Comparison research on Communities of Practice, university knowledge exchange and business model changes between the United Kingdom and Vietnamese Agri-tech Start-ups

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Abstract

This research aims at understanding the expectations that Agritech startups in the United Kingdom and Vietnam have on the benefits of Communities of Practice, and how Communities of Practice help these businesses to tackle the challenges of business model changes for their growth enhancement. The co-creational collaboration between academics and agritech startups when working together on knowledge/experience-sharing through CoPs is also explored. The research takes a case study approach, using meetings, interviews, and other documentary data to capture the events, actions and changes of attitudes, behaviors, and expectations of our eight Agritech startups (including six in the UK and two in Vietnam) towards their use of Communities of Practice. These Agritech startups are often attempting to exploit their existing business models, while at the same time explore a portfolio of new business opportunities that could generate new growth engines. Research findings indicate a significant change in the business models of the startups when integrating temporal Communities of Practice techniques. Some of them quickly move into a value creation phase by which they achieve quick-wins and medium-term actions that generate both financial & non-financial business value. The research results may have implications for policy makers and other practitioners, who are looking to develop and build these types of interventions that can takeinsights from these fundamental key actors, relations, and value exchanges within the Communities of Practice. Businesses in other fields could also better understand the value and potential of temporal COPs and apply these to their own sector.

Keywords: Agritech, business model change, knowledge exchange, communities of practice, startups

1. Introduction

The United Kingdom didn't just lead the Industrial Revolution – they led the Agricultural Revolution too. As science and technology change the face of agriculture, they are now in the vanguard of new agricultural technologies, pioneering new approaches to food and farming systems. The UK Government is keen to support innovation in this area, and have funded the development of four Agri-tech Centres ([16]. In fact across Europe, Agri-tech start-ups have received funding for over $3.4 billion, a 70% growth on the previous year[2]. The UK has a unique macro-environment for agriculture, and therefore is an attractive place to develop and commercialise Agri-tech innovation, over 70% of UK land is dedicated to agriculture [14]. In 2017, Defra estimated that Greenhouse Gas Emission (GHG) were estimated to be 42.1% lower than they were in 1990 [8]. The UK government is keen to continue its investment in the Agri-tech sector, seeing it as playing a major role in inspiring new diversity of green technologies in the UK farming sector.

In Vietnam, agriculture and agri-businesses are among the key economic sectors, accounting for 14.85% of the country's GDP in 2020 and 39.45% of the total employment in the country. For the importance of this field, Vietnamese government had the foresight a few years back to spend more in terms of high-tech farming productions and also getting the local IT and the tech industry to get more involved in the development of Agritech startups, which makes Vietnam one of leading countries in Asia regarding agritech startups. With the growing Agri-tech trends, the creation of more innovative tools by Agri-tech start-ups has been expected to sustain food security in Vietnam and significantly contribute to the country's economic development. Vietnam currently lacks support for emerging and high growth startups, such as 'lean' business training and access to capital, unsustainable production methods, lack of a talented workforce, business training, funding, lack of scale, and slow regulatory reforms. This often means that corporate agribusinesses and some 39 million smallholder farmers that depend on agriculture are missing out on critical innovations to drive productivity and competitiveness. Currently, Agri-tech start-ups in

Vietnam respond to these challenges by developing environmentally friendly, affordable, and easy-to-integrate solutions.

Although the UK and Viet nam are somehow different in agricultural technology development, emerging and established startup companies in both countries have much in common when dealing with the numerous challenges, including including climate and adverse weather risks, market dynamics, unsustainable production methods, and difficulties in transitioning ideas and expectations from the laboratory-designed solutions, into the commercial marketplace. They seek help from CoPs which have proven increasing important in their role in giving startups access to new digital transformation techniques [22]. CoPs are also known for their role in providing strategic tools to help manage knowledge, expertise and practice between collaborative members, and some specific forms of CoPs have been established to help their members adapt to the fast-changing business environment, especially those driven by Universities [8]. These CoPs focus on knowledge exchange between knowledge hubs, those parties who regularly create and develop new knowledge (technologies, know-how and processes), and the enterprise community that has significant experience of meeting marketplace needs and wants, providing opportunities for new business models of the agritech community.

1. However, while UK & Vietnamese governments are increasingly supporting schemes to provide high levels of technology and knowledge exchange for both startups and scaleups, calling on their universities/research institutes to share their knowledge, current research on those CoPs is still limited. Research studies evaluating the limited uptake of these nascent business models', especially in Agri-tech start-ups, has suggested two primary reasons: the relatively limited dissemination of learning experiences from either being involved in pilot studies, or other business start-up workshops; (2) the apparent failure of business support services to influence deeper responses from these targeted Agri-tech start-up's, helping them change their business model to sustain commercial success. For instance, while learning has long been established as one of the core values in the Vietnamese family and culture, its reflections in rural CoP in adapting to change have been largely overlooked in most of the studies of business adaptation and rural development. Agri-tech startups face a particular challenge in moving from the very laboratory-based environment of technical evaluation into the full commercialisation of their products in the harsh and highly competitive marketplace.

This study tries to fill the gap in the research domain of CoPs, particularly around the areas of university/research institutions knowledge exchange and help in business model change by looking at: (1) How communities of practice facilitate the knowledge transfer from universities or research institutes to agri-tech startups (2) the impact of CoPs together with university knowledge exchange on the possibility to change business model of agritech startups.

As a latecomer in agritech field in comparison with the UK, Vietnam can learn from the UK's experience to enhance the role of CoPs and to strengthen the relationship between CoPs and academics, practitioners and experts and agritech startup development. We explore the issues and challenges of knowledge exchange, through these informal CoP's, by investigating existing empirical research on the challenges that these Agri-tech start-ups face in commercialising their products and services, by using case studies.

2. Theoretical Basis

2.1.Community of Practice and University Knowledge Exchange

Knowledge exchange has depended over the years on specific intermediaries to bring together global scientific knowledge and embryonic technologies and present these to enterprises who can best develop viable product and services. These intermediaries help generate specific know-how and importantly conduct some of the early-stage development of product concepts (Yusuf, 2008).

