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Innovation capabilities and learning mechanisms: insights from Ghanaian fresh fruit processing enterprises

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ABSTRACT

Strengthening the capabilities of agro-processing enterprises to be innovative and competitive has been a long-term industrial development challenge. This is mainly because, there is limited empirical insight on the ability of the enterprises to assimilate and use knowledge to create innovations. The effectiveness of policy in supporting capability building is also often contested. This paper employs a multi-case qualitative research approach to understand innovation capability building processes. It argues that learning mechanisms required differ with agro-enterprise size. Findings reveal the acquisition of knowledge in the micro- and small enterprises is embedded in learning-by-doing and informal mechanisms that require context-specific development interventions. Therefore, knowledge supply organizations must understand these peculiarities to support these enterprises with 'easy-to-understand-and-use' technologies and practical managerial information. Policy-makers need to formulate and implement strategies that can effectively facilitate partnerships, technology development and transfer within an enabling industrial policy environment, for enhanced capability building and a competitive industrial sector.

KEYWORDS

Agro-processing; innovation; Ghana; industrial policy; learning-by-doing

Introduction

The agro-industry sub-sector includes fruit processing enterprises, about 85% being micro-, 12% small- and 2% medium-scale (Afful-Koomson et al. 2014). The micro- and small scale enterprises usually operate in the domestic and informal industry sector, using workers with little formal skills training, and high production inefficiencies. Although agro-industries contribute immensely to inclusive development, employment creation and poverty reduction (Haggblade 2011), and enhance rural livelihoods (Ackah, Adjasi, and Turkson 2014; Quartey and Darkwah 2015), past attempts at agro-industrialization were not without failures (Diao, Magalhaes, and Silver 2019). The failures were partly attributed to lack of innovation capabilities and related low productivity that led to the shutdown of many enterprises (Whitfield 2010).

To achieve the sustainable development goal 9 (industry innovation and infrastructure) by 2030, innovation capability constraints must be effectively addressed (Egbetokun

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et al. 2016). Generally, the literature is scanty on how agro-enterprises build innovation capabilities (Quartey and Darkwah 2015). There is the need to understand the ability of such enterprises to assimilate, use, adapt and change existing technologies, and/or create new technologies, develop new products and processes (Kim 1998; Dutrénit 2004). This is crucial for agro-enterprises, as it allows them to act effectively and efficiently to both the needs of customers and the fluctuations of the business environment (Olsson et al. 2010). Most literature indicates positive and significant relationship between innovation capabilities and enterprise performance (Al-Ansari, Pervan, and Xu 2012; Figueiredo 2014; Hilman and Kaliappen 2015; Kafetzopoulos and Psomas 2016), (see exceptions in Chandler and Hanks 1994; Subramanian 1996).

Shaping innovation efforts require an enabling policy environment, in which government plays a significant role (Egbetokun et al. 2017). Generally, the influence of industrial policy environment on innovation capability building can be through incentive structures and conducive macro-economic policies; availability of right quantity and quality of skills; availability of technological information and support services; finance for developing capabilities; technological advancement policies of government (Lall 1992, 36–49). Ghana's industrial policy is set within a broader strategic vision of 'industry-driven economy' with particular focus on growth, diversification, upgrading and competitiveness of the sector (GoG 2015). Currently, there is renewed commitment by government to use agro-industrialization to transform the economy, with critical focus on policy strategies that promote and sustain micro- and small-scale agro-industries. To achieve this agenda, government is rolling out several flagship initiatives such as, 'one district, one factory' and 'agric-processing parks' (GoG 2015). Business support is also provided for private entrepreneurs to set up new agro-enterprises and revamp old functional ones. Most of the policy strategies have also focused on incentives for firm competitiveness. For example, fruit juice processing enterprises are to benefit from zero input duties, value-added tax and national health levy on inputs; low-level corporate incomes tax and zero import duties on machinery imports, among others. Due to financial constraints and weak coordination, most of the strategies have not been effectively implemented. Where they are implemented, micro- and small enterprises are not able to access such incentives as they operate without the requisite registration certificates or contracts. Several projects have also been promoted, for example, the National Board for Small-scale Industries (NBSSI) organizes training programmes on business operations and provides financial assistance for their registered enterprises. But, information is not readily available on the effectiveness of these interventions in supporting enterprises to build innovation capability.

