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Scaling strategies and mechanisms in small and medium enterprises in the agri-food sector: a systematic literature review

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The question of how small and medium enterprises (SMEs) in the agri-food sector successfully develop and grow their business is a matter of high practical and theoretical relevance. The current paper conducts a systematic literature review focused on two key objectives. First, it explores the conceptual underpinning and evolution of the scaling concept by analyzing relevant conceptual and empirical journal articles. Second, the paper identifies and systematizes the key scaling strategies, drivers and mechanisms implemented by agri-food SMEs by reviewing published business case studies. The study's findings reveal that agri-food SMEs primarily utilize vertical scaling up, which is achieved through establishing partnership relations, collaboration and integration mechanisms. Horizontal scaling out is another frequently used strategy accomplished *via* market demand stimulation, product diversification and geographic expansion. In contrast, scaling deep is the least frequently used strategy, which is achieved through transformative learning and cultural mechanisms. Overall, the results contribute to the literature on scaling agri-food SMEs by providing a comprehensive overview and classification of the key strategies, drivers and mechanisms used by agri-food SMEs.

KEYWORDS

scaling, strategy, mechanism, agri-food, small and medium enterprise, scaling up, scaling out, scaling deep

1. Introduction

The agri-food sector provides employment and serves as the primary income source for a large share of the world's economically active population. Nowadays, more than 608 million family farms produce approximately 80% of the world's food (Lowder et al., 2021). Large multinational enterprises traditionally dominate significant parts of the agri-food processing and retail sectors due to the increased industry consolidation, reduction of trade barriers, and overall globalization (Tell et al., 2016; García-Álvarez de Perea et al., 2019). Yet, cultural and health-determined food preferences and social and environmental concerns are creating an increasing demand for local, farm-grown (Rikkonen et al., 2013), authentic, and niche food (Kvam et al., 2014). This counteracts the increasing concentration trend and provides important niches for Small and Medium Enterprises (SMEs) such as agricultural producers and food entrepreneurs (Zaridis et al., 2020).

SMEs occupy a significant part of the business environment of the agri-food sector (Camanzi and Giua, 2020). SMEs make up more than 99% of the agri-food businesses in Europe and accumulate 40.5% of the sector's total turnover (Schmerber et al., 2022). In other parts of the world, SMEs provide up to 69% of employment and comprise up to 97% of all enterprises (Asian Development Bank, 2020).

However, many agri-food SMEs face numerous internal and external barriers to scaling their business. Among the key challenges are a lack of adequate management and technical expertise (Scozzi et al., 2005), inadequate human capital, financial constraints (Woschke et al., 2017), competitive dynamics due to globalization, trade barriers, consolidation of food retailers (Brinkmann et al., 2014) and unfavorable policy environments (OECD, 2018). All this leads to such negative consequences as low financial performance, lack of innovation, loss of market and supply opportunities, etc. (Bourlakis et al., 2014; Zaridis et al., 2020).

As a consequence, initiatives of agri-food SMEs to grow and scale their business often do not produce the desired economic effect. For example, the existing power imbalance favoring large food retailers leads to an overall decline in profits of small agri-food producers while the profits of the retailers increase (Hingley, 2005). In addition, scaling initiatives of agri-food SMEs and increased agricultural production may often lead to adverse social and environmental effects if not adequately managed (Wigboldus et al., 2016).

Building on the above, investigating the conditions under which SMEs in the agri-food sector successfully establish, develop and scale activities is, therefore, a question of high practical relevance and intellectual appeal. While the concept of scaling has received increasing scientific attention, most of the available literature on scaling in the agri-food sector focuses on primary agricultural production stages, including the adoption of environmentally sustainable practices (Westermann et al., 2018; González de Molina, 2020), the adoption of farming innovations (Shilomboleni et al., 2019; Schut et al., 2020), and the impact of agricultural research for development (Garcia-Alvarez-Coque et al., 2015; Faure et al., 2018). In contrast, the scaling of business activities in other segments of the agri-food value chains has not received adequate scientific attention to date. A number of systematic literature reviews have been conducted in the field of scaling, with some focusing on social enterprises (Weber et al., 2012) and others defining the concept of scaling (Palmié et al., 2023). Yet, to the authors' knowledge, none of these works have systematically investigated the scaling strategies and mechanisms employed by agri-food SMEs. Thus, given the increasing theoretical and empirical interest in this field, a thorough review of the scattered literature on the scaling of SMEs in the agri-food sector can not only fill the existing gap by offering a comprehensive summary of recent research, but also serve as a foundation for further advancement in this area that can inform practitioners on the most effective scaling strategies for agri-food SMEs.

Against this backdrop, this systematic literature review is focused on two key objectives: (i) first, it aims to explore the conceptual underpinning and evolution of the scaling concept and, based on the conceptual analysis, (ii) it aims to identify and systematize the key scaling strategies and mechanisms implemented by SMEs in the agri-food sector through a systematic review of published real-life business case studies.

2. Methodology

To achieve the research objectives, we used a systematic literature review method (Petticrew and Roberts, 2006). We reviewed international peer-reviewed journal publications and grey literature for the conceptual part and published real-life business case studies for the analytical part of the study.

To search for relevant articles, we have developed three groups of keywords. First, based on the preliminary review of conceptual literature (Uvin, 1995; Bloom and Chatterji, 2009; Do, 2019), the following keywords were identified as synonyms of the scaling concept: "scal*," "grow*," "expans*" and "develop*." The second group of keywords defined the industry context *via* "agr*" and "food." Lastly, the keywords "SME," "small*," "medium," and "enterprise" defined the size and type of organizations.

For the conceptual part of the research, search strings were composed using a keyword from each of the three keyword groups and the Boolean operator "AND" (32 search combinations) among the provided (author) keywords. The initial search was conducted in the Web of Science and Scopus databases in January 2022 and updated in January 2023. A total of 14,805 articles were identified at this stage. Figure 1 shows a detailed Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) flowchart for both parts (Page et al., 2021).

The collected papers were filtered by excluding irrelevant publications (e.g., book reviews, proceeding papers, editorial materials, etc.) and unrelated fields of science (e.g., biology, earth sciences, biochemistry, genetics, etc.). This resulted in 716 papers. Then papers were screened manually based on titles, and duplicates were removed. This resulted in 202 articles for further assessment based on the abstracts. At this stage, we removed 142 articles and selected 60 for full-text screening. Based on a thorough evaluation of whole texts, 54 articles were selected. In addition, we used "pearl growing," "snowballing," and "reverse search technique" *via* citations to broaden the literature base of our review (Petticrew and Roberts, 2006). This resulted in an additional 6 articles. In total, we identified 60 articles: 16 conceptual and 44 empirical studies for our review.

The second analytic part of the research employs a comparative analytical approach based on the analysis of case studies (Yin, 2018). For this, business case studies were searched in the database of theCaseCentre.org, one of the largest repositories of Harvard-style business case studies. The authors used the same set of keywords as described above. A total of 4,164 case studies were identified at the initial stage. By excluding irrelevant studies in consecutive steps, 96 case studies were left for the title and abstract screening stage. For the full-text review, were selected and purchased 84 case studies. Based on the full-text reading, 67 case studies were included in the research, as shown in the Case studies section of Figure 1.