Formally, communities of practice are "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly." Communities of Practice (CoP) are often formed and maintained by *"a group of people having a common identity, professional interests and that undertake to share, participate and establish a fellowship"* [30]. According to Wenger (2006) communities of practice have three defining characteristics: the domain, the community, and the practice. The domain is the common interest that links the community; the community is the joint activities in which members engage; and the practice refers to the shared stories, tools, and resources from which the group can draw.

Beside common CoPs, there is also a kind of CoPs between Universities/Research Institutes and Agri-tech start-ups which are the unique communities bringing together partners that would not normally share the same formal professional affiliations, or informal enterprise support networks. Effectively CoP's are often a special outcome of entrepreneurial eco-systems, and we are evaluating the conditions that make these ecosystems-CoP's more or less favorable for entrepreneurship/startup activity.

The life cycle model of these CoP's must be aligned with the different Knowledge Management (KM) roles and responsibilities, and importantly needs of its community partners, adapted from Dalkir (2005) [30]:

- Knowledge journalist – helps build, identify and extract valuable content from community members;
- Knowledge taxonomist – helps organize content once its produced;

- Knowledge archivist – helps store knowledge and experience, gaining support for changing enterprise processes, systems and strategy.

Fig. 1. Characteristics of temporal CoPs (adapted from Wenger, 1997)

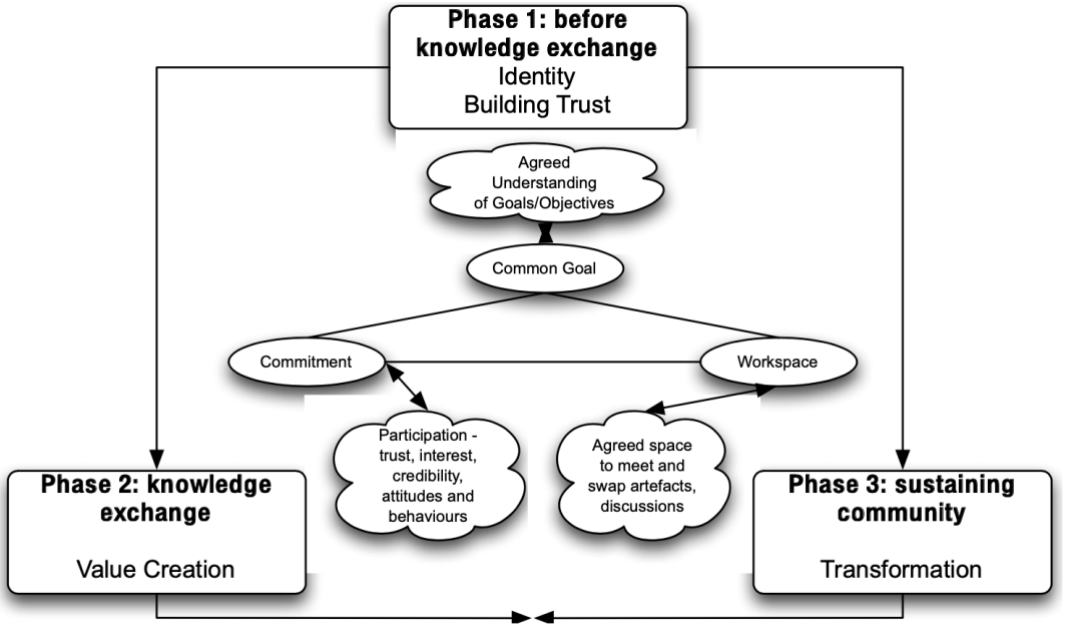

Fig. 1 – Temporal Communities of Practice Life Cycle and Knowledge Exchange

The CoP life cycle is built upon the continuous process of learning and reflection of the CoP members.

2.2 CoPs, Entrepreneurial Strategic Orientation and Business Model Changes

Entrepreneurial strategic orientation can be considered as the principles regarding risk-taking, reform, innovation, and the competition that guide and influence enterprise activities and produces behaviours that ensure enterprise survival and performance. Research by Miles and Snow (1978) suggested that these strategic orientations result from the business entrepreneurs' and the enterprises' analysis of internal and external environmental factors (competitiveness, marketplace uncertainty and ambiguity, market orientation, economic growth), and reflect their values, attitudes and practices towards ecologically driven innovation. They typology of generic strategies including prospectors, defenders, analyzers, and reactors.

Communities of practice can effectively support and enhance the company's strategic capabilities thanks to the nature of collective learning, knowledge creation and sharing of CoPs. Indeed, knowledge strategy an integral part of the company's overall strategy, which is intended to lead a company through changes and shifts, securing its future growth and sustained success. Therefore, companies based on determined entrepreneurial strategic orientations need to understand what knowledge will result in commercial success. They need to keep this knowledge on the cutting edge, deploy it, leverage it in operations and spread it across the organization to generate capabilities. Wenger et al. (2002) argue that using CoP in the strategic context is a practical way to manage knowledge as an asset systematically, just as companies manage other critical assets. CoPs can help companies develop new strategies complementing existing ones, realize a business strategy, and go beyond that change the company's business model.

Business model and business strategy have a close relationship, forming two essential preconditions and fundamentals of a company existence. A business model is an outline of how a company plans to make money with its product and customer base in a specific market. A business strategy describes and explains how, where and for what purpose and goal a business model will be used. Businesses are constantly managing a portfolio of both new and existing business models, that exploit and explore business/market opportunities. Utilizing both internal and external resources and expertise to both exploit and improve their existing business model, whilst simultaneously exploring new business models that will become their future growth engines to both disrupt and protect against disruption in their market[23]. Companies change their business model to fit business operations within specific prevailing business environments, to identify and explore growth opportunities, with the aim of creating sustainable

competitive advantages . CoPs possibly support companies in capturing the changes of business environment and adapt their business model for successful strategy and better growth. It is worth noticing that benefits from CoPs varies with types and development phases of enterprises. Companies needs to identify the potential CoPs that will effectively nurture their entrepreneurial strategy and business model.