More so, there is not much empirical information on the various ways of acquiring and using knowledge for innovative activities, and generating new opportunities for business lines (Narula 2002; Whitfield 2010). Authors like Figueiredo (2002) and Ariffin (2010) provided insights into technological capability building (an aspect of innovation capability) in developing countries. But, generally there is scarcity of research on understanding innovation capability building and particularly the underlying learning mechanisms in enterprises related to fresh fruit processing in Ghana. This paper seeks to address the gap. The paper argues that learning mechanisms required building innovation capabilities differ with enterprise size and resource. It contributes insights into learning mechanisms, innovations generated and outcomes, as well as the enabling

policy environment required for fresh fruit processing enterprises to build innovation capabilities. Specifically, these questions are explored: what types of internal and external learning mechanisms are explored by different enterprises to build innovation capabilities? What innovations are generated and with what outcomes? These questions are answered by examining and drawing lessons from case studies comprising micro-, small and large fresh fruit processing enterprises in Ghana.

A review of the literature on learning mechanisms for building innovation capabilities, and analytical framework for the study follows. Next, the methodology is presented. The fourth section focuses on the findings, which are then discussed. The conclusions are indicated in the final section.

Innovation capabilities building and learning mechanisms

This section reviews literature on innovation capability and related learning mechanisms. Concepts from organizational and innovation theories are explained and subsequently operationalized in an analytical framework.

Innovations occur when a new product, process or method is produced, or significantly improved by a firm, even if it has already been implemented by others (Bell 2009). Innovation capability, therefore, refers to a firm's ability to create value from its resources, to generate new technologies, develop new products and processes (Dutrénit 2004; Kim 1998). Neely et al. (2001) put it as a firm's potential to generate innovative outputs. The capabilities are usually built in individual staff members (in the form of knowledge, skills and experience), and/or in organizational systems (trainings, research, infrastructure). It also relates to a firm's potential to find out or learn about new ways of doing core activities and the capacity to internalize the outcomes (Wangwe 1995).

Learning processes provide mechanisms for acquiring and creating knowledge, skills and organizational arrangements for supporting innovation capability building (Sobanke, Ilori, and Adegbite 2012; Ehikioya 2012). To build their capabilities, firms must, therefore, engage in a process of technological learning (Bell and Pavitt 1993). This involves the acquisition and assimilation of new technical knowledge (Bell, Ross-Larson, and Westphal 1984; Lall 1992), through complex interrelationships of actors and skills. They must also learn to improve their organizational or managerial skills. The innovations generated from the acquired capabilities may thus be related to process and product technologies (technological innovations), and/or new business models linked to how the different resources are organized and managed (managerial innovations) (Albaladejo and Romijn 2000). For this paper, innovation capability is seen as an enterprise's ability to engage in not only technological, but also managerial innovations (Mol and Birkinshaw 2009).

Generally, learning mechanisms can be internal or external. The internal learning mechanisms are mostly related to innovation-related skills; knowledge creation through R&D; intra-firm communication of knowledge; knowledge articulation and assimilation and various forms of experience acquisition (Bell and Figueiredo 2012). These depict the quality and quantity of skilled human resources, particularly highly skilled and educated scientists and entrepreneurs, that enhance capability towards technological innovations (Le Blanc et al. 1997). For example, in a cable and wire manufacturing sub-sector Egbetokun, Adeniyi, and Siyanbola (2012) found that the building of

