategy. Qiyuan created novel goods, provided tailored mulberry fruit gathering services, and collaborated profitably with top local businesses.

In the growth period, they adopt institutional bricolage, focusing on social norms and practices, to break traditional trading modes and industry standards, eventually boosting the rural economy. Tianxige introduced agricultural science and technology into the pre-, during-, and post-production stages of ecological rice production. Qiyuan

invited agricultural experts for industrial planning, tried to implement equity system reform, and enhanced contract management to minimize disputes.

The case study shows that Chinese countryside is a society characterized by a ordered pattern, so family farms are able to reconfigure the various resources embedded in the rural social network through entrepreneurial bricolage, thus effectively reducing resource costs, enhancing competitive advantage and realizing sustainable development. In other words, family farms embedded in multiple networks further integrate, reorganize or create heterogeneous resources (Makadok, 2001; Mayaux et al., 2022), and progressively adopt entrepreneurial bricolage strategies such as element production, skill learning, product innovation, brand building and industry chain extension to co-create and share knowledge experiences and outcomes with multiple stakeholders (Adro and Franco, 2020).

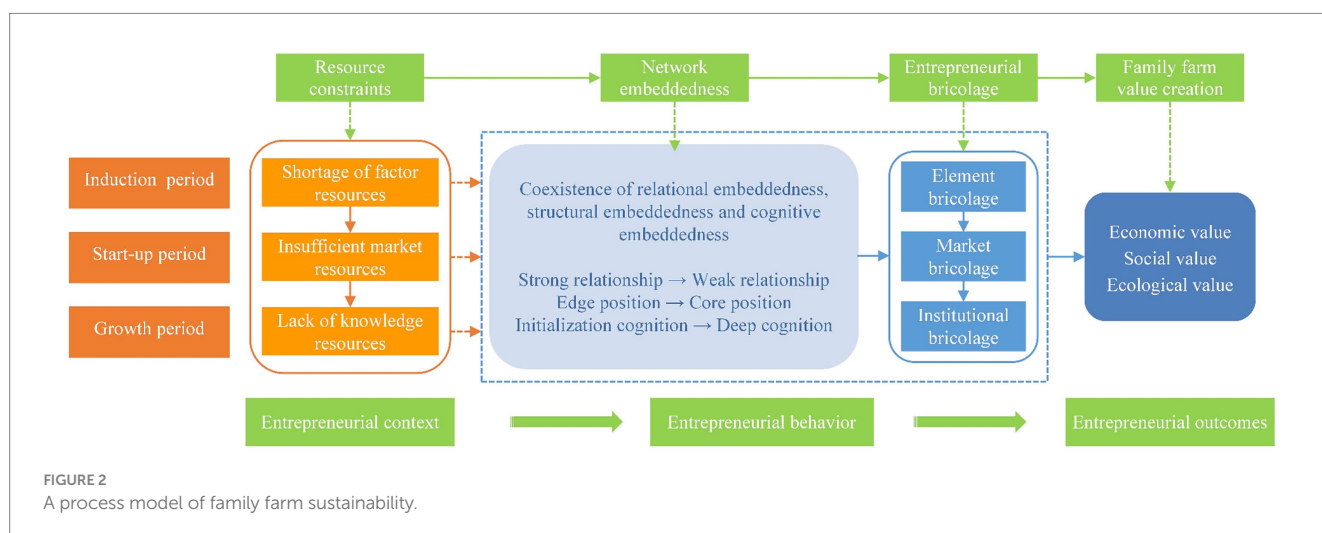
5.4 Value creation path for family farm sustainability