3. Results

3.1. Overview of identified studies

3.1.1. Years of publication

The selected studies were published between 1995 and 2022, as shown in Figure 2. The concept of scaling appeared in the scientific literature around the mid-1990s and was researched and developed

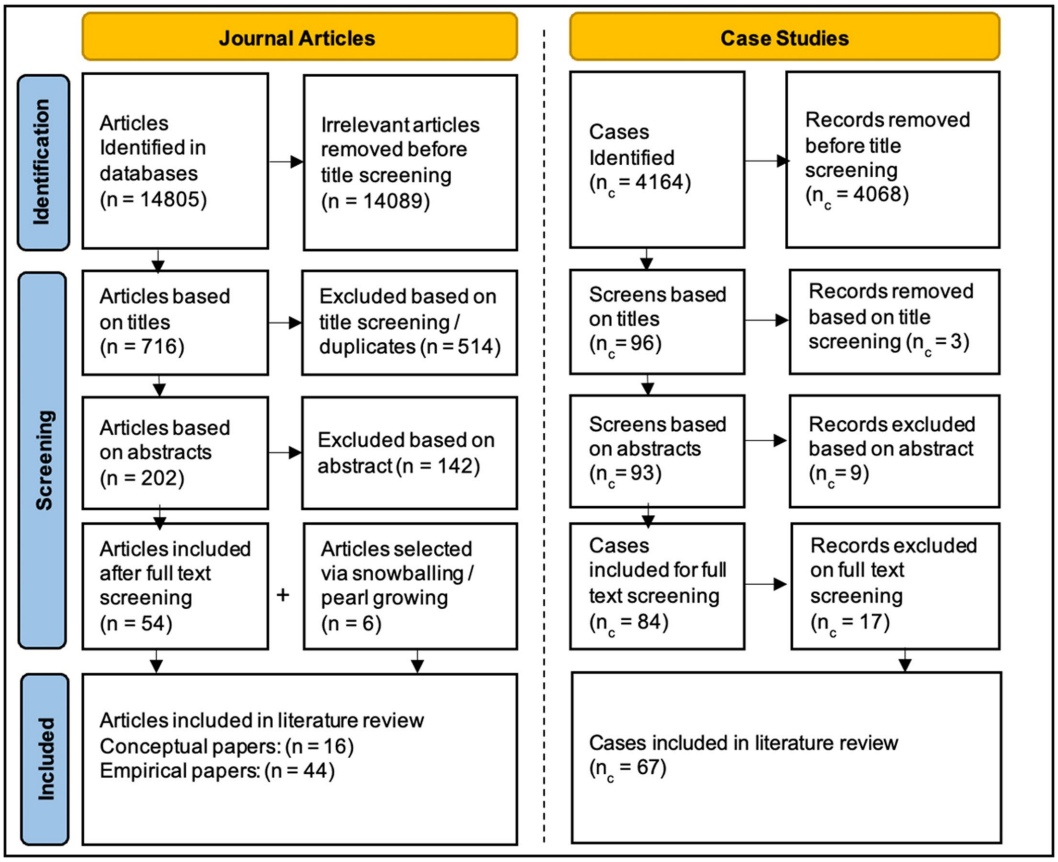

FIGURE 1
Flow chart of the literature selection process - adapted from Page et al. (2021).

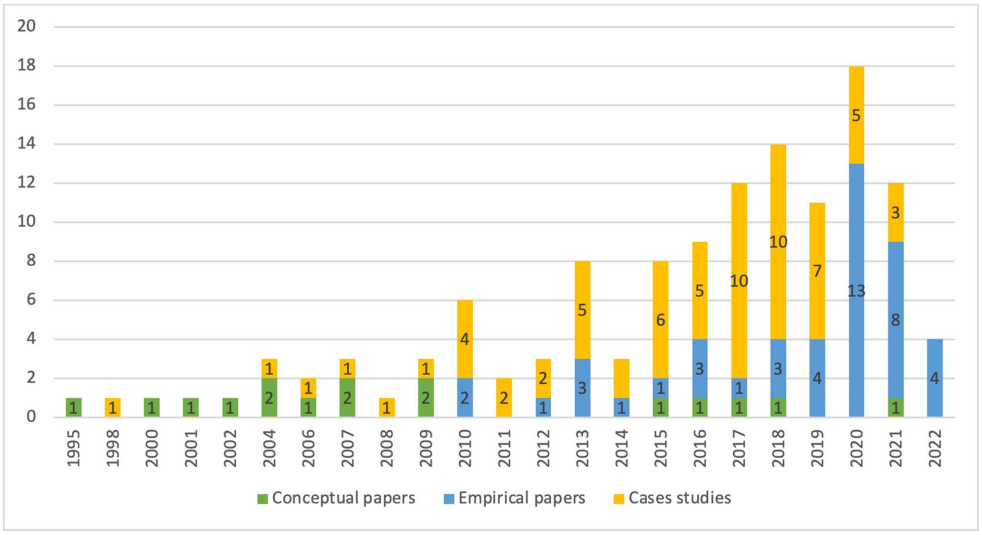

FIGURE 2
Article types by years of publication.

until 2009. At the same time, the growth of empirical research began in 2010. Since then, the number of published empirical research has grown and reached its peak by 2020. The selected case studies were published between 1998 and 2021. Similar to the empirical research, the number of published case studies also started to grow from around 2010 and reached its peak by 2017.

3.1.2. Bibliographic sources

Table 1 presents the bibliographic sources of selected conceptual and empirical studies and case studies. Although the case studies were identified and purchased from theCaseCenter.org, various publishers have issued them.

3.2. Overview of the concept of scaling

3.2.1. Types of scaling

One of the earliest scaling concepts was developed by Uvin (1995) in the context of grassroots organizations focused on food security. He defined scaling as "expansion" aimed "to reach several times the actual number of members." Uvin (1995) identified four types of scaling: quantitative scaling – geographic increase to reach out to a higher number of people; functional scaling – increasing the quantity and quality of activities; political scaling – collaborating actively with state entities; and organizational scaling – strengthening the organization by improving efficiency, effectiveness, and sustainability (Uvin, 1995).

Another widely accepted scaling classification is the differentiation between horizontal and vertical scaling. Originally proposed in the Going to Scale Workshop at International Institute for Rural Reconstruction (2000), this classification found its practical implementation in natural resources management (Gündel et al., 2001) and the spread of agricultural research (Menter et al., 2004). Horizontal scaling is viewed primarily as a geographical increase of activities to cover more people and communities. Vertical scaling is described as growing up and down (the latter one referred to as scale down) along the administrative and other hierarchies (e.g., local, regional, and state-level of social and development organizations) or involves other institutions (e.g., grassroots organizations, donors, development entities, etc.). World Health Organization expanded this type of scaling by adding spontaneous diffusion and diversification (World Health Organization, 2009). Spontaneous diffusion is typical for market-driven innovations (e.g., information technologies and communication services) that spread naturally without external involvement (Hartmann and Linn, 2007; Cooley and Kohl, 2016). Diversification (or functional scaling) is based on increasing the types of provided activities, services/products, or expansion to new social areas (e.g., adding men to healthcare programs aimed at women; World Health Organization, 2009).

Similarly, distinctions are made between scaling up, scaling out, and scaling deep. While sometimes the concepts are used in combination (e.g., Dees et al., 2004; Mulgan, 2006; World Health Organization, 2009, and others), they have also been dealt with separately in various research works. The concept of scaling up is the least clearly defined (Gündel et al., 2001; Frake and Messina, 2018), as illustrated by the variety of orthographical forms used, such as "scaling up" (Anderson, 2012), "scaling-up" (Nost, 2014), "scale-up" or "up-scaling" (Petrovics and Giezen, 2021). In addition, while scaling up is often used in research titles, many of these studies, in reality, deal with scaling out (Wigboldus and Leeuwis, 2013). The term is also used to describe different concepts, such as dissemination, to cover

TABLE 1 Bibliographic sources of articles and case studies.