technological innovation was mainly through internal training (on-the-floor experimentation, apprenticeship and minor adaptations to products). External learning mechanisms relate to short courses and/or postgraduate programmes in overseas organizations for staff; active participation in scientific conferences; access to codified knowledge (research reports, articles etc.); knowledge from specialized consultants; and hiring universities graduates (Bell and Figueiredo 2012). They also include interacting with diverse actors (e.g. customers, input suppliers), research and financial network of institutions (Massa and Testa 2008). The interactions support managerial innovations that enhance the importation and diffusion of information on markets, technologies, credit and training opportunities (Amara et al. 2008; Egbetokun, Adeniyi, and Siyanbola 2012). Sobanke, Ilori, and Adegbite (2014), using a survey of metalworking firms in Nigeria, examined internal and external factors associated with the accumulation of innovation capability. They found that prior work experience of the entrepreneur, in-house training of the technical staff and networking with members of the industry association are important for the build-up of capabilities.

The learning and innovation processes stem from formal and informal knowledge (Egbetokun et al. 2017). Formal learning and interactions mostly involve codified information and contractual technical agreements (Tether 2002). Oyelaran-Oyeyinka and Lal (2006), in Nigeria, found that formal training is pivotal to knowledge build-up, which is, in turn, positively linked to innovation performance. Robson and Obeng (2008) found that in Ghana, formal training in firms had a greater probability of combating business impediments. Informal knowledge sharing, which entails mostly 'off the record' interactions, is prevalent among SMEs in developing countries (Ajao, Oyebisi, and Aderemi 2019).

Conceptual/analytical framework

The concept of innovation capability has been found not to be an easy and separately identifiable construct, because it is composed of reinforcing practices and processes within a firm (Figueiredo 2002). There is difficulty in capturing innovation capability because skills and knowledge exhibited in a firm cannot be directly observed and recorded. Proxies that capture observable qualities that reflect innovation capabilities have, therefore, been used (Bell and Figueiredo 2012; Saunila and Ukko 2012; Figueiredo 2017). The observable measures usually relate to sources of innovations (e.g. R&D, training expenditure), generated through formal science, technology and innovation, as well as informal learning mechanisms. Measures also relate to results (e.g. new products, new ways of doing) of using the capabilities (Bell and Figueiredo 2012). Conceptually, these explanations imply innovation capabilities are better proxied by the technological and managerial innovative activities of the firms to be studied (Iammarino et al. 2012). Thus, this paper explores three main analytical elements of innovation capability:

- innovation potential – factors that reflect the firm's potential to innovate e.g. organizational structure, policy environment;
- innovation processes – sources of innovation (learning mechanisms) and ways activities are actually carried out;
- innovation results – innovations and outcomes of the innovation processes (Saunila and Ukko's 2012)

As indicated in Figure 1, the paper focuses on innovation capabilities 'revealed' (Sutton 2012), within an industrial policy context, which sets the tone for the creation of incentives and effective knowledge linkages. The analytical elements of Saunila and Ukko (2012) are adapted to help unravel insights from different scales of fruit processing enterprises. By tracking technological and managerial innovations related to the learning mechanisms, innovation capabilities and outcomes generated are described.

Methodology

Following most studies on innovation capabilities that use case study approach (e.g. Dantas and Bell 2011; Hansen and Ockwell 2014; Figueiredo 2016, 2017), an inductive strategy (Eisenhardt and Graebner 2007), and in-depth qualitative multi-case study research design (Yin 2009) was used to provide deep insights. The paper focused on varying scales of fresh fruit processing enterprises, an important component of agro-processing in Ghana. This was to avoid the wide innovation diversity that may occur in different sub-sectors (example between metal and fresh fruit processing enterprises). A purposive sampling approach was employed to select information-rich cases for analytical generalization (Yin 2009). Based on the classification of enterprises used in the Regional Project on Enterprise Development survey (Teal 2002), the paper categorized the fresh fruit processing enterprises as follows: (i) micro-enterprise, less than five employees (ii) small enterprise, 5–29 employees (iii) large enterprise, 100 and more employees. Specifically, six cases, comprising three micro-, two small, and one large enterprise, were purposively selected, based on the number of staff employed and the processing of mangoes, oranges and/or pineapples (see Appendix for description of cases). As most micro- and small fruit processing enterprises are located in the main cities, the cases were selected from the Greater Accra (micro- and small) and Eastern (large) Regions.