2. Research Methodology

With the research study being focused around the perspective of the business entrepreneurs, it is important to embrace a research approach that "researchers need to develop the capacity to see their topic with new and different lenses in order to look beyond and transform their own knowledge"[24]. It is for this reason that the authors choose a qualitative approach to utilize interviews and observations to explore the understanding of our business entrepreneurs. To explore the business entrepreneurs' sensemaking of the knowledge and expertise exchange we adopted an interpretative epistemology and thus feel confident that we could "understand the world from the perspective of the participants in that world"[24]. We are therefore adopting an inductive approach to the development of theory building, and therefore follow a traditional social constructionist interpretative methodology [20] in terms of data collection and content analysis.

4.2 Method

The research design takes a case study approach, being the best approach when 'How' and 'Why' questions are the objective of the study[20]. Clearly, a case study approach generates an 'In-depth' understanding of the social phenomenon under-study and focuses on the contemporary events and activities influencing our study participants and their businesses.

Of course, using a case study approach provides a "unique strength is its ability to deal with a variety of evidence...documents, artefacts, interviews and observations…Beyond what might be available in a conventional historical study"[26]. Other researchers talk about the caution a researcher should have to using a case study approach, highlighting the difficulty of generalisations of the findings . Yet using multiple cases will "increase the commonality or variety of interpretations that they produce providing a greater claim of generalisability"[19].

4.3 Research Questions

Our research aim is to study the use and the impact of Communities of Practice (CoPs) on Agritech start-ups in accessing knowledge and expertise key to their growth. We have broken this down into three primary research questions:

- How is their current business model challenged by the lack of knowledge and expertise?
- What do they perceive are the main benefits of seeking expertise and knowledge from the CoPs?
- What are their expectations on the benefits that these temporal Communities of Practice (CoPs) can bring to meet their short-to long-term needs?

4.4 Data Collection

Though it would be interesting to approach our data collection as a state of tabula rasa or as a blank slate [12]. It is logical to accept that the researcher in these case studies has some prior knowledge, and that before we committed to this field work, we undertook an extensive literature review around the topics of communities of practice, knowledge exchange and business entrepreneur's mindsets toward seeking knowledge and expertise. Data was collected from October 2020 to September 2021 in both UK and Vietnam, with 6 agritech startups in UK and 2 Agritech Startups in Vietnam, to better understanding the difference of companies in 2 countries in perceiving the benefits and the needs of CoP to their business operations. In the case of the UK Agritech sector we explore the initiative of this collaboration co-funded by the French central bank. For the Vietnamese cases, we chose 2 startups in 2 different locations which have collaboration with several CoPs and universities to see the similar and different points in comparision to the UK Agritech startup cases.

To assess business model, some elements of the Business model canvas are used with respective questions to collect data from the research cases.

Table1. Questionaire for assessment of business model change

Elements	Description	Key questionaire
Customer Segment	The businesses' customer segments have the jobs, pains and gains relevant for selling their value propositions?	- What has been your turnover in the last 12 months, how does this compare to the previous 12 months? - What has been your growth rate over the last 12 months (unit sales)?

		- What are your key target audiences?
Value Proposition	The businesses' value proposition resonates with their critical customer segments?	- How do your products perform compared to your competition? - How differentiated are your products and services from the competition?
Channels	The business has found the best channels to reach and acquire their critical customer segments?	- What are your sales channels like, are you heavily dependent on intermediaries to get access to your market? - What direct access do you have with the target customer segment?
Customer relationship	The business has developed the right relationships to retain customers and repeatedly earn from them?	- What buy-in do you have from your customers, what are the dropout rates and switching costs for customer to switch to your competitors? - What is the percentage of your customers who are lock-in for the foreseeable future?

3. Analysis and Key Findings

The findings are presented in the form of the eight enterprise case studies, including six UK cases (from A to F), and 2 Vietnamese cases (G and H). We describe and analyse the key challenges of each company in their value propositions, channels and relationship management, their needs of CoPs and what they achieved from the CoPs. Soon after starting the process of support from the Climate Change Initiative Programme (called Shaked Programme), the UK enterprises entered into an informal CoP – focused on the specific areas of support/expertise needed and developing their business models, while the two Vietnamese cases benefit the knowledge from different types of CoPs.

4.5 Agritech Startups Case Study

As previously stated, the UK and Vietnamese governments are increasingly focusing on the need to support start-ups in many of the key sectors responsible for increasing productivity and growth . Table 1 provides some background information about the the cases' operations and characteristics.

Table 2. – . Case study characteristics.

Firm Character-istics	Strategy	Market Dynamics	Key Target Customers
A (UK)	Producing Chitin film	Setting up a biorefinery	The start-up focuses on plastics market, particularly bioplastics area, the global market of which was worth over $8.3 billion in 2019. This largely driven by the increased demand for bioplastics in the packaging sector, which is particularly interested in the biodegradable or compostable bioplastics. Key customers of Chitin are those who favour compostable, bio-based, and eco-friendly materials with antibacterial, non-toxic and hydrophobic properties.
B (UK)	Compositable Plant Pots from Alpaca manure	Open the Market direct to Farmer	1500 Alpaca farmers distributed around the UK, generating over 92 tonnes of nutrient rich manure per day, they all have a manure management issue. Current need is to dispose of this manure, with the opportunity to generate an additional revenue stream, with the net benefits of solving their manure management challenge and supplying the horticultural market with an additional product. A long-term solution is both desirable from the sectors perspective and from the individual farmer wanting a solution that offers an addition revenue stream.
C (UK	Drone imagery to	Current Pilot Study	Enterprise C's end users are farmers and growers, but their direct customers are the broader pipeline of product/services to the agricultural sector e.g. farmers/growers, agrochemical companies,

