10 tips for going digital in the spice and herb sector

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Digitalisation is already a part of our normal daily lives, not only in Europe but worldwide. It is also becoming increasingly important in the sourcing of spices and herbs. New trends include the use of sensors, digital tools and online activities to make the whole supply chain more transparent and sustainable.

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1. Monitor digital trends from the farm to the fork in the spice and herb supply chain

The spice and herb supply chain is long and comprises many steps. Various digital innovations are increasingly being used at each of these stages. Sourcing starts at the level of the farmer where smart applications and precision agriculture are increasingly being used. It then continues at the level of the processor where many advanced process technologies are being developed. Export operations are tracked using digital traceability solutions. Finally, consumers have access to more information about spices and herbs they eat by using scannable QR codes.

- At the level of the farm, precise methods are employed to reduce the use of pesticides and to use irrigation and fertilisation more efficiently. Advisory services such as digital support tools and automatic weather stations are increasingly being used. As many advanced technologies require small producers to make large investments, low-cost smartphone applications are being developed in spice- and herb-producing countries.
- At the level of the processor, new technologies, equipment and databases enable precise measurement of the main quality parameters for certain products. This improves transparency and control over quality and food safety issues. In the spices and herbs sector this involves monitoring parameters such as moisture, density and seed size, as well as controlling contamination with foreign bodies. Process automation and artificial intelligence are also key trends.
- At the level of the sector, lots of data is collected to establish quality parameters and gather market data. For example, leading laboratory testing companies such as Eurofins Genomics use next generation sequencing to establish the authenticity of products. This DNA fingerprint database contains unique

identifying characteristics (the "fingerprints") of foodstuffs and makes it possible to obtain proof of authenticity, which was not previously available.

- Online trade events have become a solution for the temporary ban on large physical events due to the COVID-19 pandemic. Several leading trade fair organisers started organising online platforms and events in 2020. For example, instead of the physical trade fair SIAL in Paris, online events such as ANUGA@Home, SIAL Innovation or SIAL Insights online, have been held. Food Ingredient Europe organised the digital FI Connect matchmaking event.
- Online food sales grew significantly during the COVID-19 pandemic in 2020 and 2021. Exporters of spices and herbs still sell most of their products in the traditional B2B way, but many of them are switching to online marketing. Some of the large traders and processors have established online sales platforms. Olam Spices, one of the world's largest processors and traders of spices and herbs, is one such example. However, most spice companies still use online sales platforms mainly for domestic transactions, rather than for export shipments.
- During transport blockchain technology is increasingly being used to reduce the costs of intermediaries. Blockchain systems allow each stakeholder in the supply chain to view the progress of goods throughout the supply chain, monitor the container movement in real time, and see the status of the customs documents. In addition to tracking the goods, blockchain technology can be used to encrypt important documentation (e.g. regarding quantities or prices and contracts).
- At the consumer level many mobile applications now help consumers make better informed food choices. Online shopping has taken off due to the COVID-19 pandemic. Although online shopping is used primarily for local purchases, some spice and herb products can now be bought directly from the source. For example, Biobhutan's website enables consumers to buy directly from the origin and pay by credit card. Finally, producers use QR codes on their retail packaging to inform consumers about the place of origin and farmers, and to show greater transparency.

The most important digital trends throughout the supply chain of spices and herbs will be examined in more detail in the following chapters.

2. Helping farmers use available phone apps and smart agriculture for better yields

These days, many farmers worldwide are already using digital technologies with the help of smartphones, sensors, drones and satellites. These technologies provide a range of solutions for producers of spices and herbs, such as remote measurement of soil conditions, better water management, forecasts of pest and disease emergence and crop monitoring. The most important fields of farming digitalisation include precision farming, decision support tools and robotics.

A recent project (launched in April 2021) that focuses on digital agriculture is SpiceUp. This project combines advanced satellite technology, the internet, and information technology to support black pepper producers in Indonesia. The programme is funded by the Netherlands Space Office and involves several partners. The lead organisation of the SpiceUp consortium is Verstegen, one of the largest Dutch spice processors and traders.

One of the results of the project is the development of the SpiceUp smart phone application for pepper farmers. This app supports different actors in the black and white pepper chain, such as farmers, buyers, agricultural input providers, financial institutions and governmental organisations. For example, the app gives farmers customised advice on water management, fertilisers and agricultural techniques. Farmers also receive alerts regarding the pests and diseases specific to their crop or region, based on weather forecasting.