Data were collected from February to August 2019, through secondary (industrial policies, enterprise profiles and reports) and primary (enterprise interviews) sources.

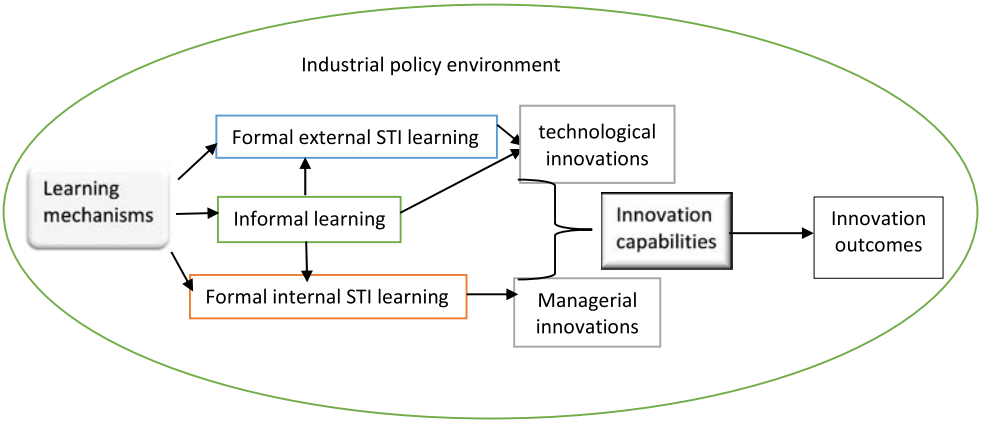

Figure 1. Analytical framework for understanding innovation capability building. Source: Based on Saunila and Ukko (2012).

Through participation in enterprise association meetings at the scoping stage, enterprise managers were identified and contacts established. In-depth interviews, based on semi-structured interview guide, were conducted with a total of 18 enterprise personnel made up of managers, factory floor workers, administrators and scientists. To understand the innovation capability building pathways, questions were asked on: innovations generated, types and sources of knowledge acquisition, level of interactions and extent of information seeking from customers, competitors and R&D organization, and outcomes of specific innovations. The interviews lasted between 35 and –55 min, were tape-recorded, and transcribed. The transcripts were coded using Atlas ti.8. Content analysis was employed, and the report of the coding interpreted using the components of the analytical framework.

Findings

Industrial policy environment

Entrepreneurs of all the case studies had knowledge of the existence of a national industrial policy, but felt the outlined strategies have not been successfully implemented to address challenges of the fresh fruit processing enterprises. Under the policy, the large enterprise had benefitted from zero input duties, value-added tax and national health insurance levy incentives. However, increasing foreign exchange rates, unreliable electricity supply, inadequate linkages to local markets and financial support services negatively influence its productivity. Policy strategies that provide platforms for knowledge sharing and partnerships were said to be inadequate. It was explained that,

> within the country, there are generally no opportunities to meet with competitors, except during programmes of the Association of Ghana Industries'. And even that, we do not meet to exchange or discuss new technology knowledge … it is only on increasing utility tariffs and social challenges. (Administrative staff, large enterprise)

This is in line with findings from Anaman and Osei-Amponsah (2008) that indicated that the agro-industry sector is straddled with limited technical capacity, policy support, lack of inter-firm collaborations and coordinated industry investments.