	save time and money	in Malaysia	agronomists and farm management companies. Across Europe their already a £77 billion overspend on pesticides, a significant spend for small to medium-sized farmers
D (UK)	Aquaponics to accelerated Tree Growth	Small Demo in Constructi on	Targeted customers for this agroforestry modular system are small-large farmers, with a particular interest from local councils and county authorities, and community project funders.
E (UK)	Soil Health Intelligence	Agronomis ts and Farm-managers	Enterprise E's end users are farmers and growers, future of soil health intelligence – our handheld sensor product provides comprehensive analyses of soil health in-field in 5 minutes, thereby increasing the efficiency and efficacy of land management decision-making of agricultural practitioners
F (UK)	Plant-based Proteins	Plant-based Food Protein markets	Start-up F believes that the current Agri-food system is essentially broken, inefficient, depletive, and damaging to the environment. They are on a mission to create healthier and more nutrious proteins from plant-based foods using more sustainable crops
G (Vietnam)	Producing Fresh Vegetable	Using hydroponic s and automatic environme nt control system	The company's main customers are individuals and households who want to use fresh and clean agricultural products in Hochiminh city. Previously, there was also a group of high-class restaurants and hotels (Novotel, Rex, Renaissance, Sheraton, Saigon Prince..), but due to covid-19 pandemic, they had to be closed, which a part affected to the company's business orientation. This situation leads the company focusing more on groups of middle-class individuals and households
H (Vietnam)	Providing services and products for the seafood industry.	Organic agriculture with high technology	Start-up H specialize in providing products and services for the seafood industry. Start-up H stablished its vision and mission towards organic agriculture, using the very natural sources of raw materials to create the highest quality and safest products. With a team of qualified and experienced technicians, the management of the farming environment and disease prevention for fish are carried out periodically and strictly in accordance with the standard process.

Enterprise A:
Enterprise A provides products and services to the bioplastics industry.
The start-up is in the early stages of proof-of-concept, as such need to establish a pilot plant to prove the following: (1) Develop an initial insert colony, feeding these insects on organic waste; (2) Extract the chitin from the insect's exoskeletons; (3) Develop the production of bioplastics from this chitin, and test the underlying properties.

In linking the chitin farming to the production and manufacturing of bioplastics, there are many issues around the channels to the market to both test and develop. They need an expert CoP with understanding of polymer extruders, consumer brands, and UK retailers. Relating to relationship mananagement, early stages of the proof-of-concept stage, so the main value of the programme is the access to both resources of the university/research institutes and their expertise in the different elements of the production process. During their time of operation, they got the mentoring and coaching from the CoP.

Enterprise B:
Enterprise B has the goal of giving the UK's alpaca farmer community the opportunity to add further revenue streams to its operations. Enterprise B's product provides a more convenient local process to convert the bi-product into a rich compostable product desired by the horticultural sector. Enterprise B have worked with an Asian manufacturer to produce a cost-effective organic fertiliser converter, that can either be bought or leased by the farmer. The composter plant output is a product that has a 70% reduced mass for the farmer, and a product that be more easily transported and then converted into a nutrient rich biochar than can be returned to help support a healthy soil regeneration both in the agriculture and horticulture sectors. They got the support from the CoPs in identifying opportunities for additional revenue streams for the UK's Alpaca farmers is essential to selling Enterprise B's solutions and developing further opportunities. Relating to the Channels to Market, as the business had already conducted extensive field-trials using the new plant to convert the raw Alpaca manure and producing the performance/operational metrics that would be essential for proving the ROI for any Alpaca farmer using the technology, the real challenge has been

the scaling-up of the micro-business, evaluating the opportunities to create more products that can scale-up the revenue streams to get the business onto a more sustainable footing. On relationship management, they looked at other R&D partners who could develop further products from the raw material. They need to work with the CoP members to identify nascent partners in this particular field. They have provided relevant contacts from useful network partners and members of the CoPs.

Enterprise C:

Enterprise C are committed to bringing the advantages of new agri-tech products to Joe Farmer. There main selling point is to bring precision agricultural management to the masses by making it cheap, easy-to-use and practical. Enterprise C's product provides an AI model that delivers acceptable information to help them make more informed decisions. What is different about Enterprise C's solution is that it uses free Satellite data combined with AI to offer truly affordable solutions to help framers/growers of all sizes reduce their reliance on harmful products and improve their profit margins. The Enterprise C's platform alerts farmers when stress has been detected and will diagnose crop disease using images taken from a smartphone, drone or rover. The competition in the marketplace is strong, with competitors offering farmers big technology and specifically to those farmers willing to spend big money on electronic gadgets. Their farmer clients want to help the environment, and by the use of Enterprise C's crop/soil management they can maximise the fields growing period and therefore reduce the impact that bare soil can have on the climate. They need the project management tools to more accurately cost the opportunity costs and provide better AI management of projects and have the supports from the Shake programmes. Enterprise C has a working prototype that is keen to get more field data from working with the farmers/growers in the UK/Asia. They have a live project in Malaysia, their field client captures drone imagery of rice fields. Enterprise C has the challenges to develop a wider network of farmers/growers to better understand the key challenges that affect the sustainability of their farm/crop. They need to extend the partnerships with other state departments and governments around the world and already got the support to develop he green credentials of land management on the reduction of pesticides in the EU and worldwide.

Enterprise D:

Enterprise D has developed an agroforestry product that utilises a self-contained modular environmentally controlled chamber. This module utilises an aquaponics nutrition system, that accelerates the growth of trees, helping deliver a variety of high-value, high yield crops for local food production. Enterprise D's core value proposition is that there is currently not another product like it on the marketplace, it offers an accelerated growth of trees and provides certifiable contributions to a positive impact on the climate crisis. The aquaponics nutrient delivered system approach proved maximum reduction of nitrogen-based fertilisers, thus minimising the impact on N2 emissions. Enterprise D has already built up a global-shared data service available to all its customers to help optimise growing conditions in whatever environmental conditions, the community of practice allows optimal shared advice, knowledge and experience on successes and failures. The system is deployable and re-deployable to different locations depending on the crop. They need the expertise and resources to develop the full-sized prototype are key to the next stage in the product development and already got a supporting programme which deliver the key resources and outputs needed to both show the growth potential and give further investor input. The competition in the marketplace is strong, with traditional polytunnel manufacturers and channels being the obvious channel for farmers to source their capital equipment. The company has the challenges in accessing to other farmers who are willing to engage and fund a full – pilot system. These are the opportunities to redefine the business model and re-pitch it to other investors. The CoP has supported the company in attracting significant interest from other parties willing to invest and commit resources.
On relationship management, as the start-up is very new, the website is still lack of necessary information. The company also needs the support to generate the data/performance metrics for different crop types. The resources available from the research institute to gain access to farms and resources at their establishment is vital. During their period of opeation, the regular meeting with the tCoP have created a series of activities and actions for further work.