In the induction period, family farms create economic and social value. In Tianxige, the price of selenium-rich rice was four times of ordinary rice, the planting revenue of selenium-rich rice was 20% higher than that of conventional rice, and its machine saved ¥1.3 million a year in plant-protecting-related expenses. Qiyuan got a high reputation, and attracted many people to buy, making the mulberry fruit industry a new local economic growth point. In the start-up period, family farm create economic, social and ecological value. Tianxige expanded the consumer market for branded gift rice, built a local industrial foundation for poverty alleviation, and recycled agricultural waste to reduce surface source pollution. Qiyuan increased profitability, fueled the development of local mulberry and fruit industries, and promoted the intense utilization of resources. In the growth period, family farms create more economic, social and ecological value. Tianxige won the national landmark brand, promoted the prosperity and revitalization of rice culture, and improved the comprehensive utilization efficiency of livestock and poultry manure. Qiyuan sold mulberry fruit wine to countries along the “Belt and Road”, eradicated the local gambling culture, and cut back on chemical fertilizers and pesticides to support environmentally friendly growth.

The case study shows that an increasing number of family farms are realizing multiple value creation through network embeddedness and entrepreneurial bricolage. Specifically, farmers and local growers build strategic alliances to jointly create a regional shared brand of agricultural products, and constantly improve sales. Family farms help local farmers get rid of poverty by accomplishing the government subsidies (Savickienė and Miceikienė, 2018; Micu et al., 2022). When seeking technical support from research institutes, family farms promote the transformation and application of related scientific research, promoting the construction of ecological civilization (Godoy-Durán et al., 2017; Yu et al., 2023). With the growth of family farms, new stakeholders, such as investors, are continually attracted to participate (Conner et al., 2008; Wu et al., 2023). They effectively raise farmers' income, protect rural ecological environment,

TABLE 3 The four main categories from the axial coding of concepts and subcategories.

Main categories	Subcategories	Connotation of the relationship between concepts and subcategories
Resource constraints	Shortage of element resources	Family farms face problems such as inadequate infrastructure, rural labor, capital and land.
	Insufficient market resources	Family farms lack market influence, brand reputation and marketing channel.
	Lack of knowledge resources	Family farms lack rural industry construction plans or industry chain development models.
Network embeddedness	Relational embeddedness	Family farm acquire knowledge, information and resources through different relationships.
	Structural embeddedness	Family farms have access to different social networks through cooperation with actors.
	Cognitive embeddedness	Family farms form cognition of the countryside by understanding rural routine and culture.
Entrepreneurial bricolage	Element bricolage	Transforming seemingly useless or idle resources into elements of agricultural production.
	Market bricolage	Creating new agricultural products or services by using existing resources to meet market.
	Institutional bricolage	Rejecting tradition, and mobilizing resources to adapt institutional arrangements.
Family farm value creation	Economic value	Product price, planting efficiency, market scale, profitability, and brand influence increase.
	Social value	Rural industries flourish, rural culture revitalizes, and farmers' income increases.
	Ecological value	Pesticide use is reduced, pollution emissions are lowered, and resources are conserved.



prosper rural society, and promote rural communities to achieve sustainable development.

Finally, a process model of family farm sustainability was created (see Figure 2).

6 Conclusion

This study addressed the question of how family farms can develop sustainably. It was found that in order to break through resource constraints, family farms integrated and utilized internal and external resources through multiple network embeddedness and entrepreneurial bricolage, thus creating economic, social and ecological values. The theoretical implications are manifested in three ways. First, most prior studies explored network embeddedness from a static standpoint (Burt and Soda, 2021), this study demonstrated its dynamic nature in family farm. Second, the impact of network embeddedness on entrepreneurial bricolage was revealed. Third, this study answered calls to explain how network embeddedness and entrepreneurial bricolage facilitated family farm sustainability (e.g.,

Benítez et al., 2020). To promote family farms, the government should increase the policy support for them, and promote the synergistic development of leading enterprises and family farms. Family farms should join industrial networks such as industry associations, chambers of commerce and business incubators actively, strengthen ties with rural communities, and carry out entrepreneurial bricolage according to resource conditions.

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 authors.