Journal name	Conceptual papers	Empirical papers	Publisher	Cases studies
Stanford Social Innovation Review	2		Ivey Publishing	28
California Management Review	1		Harvard Business Publishing	14
The Journal of Corporate Citizenship	1		Amity Case Research Centers	4
Journal of International Business Studies	1		IBS Center	4
Sustainability (Switzerland)	1	2	Stanford Business School	3
Agricultural Systems		9	Indian Institute of Management	2
Frontiers in Sustainable Food Systems		4	MIT Sloan School of Management	2
Journal of Cleaner Production		3	Asia Case Research Centre	1
Resources, Conservation and Recycling		1	Edinburgh Napier University	1
Agriculture and Human Values		1	Emerald Group Publishing Limited	1
Agricultural Economics		1	RSM Case Development Centre	1
Frontiers of Entrepreneurship Research		1	Thunderbird School	1
British Food Journal		1	University of Surrey	1
Others	10	21	Others	4
Total	16	44	Total	67

everyone who needs the product or innovation offered by an organization (Wesley et al., 2019). Another meaning of scaling up is the increase in the impact of a particular social activity or the effects of technology to benefit more people (Simmons et al., 2007). Within strategic management of social entrepreneurship, scaling up is achieved through "impacting laws and policies" to create favorable legislative environments (Moore et al., 2015).

Scaling out is mainly used as a synonym for horizontal scaling and describes a geographical extension to reach out to more people and communities (Gündel et al., 2001; Menter et al., 2004). Scaling out can be achieved through replication (dissemination) or spreading (adaptation) within the same sector or stakeholder group (Roothaert and Kaaria, 2004). Replication (dissemination) involves a geographic expansion of projects to cover more people (Dees et al., 2004). Spreading (adaptation) is a more flexible model in which core activities are dispersed more independently from the central point. The societies involved in spreading have more freedom to adapt the innovation based on the specifications of local cultural, social, economic, environmental, and other conditions (Moore et al., 2015).

The concept of scaling deep was first introduced by Taylor et al. (2002) to describe organizational efforts to increase power in the domestic market. It can be achieved by improving the quality of service, finding a new way to deliver it, or deeper penetration within the same or new customer segments and becoming a benchmark to others in the industry (Taylor et al., 2002). Scaling deep is defined as "impacting cultural roots by affecting relationships, cultural values and beliefs, hearts and minds" (Moore et al., 2015). The definition is based on the earlier work of Van den Bosch and Rotmans (2008), who described that sustainable and positive changes are achieved by changing people's hearts, minds, values, and cultural practices. Scaling deep can be performed by spreading ideas and/or investing in learning (Moore et al., 2015). First, spreading ideas can be achieved by continuous efforts to change the dominating narratives, thus changing the cultural beliefs and values about an issue (Moore et al., 2015). Second, investing in transformative learning helps build the necessary beliefs shared across the community by influencing the commonly established habits and practices through organizing courses and training or mentoring programs (Moore et al., 2015).

The concept of scaling can be closely related to both social enterprises and business organizations. The main difference is that social enterprises aim at reaching more social needs, and business organizations are motivated by profit maximization (Mulgan, 2006). Despite the variety of classifications, the general idea of the scaling concept is moving from smaller to larger. This understanding goes back to the 19th century when industrial expansion started to change the way of doing business (Gargani and McLean, 2017). In this context, scaling emphasizes producing and distributing standard products at the lowest possible cost (Gargani and McLean, 2017). The main focus was on operational growth, with the primary goal to expand physically into other markets *via* economies of scale.

The industrial (economic) view of scaling was further developed within entrepreneurship science. It perceives scaling as the extent and sustainability of organizational growth in terms of sales or size (Reuber et al., 2021). Often this type of scaling is associated with high capital expenses (Reuber et al., 2021). Unlike the industrial perspective of cost reduction, entrepreneurship scaling is achieved through sustainable growth, leading to market expansion and further dominance. This can be achieved by acquiring competitive advantages through technological innovation, consumer loyalty, and other intangible and tangible resources.

With the further development of business science, the strategic management perspective viewed scaling from the angle of strategic replication (Reuber et al., 2021). Strategic scaling is achieved by replicating established business models in new places (Winter et al., 2012). Due to the fast-changing world and high competition, the critical success factor in replication is making minimum adjustments in the business models to adapt them to new places.

3.2.2. Resources and mechanisms of scaling

Further analysis of empirical articles expands the understanding of how different agri-food organizations can achieve scaling. The literature focuses on two important aspects. First, scaling activities require the existence of enabling drivers. Second, scaling can be achieved through various mechanisms, as discussed below.

3.2.2.1. Drivers of scaling

Enterprises need specific forces that trigger the scaling process forward. In literature, these forces are also referred to as sparks (International Institute for Rural Reconstruction, 2000), spaces (Hartmann and Linn, 2007), or drivers (Materechera and Scholes, 2022). In general, these drivers can be classified into the following types:

3.2.2.1.1. Finance

The availability of financial resources is among the most critical factors for the successful scaling of agri-food enterprises (Nwajiuba et al., 2013; Van Loon et al., 2020). Scaling often implies making additional investments in agricultural technologies (Groot et al., 2019), recruiting and educating farm interns (Weil et al., 2017), network building (Nicol, 2020), and information technologies (Singh et al., 2019). To cover expenses and generate revenue, profit and non-profit enterprises try to increase efficiency and decrease costs (Bocken et al., 2016; Loury-Okoumba and Mafini, 2021; Maria et al., 2022). In addition to making profits, enterprises can find and establish sustainable cash inflows *via* donations, grants, and sponsorships to support activities (Bloom and Chatterji, 2009; Verver et al., 2021). Alternatively, investors can be attracted, which also acts as a positive signal for others to invest (Walske and Tyson, 2015).

3.2.2.1.2. Resources

Access to and availability of necessary resources is another factor that drives the success of the scaling process. The dependence of food enterprises on resources is at the center of the resource-based view and the dynamic capabilities framework (Carraresi et al., 2016). Scaling often requires an additional new or existing resource, e.g., in the case of creating a new product or service (Islam, 2021). The ability to obtain essential resources is equally crucial for commercial and hybrid organizations (Weber et al., 2012). Sometimes, even with sufficient financial resources, agri-food enterprises might not have access to valuable resources necessary for scaling, e.g., land, fertilizers, irrigation systems, etc. (Materechera and Scholes, 2022).

3.2.2.1.3. Management and human resources

A management team and human resources are also crucial for successful scaling. The process of scaling requires a competent manager with the proper skills and abilities (Weber et al., 2012).

Regardless of the type, agri-food organizations require conducting day-to-day business operations such as accounting, marketing, quality control, etc., and various entrepreneurial activities such as planning, forecasting, budgeting, etc. (Abebe and Gebremariam, 2021). Also, the growth of agri-food SMEs is associated with hiring and training additional human resources (Weil et al., 2017). The lack of skilled workers is associated with an overall decline in business of the owner-managed local food trade (Sipple and Schanz, 2021). Hartmann and Linn (2007) associated human resources with capacity space. Bloom and Chatterji (2009) highlighted the importance of human resources to support organizational growth from the perspective of human resources management. Absence of proper management and appropriate human resources increase the likelihood that the scaling process might fail (Weber et al., 2012).

3.2.2.2. Mechanisms of scaling

Next, the various organizational activities aimed at achieving scaling, described in empirical and conceptual articles, were classified into more specific mechanisms.