Enterprise E:

Enterprise E's product is an entirely new development that will both speed up soil health intelligence, but also bring it down to a level that is both cheap enough and fast enough to be a practical tool for the urban farmer. Enterprise E's product will reduce the overuse of chemicals and fertilizers on farms and improve their soil health, which would reduce agricultural run-off, improve food security, and sequester carbon in soil (which will mitigate the impact of greenhouse gas emissions on climate change). Key challenges of the company regarding to value propostion is to convert what is clearly a product differentiator into something that is appealing to the target customer. They need the help to understand the attitudes and behaviors of the target customers to using new technology. With the support from the CoP, they have undertaken a market intelligence and insight report on the industry regarding using different technologies/sensor to capture soil health. They also need to utilise the CoP's network and access to practitioners and advisors who directly work with farmers and farmer advisors to understand how farmers and agronomists obtain their soil health data. The enterprise E has a working prototype and is currently working on the AI (Machine learning) side to provide useful information on the biological soil health indicators. Both the sensor and reader products have been extensively field tested, and the next phase is to finalise the data analysis and production of a farm report. COP has supported the company in developing a trial plan that identifies the critical product testing essential for commercializing the product/service.

Enterprise F:
Start-up F believes that the current Agri-food system is essentially broken, inefficient, depletive, and damaging to the environment. They are on a mission to create healthier and more nutrious proteins from plant-based foods using more sustainable crops. The key value proposition is the novel method that yields protein isolates with adequate purity while exceeding the functionalities of protein obtained using other extraction methods, and thus minimises the use of unnecessary chemicals, water and energy use. The novel process co-yields starch and fibres and thus requirement for minimum purification prior to usage, by their customers, in the production of food products, this both increases overall sustainability and help reduce waste. They found the CoP to help develop a strategy to approach this larger food producer so that we can carry this out, without jeopardizing the loose of IP. With the support from the university's hub, they have re-evaluated the target markets, provided a market intelligence and insight report and further in curricula projects for the university's postgrads. The large protein production companies like Dupont and Puris, Burcon Nutrascience, Roquette, Emsland, Cosucra are just some of the main competitors. There are no major protein producers in the UK, and with the advent of BREXIT, this makes it expensive and difficult for Agri-food companies using these protein extracts to source their feedstuff. They have awaited for the occasion to understand the types of co-partnerships around doing collaborative R&D, but without giving away their IP, and got the improvement in expanding network of university/research institute researchers interested in co-research opportunities. To date of research, they are still at the working prototype level, and therefore need more customers to test our protein extract. However, the development of a pea-protein based milk has allowed the start-up to work with consumers on testing some of the important aspects of attitude and behaviour of consumer purchase this type of protein-based food. The primary research with consumers has helped them improve product taste, appearance, and flavour, as well as exploring different product applications and enabled deeper understanding of the functionalities of their protein extracts for a range of food applications: emulsification's, oil-binding and gelation. They try to get Innovate UK investment which requires greater identification of the traction and validation of the process/product in the marketplace. The Shake Program has helped to improve the skills on developing and being successful with the comany's future bids or gaining R&D's grants.

Enterprise G:
Vietnam's agricultural product market currently faces many problems such as the excessive use of plant protection products, pesticides,..causing harm to consumers. Start-up G was established in 2016 with the mission to produce fresh vegetables in following the strict national and international production standards and process. The company commits to produce fresh vegetables with 3 no criteria: no pesticides, no growth drugs, and no preservatives. To do that, the company have strictly followed the provisions of the Global G.A.P and ISO 22000:2005 standards. Their products have gone through 5 cleaning processes: clean seeds, clean planting process, clean harvesting, clean packaging, and clean transportation. They need knowledge and experience support to improve technology, improve productivity while maintaining good product quality and reducing costs. The company has received consultation from universities' researchers and CoPs and has invested in improving production technology and productivity, thus revenue has grown well. Enterprise G uses indirect distribution channels to sell to large supermarkets in Hochiminh city (such as Coopmart, Nam An..) and builds its own sales system with partners in residential areas. The company also conducts direct sales of products through receiving online orders (in designing certain types of fruit and vegetable combos) on the company's website. They are seeking for types of co-partnerships around, and with the support from the CoPs, their suppliers and customers networks have been expanded. However, relating to relationship management, they realize that there are still many shortcomings in customer care, as they did not really pay attention to value-added services for customers. Even did not achieve any support from CoP on this issue until now, they intend to make more efforts to improve the customer care skill to be more professional.

Enterprise H:
Start-up H was established in 2015, specializing in providing products and services for the seafood industry. Start-up H stablished its vision and mission towards organic agriculture, using the very natural sources of raw materials to create the highest quality and safest products. The farming areas feed fish entirely with high-quality floating pellets. With a team of qualified and experienced technicians, the management of the farming environment and disease prevention for fish are carried out periodically and strictly in accordance with the standard process. The company embraces business philosophy of "clean from farm to table". Same as enterprise G, all enterprise H's products are grown to Global G.A.P standards, strictly selected, processed, checked, and have their origins traced all the way. Many products are highly unique because they are grown according to their own process on the farm, which is highly appreciated by most of the customers. The company commits to ensuring "Five NO" criteria, which are no weight gainers, no heavy metals, no chemicals, no antibiotics, and no preservatives. The adoption of cutting-edge technology for cage fish farming or all-female shrimp aquaculture developed by Enzootic have helped the company build customers' trust and loyalty. The company is proactive in finding and distributing products to partners and customers. The company established both direct and indirect channels of distribution, yet indirect channel acts as the main one. Since the Covid-19 outbreak, online sales activities have been strongly promoted and initially shown positive results. The company is highly appreciated by many customers. The customer loyalty rate is 50-70, which is quite a positive number compared to other competitors in the food service industry. Customer

care service has performed effectively which requires the company to promote when production on the farm reaches a higher scale.

