



Feeding future generations

How finance can boost
innovation in agri-food

Executive summary



European
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Executive summary

A new approach to food production

To make sure our production of food is prepared for the future, we need more innovation in the agri-food sector and we must reap the full potential of existing and new technologies. As this study will explain, we also need creative and ambitious financing on various levels.

Agri-food and the UN Sustainable Development Goals

The agri-food sector contributes significantly to the UN Sustainable Development Goals. Many of these goals are directly connected to the agri-food value chain, such as hunger, nutrition, global partnerships, jobs and economic growth. To nourish the 815 million people who are hungry around the world and the 2 billion extra people expected to be undernourished by 2050, investments in agriculture and food production are crucial. Such investments will increase productivity and create more sustainable food production systems.

The timetable for the UN goals, known as the Sustainable Development Goals (SDGs), is similar to the timeline for the European Commission's FOOD 2030 initiative, which emphasises the importance of research to create more sustainable, circular, inclusive, competitive and healthy food systems. The initiative calls for a better approach to innovation that deploys solutions for key issues such as food waste, which equals 20% of EU production. The initiative also calls for coherent policy actions that go beyond funding for research and development.



Figure 1: Contribution of the agri-food sector to the UN SDGs

Complex challenges

The agri-food sector is a strategic part of the European economy, but it faces many complex challenges. The sector's revenues of about €1.45 trillion are equal to 9% of the EU's gross domestic product and represent over 15% of Europe's manufacturing industry. Over 15 million people in the EU have agri-food jobs. The sector is a key driver of employment, particularly in peripheral or structurally disadvantaged regions of Europe. The EU is the world's largest exporter of agri-food products, amounting to over 17% of the EU's exports and generating a trade surplus of almost €30 billion.

However, the European agri-food sector is facing challenges regarding growth, fragmentation, low innovation spending and the slow uptake of new technologies. In addition, there are the bigger societal challenges like demographic growth, competition for resources and climate change. At an average annual growth rate of 0.7% over the period 2008-2017, total sales of the European food and drink sector have underperformed the growth rates in the US (1.6%) and China (10.8%). More than 99% of the companies in the sector are small businesses, which makes it hard to realise economies of scale, to be competitive on the global agri-food market and to take advantage of innovations.

Low participation in innovation

The sector's total annual private investment R&D of €3 billion is significantly lower than that of other key areas of the European economy, like the health sector, at €41 billion, or the information technology sector, at €34.3 billion. Less than 50% of all agri-food companies in the EU undertook innovation activities over the past three years, while only 9% innovated in core areas such as technology, products and processes. Demand for food is projected to increase by 98% by 2050, while the situation of available arable land and other natural resources is expected to remain unchanged or even deteriorate – creating a big demand for innovation across the entire food system. There is a lot of potential in the sector for invention by using a new set of digitalisation-driven technologies in areas such as precision farming, sustainable packaging and blockchain-based food tracing.

Innovation in the agri-food value chain is hard. Businesses in the agri-food sector are interdependent and generally compete more on price than on quality, innovation or environmental impact. Price competition, in combination with low margins and long payback periods, limits the appetite and possibilities for innovation and risk-taking. This also reduces the financing of agri-food innovation.



A study on R&D and innovation financing

The main objective of this study is to explore the financing practices of R&D and innovation in the European agri-food sector. The sector comprises agricultural production, food processing and food packaging. We want to identify areas where there is not enough financing and explore how better government policy can address these gaps. The study focused on four groups of high-impact innovations (as illustrated below).