3.2.2.2.1. Geographic expansion

Scaling through geographic expansion is considered one of the most common mechanisms for growing business activity. It is also referred to as quantitative scaling (Uvin, 1995), horizontal scaling (International Institute for Rural Reconstruction, 2000; Gündel et al., 2001; Menter et al., 2004), and scaling out (Moore et al., 2015). There exist numerous techniques for geographic expansion, such as replication of the business model to other places (Weber et al., 2012), dissemination, branching, and affiliation (Dees et al., 2004), or growth, restructuring, decentralization, franchising, and spinning off (Cooley and Kohl, 2016). These techniques provide clear guidelines in each situation and make geographic expansion flexible. For agri-food SMEs, the geographic expansion also implies a scale of a particular process, technology, or business model. This requires agri-food organizations to be flexible by experimenting to adapt to local conditions (Dobson et al., 2018) and using a tailored rather than "one-size-fits-all" approach (Hammond et al., 2020).

3.2.2.2.2. Market demand

The success and profitability of scaling also depend on sufficient market demand. Organizations can scale by covering more customers within the same or new customer segment (Cooley and Kohl, 2016). Demand for food also depends on the social, economic, cultural, and other characteristics of consumers (Kvam et al., 2014). Mainly, farmers below the poverty line usually cannot adopt capital-intensive agricultural technologies and methods (Hartmann and Linn, 2007). Because of this, it might be easier for them to scale over into alternative food networks (Brislen, 2018), niche markets (Kvam et al., 2014), or local farm gates sales (Rikkonen et al., 2013) instead of increasing production volumes. In this case, stimulating the demand by developing the necessary incentives is suggested (Bloom and Chatterji, 2009).

3.2.2.2.3. Extension of products and services

Scaling of commercial and social enterprises can also be achieved by introducing new products and services (Islam, 2021; Jha et al., 2021). Diversification of products and services improves the corporate image, competitiveness, and familiarity with its target community (Jha et al., 2021). The extension of products and services can take various forms, such as developing new or improving existing products and services, creating products and services related or unrelated to core activities, etc. (Islam, 2021). Alternatively, enterprises can be scaled *via* product/service diversification, which is close to their core activity and relates to the community demand (Jha et al., 2021).

3.2.2.2.4. Policy support

Numerous conceptual papers mention policy support as one of the essential factors in driving the scaling process and refer to it as political scaling (Uvin, 1995), policy support (International Institute for Rural Reconstruction, 2000), vertical scaling (Gündel et al., 2001; Menter et al., 2004), political space (Hartmann and Linn, 2007), institutional support (Millar and Connell, 2010) and scaling up (Moore et al., 2015). Government support positively impacts economic growth (Qi et al., 2013; Sipple and Schanz, 2021) and the export potential of small and medium agri-food enterprises (Tamini and Valéa, 2021). Policy support is also essential in introducing agricultural innovations that positively affect the growth of agri-food SMEs (Singh et al., 2019; Totin et al., 2020; Khandelwal et al., 2022). In situations with no apparent government support, lobbying and advocating can be one of the ways to obtain a legislative base, budget support, or tax benefits (Bloom and Chatterji, 2009). Millar and Connell (2010) suggest dividing institutional support into local and international levels.

3.2.2.2.5. Partnership and integration

Identifying and establishing relationships with the right partners is vital for successful scaling. This process is also referred to as creating space for external and internal partners (Hartmann and Linn, 2007), alliance building (Bloom and Chatterji, 2009), establishing informal networks (Millar and Connell, 2010), production and distribution supply chain building (Walske and Tyson, 2015), etc. A partnership can have different forms, such as collaboration (based on learning, reward, and risk sharing), cooperation (based on resource sharing), and coordination (with trust building) (Prain et al., 2020). Organizations can establish partnerships to achieve economies of scale (Bloom and Chatterji, 2009; Groot et al., 2019; Shilomboleni et al., 2019), gain government support (Millar and Connell, 2010; Van Doren et al., 2018), learn (Schut et al., 2020), and innovate (Low and Thiele, 2020; Seifu et al., 2020). Different forms of value chain integration and collaboration can help to improve the supplier base, strengthen the position and increase the profit of agri-food enterprises (Bavarová, 2010; Walske and Tyson, 2015; Ćwiklicki, 2019; Zaridis et al., 2020).

3.2.2.2.6. Culture

Considering the culture of local communities is an essential aspect of effective scaling. Researchers refer to it as cultural space (Hartmann and Linn, 2007), suitability to social, cultural, and environmental conditions (Millar and Connell, 2010), adaptability (Weber et al., 2012), and scaling deep to impact cultural roots (Moore et al., 2015). On one side, this includes spreading big cultural ideas, as proposed by Moore et al. (2015), to achieve scaling deep. Cultural adaptation is also relevant to the geographic expansion of organizations and practices where growth requires greater patience and time, considering cultural specifications (Wigboldus and Brouwers, 2016).

3.2.2.2.7. Learning

Creating a learning environment is another important mechanism for establishing a scaling process, e.g., increasing labor productivity (Weil et al., 2017) and crop productivity (Hammond et al., 2020). Literature refers to it as a space for learning (Hartmann and Linn, 2007), a peer learning environment (Millar and Connell, 2010), and scaling deep *via* transformative learning (Moore et al., 2015). Some authors primarily consider learning as a strategy to scale the impact of social innovation *via* edutainment activities (Verver et al., 2021) and *via* influencing cultural roots (Moore et al., 2015). Others view learning as a constant process to improve agri-food SMEs' performance (Schut et al., 2020), establish business models (Dobson et al., 2018), and identify strategies (Sartas et al., 2020) at new places. Also, development organizations can use learning to help agri-food SMEs to overcome institutional and social barriers to growth (Butler et al., 2020; Hedberg and Lounsbury, 2021).

3.2.3. Conceptual framework

Based on the conducted literature review, a framework for further analysis has been developed (Figure 3).

The analysis of the conceptual literature revealed three main scaling strategies: scaling out, scaling up, and scaling deep. The analysis of empirical articles allowed us to identify drivers of scaling and specific mechanisms through which scaling strategies can be implemented.

3.3. Scaling strategies and mechanisms used by agri-food SMEs

This section discusses scaling mechanisms and processes various agri-food SMEs use based on the analysis of case studies and within the developed conceptual framework. To simplify the understanding, all agri-food SMEs included in the review of cases were grouped according to FAO's core food value chain stages (FAO, 2014), including production, processing, and distribution.

3.3.1. Scaling up

The strategy of scaling up is achieved through collaboration, establishing partnership relations, and various forms of integration