The app enables spice collectors to use farmer QR codes to collect specific data regarding farm size, pepper variety, and yield, for example. Via the geodata intelligence platform, SpiceUp provides pepper buyers (collectors and processors) with information about soil and weather suitability (specific to the pepper variety and its needs), good agricultural practice, and traceability info of the pepper produced by farmers in the specific buyer's network. The market price can be accessed and used as input for farmers' transactions.

Figure 1: Main page of SpiceUp app

Figure 2: SpiceUp app page for monitoring pepper plots

Source: Google Play

There are several more examples of phone apps in combination with digitalisation in farming that support spice and herb producers around the world. Some notable examples are explained below.

Precision farming

The use of sensors in agricultural machinery is an important trend, as demonstrated by the fact that up to 80% of new machinery is equipped with sensors and actuators (pdf). The most commonly used types of precision farming in the production of spices and herbs are irrigation and fertilisation based on real-time plant needs. Precision farming is still not widely used by most smallholders in the spice- and herb-producing countries, but several examples of small farmers who have already adopted such methods are given below:

- In Kerala, one of the largest Indian spice- and herb-producing regions, the Qore3 Innovations start-up developed several high-tech farming solutions. Several farmers, including producers of herbs (mint, celery, parsley, thyme) and spices (coriander and oregano), use high-tech farming techniques such as micro-irrigation and precision fertilisation.
- Another initiative supporting cardamom growing in Kerala is preparing to launch. The Spices Board, Rubber Board, and the Digital University of Kerala have signed a memorandum of understanding to create spatial models of soil nutrients in cardamom fields. The aim of this initiative is to develop an Android-based mobile app for cardamom farmers to provide them with site-specific, need-based fertiliser recommendations.
- In Malaysia, Kairos Agriculture has launched the first Smart Vanilla Farm in Penang, which uses Agriculture 4.0 technologies including Internet of things (IoT), Big Data, AI and Machine Learning. This system includes the use of crop residue as compost, the production of Efficient Microbes, an automated irrigation system, a rainwater harvesting system and full-LED usage in the farm.

Decision support tools

The range of decision support tools is extensive and includes software solutions for farmers (such as bookkeeping, planning and agricultural science), software connected to weather stations used to plan plant protection, determination of the best time to harvest, and many others. An example of an application available for farmers worldwide is 365 FarmNet, which helps farmers automate documentation, plan and manage time, get important weather data, and apply fertilisers and pesticides. Some more examples are illustrated below:

- Olam International uses an integrated smart agriculture system in the production of black pepper in Vietnam and Brazil. This system uses automatic drip irrigation, weather stations and real-time monitoring. Thanks to real-time monitoring, this smart system can predict the emergence of phytophthora (a fungus type disease) and implement protection measures in good time.
- Indian company WRMS has developed the SecuFarm smart farming solution. This solution is used by producers of cumin seeds who do not have the financial means to invest in advanced equipment. By installing the SecuFarm app farmers get customised farming advice in easy-to-understand local language. The system uses soil information based on satellite screening and timely weather alerts. The Plant Doctor feature allows the farmers to upload the images of their crops and consult the Agronomists in case of any crop diseases.
- In South Ethiopia, the project Farm Africa supported the equipment of many farmers (including spice producers) with systems to react based on the weather conditions. The system uses text messaging, a

mobile app and a website to deliver a combination of information that matches agricultural techniques with weather events and market trends.

Mobile banking

Mobile banking is a very important digital tool that is frequently used in Asia and Africa. It is an excellent low-investment tool that replaces risky cash payments and can be used by anyone who has a mobile phone. Smartphone applications have in general increased the market transparency and enable even small farmers to follow the fluctuating spice market prices daily.

In Tanzania, for example, where the agriculture sector employs 75% of the population, nearly half of all adults have been excluded from traditional banks. By making financial services accessible and convenient, initiatives like Tanzania's Tigo have helped increase access to financial services. More than 9 million people in Tanzania currently use Tigo Pesa to easily make or accept payments using their phones.