All the five micro- and small enterprises in the study were owner-managed, and with limited skills and knowledge. They were unaware of, or could not afford advanced processing and packaging technologies. They were also not connected to the large enterprise to tap into their innovations. The entrepreneurs knew of programmes implemented by the NBSSI, and have attended some of their training meetings. But, they felt the topics were too focused on preparing business plans, and not technical knowledge. A micro-enterprise entrepreneur stated,

> what l am expecting is that … they (NBSSI) will send a text or email message that, this year new technology, new things or new systems or new information has come and we are adding on to what we taught the last time … but it's the same training on business plans every time, at a point you see you are not interested, and just stop attending.

Three of the case studies were not registered, and it was explained that the process and acquisition of operating permits were tedious, bureaucratic and too expensive.

Learning mechanisms, core innovations and outcomes

Case study 1: micro-enterprises

The study found that the source of formal and codified STI knowledge was mainly through 'google search from the internet', and observation from other fresh fruit juice processors. Science-based learning, within the enterprises through upgrading of staff skills and technologies, was basically absent. As indicated in Table 1, the sources of information and learning mechanisms for innovations in the micro-enterprises were largely informal and practice-based. A supervisor said,

> Something like the expiring date, the life span, after we finish we just pick one put it in the fridge and every day we taste, … so basically that is how we get to know if it is still fresh. So you could see from the 5th day the taste starts changing, and that is how we said okay so within 5 days it has fermented, so it is try and error.

The learning processes involved the use of non-scientific experimentations using logics of practice and familiar measurements (cups, gallons, bowls), to help the low educated or unskilled work force understand practices faster and retain the standard operating practices (SOPs) longer. An entrepreneur explained that, 'they learn more with practicals than with theory … They don't do well with reading a lot but when you take them through practice for a long time they become masters of their game'. Both workers and the owner-managers emphasized that this practical way of learning has been very effective in helping to build capability especially for basic technological innovations (both product and process).

The innovations were generally technological, largely process- and market-centred, such as efficient practices of processing, addition of special herbs for unique products and product supply arrangements for niche markets. For instance, Vineyard Exotics processed and marketed some herb-based unique juices from traditional fruits and fresh apple juice (foreign fruit) to local air flights and selected supermarkets. Such innovations led to increased productivity and market access. The entrepreneurs and main supervisors of the micro-enterprises had inadequate scientific and managerial knowledge and skills, although they attended training programmes of the processors' association and NBSSI. Basically, non-STI and informal interactive learning played an important role in the innovation capability building process. The entrepreneurs learned to improve their processing skills mainly through informal learning, by observing and tasting juice products from known brands, and then try to imitate through 'trial and error' experimentation. An entrepreneur mentioned that, 'when I go out, there are so many fruit juices, sometimes I buy, bring the juice home for us to just have a taste of it and see how we compare with others'. Another pointed out, 'when I have something new I want to bring on board, we discuss it, prepare it, allow everybody to taste and then we take comments, maybe we add this or subtract this then we run with the nice one'.

Technological upgrading and advancement was lacking in the micro-enterprises. The entrepreneurs knew from the internet and 'gossips' from the large enterprise some new technologies and innovative products in the fresh fruit processing space, but have not built the capability to take up such an idea. This was also confirmed by Abramo et al. (2009) who found that such enterprises are not able to access and capitalize on the

Table 1. Micro-enterprises: Learning mechanisms, core innovation and outcomes.