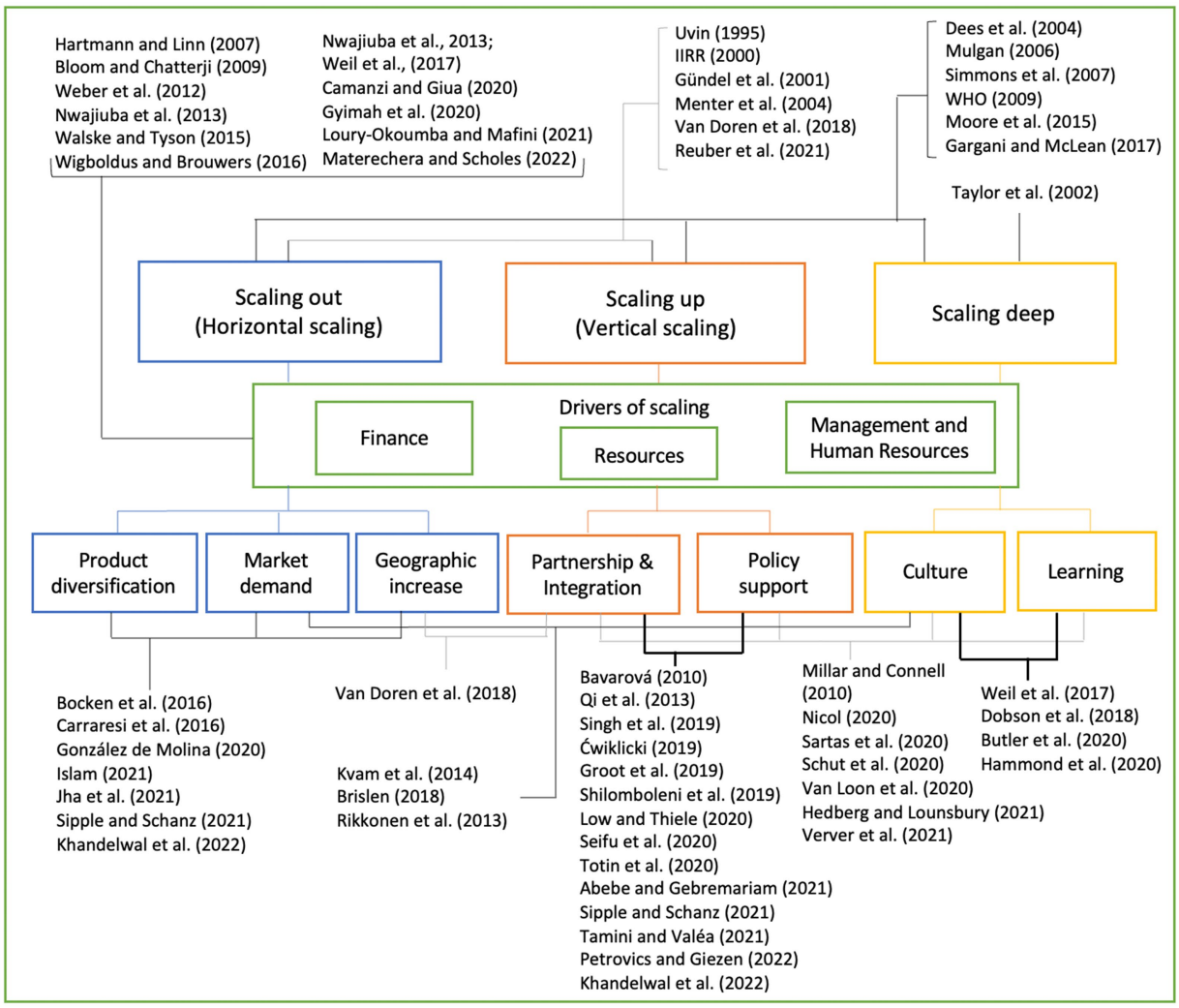

FIGURE 3
Conceptual framework of scaling strategies based on the analyzed literature.

along the value chain stages. The mechanisms differ depending on the different stages of the value chain, economic factors, and challenges, as discussed in the following sub-sections.

3.3.1.1. Production stage

3.3.1.1.1. Partnership and integration

To avoid price-related risks and increase the share of captured revenue, agri-food producers often went into downstream partnerships and value chain integration (Strike et al., 2016; Case and Kalesnikoff, 2017; Reinhardt et al., 2021). For example, in addition to crop cultivation, some agri-food SMEs also scaled up their activities into processing (Lee and Zhao, 2018), cleaning, packing (Strike et al., 2016), transporting, storing (Case and Kalesnikoff, 2017) and distribution (Wong et al., 2009). Animal producers went into upstream integration to cultivate fodder, such as corn, soybeans, etc., for cows, pigs, chicken, and turkey (Singh et al., 2015; Reinhardt et al., 2021) and downstream integration by processing the caught marine products (Ding et al., 2017). The mechanism allowed to stabilize smallholder farmers' revenues (Ahmed, 2014), diversify sources of income during the off-seasons (Ahmed, 2014), and achieve specific niche markets (Wong et al., 2009). Agri-food SMEs also decreased their dependence on external service suppliers and transport companies, which usually increase prices during peak harvest seasons (Case and Kalesnikoff, 2017). Partnership and integration mechanisms provided good growth opportunities for cultivators of lentils, chickpeas, yellow peas (Strike et al., 2016), wheat, cotton, and maize (Ahmed, 2014) of conventional and organic types (Wong et al., 2009).

Whereas vertical integration often required additional financial and other resources, a more available alternative was unification into cooperatives. Stimulated by governments, cooperatives proved to be helpful for smallholder farmers (Goldberg and Cornell, 2013; Tripathy et al., 2015; Lyngdoh et al., 2017). The mechanism allowed collective farmers to achieve economies of scale, increase bargaining power, sales, and the level of value captured (e.g., Goldberg and Cornell, 2013; Agarwal, 2020). Also, cooperatives allowed introducing better and more efficient practices and innovative technologies, sharing knowledge and experience, and improved social and economic conditions of local communities (Tripathy et al., 2015; Iwashita et al., 2018). In general, cooperative models proved to be practical with such examples as crop-cultivating farm cooperatives (He et al., 2018), dairy cooperatives (Goldberg and Cornell, 2013; Agarwal, 2020), groundnut cooperatives (Tripathy et al., 2015), and tea grower cooperatives (Lyngdoh et al., 2017).

3.3.1.1.2. Policy support

Governmental support was essential in helping small and medium agri-food producers to develop (Alvarez et al., 2019). Primarily, these activities aimed to increase the global potential of produced food, following export requirements and modern market trends. The support of international organizations helped food producers to obtain and follow different sustainability certifications (Alvarez et al., 2019). Governments also established minimum quality standards for food exports, helped with branding and marketing on international markets, and provided financial resources for R&D activities to improve the quality of food products (Alvarez and Shelman, 2010). Also, policy support created a positive environment for adopting informational technologies and developing "agri-tech" products to support smallholder farmers (Anirudhan and Dutta, 2021; John, 2021).

3.3.1.2. Processing stage

3.3.1.2.1. Partnership and integration

At the processing stage, vertical scaling was carried out by either upstream or downstream integration. Depending on the financial possibilities of processors, upstream integration could take various forms, including outgrower schemes, contract farming, outsourcing through specialized agents, cooperating with development agencies, and renting land plots (Singh and Gosain, 2015). Unlike more capital-intensive types of integration, these schemes were more asset-light and suitable for small and medium agri-food organizations. Also, considering the importance of financial resources, processors provided financing to partner farmers (Agarwal and Satish, 2018) or collaborated with other financial organizations to finance member farmers (Srikant, 2018). These mechanisms were successfully implemented by processors of milk (Agarwal, 2020), dried fruits and nuts (Beamish and Eghbali-Zarch, 2010), poultry (Alvarez and Kindred, 2019; Wang et al., 2019), and cassava (Shotts and Otieno, 2016).

Downstream integration was carried out by opening own distribution channels, improving underdeveloped logistic infrastructures and cold storage facilities with the support of government and development agencies, and in partnership with other processors (Raj and Adhikari, 2013; Singh and Gosain, 2015). In general, both types of the mechanism allowed processors to mitigate risks associated with high waste and low quality of supplied fruits and vegetables, decrease overall costs, increase the value added, plan production, and reduce the threat of possible price fluctuations in the local markets (Bell et al., 2017; Roy and Kulkarni, 2018). Also, it allowed agri-food processors to scale up across multiple geographies (Beamish and Eghbali-Zarch, 2010; Agarwal, 2020). The mechanism was successfully implemented in the processing of wheat (Reinhardt et al., 2021), raw milk (Bell and Hogan, 2004; Goldberg and Cornell, 2013; Margolis and Preble, 2013; Agarwal, 2020); beef (White et al., 2015; Currie and Meyer, 2017), coffee (Siegrist et al., 2020), and fruits (Liang et al., 2020).