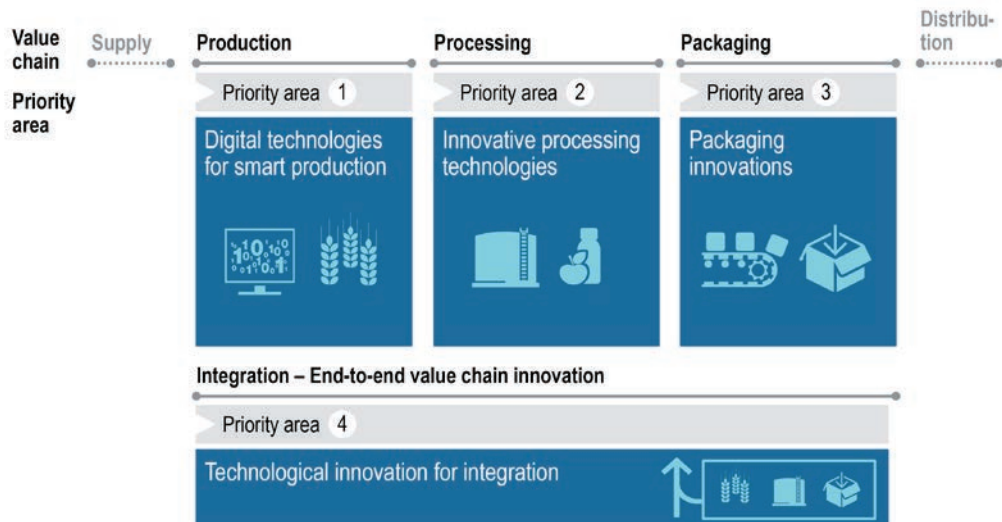


Figure 2: Selected priority areas along the agri-food value chain

- Digital technologies for smart production can make agri-food production more efficient and sustainable by reducing the use of fertilisers and chemicals to protect crops
- Innovative processing technologies are important for adapting to changing consumer demands and enhancing the efficiency of food manufacturing.
- Packaging innovations can reduce waste with biodegradable materials and new contact materials that increase the shelf life of food.
- Technological innovation for integration can optimise the use of resources and improve transparency by linking data from different segments along the agri-food value chain.

VOICES FROM THE SECTOR

“For our business, seasonality in terms of harvest cycles and consumer demand is a major factor. Our customers have to pay for our services early in the season, but mostly generate profit only at the end of the season.” – CEO of a company offering digital technologies for integration along the value chain

“Farmers are quite conservative. In our experience, they do not invest much per year and are quite risk-averse. Hence, it is key to convince the farmer of the added value. Furthermore, data handling is crucial.” – CEO of an innovative agri-tech company

“Digitalisation can increase consumer trust by ensuring transparency along the whole agri-food value chain.” – Founder of a company developing innovative technologies for food processing

The study involved 40 interviews with agri-food innovators, technology-driven start-ups, innovative small businesses, and mid-cap or established innovators. We also interviewed 20 agri-food financiers from commercial and public banks, and from the fields of private equity and corporate venture capital.

About 50 national and international good practices were screened and two workshops took place with sector experts, intermediaries (federations, research centres) and policy makers.

Ten key findings

Demand for new financing tools in the agri-food sector has steadily increased since the reform of the EU Common Agricultural Policy in 2013 and the shift towards the abolition of production and market support mechanisms. Institutions such as the European Investment Bank already offer a wide range of financial instruments to the sector, including loans, equity products, advisory services for national and regional governments, and guarantees.

The study confirmed the broader rationale behind these instruments, showing that there are barriers and opportunities. However, the study also highlights the need for more tailored and creative approaches to financing for the development and uptake of exciting new (e.g. digital) technologies. As the EU debates its next long-term budget, known as the Multiannual Financial Framework, the study's insights are timely.

The key messages of this study are:

- 1) The agri food sector is predominantly risk-averse and cautious
- 2) There is a lot of potential for digital, data-driven solutions
- 3) Financing is complex and dominated by specialised investors and financiers.

Here are the 10 key findings of the study:

Key finding	In detail
A predominantly risk-averse and cautious sector	
1 Risk-averse and cautious segment of the European economy	<ul style="list-style-type: none"> • This is mainly driven by consumer demand for safe and attractive food products, but also economic parameters like high cash flow cyclicity (resulting from long harvest cycles, seasonality and market volatility) and strong price competition • Prudence towards innovation and slow innovation uptake in the agri-food sector is not caused by scepticism, but appears to be a rational phenomenon related to the specific market characteristics