	Internal learning: STI, formal and science-based	External learning: codified knowledge acquisition and transfer	Informal and experience-based learning	Technological and managerial innovations	Innovation outcomes
Blossom Way	No engineers; No research unit nor links with R&D company; No standardized administrative and processing practices; No formal STI-based upgrading of skills; No documentation of procedures; Use expertise of graduate nutritionist	Training from NBSSI; Observing and copying from high brand processors; Feedback from customers; Information from internet search	Tasting juice from competitors; Experimentation; Practical learning on the job through observation	*Technological* Use of industrial blender; Process for no additives mango juice; Juice dispenser for serving at events *Managerial* Promotional banners at events; Sale of pastries and salads with juice	Increased productivity and patronage by hotels
Reggies Juice Bar	No engineers or STI-based staff; Procedures not standardized nor documented; No research unit or links to R&D company Have formal safety trainings; monthly debriefing meetings	Attends NBSSI seminars; Internet search; Collect information from competitors' website; Knowledge from Fruit Processors' Association	Learn by doing and observing; Instructions by word of mouth; Trial and error experiments	*Technological* Upgrade from home blender to industrial juicer; Refrigeration systems; Process of no additives pure fruit juice; Consistent product taste *Managerial* Follow up with customers for feedback	Increase productivity from 200 to 300 pineapples to 3000–4000 per day
Vineyard Exotics	Non-STI skilled staff; No research unit; Registered with Food and Drugs Authority and Standard Authority; Standard operating procedures documented; Adhere to strict safety and quality control measures	No formal external STI training for staff; Engages accredited biochemist consultant from large companies; Information from internet search; Learn from products of large companies; Contact with leader of Processors' Association	Informal talks with customers and sale persons of competitive products; Several trial samples for tasting by diverse people; Constant experimentations of juice mixing; Practical training on the job; Informal meetings on the job	*Technological* Devices for checking sweetness and acidity; Unique and customized juice products for different markets; fruits juice dispensers at restaurants; Use of foreign fruit juices; Process for product consistency *Managerial* Good relationship with fruit juice suppliers to maintain product consistency and constant supplies to retailers; regular staff meetings for feedback and follow-ups	Niche market (supply to domestic flights) for middle to high income earners; Increase productivity and income

Source: Author's compilation from interviews.

advancement of technology, mainly due to lack of investment capital and also a processing unit or factory. This may result in the incapability to learn towards innovation and utilization of technology advancement benefits (Oyebisi, Ilori, and Nassar 1996). To get around the lack of technological advancement, Vineyard Exotics, for instance, initially acquired knowledge of the processing space through formal learning using a scoping study. The insights of the study helped with the identification of potential fresh fruit markets, the demands, quality assurance issues. The entrepreneur then leveraged on the identified opportunities, and dealt with the constraints, through effective feedback interactions with suppliers and customers, use of the services of a biochemist consultant, and certifications from the relevant national safety and quality assurance organizations. Learning through observations and information from the internet on what pertains in the large enterprise, the entrepreneur enhanced managerial innovations to secure sustainable supply chains and consistency in products. Thus, the raw materials were always bought from the same suppliers and foreign fruits already processed into juices were utilized to ensure all year round supply to customers, while avoiding the recruitment of a large work force. These ensured increased market access all year round, and reduced processing costs for improved income.

Case study 2: small enterprises

The learning mechanisms for the small enterprises were not very different from those of the micro-enterprises. As shown in Table 2, formal STI and science-based internal learning were basically absent. External codified technical knowledge was acquired from internet searches, training on standard operating practices (SOPs), workshops, machine fabricators, other processors and customers. Informal and experience-based learning was mostly utilized, in that, 'we are still learning so we just end up recording how we went by it and try to perfect it and then we add it to the catalogue of things we do'.

Building innovation capabilities was important for the two small enterprises to be efficient in the use of their resources. The entrepreneurs utilized formal cum informal learning, through the services of consultants to train their low educated staff, on quality control in a practical manner (hands-on learning on factory floor). This allowed the enterprises to acquire the necessary skills needed for the innovation of their processing practices, products and managerial mechanisms to ensure market competitive advantage. As in the case of micro-enterprises, the findings indicated that learning for building innovation capabilities was also through external interactions with mostly suppliers and customers. There was technological upgrading, but this was generally from the use of kitchen blender to industrial juicer, nothing closer to the technological advancement of automated systems utilized in the large enterprise.