3.3.1.3. Distribution stage

3.3.1.3.1. Partnership and integration

Within the growing competition and consolidation of large retailers, small and medium food retailers mainly sold food products online with home delivery (Liang et al., 2020). At the same time, another challenge was keeping the appropriate quality and freshness of delivered food items (Narasimhan et al., 2017; Liang et al., 2020). It was directly connected with the food supply, product warehousing, and speed of delivery. To overcome the challenges, SMEs often went into upstream vertical integration by obtaining vegetable farms in various climatic zones (Liang et al., 2020). This allowed the companies to decrease the seasonality of supply and increase the quality of supplied products (Liang et al., 2020). In addition to the supply side, e-commerce retailers often referred to third-party warehousing and transportation companies to improve logistics (Narasimhan et al., 2017; Liang et al., 2020).

While purchasing supply bases required financial resources, establishing a contractual relationship was cheaper and still effective. Although the quality and timeliness of supply could be an issue (Liang et al., 2020), agri-food SMEs tried to alleviate these risks by providing technical advice and input resources to contract farmers to decrease their dependency on intermediaries and increase profitability by increasing margins (Alvarez and Kindred, 2019). Some agri-food enterprises used contractual relationships to have authentic, local, and always fresh ingredients (Gino et al., 2017). Alternatively, establishing downstream relationships also allowed foodservice SMEs to grow together with contractors (Foster and Rosenthal, 2012).

3.3.2. Scaling out

The strategy of scaling out is mainly aimed at a quantitative increase of the organizational performance of agri-food SMEs. It is achieved through market demand stimulation, product diversification, facility extension, and geographic expansion. These mechanisms vary depending on the stage of the agri-food value chain, as discussed further.

3.3.2.1. Production stage

3.3.2.1.1. Market demand

Within the context of the growing consumer trend toward organically grown products, some farms were practicing direct sales "from the farm gate" of organic products (e.g., pasture-raised chickens and eggs; Grasby and Bloomfield, 2017). Despite requiring a distinctive organic approach to the production process, such as no pesticides, hormones, or antibiotics, additional costs faced by farmers could still be paid off by the higher-income consumer segments (Wong et al., 2009; White et al., 2015).

Similarly, opportunities to scale out enterprises at the production stage through direct marketing included selling and delivering *organic/vegetable boxes* (Milestad et al., 2017). Amid the growing consumer preferences toward locally produced and healthy food, this method substantially increased the customer base and retention rate by 90% (Alvarez et al., 2013). Sales and revenue levels have also been improved with upfront payments for agricultural products. Together with delivered boxes, agri-food producers shared with consumers information about the origins of the ordered products by including personalized brochures and posters (Milestad et al., 2017).

Many farmers have been affected by the COVID-19 pandemic due to transportation restrictions and a lack of storage facilities (Anirudhan and Dutta, 2021). While large retailers could still operate, small and medium farmers from developing countries became isolated from markets. In this situation, a beneficial solution was found with the help of information technologies. The "agri-tech" platforms allowed farmers not only to sell products online (Anirudhan and Dutta, 2021) but also provided additional services such as payments, transportation, warehousing, and provision of financial and input resources (Mohanty, 2020; John, 2021).

3.3.2.1.2. Geographic increase

Farmers scaled out physically by geographically expanding production facilities and renting or buying additional land plots (Porporato and Waweru, 2010; Barclay and Kelly, 2011; Vandenbosch and Anderson, 2014). The mechanism increased production volumes and, as a result, incomes. However, the method required significant investments (Vandenbosch and Anderson, 2014), which in case of limited financial resources, could lead to a decrease in cash (Vandenbosch and Anderson, 2014). On the other hand, operating on a fully rented production facility exposed to risks of the rent price increase and out-renting the facility by bigger farms (Barclay and Kelly, 2011).

3.3.2.1.3. Product/service diversification

Farmers often looked for additional and complementary business opportunities, such as farm accommodations and leisure activities, to reduce risks connected with low harvest seasons or market price declines. Examples include opening a lodge with a bar, restaurant, swimming pool, and hotel by coffee growers (Siegrist et al., 2020) or opening a visitor attraction by a hop grower where guests could relax and learn about hop growing heritage and culture with an area for children to play with farm animals (Bowen and Miller, 2006). Also, farmers tried to diversify the offered product range. For example, sheep farmers could produce cheese and other dairy products to cover the costs of farm operations and increase incomes (Dana, 1998). With this mechanism, agri-food SMEs could diversify business activities, protect revenues during off-seasons, depend less on market prices, and integrate the value chain (Bowen and Miller, 2006; Siegrist et al., 2020).

3.3.2.2. Processing stage

3.3.2.2.1. Market demand

Unlike agri-food producers, food processors were primarily involved in direct sales and dealing with marketing issues. To be successful, the processors had to consider varied market demands. For example, depending on the type of food, some consumers preferred to eat at the place of sale (Prasad, 2020), while others liked to buy at a retail outlet and bring food home for further processing and eating (Fernandes et al., 2018). In any case, the important aspect of successful scaling was to make the right decision and select the right distribution strategy that would leave an opportunity for further growth (Ranjan et al., 2018).

3.3.2.2.2. Product diversification

At the processing stage, some agri-food processors could achieve horizontal scaling (scaling out) by implementing and combining mechanisms of diversifying and extending the product range (Beamish and Eghbali-Zarch, 2010; Margolis and Preble, 2013; Alvarez et al., 2017). Processors diversified production by introducing new related and unrelated products or improving existing ones (Islam, 2021). Enhancing the existing products allowed the processor of milk products (Margolis and Preble, 2013), beef (White et al., 2015), cattle feed (Alvarez et al., 2017), and dried fruits (Beamish and Eghbali-Zarch, 2010) to increase sales by staying focused on quality and keeping the costs lower. Similarly, developing products related to the existing business allowed dairy processors to widen the consumer segments covered while keeping themselves within the same field of the food industry (Agarwal, 2020). In creating unrelated products, some SMEs followed systematic approaches by testing markets with pilot product versions. This approach increased the likelihood of success by monitoring the sales dynamics, studying consumer behavior, and collecting feedback from distributors and potential consumers. In general, the mechanism was successfully implemented in the production of ready-to-eat foods (Prasad, 2020), healthy snacks

(Ranjan et al., 2018), and the cosmetics industry by using natural components in skincare products (Stevenson and Zalosh, 2016).

3.3.2.3. Distribution stage

3.3.2.3.1. Market demand

The distribution stage consists of the retail sector, usually highly consolidated and dominated by large multinational enterprises (MNEs) (Zaridis et al., 2020). To make profits, MNEs usually establish payment policies that do not favor SMEs. For example, in the U.S., from each dollar that large retailers earn, agri-food producers and processors usually receive not more than 14.8 cents (14.8%) (Hoffman, 2019). Considering this, some small and medium distributors in the agricultural and food sector used alternative models. One was the consignment model when farmers established prices and owned products until they were sold (Hoffman, 2019). The value captured by farmers in such a model reached 60%. An additional advantage of the consignment model was a low level of store inventory, which kept operation costs lower than traditional retailers (Hoffman, 2019).