3. Increase your yield using robotics solutions for spice and herb production

The robotics solutions currently used in agriculture include robot picking, harvesting and weeding machines, precise pesticide applicators and drones. Drones are used on larger farms to help farmers closely monitor plant and soil conditions. They can help with irrigation and harvest planning. Several European projects support developments in the area of robotics for agriculture, including a robotic herb harvester in Denmark.

The implementation of robotics in spice and herb production is still in its infancy. It is not yet used by many suppliers in developing countries, but its use is sometimes supported by large multinational customers or international support organisations. For example, the international non-profit-organisation CABI supports the use of drones in Africa to protect crops against desert locust.

The European Union strongly supports digitalisation and high-tech investment in agriculture. To find the latest information on the current projects you can search the official database of the European Commission for digital farming research needs. Some of the recent projects include Internet of Food & Farm 2020 (33 case studies of digitalisation solutions in agriculture), ATLAS (a digital service platform for agricultural applications), FI-ORAMA (Orchards Automated Management) and DEMETER (smart farming platforms delivered through 20 pilot projects in 18 countries).

Tips:

Invest in the digital skills of the farmers who supply you to increase the sustainability of your production. Go step by step, and teach farmers basic digital skills first before moving on to more sophisticated software and equipment. You can start by showing them how to use a smartphone, computers, email, web searches and basic applications. A basic understanding of digital fundamentals will enable farmers to manage more specialised software, applications and machinery later.

Watch the SpiceUp YouTube channel to become familiar with the black pepper smart application and its features.

Check the Plantwise digital tools for the protection of plants from diseases and pests. Plantwise programmes are already available for spice and herb producers in many developing countries in Africa, South America and Asia.

Invest in the network connectivity in rural areas in your country. Many farmers do not have a good internet connection in their villages. Cooperate with network solution providers to find ways to support farmers. Good networks are needed in order to implement the digitalisation improvements in your supply chain. One solution is to instal solar-powered WiFi base stations with access points placed in the centres of the villages.

4. Become more competitive by automating your spice and herb processing

The digitalisation and automation of spices and herbs processing is not a new development, but the use of a digital system is more commonplace among large companies or after importation of raw materials in Europe. In developing countries, the spice companies usually invest in cleaning technology first, as a high degree of cleanliness raises the quality grade of spices and herbs. Buyers in the international market expect to receive a cleanliness specification of the spices and herbs on offer.

Within the supply chain of spices and herbs, digitalisation can help you become more efficient and improve your product quality. Digital solutions are used in many aspects of spice processing, such as cleaning, sorting, sterilisation, mixing and quality assessment. You do not need to implement all digital solutions available, but using the ones that increase your competitiveness is helpful. Therefore, careful market research is recommended before you make these (often expensive) investments. Please note that this might result in you becoming a competitor of some of your current customers, which they might not appreciate. Some important trends at different steps of the spice and herb supply chain are described below:

- Automation of cleaning equipment – High quality spices and herbs must contain as little external matter as possible. European buyers often request products that are more than 99.5% free of any external matter, such as dust or other parts of the plants. Random samples of spices and herbs are taken to measure their cleanliness. To ensure that each sample of the export lot will satisfy customer demands, equipment producers have developed advanced high-tech solutions.

Cleaning equipment usually uses systems such as sieves and air flow to remove external matter. Modern machines use automatic adjustment of air flow according to the specific characteristics of the spices and herbs. Multinational company Bühler, which provides cleaning systems such as magnetic separators, seed separators and universal cleaning machines, is an example of a company that produces advanced spice and herb cleaning equipment. All equipment can be connected to a digital platform such as Bühler Insights.

- Use of sensors for the optical sorting of spices and herbs - Sensors are already used in the sorting of products that are classified by size, such as seed spices and whole unprocessed spices. In addition, X-ray and optical automatic sensors are used to detect foreign bodies. Optical sorters are widely used in spice-producing countries such as India, China, Vietnam and Turkey. Additionally, the colour (ASTA-value) of dried chillies and paprika (capsicum) can be measured digitally. For example, Hunter Lab has developed customised equipment and software to classify powdered capsicum in colour categories.
- Artificial intelligence for assessing aroma, quality and authenticity of spices and herbs - Advanced quality assessment can be performed by an electronic nose – a sensing device that detects odours and flavours. For example, the leading spice company McCormick uses artificial intelligence to develop new flavours. This equipment can also be used to safeguard product authenticity, as ground spices and herbs are high-risk products when it comes to food fraud.