Ethics statement

The studies involving humans were approved by the Jinan University Human Subjects Division. The studies were conducted in

accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

HD: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. ZW: Writing – review & editing. ZY: Writing – review & editing, Methodology, Investigation, Funding acquisition, Conceptualization. XS: Writing – review & editing, Supervision, Funding acquisition, Conceptualization.

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References

- Adro, F. D., and Franco, M. (2020). Rural and Agri-entrepreneurial networks: a qualitative case study. *Land Use Policy* 99:105117. doi: 10.1016/j.landusepol.2020.105117
- Baier-Fuentes, H., Andrade-Valbuena, N. A., Gonzalez-Serrano, M. H., and Gaviña-Marin, M. (2023). Bricolage as an effective tool for the survival of owner-managed SMEs during crises. *J. Bus. Res.* 157:113608. doi: 10.1016/j.jbusres.2022.113608
- Baker, T., and Nelson, R. E. (2005). Creating something from nothing: resource construction through entrepreneurial bricolage. *Adm. Sci. Q.* 50, 329–366. doi: 10.2189/asqu.2005.50.3.329
- Barbieri, C. (2013). Assessing the sustainability of agritourism in the US: a comparison between agritourism and other farm entrepreneurial ventures. *J. Sustain. Tour.* 21, 252–270. doi: 10.1080/09669582.2012.685174
- Baumann, S., Johnston, J., and Oleschuk, M. (2023). How do producers imagine consumers? Connecting farm and fork through a cultural repertoire of consumer sovereignty. *Sociol. Rural.* 63, 178–199. doi: 10.1111/soru.12401
- Benítez, B., Nelson, E., Romero Sarduy, M. I., Ortiz Perez, R., Crespo Morales, A., Casanova Rodriguez, C., et al. (2020). Empowering women and building sustainable food systems: a case study of Cuba's local agricultural innovation project. *Front. Sustain. Food Syst.* 4:554414. doi: 10.3389/fsufs.2020.554414
- Björklund, C. J., and Johansson, J. (2020). Farming beyond food: effect of embeddedness and governance structures on farmers' role in rural development. *Entrep. Reg. Dev.* 32, 1–21. Available at: <https://www.diva-portal.org/smash/record.jsf?pid=diva2:1384688>
- Boeije, H. (2002). A purposeful approach to the constant comparative method in the analysis of qualitative interviews. *Qual. Quant.* 36, 391–409. doi: 10.1023/A:1020909529486
- Brasileiro-Assing, A. C. B., Kades, J., de Almeida Sinisgalli, P. A., Farley, J., and Schmitt-Filho, A. (2022). Performance analysis of dairy farms transitioning to environmentally friendly grazing practices: the case study of Santa Catarina, Brazil. *Land* 11, 1–18. doi: 10.3390/land11020294
- Buendía, C., Garces, E., and Aceros, J. C. (2023). FiNCO farms for knowledge exchange: a Colombian seed for a good Anthropocene. *Ambio* 52, 963–975. doi: 10.1007/s13280-022-01821-0
- Burt, R. S., and Soda, G. (2021). Network capabilities: brokerage as a bridge between network theory and the resource-based view of the firm. *J. Manag.* 47, 1698–1719. doi: 10.1177/0149206320988764
- Casey, S., Crimmins, G., Rodriguez Castro, L., and Holliday, P. (2022). “We would be dead in the water without our social media!”: women using entrepreneurial bricolage to mitigate drought impacts in rural Australia. *Community Dev.* 53, 196–213. doi: 10.1080/15575330.2021.1972017
- Chen, Z., Meng, Q., Xu, R., Guo, X., and Cai, C. (2022). How rural financial credit affects family farm operating performance: an empirical investigation from rural China. *J. Rural. Stud.* 91, 86–97. doi: 10.1016/j.jrurstud.2022.03.003
- Chmieliński, P., Wrzasczcz, W., Zieliński, M., and Wigier, M. (2022). Intensity and biodiversity: the “green” potential of agriculture and rural territories in Poland in the context of sustainable development. *Energies* 15:2388. doi: 10.3390/en15072388
- Conner, D. S., Campbell-Arva, V., and Hamm, M. W. (2008). Value in the values: pasture-raised livestock products offer opportunities for reconnecting producers and consumers. *Renew. Agric. Food Syst.* 23, 62–69. doi: 10.1017/S1742170507002086