<p>2</p>	<p>There is a significant “barrier” preventing most agri-food producers from adopting new technologies</p>	<ul style="list-style-type: none"> • About 75% of the agri-food innovation developers interviewed agreed that the European agri-food sector is conservative in the uptake of new technologies • High reliance on tried-and-tested practices and little professional exposure to IT-based innovation (generational issue) • Innovation is typically incremental rather than transformational
<p>Digital, data-driven solutions have strong potential for disruptive innovation in the agri-food sector</p>		
<p>3</p>	<p>Digitalisation, consumer health and sustainability are key drivers</p>	<ul style="list-style-type: none"> • Digital, data-driven solutions like big data applications and data analytics, drones, robotics, and automation have strong disruptive potential in agri-food production • Potential to transform food systems, strengthen cooperation along the value chain, lower costs to scale and accelerate innovation, and increase sustainability
<p>4</p>	<p>Innovation is most intensively driven by highly agile, small agri-food innovation developers</p>	<ul style="list-style-type: none"> • About 67% of the agri-food innovators interviewed during the study that develop data-driven innovations have revenues below €1 million • Larger, well-capitalised industry players tend to take up these innovations through open, collaborative platforms and other knowledge-transfer approaches, like field labs, innovation hubs and other open-innovation activities
<p>5</p>	<p>Also in food processing and packaging, incremental innovation is prominent</p>	<ul style="list-style-type: none"> • Development and production of new food ingredients is a promising and growing subsector • In packaging, bio-based and biodegradable materials are a key area of innovation activity • Both sectors are highly driven by cost and heavily asset-based, with a reluctance to invest in disruptive innovation
<p>6</p>	<p>Data-driven technologies and services are key innovations for integration along the value chain</p>	<ul style="list-style-type: none"> • Technologies like blockchain-based smart monitoring systems aim at increasing supply chain transparency by allowing the product to be traced back to the specific farm • Importance of fair rules on data ownership and data protection in order to encourage data sharing

Fragmented and complex funding landscape dominated by specialised investors and financiers		
7	The European funding landscape is fragmented and highly complex	<ul style="list-style-type: none"> • A wide range of financing instruments is available at European, national and regional levels; applicants need to meet widely differing conditions • Small-scale post-start-up agri-food innovators mostly have trouble navigating Europe's multilevel financing and funding landscape • Market participants stress that supply does not meet the market's demand in an effective way. To match US agri-food financing, over €20 billion of additional financial investments per year would be needed
8	Importance of specialisation and sector experience; only few equity investors have so far entered the market	<ul style="list-style-type: none"> • Lenders and investors in the agri-food market need to be highly knowledgeable of the sector and must be able to provide "patient capital" • Margins in agri-food production and processing are typically low and innovation cycles are long (below average ROI/EBITDA margins) • The average holding period of a venture capital fund in the agri-food sector is about nine years, while the overall market average is six years
9	Finance needs to go hand in hand with knowledge	<ul style="list-style-type: none"> • Small-scale innovators in the agri-food sector are primarily looking for "intelligent money" from equity investors, especially in the early stages • They are specifically looking for investors with industry knowledge and relevant networks – only a few of which are active in Europe
10	Obtaining finance for growth is a key challenge	<ul style="list-style-type: none"> • The most frequently mentioned reason that finance was not obtained was an unclear or unproven business model. Other reasons were poor commercial outlook, limited financial track record and regulatory uncertainty • A visible financing gap exists regarding the scale-up of smaller agri-food innovators that earn €250,000 to €5 million per year • The agri-food innovators that reported difficulties in accessing finance were looking for loans of €250,000 to €1.5 million

CASE STUDY: AGRIVI – FARM MANAGEMENT SOFTWARE

- Founded in 2013 in Croatia as a Europe-based farming software company employing big data algorithms for farm management
- Team of agricultural experts and software engineers with farming background and a staff of about 32
- Financing of the company is ensured by private angel investors and Southern Central Ventures
- Customers are farmers of all scales in 150 countries
- Honoured by Barclays as a top 10 high-growth company in UK

Agrivi says, “Our software lets you plan, monitor and analyse all activities on your farm easily. Tillage, planting, spraying, fertilisation, irrigation, harvesting and all other activities are managed with a few clicks.” Agrivi employs big data algorithms to analyse and visualise farm data in a farmer-friendly manner. This means that elements like graphics or tables are developed from a farmer’s perspective. In the area of existing farm management software, Agrivi is one of the few providers that are transparent about data ownership. Farmers decide for themselves on the distribution of their data.

Agrivi’s software builds on existing farm data, which can either be supported manually by the farmer or collected through existing farm sensors. In the case of field treatments, the software compares the farmer’s current situation (soil fertility, weather forecast, etc.) with similar situations in the past and recommends the input combination that will achieve the best yield overall. This way, a large and constantly growing data pool analysed by big data algorithms enables Agrivi to define best practices and constantly improve them.