Table 3. – Agritech Start-ups informal tCoP, Overall Entrepreneurial Intentions (Started[1] and Finished[2])

Perceptions of the need for Business Model change	Key Challenges	Key Business Model Changes	Change in EI Values, Attitudes and Practices	Expected and Actual Impact (Performance Measure)
Enterprise A Entrepreneurial Intentions – the very start of their Business Model – looking for exemplars in the sector	Predicted 16% growth rates in the bioplastic field are encouraging strong competition[1] How to engage with these new Bioplastic customers[2]	Develop new markets Marketing best practice to existing markets[2]	Reactive[1] Analyzer[2]	Early Success in attracting investment[1] First life cycle testing of the product and its quality[2]
Enterprise B Entrepreneurial Intentions – bringing precision Agri-tech solution to over 50,000 farmer sector, cheap, easy-to-use and practical	Bringing a new product to market[1] Expand the cost-effective business model of Alpaca farmers[2]	Develop new markets and increase share of existing market[1] Develop the business model ROI for Alpaca farmers[2]	Analyser[1] Prospector[2]	Quick solutions to market identification and sales output options[1] Development of fully-field tested products, and developed sales tools for commercialization of two of the main product lines
Enterprise C Entrepreneurial Intentions – Long sales cycles in agriculture is always challenging for start-ups	Re-packaging Satellite data is being offered by many[1] Expand the cost-effective business model of Alpaca farmers[2]	Develop new markets and increase share of existing market[1] Develop the business model ROI for Alpaca farmers[2]	Analyser[1] Prospector[2]	Quick solutions to market identification and sales output options[1] Development of fully-field tested products, and developed sales tools for commercialization of two of the main product lines
Enterprise D Entrepreneurial Intentions – development of multiple products with applications across the world	Creating a convincing business model for our target customer markets[1] With success in this funding stream, we will have the full-scale pilot to provide evidence of the growth model[2].	Core resources around Aquaponics, Project Management, Systems engineering Develop the channels to Market	Analyser[1] Prospector[2]	Comparatively new business, needing more products and systems for key Target Customers Segments[1] Need to make this Business Model work, the main deliverables are there, but without further help fiscally and commercial it won't succeed[2]
Enterprise E	Changing farm-managers	Develop new markets[1]	Analyser[1]	Quick solutions to market identification and sales outlets[1]

Entrepreneurial Intentions – Changing agronomists and farm-managers approach to managing the application of fertilizers and its consequential harmful run-offs	approach to evaluating soil health[1] Reducing the overuse of chemicals and fertilizer on farms[2]	Develop the business model ROI for the new soil health product[2]	Prospector[2]	Development of fully-field tested products, and developed sales tools for commercialization[2]
Enterprise F Entrepreneurial Intentions – Change the nature of use of protein based plant extracts	Getting these food start-ups to adopt the new plant-based protein extract[1] Getting Agri-food production companies to be more mindful about the processes used to get this protein extract[2]	Develop new markets and increase share of existing protein-extract market[1] Develop the business model value proposition that focuses on the environmental impact of other protein extraction methods[2]	Analyser[1] Prospector[2]	Identifying other opportunities for own-branded products e.g. substitute milk[1] Become a knowledge and expert source for other food protein plant extraction start-ups[2]
Enterprise G Entrepreneurial Intentions – Changing production methods and processes to meet consumption needs and market conditions	Apply high technology in the field of fresh vegetable production Problems of supply chain disruption and increase in input prices due to covid-19	Develop new markets, targeting a group of middle-class customers who want to use fresh products Try to save costs and apply technological improvements to increase labor productivity	Analyser Prospector	Development of fully-field tested products, and developed sales channels for commercialization of fresh vegetables Become an expert in applying hydroponics and automatic environment control system
Enterprise H Entrepreneurial Intentions – Changing production methods and processes to ensure stable and quality supply, to meet consumption needs and market conditions	Apply high technology in the organic seafood production Problems of supply chain disruption and increase in input prices due to covid-19	Develop supply, improve distribution system, and attract new customers. Try to reduce costs and apply technological improvements to increase labor productivity and product quality	Prospector Prospector	Improve production process and technology; develop sales channels for distant market. Become one of a leading market supplier in organic seafood market.

To compare between the UK and Vietnamese start-ups when engaging with the informal CoP, the main knowledge/expertise outcomes that the UK start ups achieved are: (1) They are both having regular monthly meetings of the tCoP are conducted at the university (which engage in the program) and remotely via Microsoft Teams; (2) The Shake programme is highly structured to deliver several key outputs, a market evaluation report, identified skills and competence needs, and a programme of workshops delivering skills training in both technical and business toolkits. Observing each start-up, with the support from the informal CoP, Enterprise A have received a frequent Production and Processing expertise (in life sciences), when enterprise B is keen to further diversify its product/services to other market opportunities. At the time of surveyed – about a year after each start-up begin their operations, Enterprise C and D are both anticipated to have a realistic product launch strategy. Start-up E is expecting to have its full plans finalised for a product launch in 2023, and start-up F will launch at least two other products.

As they are both new in the market, they expect to have more support from the CoP not only in technology knowledge transfer but also continue to penetrate and develop their potential markets.

Relating to the two Vietnamese cases, enterprise G has received important supports from the tCoPs during a quite long period of 5 years' operation from the beginning until now: (1) Regular meetings are conducted with the universities specialized in science and agriculture (University of Agroforestry, HUTECH, Can Tho University..) to exchange knowledge of applying high-tech to agriculture production. Invite researchers, lecturers and students participating in the company's R&D activities and technology transfer projects. Internal trainings have been frequently updated to the company's staff; (2) Joining social networks (Agritech network, Fresh vegetables production network, Gardening network, Fresh agriculture network). The enterprise expects in the short term to conduct knowledge and experience exchange activities on a regular and continuous basis to enhance the development of all the joined parties. In the longer term, these CoPs should be developed in a more selective way with the participants to minimize those who may affects to the goals and development of the CoP.