A good example of the use of artificial intelligence to assess the quality of spices and herbs was created by the Sri Lankan company SpectrifyAI. The company developed a unique approach, using German technology to test the quality and composition of spices, herbs and tea by means of spectral analysis. This technology scans products, and with each scan, its artificial intelligence algorithms learn and understand more about the unique light patterns. The advantage of this technology is that it does not require samples to be taken.

- Process control in drying and heat sterilisation of spices and herbs - Heat sterilisation is becoming the only acceptable option for many European buyers, as it is natural and chemical- and radiation-free. Steam sterilisation is the most frequently-used option for the decontamination of spices and herbs. Equipment producers such as Ventilex have developed specialised operating software that individually sets and tightly monitors process parameters such as critical temperature, treatment time and pressure.
- Use of digital instruments to assess quality parameters – These include digital instruments to measure moisture and density. New laser equipped machines are increasingly being used for density control.
- Full automation of the production process – Fully automatic lines are used in the processing of spices and herbs for operations such as grinding, mixing, chopping and vacuum packing.
- Use of robots for precise operations – There are many examples of robot applications in the food industry. In the processing of spices and herbs, the use of robots is in its infancy. For example, one of the leading European spice companies, Euroma, has built a plant that uses laser-operated automatic guided vehicles to collect dry components.

> ## Tips:
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> Prepare a cost–benefit analysis before investing in modern processing equipment. The best way to do it is to contact some of the well-known equipment manufacturers before investing. Examples of makers of spice and herb processing equipment are Bühler, Tomra, BHS Sonthofen, Daxner, Derichs, Amixion, Lödige and Sesotec.
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> Search the database of ANUGA FOOD TEC exhibitors to find the best equipment and digital solutions for your processes. You can select 'processing technology' from the menu and then 'aroma, essence and spice technology'. More specifically, to find digital solutions, select 'automation, data processing, controlling and regulation technology'.
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> Consider cutting your production costs by investing in used but high-quality equipment. Check the websites Industrial Auctions or Troostwijk Auctions to find the equipment that best suits your needs.

Large data sets and advanced analytic methods are used to assess the quality and authenticity of spices and herbs, to gain insight into food safety issues, and to analyse the international market.

- Quality and authenticity of spices and herbs - A notable example of the use of big data for analysing the authenticity of spices and herbs is Eurofins. Eurofins uses large numbers of samples collected in its global network of laboratories to gather information about different spice varieties (such as chilli types), check whether vanilla is natural or synthetic, or to verify the products' origins. Eurofins has patented SNIF-NMR stable isotope analysis to check the authenticity of food, including spices and herbs.
- Checking food safety issues in spices and herbs imported to Europe – The EU has developed a tool to ensure the flow of information and a quick response when risks to public health are detected in the food chain. This tool is called the Rapid Alert System for Food and Feed (RASFF). Food inspectors in all EU member states collect information about the reasons why different food products have been rejected by the market and send those data to RASFF. You can find information about the main issues with spices and herbs by checking the RASFF portal and selecting the subcategory 'herbs and spices'.
- Analysing international trade in spices and herbs - One of the best solutions for developing country exporters is to use the available international trade tools such as Trade Map. Trade Map transforms large volumes of primary trade data into a user-friendly and interactive format. To find information about spice and herb trade, do an 'advanced search' and select the product of interest under product group 09 – "Coffee, tea, maté and spices". The statistics page of Acces2Markets portal is another useful data tool.
- Use Big data in market research - Several marketing research companies regularly collect extremely large data sets related to retail sales of food items to identify consumer behaviour and trends. Those companies sell data to commercial companies to help them innovate and make better marketing decisions. Notable examples are the data of the companies Mintel and Innova Market Insights. However, for most small and

medium-sized companies, the large data sets of leading data providers are too expensive for daily use.

- Big data in agriculture - Another field where big data is available is agriculture. Some of the most famous free platforms for agriculture and food data are Global Open Data for Agriculture and Nutrition and CGIAR – Platform for Big Data in Agriculture. You can check these platforms to find solutions to agricultural problems such as the organisation and planning of production.