Five recommendations

The study makes five recommendations aimed at improving access to finance for innovative agri-food companies. Three recommendations address access to finance, and two focus on the broader environment.

VOICES FROM THE SECTOR

"In the agri-business, you can forget about the revenue in the business plan: the price depends on global markets and the quantity on the weather. What you can look at is the margin. Except if you have a company that sells branded products." – Head of debt financing of a large cooperative bank

"You need to be patient if you want to invest in the agri-food sector. Being a successful investor in agri-food is more difficult than in other sectors." – Managing Director of a venture capital fund

The recommendations are :

ACCESS TO FINANCE	
1	<u>STRENGTHEN CROWDFUNDING TO FINANCE AGRI-FOOD INNOVATIONS</u> Development of new and/or strengthening of existing crowd lending platforms (crowdfunding) dedicated to the financing of agri-food innovators
2	<u>FACILITATE ACCESS TO RISK BEARING/PATIENT CAPITAL FOR INNOVATORS</u> Enable the issuance and securitisation of mini-bonds to share risks and unlock investments for the adoption of agri-food innovations
3	<u>EXPLORE THE DEVELOPMENT OF A DEDICATED RISK-SHARING FINANCIAL INSTRUMENT</u> Further explore the development of a purpose-driven (risk-sharing) financial instrument dedicated to digital/data-driven agri-food innovators
SOFT MEASURES TO CATALYSE INNOVATION	
4	<u>SUPPORT THE ECOSYSTEM ON DIGITAL TRANSFORMATION</u> Empower Digital Innovation Hubs (DIH) to further prioritise their support activities for the digitalisation along the agri-food value chain
5	<u>SUPPORT THE RAMP-UP OF TECHNOLOGIES/INNOVATIONS</u> Support the broader rollout of field labs to increase the take-up/scale-up of promising technologies/innovations

Recommendation 1: Further develop and strengthen crowd-lending platforms (crowdfunding) dedicated to agri-food innovators

Agri-food is more than a strategically important economic sector. It is also crucial for society, because it provides affordable and sustainable nutrition for the population. An increasingly growing part of society, especially the young, are willing to pay more for sustainable food. This is important, as the sector is extremely sensitive to price changes.

Crowdfunding can give more financing to smaller agri-food innovators and it can connect consumers to small agri-food businesses. This type of funding has gained significant popularity in recent years, especially in the US (AgFunder or Barnraiser), and European platforms are starting to emerge (MiiMOSA, CONDA or platforms like Lendix). The agri-food sector can be suitable for crowdfunding, as the connection between the investor and the company (i.e. the agri-food innovator and its product) can be fairly close, geographically and conceptually. This type of funding could be supported by blockchain technology, offering transparency and a direct connection between the investor and the small business. Furthermore, the results of the investment can be seen and are tangible. For example, a company developing sustainable packaging sold at local supermarkets or at regional farmers' markets, where investors live and shop, offers a direct connection between the investment and the investor.

The financing gap for small-scale agri-food innovators, especially in smart technologies, will not be filled by the market alone. This suggests that there is space for public financial institutions. Also, the investors in sustainable investments usually expect lower returns than venture capitalists. Using equity offerings on a crowdfunding platform, which would let the public invest in small businesses, will bring more capital to agri-food innovators. In addition to partially addressing the financing gap, crowdfunding for agri-food would raise awareness of the importance of the sector, create a direct local link with society and have a positive effect on the Bank's decision to finance agri-food projects, due to the equity contribution to the small businesses' capital.

We should explore the potential for equity crowdfunding platforms to help agri-food innovations, while enhancing the role of public financial institutions such as national promotional banks or the EIB Group. The establishment of pilot projects in innovation hotspots in the European agri-food sector could be a good first step. This could start via an established crowdfunding platform such as Oneplanetcrowd in the Netherlands, a crowdfunding platform that focuses on sustainable investments. In 2017, the EIB Group, through the European Investment Fund, joined with the European-based Lendix platform to increase crowd lending for businesses via a joint investment fund backed to the tune of €18.5 million. Similar platforms relevant to agri-food could benefit from this type of support and provide even more investment to the sector.