With enterprise H, they have participated in business community network and several business forums for exchange of practices, experiences and tools. However, the role of universities and research institutes is still limited in those groups. The company also have contacted with scientist in agricultural field, technological experts and economists for consultation related to cultivation, production process and measures to adapt to changes of business environment.

The company expects that the participants in communities of practice learn together by focusing on problems that are directly related to their work. In the short term, this made their work easier or more effective; in the long term, it helped build both their communities and their shared practices—thus developing capabilities critical to the continuing success of the companies.

4. Conclusions, implications, and limitations

4.1 Main contributions and implications

Even before the onset of the Global Pandemic, Covid-19, governments have been concerned about issues of long-term productivity growth in the SME sector (Isabelle Roland, 2018). In the UK, the industrial strategy main goals launched in 2018 were targeted at higher growth potential SME's, helping prioritise future financial and management support, since these are two of the main obstacles most often identified in SME research (Goldman Sachs, 2015; Isabelle Roland, 2018). In Vietnam, in addition to the government policies of reducing taxes and removing administrative procedures, agencies such as the Department of Industry and Trade, the Department of Agriculture and Rural Development have supported agribusiness enterprises in promoting domestic product consumption and exportation. Many informal groups in the form of tCoPs have created connections for these enterprises to help find new outlets for their products.

This study on agritech startups in the UK and Vietnam, using tCoPs to enhance business growth, has illustrated the very real difficulties of startup knowledge exchange on specific knowledge, expertise and technology. Importantly these start-ups and scale-up businesses embrace two key challenges: the development of a new agri-tech product/service which ultimately requires changes to their own business in the form of new skills for their people, new processes and technology to create, develop and deliver these solutions to their targeted customers segments (Deloitte, 2020). The digital transformation underlying their agri-tech new products/services require them building to build digital capabilities, integrating new digital talent (inside and outside their business), and lastly developing their employees' digital skillsets. According to our research , the CoP's approach has delivered real value though the three areas: (1) Identifying knowledge/expertise gaps - based on their current/future technological needs, helping identify the skills needs to grow and sustain the business**;** (2) Update internal training – based on the acquired technology and methods of construction obtained through the tCoP. The tCoP has helped the businesses identify the training needs and the means of deliver on this to maintain their learning**;** (3) Connect businesses – based on the network of participants (Community members), helped to promote the relationship between the founders/managers and these external resources, providing the environment for sharing, discussing, exchange knowledge and experiences, developing customers network and enhancing growth.

Our findings show that these Agri-tech enterprises generally start out with a prospector strategy, one based on a technology readiness model, developing their initial product/service, and then looking to growing its market penetration, securing sustainable revenue/profit streams and allowing for more investment in their R&D. Some startups will then adopt a more conservative position – either attempting to defend its current marketplace, or others who react to changes in marketplace – sometimes too late. Other Agri-tech startups instead take a more active role, some analyzing the marketplace dynamics carefully and changing their strategies, first defensive, and then prospective, carefully weighing up the benefits and costs of any change; prospectors take a more aggressive and proactive stance, continuously searching for new opportunities and ways of challenging the status quo.

The business change model framework, and its corresponding Osterwalder Business Model Canvas toolset, helped all enterprises understand the important link between environmental threats and opportunities, their sensemaking of the potential changes needed in their business model, and the practical issues of then implementing these changes with the helped from the tCoP. Yet successful collaboration is largely down to the individuals involved having an investment in the success of the overall Communities of Practice (tCoP). To better understand the challenges and

issues likely to affect the success or otherwise of the partnership, the researchers undertook a careful evaluation of the business entrepreneurs' motivations and expectations of the informal tCoP, and its impact on their business model.

The other contribution of this research study is its original insights into Agri-tech entrepreneurship. The opportunities for resource acquisition and further collaboration have been reported throughout the findings, this study also adds original materials and insights into how the use of these temporal Communities of Practice is organised. The tCoP's formation is both a temporal and permanent solution for effective collaboration and start-up growth development. The case study of eight entrepreneurial start-ups in both UK and Vietnam illustrates the huge benefits they experience whilst benefitting from the large pool of resources, expertise and advise open to them.
The different between the benefits received from the CoPs of UK start-ups and Vietnamese start-ups is that, with 6 UK cases, as they are just start their operations for less than one year and receiving support in launching products and penetrating the market, while Vietnamese startups have these kinds of support a few years ago and now receiving benefits in increasing connectivity, expanding network, changing their business model to meet market demand and transition. 6 UK cases only take advantage of support from one CoP engaged with the university (but still informal), while the 2 Vietnamese cases have joined many different CoPs, including those from social networking channels.

An interesting development was a business model change framework that both helped explain the need for change and become a useful tool in sensemaking the business entrepreneurs' mindset towards making these changes, and thus help them in quantifying the impact on future business growth.