6. Use business software for easier control of spices and herbs processing and export operations

Enterprise resource planning (ERP) software applications have been used over the last couple of decades to improve planning and optimise the use of company resources. A lot of ERP solutions are general, but some are customised for food producers such as NetSuite, SysPro, Food 365, Columbus Food or Aptean Food and Beverage.

ERP can help spice processors improve the organisation and cost monitoring of raw material orders, processing, shipping and traceability. A lot of numbers can be entered into an ERP system for full traceability of raw materials and finished spice mixes. The labelling and tracking of spices can help you find the products that contain allergens or contaminants in case of a recall. Specific features can be used for exports, for example for processing orders automatically or sending shipping documents to the customer.

Some ERP software companies have developed specific solutions for the spice and herb industry. Examples include Aptean for Spices and Ingredients, Parity Factory for Spices and Flavourings, Batchmaster Seasonings & Additives and ProcessPro Spices & Seasonings. With this software, spice processors can better manage raw spices and ensure separation of products according to shelf life, allergen risk and origin. ERP software can also set mandatory quality checks for each type of spice or herb, such as cleaning procedures, storage temperatures and finished product reviews.

ERP solutions are particularly useful for producers of added value spices, such as standardised or customised spices mixes. Software can ensure that spices and herbs blends are mixed properly, by monitoring the exact quantities of ingredients. Software can also assist with checking quality characteristics such as flavour, colour, texture or aroma, and generate laboratory analysis results for customers.

Most ERP solutions are developed and used by large companies and are too costly for smaller enterprises, but an increasing number of applications are becoming available that are suitable for smaller companies. You can try some of the cheaper solutions that specifically designed for different aspects of your business. Examples include software for accounting, organising, team management, note-taking, time management, business planning, video conferencing, job scheduling or CRM management.

7. Ensure traceability of your spices and herbs using digital solutions

Warehousing – Key issues in spice and herb logistics are full traceability and control over contaminants and allergens. It is important to store potential allergens separately from spices and herbs. To make logistics operations more efficient, companies have started to invest in automated warehouses that are operated digitally. Modern palletising solutions include robots, automated guided cranes and motion control systems.

One of the most notable examples of automated warehousing is the system employed by Dutch spice company Euroma. It uses a robotised warehouse with automatic pallet cranes, in which robots deliver and collect the pallets. However, keep in mind that automatic warehousing requires large investments and might not be the best solution for all aspects of spice processing. For example, fully automatic warehouses work very well with fixed (well-stacked) pallet sizes. As many spices and herbs have different packaging materials and sizes, keep in mind that this might cause problems in a fully automatic warehouse.

Although warehouse automation is often too expensive for small companies, you can still use software solutions for better warehouse and container management. For example, German company GQM has developed warehousing management software that can help you manage current stocks, empty pallets, control the loading of the vehicles and comply with the European food safety standards. You can also use simple smartphone applications such as Stock and Inventory Management System or Inventory Management.

Transport and export shipment - A trend in the area of transport and logistics is the development of blockchain technology to reduce the costs of intermediaries. Blockchain systems allow each stakeholder in the supply chain to view the progress of goods throughout the supply chain, monitor container movement in real time and check the status of the customs documents. In addition to tracking the goods, blockchain technology can be used to encrypt important documentation (e.g. with regard to quantities or prices and contracts).

An example of a business which has successfully used blockchain technology for the sourcing of spices and herbs is leading Dutch spice company Verstegen. By scanning the QR code on a package of nutmeg it is possible to learn more about the place of origin in Indonesia and to see which farmer has grown a particular packaged spice. Among the interesting features offered by this application is the ability to check the price charged by the farmer. The farmer can use a phone app to confirm anonymously whether price agreements have been fulfilled so other players in the chain can see whether or not the farmer was satisfied with the price.

Leading spice and herb exporters are becoming more interested in the use of blockchain technology to make the supply chain more transparent. For example, the Indian Spice Board has signed a memorandum of understanding with the United Nations Development Programme (UNDP) Accelerator Labs to build a blockchain-based traceability interface for Indian spices. The project will be piloted with more than three thousand chilli and

turmeric farmers in select districts of Andhra Pradesh.

Another blockchain programme in development concerns the sourcing of vanilla from Madagascar for cosmetic products. In February 2019, Aveda (brand of Estée Lauder Companies) partnered with IFF, local Madagascar vanilla supplier Biovanilla, non-profit organisation BSR, and blockchain innovation partner Wholechain to launch a pilot programme to leverage blockchain technology in its Madagascan vanilla supply chain. The programme is expected to be launched in 2021.