3.3.2.3.2. Geographic expansion

Some foodservice SMEs expanded their operations to other geographic locations to support business growth and increase their customer base. The franchising model was among the most popular methods of geographic expansion. Franchising was fast and cost-effective (Tracey and Jarvis, 2007; Beckmann and Zeyen, 2014; Islam, 2021). Low control over the quality of products by the franchisee has been cited as a weakness of the franchising mechanism (Thomas and Nambudiri, 2018). To keep the food quality, some franchisors maintained control over the key ingredients (Lehrich et al., 2010; Trehan and Bakhshi, 2018), while others preferred to stop franchising activity and opened retail or online stores (Kohli and Poddar, 2016; Thomas and Nambudiri, 2018).

Alternatively, the branching model provided more control over the quality. However, due to higher financial requirements, it could be used mainly by larger foodservice companies that could invest in new locations (Pisano et al., 2017). To alleviate the lack of financial resources, foodservice SMEs combined branching with other scaling methods, such as establishing a partnership or co-ownership relations with the managers of new locations (Pisano et al., 2017).

3.3.3. Scaling deep

The strategy of scaling deep aims to strengthen organizations by affecting cultural aspects of societies and conducting learning activities. Even though agri-food SMEs are mostly profit-oriented, the specificity of the industry implies making socially significant influences that indirectly affect growth, as discussed below.

3.3.3.1. Production stage

3.3.3.1.1. Learning

At the production stage, agri-food SMEs used the learning mechanisms directed toward local consumers or other farmers. Under the first option, agri-food SMEs focused on increasing the awareness of local communities and consumers on credence attributes of produced food, e.g., health, food safety, community and environmental support (Alvarez et al., 2013; Milestad et al., 2017; Gladu and Paquin, 2019; Myres and Mamabolo, 2019). To achieve community learning, agri-food producers cooperated with local educational institutions (schools and universities) to integrate the importance of fresh, local, sustainably produced food into the learning processes (Rao and Elkin, 2008). Also, food producers developed various web-based educational platforms with video materials, which allowed staff to be involved during low seasons (Gladu and Paquin, 2019).

The second option was mainly based on knowledge dissemination among rural smallholder farmers. Vendors organized village campaigns with agricultural scientists and specialists to explain to farmers modern farming methods, productive crops, cultivation procedures (Adhikari and Das, 2015), grading techniques, and post-harvest storage management (Roy and Kulkarni, 2018). The mechanism sometimes required cooperation with financial institutes, input producers, and contractors to finance seeds, fertilizers, and technical equipment. The mechanism increased the productivity of cultivated crops (Adhikari and Das, 2015) and the quality of fruits and vegetables (Roy and Kulkarni, 2018). As a result, the mechanism stabilized incomes and improved the overall social well-being of farmers (Goldberg and Cornell, 2013; Tripathy et al., 2015; Lyngdoh et al., 2017; Srikant, 2018).

3.3.3.2. Processing and distribution stages

3.3.3.2.1. Learning

Agri-food SMEs at the processing and distribution stages used learning mechanisms to inform local communities about environmental and social attributes (e.g., Organic and Fairtrade certification) (Collins et al., 2016) and waste reduction techniques, e.g., redistribution of food and food recycling (Bullough et al., 2013; Laszlo et al., 2015). The process involved such methods as establishing direct communication by sending letters and brochures to prospective clients (Myres and Mamabolo, 2019), publishing articles in newspapers (Wong and Dowejko, 2011), or communicating with current and potential customers *via* social media (Jamali and Khoury, 2012; Collins et al., 2016; Gallagher, 2019).

Alternatively, learning between agri-food SMEs along the value chain stages involved financing various activities and agricultural programs for farmers (Bell et al., 2007), processors (Goldberg and Cornell, 2013), and producers (Wong and Dowejko, 2011) to spread and disseminate the improved, innovative food processing techniques. Also, especially in developing countries, the importance of different environmental and social standards and certifications was disseminated among food processors to scale deep into specific niche markets of certified fruits and nuts (Beamish and Eghbali-Zarch, 2010).

3.3.3.2.2. Culture

Also, scaling deep involves spreading big cultural ideas and changing cultural values (Moore et al., 2015). Farm markets in Beirut used this type of mechanism to support national smallholder farm producers and promote cultural awareness campaigns in food traditions and heritage for urban residents by organizing various food-related activities, events, and festivals (Jamali and Khoury, 2012). Also, food processors in India used the same strategy to introduce a "Westernized" type of snacks into the local markets with highly cultural food preferences (Ranjan et al., 2018). In general, cultural scaling was used by organizations mostly at their early stages to increase customer awareness, establish brand image and build on

marketing strategies to attract new customers and convince them to make the shift from one preference to another (Jamali and Khoury, 2012; Ranjan et al., 2018).

4. Discussion

The conducted review allowed us to systematize the existing conceptual and empirical studies related to the scaling process. The research advances findings from earlier studies that focused on the challenges and opportunities facing agri-food SMEs, by reviewing published case studies that demonstrate how various small and medium agri-food enterprises can use the scaling mechanisms and strategies. In doing so, the review offers a more comprehensive and detailed understanding of the factors that contribute to successful scaling in the agri-food sector. The overall summary of the analysis is shown in Figure 4. Based on our findings, the following sub-sections discuss some critical conceptual and practical implications, future research opportunities, and limitations of the study.

4.1. Conceptual implications

The systematic literature review presented in this paper consolidates and synthesizes previous studies as an initial step to organizing the disparate concepts of scaling that exist in literature. The concept of scaling is multidimensional and has been researched within various disciplines, including natural resources management, agricultural research for development, health service innovations, social innovations, etc. Such a wide array of research areas has led to various orthographical forms being used interchangeably. For example, horizontal and vertical scaling types are almost identical to scaling out and scaling up. At the same time, the lack of common taxonomy creates confusion among researchers by, for example, using the concept of scaling up to identify scaling out.

The first part of the work aimed to streamline the existing literature, which led to the identification of three primary scaling strategies for agri-food SMEs. The first strategy is scaling out (horizontal scaling), which involves a quantitative increase. The second strategy is scaling up (vertical scaling), which entails growth along the value chain either within or beyond the original industry. The last strategy is scaling deep, which refers to deepening roots within a particular community.

Over time, scientific works devoted to scaling have gradually moved from conceptual to empirical research. Different drivers and mechanisms to achieve scaling strategies have been identified. Key drivers represent enabling factors, including financial resources, management skills, and human and other input resources. Mechanisms represent various organizational activities aimed at achieving scaling. Depending on the type of organization, the mechanisms can also vary. Scaling out can be performed *via* geographic expansion, product or service diversification, and stimulating market demand to increase the covered communities and, as a result, profit. Scaling up is based on partnership building and integration, and finding policy support to bring fundamental changes embedded at the value chain and legislative levels. Scaling deep is achieved *via* spreading knowledge within cultures and transforming communities through learning.

4.2. Practical implications

Scaling strategies and mechanisms described in this paper can be considered by managers and owners of small and medium agri-food enterprises at all value chain stages. Also, various government entities and policymakers, NGOs, development organizations, and other important stakeholders of the agri-food sector can stimulate the scaling of agri-food SMEs.