Recommendation 2: Enable the issuance of mini-bonds to share risks and unlock investment in agri-food innovations

The uptake of innovations as well as investment in innovations are slow, mainly due to the financial risks that farmers and small businesses face. The financiers, including commercial banks, are not willing to accept this risk. This prevents many farmers and small businesses in agri-food processing and packaging from adopting smart technologies. The issuance of mini-bonds at regional, national and European levels could address this barrier. Such a risk-sharing structure would provide farmers and small businesses with extra money to invest in innovation and let them share the risk with other farmers and businesses, for example through the involvement of cooperatives (see illustration below).

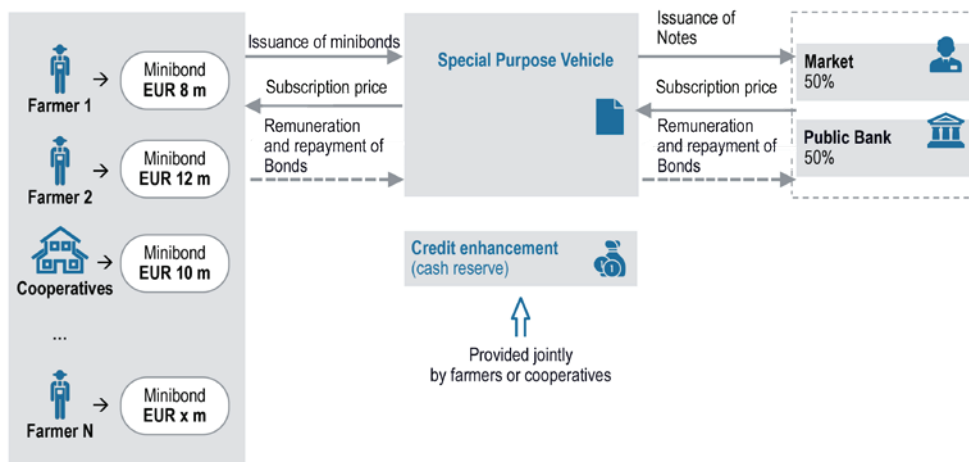


Figure 3: Illustration of financial structure based on the issuance of mini-bonds

In 2012 and 2013, Italy introduced legislation to facilitate the issuance of mini-bonds for small companies not listed on the stock market (those with more than 10 employees and sales of more than €2 million) as a response to the sovereign debt crisis. With the support of an advisor, small and medium-sized companies issued mini-bonds, which provided investment opportunities for concrete projects. In 2016, the Italian cooperative Faro Società Cooperativa Agricola issued mini-bonds, showing their ability to attract finance in the agri-food sector. Similar mini-bond markets exist in the UK, France, Spain, Germany and Norway. Once the legal framework and trading systems are in place, innovative securitisation structures can be designed. A structure that demonstrates the functionality was developed, together with the EIB, by eight Italian water utilities in the Veneto Region in 2014 (Viveracqua). This structure uses mini-bonds in combination with the well-established Italian securitisation legal framework to finance medium and small-sized water companies that have trouble getting long-term loans because of their risk profile. This was the first case of self-financing by medium-sized enterprises in the capital markets through securitisation – without using a bank as an intermediary.

A similar instrument could be used by European farmers, cooperatives and small agri-food businesses. It would enable farmers and agri-food businesses to invest in innovations by raising money through mini-bonds issued on a cross-collateralised basis. This would then enable a larger loan, possibly supported by a credit enhancement instrument. The farmers and businesses would have a better credit standing due to risk diversification and the credit enhancement facility.

Recommendation 3: Explore the development of risk-sharing financial instruments dedicated to digital, data-driven agri-food innovators

The market analysis shows that smaller agri-food innovators that focus on digital, data-driven offerings find it particularly difficult to access financing in order to grow, as opposed to financing

to launch a start-up. During the interviews with agri-food companies, 61% of small companies with revenues below €10 million per year reported that obtaining financing had been “difficult” or “very difficult.” These companies have typically developed an innovation and are in the process of setting up final pilots or entering the market. Mobilising sufficient equity is the largest financing constraint for these smaller agri-food innovators wishing to grow their business. This is particularly true for digital innovators that use a virtual business model and do not have a financial record to demonstrate their accomplishments.