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Conflict of interest

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

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- Damke, L. I., Silva, D. J. C. D., Kneipp, J. M., Gomes, C. M., da Rosa, L. A. B., Godoy, T. P., et al. (2022). Alignment evaluation using sustainable family farm practices with fuzzy TOPSIS. *Environ. Qual. Manag.* 31, 151–163. doi: 10.1002/tqem.21783
- Darnhofer, I., Bellon, S., Dedieu, B., and Milestad, R. (2010). Adaptiveness to enhance the sustainability of farming systems. A review. *Agron. Sustain. Dev.* 30, 545–555. doi: 10.1051/agro/2009053
- Darnhofer, I., Lamine, C., Strauss, A., and Navarrete, M. (2016). The resilience of family farms: towards a relational approach. *J. Rural. Stud.* 44, 111–122. doi: 10.1016/j.jrurstud.2016.01.013
- Dogliotti, S., Van Ittersum, M. K., and Rossing, W. A. H. (2006). Influence of farm resource endowment on possibilities for sustainable development: a case study for vegetable farms in South Uruguay. *J. Environ. Manag.* 78, 305–315. doi: 10.1016/j.jenvman.2005.04.025
- Fisher, R. (2013). “A gentleman's handshake”: the role of social capital and trust in transforming information into usable knowledge. *J. Rural. Stud.* 31, 13–22. doi: 10.1016/j.jrurstud.2013.02.006
- Glover, J. L., and Reay, T. (2015). Sustaining the family business with minimal financial rewards: how do family farms continue? *Fam. Bus. Rev.* 28, 163–177. doi: 10.1177/0894486513511814
- Godoy-Durán, Á., Galdeano-Gómez, E., Pérez-Mesa, J. C., and Piedra-Muñoz, L. (2017). Assessing eco-efficiency and the determinants of horticultural family-farming in Southeast Spain. *J. Environ. Manag.* 204, 594–604. doi: 10.1016/j.jenvman.2017.09.037
- Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *Am. J. Sociol.* 91, 481–510. doi: 10.1086/228311
- Grivins, M., Keech, D., Kunda, I., and Tisenkopfs, T. (2017). Bricolage for self-sufficiency: an analysis of alternative food networks. *Sociol. Rural.* 57, 340–356. doi: 10.1111/soru.12171
- Grüner, B., and Konzett, S. (2024). Engagement of new entrants in mountain farming through the lens of generativity: lack of family farming background and its implications in alpine Austria and Italy. *Sociol. Ruralis* 64, 325–352. doi: 10.1111/soru.12476
- Hyett, N., Kenny, A., and Dickson-Swift, V. (2014). Methodology or method? A critical review of qualitative case study reports. *Int. J. Qual. Stud. Health Well Being* 9:23606. doi: 10.3402/qhw.v9.23606
- Jaafar, M., Jalali, A., Suffarruddin, S. H., and Ramasamy, N. (2023). The determinants of becoming sustainable Agropreneurs: evidence from the bottom 40 groups in Malaysia. *Sustain. For.* 15:8283. doi: 10.3390/su15108283
- Kleine-Stegemann, L., Hensellek, S., Senyard, J., Jung, P. B., and Kollmann, T. (2022). Are bricoleurs more satisfied? How bricolage affects entrepreneur job satisfaction among experienced versus novice entrepreneurs. *J. Small Bus. Manag.* 62, 1347–1384. doi: 10.1080/00472778.2022.2140159
- Kurland, N. B., and McCaffrey, S. J. (2020). Community socioemotional wealth: preservation, succession, and farming in Lancaster County, Pennsylvania. *Fam. Bus. Rev.* 33, 244–264. doi: 10.1177/0894486520910876
- Lairez, J., Affholder, F., Scopel, E., Leudpanhane, B., and Wery, J. (2023). Sustainability assessment of cropping systems: a field-based approach on family farms. Application to maize cultivation in Southeast Asia. *Eur. J. Agron.* 143:126716. doi: 10.1016/j.eja.2022.126716