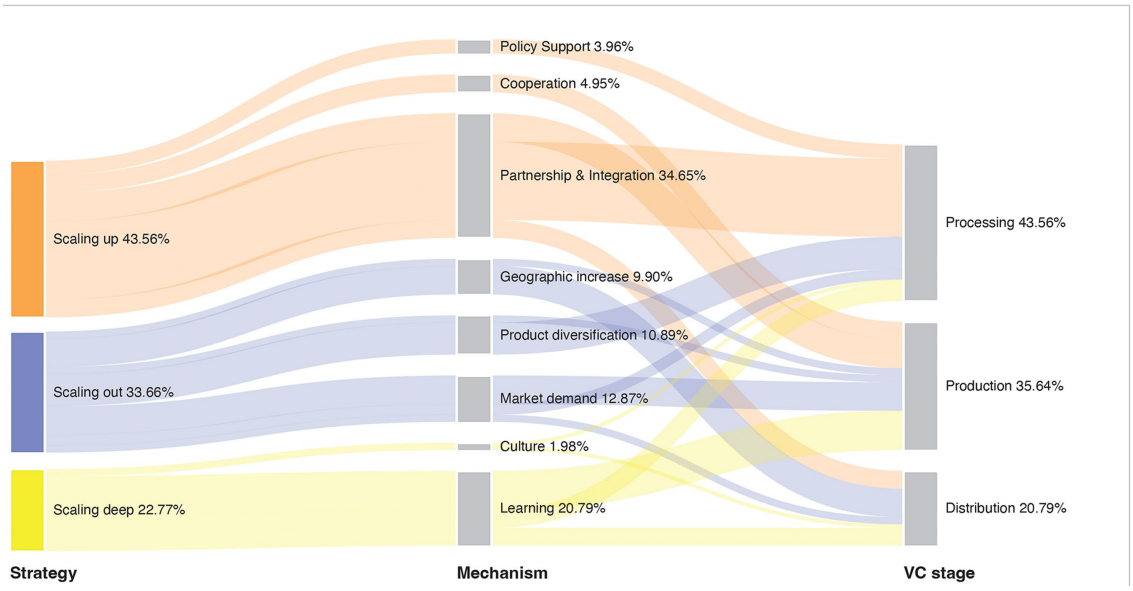

FIGURE 4
Scaling strategies and mechanisms used by agri-food SMEs at different value chain stages.

The review shows that to grow, agri-food SMEs mainly use scaling up (vertical scaling) as a primary strategy (Figure 4). The main mechanism under the scaling up strategy is partnership and integration. Agri-food producers mostly go into downstream integration and join into cooperatives to increase bargaining power, reduce market risks that negatively affect cash flows, and increase the value captured. They also use upstream integration to obtain access to various drivers, e.g., financial and input resources. Agri-food processors mostly use upstream and downstream value chain integration to strengthen market positions, alleviate risks associated with the quality of supply and obtain access to important distribution and logistics channels. The mechanism of finding policy support is the least used by agri-food SMEs. It is rarely used primarily by agri-food processors, while small and medium producers and distributors prefer other alternatives. In general, the vertical scaling strategy helps alleviate problems and risks related to the supply chain, such as quality and seasonality, financial resources, market, human resources, competition, logistics, partnership relations, management competence, and waste.

Scaling out (horizontal scaling) is the second most used strategy by agri-food SMEs focused on the quantitative increase of organizational performance. Under this strategy, it is easier for small and medium agri-food producers to adapt to the current market trends and consumer preferences for locally and organically grown products. They can do this *via* direct marketing activities such as farm gate sales, organic vegetable box deliveries, or third-party "agri-tech" platforms. On the other hand, food processors prefer more proactive marketing tools such as product improvements and diversification. The mechanism allows them to widen consumer segments and keeps processors focused on quality. For agri-food SMEs at the distribution stage, the most beneficial is to widen the geographic coverage *via* franchising or branching. The mechanism provides them with access to a greater number of consumers, thus, increasing sales. In terms of challenges, scaling out well protects against different market instabilities, high competition, product quality issues, brand awareness, low sales, political instabilities, COVID-19-like pandemics, etc.

Last, scaling deep allows achieving growth *via* affecting socio-cultural aspects of communities and *via* learning. Even though agri-food SMEs are mostly profit-oriented, the specificity of the industry implies making socially significant influences that indirectly affect growth. To scale deep, agri-food enterprises can use the learning mechanisms to disseminate knowledge about productive farming methods and crops among the producers. In the case of rural and poor households, the mechanism might also require cooperation with other enterprises to provide drivers, e.g., to finance seeds, fertilizers, and technical equipment. Also, agri-food SMEs can use learning mechanisms to educate consumers about different credence attributes of food (e.g., benefits of organically grown products, health, nutrition, or community support aspects) and food waste reduction techniques. Also, scaling deep can be implemented by spreading and changing consumer food preferences embedded in cultural values. Overall, scaling deep can be effectively used against such challenges as low productivity, lack of financial and other resources, low sales, and low consumer demand.

4.3. Future research opportunities and limitations

While the conducted review has improved the understanding of scaling, certain aspects have remained unexplored. It is still necessary to study in more detail which mechanisms are the most effective, for example, by collecting more information on market share and sales growth. Although some case studies provided such information, it was sometimes disguised and not consistently reported in the reviewed cases. Hence, further empirical research is needed to assess the performance of these strategies.

Also, a more in-depth analysis of the factors that affect the success or failure of particular scaling strategies and mechanisms is required, for example, by analyzing organizations that belong to more homogeneous environments (e.g., same stage of the value chain, region, size, type of product, etc.). Current research encompassed agri-food SMEs across multiple countries and regions, agri-food value chain stages, and over a long period to derive the general picture, following our key research objectives considering limitations in the time frame, the number of researchers involved, and financial possibilities.

5. Conclusion

In conclusion, the current study presents a systematic literature review of conceptual, empirical, and case studies on scaling strategies and mechanisms in agri-food SMEs published around the world over the period of 27 years. The review contributes to the existing literature by providing a comprehensive analysis and classification of existing scaling strategies and by identifying specific drivers and mechanisms available to small and medium agri-food enterprises to grow and expand their businesses.

The paper's first contribution is the improvement of the state-of-the-art in the field of scaling agri-food SMEs by systematizing rather dispersed research. Earlier publications focused on conceptual aspects of scaling and provided a broad definition base spanning a range of disciplines. Overall, the conceptual results were classified into three main scaling strategies: quantitative scaling out (horizontal scaling), scaling up (vertical scaling) along and beyond value chains, and scaling deep within a particular community.

The second contribution of the paper is *via* the review of empirical research, identification of drivers and specific mechanisms to achieve scaling strategies. Drivers of scaling are represented by such enabling elements as financial resources, management competence, and human and other input resources, including seeds, fertilizers, and agri-food equipment. Mechanisms represent activities that agri-food SMEs can implement to scale. To scale out horizontally, agri-food SMEs can use geographic expansion, product and service diversification, and market demand stimulation. Next, vertical scaling up is based on partnership building or establishing cooperatives (often with government support), value chain integration, and obtaining policy support. Last, scaling deep can be attained *via* transformative learning (external and internal) and spreading cultural changes.

Third, the analysis of case studies provides practical evidence of how agri-food SMEs can implement the mechanisms and scaling strategies considering the specificity of the value chain stage and product type. The results of the study can also be used by policymakers and researchers in developing appropriate strategies to support the growth and sustainability of agri-food SMEs, thereby contributing to the development of the agri-food sector and the economy at large.

Finally, the study also emphasizes the need for further research in the field of scaling agri-food SMEs, particularly in assessing the performance of specific mechanisms and factors affecting the success and failure of scaling strategies. Additionally, future research could focus on comparing

and contrasting the effectiveness of different scaling strategies across various agri-food value chain stages, regions and product types.

Data availability statement

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

Author contributions

EB and DD contributed to the methodology design and overall concept of the literature review. EB conducted literature research, analysis and wrote the initial draft of the manuscript. DD revised and edited the final draft of the manuscript. Both authors contributed to the article and approved the submitted version.

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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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