The equity volumes required to finance this scale-up phase are comparatively small. The agri-food innovators with the largest difficulties in obtaining equity finance seek up to €5 million, and very few seek up to €30 million. However, according to specialised investors, the small volumes of financing are not the barrier. The effort needed to conduct due diligence and process the investment decision takes time due to the specificities of the sector. Hence, even specialised investors cannot cater for a larger number of companies that need equity. Digital Innovation Hubs could support these investors in their due diligence processes.

On the financing side, the study suggests exploring the idea of setting up a financial instrument (or an investment platform) providing low-volume financing to agri-food innovators with a higher risk profile (due to longer lead times and high seasonality as well as a lack of conventional collateral). The ticket sizes could range from €250,000 to €5 million. Fund managers have indicated that a fund of about €50 million to €100 million should be able to support the activities of 75 to 100 small-scale innovators in the European sector. Investors from the private or public sector (such as national promotional banks) should be engaged to commit capital to these funds. There could also be financing options under the European Agricultural Fund for Rural Development, which would further stimulate innovation in the agri-food sector.

Recommendation 4: Empower Digital Innovation Hubs to further prioritise their support for the digitalisation of the agri-food value chain

The findings show that digital innovations and data-sharing technologies can be highly disruptive and create considerable value for the agri-food sector. For example, blockchain-based applications that integrate the entire value chain are particularly appealing because they make it possible to store and exchange information from different actors along a food product’s supply chain in a decentralised and tamper-proof system.

Digital Innovation Hubs help small businesses, large industries, start-ups, researchers, accelerators, and investors. They aim to create the best conditions for long-term business success for everyone involved. These hubs can develop test cases, for example, on the application of blockchain technologies or other digitalisation technologies to help the development and uptake of agri-food innovations. Young farmers and small agri-food entrepreneurs who are changing the business model when taking over a company are particularly open to new technologies and

require specific support. Hubs can also provide comfort to investors because, when they provide services to a company, this guarantees a certain level of quality. Hubs can provide a local contact point too, and act as a bridge for the regional community, which increases connectivity.

An EU-supported project called SmartAgriHubs is trying to build an extensive network of Digital Innovation Hubs across Europe to help agriculture. The project is supporting a broad digital transformation of the European farming and food sector. With a €20 million budget co-funded by the European Union, the project aims to set up 140 Digital Innovation Hubs, 9 regional clusters and 28 flagship innovation experiments. These kinds of initiative will have a major impact on the digital capabilities of the agri-food industry. To build on this initiative, we need targeted input at local, national and European levels to make sure everyone understands the objectives and to organise the financial resources.

Recommendation 5: More field labs to increase the scale-up of new technologies and innovations

Agri-food innovators not only lack financing but also need knowledge and expertise. Larger agri-food corporations are more likely to innovate if they use knowledge-transfer approaches like open collaboration platforms or field labs. These labs enable small-scale industry innovators to collaborate on projects via open innovation platforms or hubs (such as HENRi@Nestlé and The Unilever Foundry, established by Nestlé and Unilever). In such a setting, the labs usually provide resources such as venture capital, market knowledge or testing facilities for the small-scale innovators. In turn, the labs gain access to new technologies and disruptive innovations from the smaller and more agile companies. The labs can incorporate these innovations into their global production processes and product portfolio.

Mid-caps and even larger corporations often do not have the resources to establish and manage field labs with numerous stakeholders on their own. To enhance innovation and unlock innovation financing, we recommend that the European Commission support the expansion of field labs, perhaps with the financial and technical assistance of national innovation agencies, national promotional banks or the EIB Group.

Agri-food mid-caps could work together to set up field labs comprising a number of small-scale innovators. This would jumpstart business development. For example, a brewery or a dairy and a packaging innovator could set up a field lab with small-scale innovators that develop digital solutions to safely share data among the farmer, the manufacturer and the packaging company. These solutions could increase the shelf life of the drinks. The cluster could include innovators from the packaging sector that develop smart labelling technologies. The mid-caps involved can use the products and technologies developed by the small-scale companies and improve their innovation capabilities and competitiveness. Field labs may also help unleash corporate venture capital for scaling up promising technologies and introducing them to the market. Larger firms could take an equity stake in or enter into a joint venture arrangement with a small but innovative firm, and they could also provide management and marketing expertise.



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