Aside from complex systems such as blockchain, there are much cheaper solutions you can try. An example is Asset Tracker, an application that enables the remote tracking, monitoring and management of trucks, tankers, containers and farm equipment. Another example is fleet, with which you can access a GPS server to track your fleet on your smartphone.

> **Tips:**
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> Search warehousing solutions. You can find out about solutions offered by companies such as BMS Maschinenfabrik, Blumenbecker, Vanderlande, Dematic, Ocme, movisWarehouse or SSI Schäfer Fritz Schäfer.
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> Learn about computer programs that allow you to calculate and design packaging as well as plan the best arrangement of the goods inside containers and trucks. Examples include ShipHawk, Logen Solutions, Easy Cargo, packVol and TOPS Pro.
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> Use the shipping company's Track & Trace facility to follow your container and proactively communicate any delays to your customers. This might help you avoid claims.
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> Monitor the developments of blockchain applications in international transport and logistics from companies such as Maersk, Zim or Accenture.

8. Offer your spices and herbs through online digital platforms

Spice and herb processors can use e-commerce solutions in several different ways. The most interesting opportunities are explained below:

Digital trade events – Due to the COVID-19 pandemic many trade event organisers have switched to online-only platforms, or "hybrid events" that involve a combination of physical and online participation. Most events include access to virtual matchmaking tools that can be used on smartphones or computers. Examples include Digital ANUGA@Home 2021, Biofach 2021 or FI Europe. The example in Figure 7 illustrates matchmaking options displayed after searching for ginger suppliers in the online platform 'talkue' which was used for the digital edition of Biofach 2021.

Figure 3: Interface of the online platform of Biofach 2021

Source: Autentika Global

Online B2B marketplaces – The spice and herb trade is a face-to-face business, and most long-term partnerships are still formed after personal introductions, analysis of samples and factory visits. However, due to travel restrictions in 2020 and 2021 caused by the COVID-19 pandemic, the number of business deals conducted

online is increasing. Some spice-producing countries developed trading platforms even before the pandemic. One such example is by the Indian Agricultural and Processed Food Products Export Development Authority (APEDA). APEDA has launched the Agri Exchange platform where suppliers and buyers can search for offers in specific spice categories.

The Spices Board of India has developed a specific spice trade platform – eSpice Bazaar. This platform serves not only as a simple trade tool, but it includes many support functions for different actors in the supply chain. For example, it contains a lot of useful information for farmers and spice buyers. It also uses global location numbers and serial shipping container codes to enable traceability between trading partners throughout the supply chain.

Another notable example is the Saladplate platform developed by Informa Markets. Saladplate is an international platform, but it focuses on sourcing from Asian countries. After taking out a subscription, buyers and sellers can use an advanced matchmaking tool that allows for considerable customisation. Another example specifically developed for organic food is Greentrade. You can search current buyer announcements under the under the category 'herbs, spices and condiments', but if you want to view the contact information of the company you need to subscribe.

In the spice and herb sector, B2B marketplaces are mainly used to connect European buyers with suppliers from other continents. However, overseas orders are not usually placed online. Online orders are frequently placed by food operators within Europe (such as processors or home delivery restaurants), but very rarely for imports from countries outside of Europe. Still, B2B platforms are frequently used by buyers and suppliers to connect with each other.

Online trading communities – Another way to connect with spice and herb traders is by participating in communities on social media such as LinkedIn or Xing. These professional networks are increasingly being used to find companies and professionals. Examples of specialised spice and herb trading groups include Spice Network (with more 6000 members), Spices and herbs buyers suppliers forum (6000 members) and Spice Trade Professionals (almost 5000 members).

> **Tips:**
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> Visit the websites of leading European trade fairs to check whether they are planning to organise online events. To find the most relevant trade events for spices and herbs, search the trade fair database of the Association of the German Trade Fair Industry.
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> Before taking out a subscription to a B2B platform, ask the management about the number of buyers of your products on the platform, either as visitor or supplier. Ask for a trial to check whether the platform is suitable for you and your products.