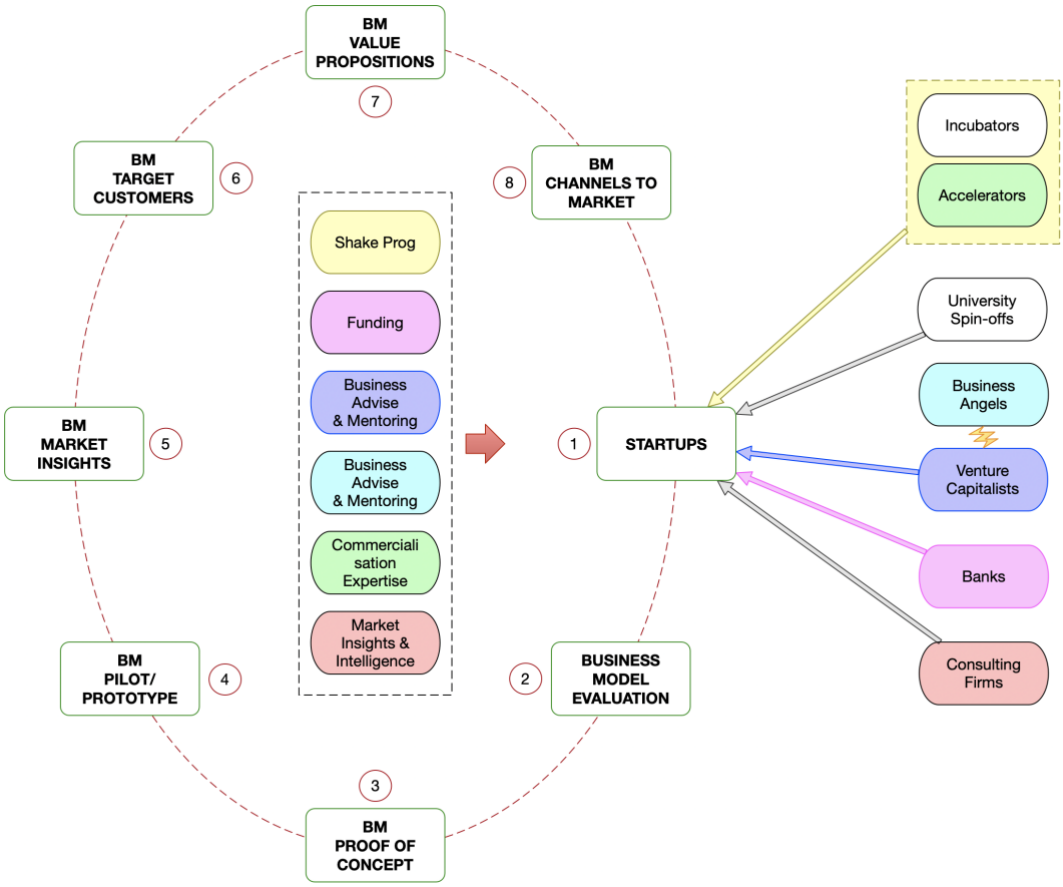

Fig.2 : Business Model Change Framework (Evolving Cognitive Model)

The business model change framework, above see figure 2, was developed out of the careful analysis of these case studies, the key components of this model are:

1 Business Start-up the entrepreneur could readily describe what the main premise was for his start-up, what the market was, what he would deliver and how they would make money from it?

2 Business Model Evaluation this helps explain the business processes set up to deliver to the initial mindset business model.

3 Proof of Concept either a strategic plan identifying the principal strategic markets targeted, with detailed information about products and services delivered, and the expected revenue and profit streams resulting. In less formal enterprises this is still evident by the sales/marketing forecasts produced for each year.

4 Pilot/Prototyping	Small changes are often evident in the Business Model as the enterprise reacts to customer/competitor changes, and/or initiates innovations to their products/services.
5 Market Insights	more dramatic changes in the product market stimulates some more dramatic changes to the product strategy, a next generation product line to help re-position the product or service.
6 Target Customers	re-evaluation of the target customer segments to identify ways to increase the customer base in both tehsort- and medium-term.
7 Value Propositions	re-positioning the product/service requires a closer matching of the product/service propositions to the target customer needs and wants.
8 Channels to Market	this is where product innovation alone can not address the external environmental threats and/or opportunities, they need help in understanding where their target customer purchases their products/services – and the linked knowledge/expertise they need with it.

Ultimately, our entrepreneur's mindset and their deep cognitive structures (Matthew P. Lynch & Corbett, 2021), how they perceive and behaviour towards opportunities, provides an insight into how business support programmes can best help these nascent entrepreneurs develop their ventures. Our Agri-tech enterprises generally start out with a prospector strategy, one based on a technology readiness model, developing their initial product/service, and then looking to growing its market penetration, securing sustainable revenue/profit streams and allowing for more investment in their R&D. Some startups will then adopt a more conservative position – either attempting to defend its current marketplace, or others who react to changes in marketplace – sometimes too late. Other Agri-tech startups instead take a more active role, some analyzing the marketplace dynamics carefully and changing their strategies, first defensive, and then prospective, carefully weighing up the benefits and costs of any change; prospectors take a more aggressive and proactive stance, continuously searching for new opportunities and ways of challenging the status quo.

These external enablers to growth have been identified by other SME research, particularly that looking at the links to performance and export growth (James Love & Roper, 2013). These research studies identify the importance of both supply and demand-side policies, both direct and indirect government support programmes, but they also identified that there is less known about which of the eco-system characteristics shown in figure 1 above, are influential in assisting SMEs innovation and business performance success.

The business change model framework, and its corresponding Osterwalder Business Model Canvas toolset, help all enterprises understand the important link between environmental threats and opportunities, their sensemaking of the potential changes needed in their business model, and the practical issues of then implementing these changes. Yet successful collaboration is largely down to the individuals involved having an investment in the success of the overall Communities of Practice (CoP). To better understand the challenges and issues likely to affect the success or otherwise of the partnership, the researchers undertook a careful evaluation of the business entrepreneurs' motivations and expectations of the informal CoP, and its impact on their business model.

4.6 Limitations of the study

The limitations of this case study are firstly that the data was collected from just eight businesses (6 start-ups in UK which both participated in one govermental funding program and only 2 cases from Vietnam) to both help the start-ups understand what they had benefits from the tCoPs and their expectations. The second limitation was on the depth and detail of each of four front-stage components of the business model. It is possible and desirable to break these down further, and future research might want to consider this to create further measures, however the aim of this research was to quickly assess the areas of strengths and weaknesses within the business and identify those aspects of the ecosystem/CoP that could deliver value.

Finally, policy makers and other practitioners looking to develop and build these types of interventions may want to take our insights into the fundamental actors, relations, and value exchanges within these temporal Communities of Practice. Businesses in not only Agritech sector but also in other fields can also better understand the value and potential of COPs and they can have the right approach and use.

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