- Li, H., Ma, Y., Ren, J., and Tong, Y. (2022). Spatiotemporal dynamic evolution and influencing factors of family farms in urban agglomerations in the middle reaches of the Yangtze River. *Front. Environ. Sci.* 10:1001274. doi: 10.3389/fenvs.2022.1001274
- Lin, J. L., Fang, S. C., Fang, S. R., and Tsai, F. S. (2009). Network embeddedness and technology transfer performance in R&D consortia in Taiwan. *Technovation* 29, 763–774. doi: 10.1016/j.technovation.2009.05.001
- Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strateg. Manag. J.* 22, 387–401. doi: 10.1002/smj.158
- Mayaux, P. L., Dajani, M., Cleaver, F., Naouri, M., Kuper, M., and Hartani, T. (2022). Explaining societal change through bricolage: transformations in regimes of water governance. *Environ. Plan. E Nat. Space* 6, 2654–2677. doi: 10.1177/25148486221143666
- Mazzola, E., Perrone, G., and Kamuriwo, D. S. (2015). Network embeddedness and new product development in the biopharmaceutical industry: the moderating role of open innovation flow. *Int. J. Prod. Econ.* 160, 106–119. doi: 10.1016/j.ijpe.2014.10.002
- Methorst, R., Roep, D., Versteegen, J., and Wiskerke, J. S. (2017). Three-fold embedding: farm development in relation to its socio-material context. *Sustain. For.* 9:1677. doi: 10.3390/su9101677
- Micu, M. M., Dumitru, E. A., Vintu, C. R., Tudor, V. C., and Fintineru, G. (2022). Models underlying the success development of family farms in Romania. *Sustain. For.* 14:2443. doi: 10.3390/su14042443
- Mincyte, D. (2023). Rethinking food regime as gender regime: agrarian change and the politics of social reproduction. *J. Peasant Stud.* 51, 18–36. doi: 10.1080/03066150.2022.2157720
- Nandi, R., Pratheepa, C. M., Nedumaran, S., Rao, N., and Rengalakshmi, R. (2022). Farm parent and youth aspirations on the generational succession of farming: evidence from South India. *Front. Sustain. Food Syst.* 5, 1–7. doi: 10.3389/fsufs.2021.804581
- Ochago, R., Dentoni, D., and Trienekens, J. (2023). Unraveling the connection between coffee farmers' value chain challenges and experiential knowledge: the role of farm family resources. *J. Agric. Educ. Ext.* 30, 181–211. doi: 10.1080/1389224X.2023.2169479
- Paskewitz, E. A. (2021). Exploring the impact of emotional intelligence on family farm member conflict experiences. *Sustain. For.* 13:8486. doi: 10.3390/su13158486
- Sáenz, J., Alcalde-Heras, H., Aramburu, N., and Buenechea-Elberdin, M. (2024). Boosting innovativeness in organic farming: the role of external relational capital. *J. Intellect. Cap.* 25, 143–165. doi: 10.1108/JIC-11-2022-0229
- Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., et al. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Qual. Quant.* 52, 1893–1907. doi: 10.1007/s11135-017-0574-8
- Savian, M., da Penha Simon, C., and Holden, N. M. (2023). Evaluating environmental, economic, and social aspects of an intensive pig production farm in the south of Brazil: a case study. *Int. J. Life Cycle Assess.* 28, 1544–1560. doi: 10.1007/s11367-023-02223-4
- Savickienė, J., and Miceikienė, A. (2018). Sustainable economic development assessment model for family farms. *Agric. Econ.* 64, 527–535. doi: 10.17221/310/2017-AGRICECON