9. Use digital solutions to inform end consumers about your products more directly

The customisation of diets, supplements and lifestyles for individual consumers is currently a trend. This so-called, 'personalised nutrition' includes different approaches, ranging from simple calorie counting, to allergen testing, to more complex nutrigenetics (performing genetic tests to obtain information about what and how to eat). Many spices and herbs have health benefits that are promoted online (such as ginger, curcuma or garlic).

Another possibility is to inform end consumers about your supply chain and the sustainability of your operations.

European consumers are becoming increasingly interested in knowing where their products come from. Many companies have started to use QR codes to better inform final producers about their products. This option is used by the SpiceUp project for Indonesian producers of black pepper, which was already mentioned above.

As the use of QR codes can be too complicated and entail a large investment, some small producers use simpler options. One example is the Cambodian company Farmlink, which sells artisanal Kampot pepper with a protected designation of origin. End consumers can find an alphanumeric code on the vacuum sealed bag and enter this code in the 'Find my Farmer' field on the website of Farmlink.

> **Tips:**
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> Learn about the use of QR codes in the European food supply chain to make it more transparent.
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> Consider using digital transparency solutions from companies such as Connecting Food, Scan Trust or Swiss DeCode.

10. Request the support of digitalisation projects in your country

Every country in the world has to contend with the strong impact of digital technologies. The World Economic Forum calls it the 'industrial revolution 4.0', while Chinese policymakers refer to it as 'Internet plus'. The industry describes it as a shift from IT/software and Internet phases to the digital phase. As illustrated in the previous chapters, the spice and herb industry is no exception.

In this 'digital transformation' phase, many internationally-funded projects are already available for agriculture and small processors. You need to search for partners and projects that can help you carry out the digital transformation efficiently. Unfortunately, the various projects cannot be found in a single location, so you will have to search within your country and contact international development organisations to check whether they have digitalisation projects that suit your needs.

The following are examples of digitalisation projects in spice- and herb-producing countries:

- Indonesia (exporter of cloves, white pepper, cinnamon, nutmeg, …) – The Agrifin project, run by Mercy Corps in collaboration with many partners, supports the introduction of digital technology and innovation services to smallholders. In 2021 the project performed in-depth research into the Landscaping of the Digital Agricultural System in Indonesia. It proposed several interventions that could be carried out in the spice and herb sector in the near future.
- Sri Lanka (exporter of cinnamon, pepper, cloves, nutmeg,…) – TAMAP is an EU-funded project in Sri Lanka aimed at supporting the creation of an environment conducive to sustainable and efficient agricultural production. Among other interventions, the project supports the implementation of digital agricultural applications that include producers of spices and herbs.
- Myanmar (exporter of chillies, curcuma, cardamom, ginger) – An example of a digital support project is the one being carried out by Village Link. The company has developed the application "Htwet Toe" where farmers can upload photos of their crop issues and ask questions in recorded voice messages. Within 12 hours, farmers receive suggestions for 'treatments' and advice from Village Link's agricultural professionals.
- Egypt (exporter of dehydrated onion, basil, marjoram, thyme, cumin, coriander …) - The Agricultural Innovation Project, funded by GIZ, supports smallholders (including spice and herb producers) in using digital solutions that improve access to information about input supply, marketing, extension and financial services.
- East Africa (exporters of bird-eye chillies, herbs, curcuma, cumin) – The EU-funded programme Markup supports spice and herb producers and processors in Kenya, Uganda and Tanzania. Among other interventions, and in collaboration with partners, the project supported the creation of the East African Trade

Information Portal and Kenyan Trade Portal. It also supported a joint venture between a Dutch investor and Tanzanian spice company Trianon.

- Other African countries (exporters of ginger, vanilla, herbs, ...) - The Technical Centre for Agricultural and Rural Cooperation (CTA), funded by the EU, developed many digitalisation projects in African agriculture. CTA has a presence in West, East, Central and South Africa, as well as in the Caribbean and Pacific.

Tip:

Visit some of the digitalisation support project websites and check whether there are any projects that might be suitable for your business. Some places to search are the GIZ Digitalisation projects, the World Bank's publication on Digital Transformation of the Agrifood System, the Digital Africa portal, the list of digitalisation support projects in South America, and the Digital Skills Innovation Awards for South-East Asia.

This study was carried out on behalf of CBI by Autentika Global.

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