- Schwabe, J., von Oppenkowski, M., Roesler, T., and Hassler, M. (2022). An embeddedness perspective on family farm development in the Carpathian Mountains. *J. Land Use Sci.* 17, 556–571. doi: 10.1080/1747423X.2022.2038295
- Si, Z. Z., Li, Y. Y., Fang, P., and Zhou, L. (2019). One family, two systems: food safety crisis as a catalyst for agrarian changes in rural China. *J. Rural. Stud.* 69, 87–96. doi: 10.1016/j.jrurstud.2019.04.011
- Simsek, Z., Lubatkin, M. H., and Floyd, S. W. (2003). Inter-firm networks and entrepreneurial behavior: a structural embeddedness perspective. *J. Manag.* 29, 427–442. doi: 10.1016/S0149-2063(03)00018-7
- Steffens, P. R., Baker, T., Davidsson, P., and Senyard, J. M. (2023). When is less more? Boundary conditions of effective entrepreneurial bricolage. *J. Manag.* 49, 1277–1311. doi: 10.1177/01492063221077210
- Suess-Reyes, J., and Fuetsch, E. (2016). The future of family farming: a literature review on innovative, sustainable and succession-oriented strategies. *J. Rural. Stud.* 47, 117–140. doi: 10.1016/j.jrurstud.2016.07.008
- Suhardiman, D., and Scurrah, N. (2021). Institutional bricolage and the (re) shaping of communal land tenure arrangements: two contrasting cases in upland and lowland northeastern Laos. *World Dev.* 147:105630. doi: 10.1016/j.worlddev.2021.105630
- Šūmane, S., Kunda, I., Knickel, K., Strauss, A., Tisenkopfs, T., des Ios Rios, I., et al. (2018). Local and farmers' knowledge matters! How integrating informal and formal knowledge enhances sustainable and resilient agriculture. *J. Rural. Stud.* 59, 232–241. doi: 10.1016/j.jrurstud.2017.01.020
- Swagemakers, P., García, M. D. D., Milone, P., Ventura, F., and Wiskerke, J. S. (2019). Exploring cooperative place-based approaches to restorative agriculture. *J. Rural. Stud.* 68, 191–199. doi: 10.1016/j.jrurstud.2018.12.003
- Ter Wal, A. L., Alexy, O., Block, J., and Sandner, P. G. (2016). The best of both worlds: the benefits of open-specialized and closed-diverse syndication networks for new ventures' success. *Adm. Sci. Q.* 61, 393–432. doi: 10.1177/0001839216637849
- Volpato, G., Benegiamo, M., and Ellena, R. (2022). The long reach of commodity frontiers: social reproduction and food procurement strategies among migrant workers in Kenya's flower farms. *J. Peasant Stud.* 50, 1455–1477. doi: 10.1080/03066150.2022.2051492
- Wilson, J., and Tonner, A. (2020). Doing family: the constructed meanings of family in family farms. *J. Rural. Stud.* 78, 245–253. doi: 10.1016/j.jrurstud.2020.06.002
- Wu, F., Guo, X., and Guo, X. (2023). The impact of cooperative membership on family farms' income: evidence from China. *Appl. Econ.* 55, 6520–6537. doi: 10.1080/00036846.2022.2159009
- Yachin, J. M., and Ioannides, D. (2020). "Making do" in rural tourism: the resourcing behaviour of tourism micro-firms. *J. Sustain. Tour.* 28, 1003–1021. doi: 10.1080/09669582.2020.1715993
- Yin, R. K. (2018). *Case study research and applications*. California: Sage Publications, Inc.
- Yu, X., Schweikert, K., Li, Y., Ma, J., and Doluschitz, R. (2023). Farm size, farmers' perceptions and chemical fertilizer overuse in grain production: evidence from maize farmers in northern China. *J. Environ. Manag.* 325:116347. doi: 10.1016/j.jenvman.2022.116347