The process of external learning for the two small enterprises was through transfer of knowledge from the leadership of Processors' Association and the NBSSI to the entrepreneurs in periodic capacity-building and training activities at regional and district levels. The knowledge was on writing business plans, quality control measures, certification and best practices in the fresh fruit processing sub-sector. They were not trained in new technologies nor supported with technological upgrade services. Thus the enterprises relied on learning by doing to improve on their practices. As mentioned by a staff, 'For us about 95% of what we do is practical, so we just end up learning how to do something else'.

Table 2. Small enterprises: learning mechanisms, core innovations and outcomes.

	Internal learning: STI, formal and science-based	External learning: codified knowledge acquisition and transfer	Informal and experience-based learning	Technological and Managerial Innovations	Innovation Outcomes
Ayhow Fruit Juice Company	No engineers, No research unit nor links with R&D organization; Management-based seminars attended; Meetings for information sharing; SOPs documented	Training from NBSSI; training on SOPs when needed; Information from internet	Experiment on small quantity of fruit until quality and taste of juice is good	*Technological* Different fresh fruit and tiger nut juice products Juice from fruit peels said to have medicinal properties *Managerial* Open door policy, for easy interaction and feedback from staff and suppliers	Increased patronage of tiger nut-based juice; increased income
Nhyrah Fruits	No engineers, but 2 university graduates; No research unit nor links with R&D organization; MBA holder administrator; SOPs and market orders documented; Procedures recorded and replayed; training every 6 months by quality control consultant; more practical in-house training for factory floor staff	Engages equipment fabricators/ engineers for training; Feedback to engineers for machine upgrade; Workshop attended by entrepreneur and administrator; No short course training abroad; No interaction with large firms; Information mostly from internet, friends in same business; Feedback from customers	Learnt overtime how machines and fruits behave; factory floor experimentation; open door policy with staff; informal talks on-the-spot discussions; practical learning; experience sharing with high brand product friends	*Technological* Upgrade to one ton/hour fruit crusher from using wooden pestle to pound ginger; Upgrade from manual grating of pineapple to juice extractor; Air condition in peeling room; labelling and branding processes *Managerial* Established and maintained relationships with supply chain actors	Faster and efficient process; More juice produced, From 30 to 200 gallons; Better crushing and squeezing; Increase staff from 3 to 15; More customers; Quality improved

Source: Author's compilation from interviews.

Case study 3: large enterprise

The internal and external learning mechanisms in the large enterprise were very different from those of the micro- and small enterprises. The large enterprise placed high importance on new product development and quality assurance (see Table 3). Thus there is a R&D unit made of staff with specialized skills and scientific expertise to ensure the enterprise to continually upgrade its processing facilities with the state-of-the- art refrigeration, high-tech communication and information technology centres to meet emerging market demands. An administrator indicated that,

> the company's production process involves a cold chain process which is mainly handled by refigeration engineers, … there are also mechanical and electrical engineers. In every year a number of courses are listed for all the engineers for capacity training and building purposes. Recently an engineer went on automation training on how to build panels and about six engineers also received various training.

The enterprise also used new technologies for production of biodegradable packaging materials, biomass energy and bioethanol fuels to reduce energy consumption and cost of production. The staff had higher education qualifications, unlike those with senior high school certificate in the micro-enterprises. A lot of training and certification support opportunities were provided for its farmers to ensure standards of the importing countries are met. Its products were guided by food safety standards from the British Retail Consortium and the International Food Standard. Intellectual property was protected and the enterprise had registered a trademark and also tapped into the trademark of the certification partners.

In addition, its farmers had achieved GLOBALGAP, Soil Association and Organic Food Federation, LEAF and Fairtrade certification and premium prices for the fruits they supply. An agronomist explained that,

> in terms of standardization, the process starts from the farm where GLOBALGAP (Global Good Agricultural Practices) and LEAF (Linking Environment and Farming) certifications are done. These are basically done to control the usage of chemicals on the farm, child labor among other standards.

The enterprise also placed a lot of emphasis on a strong brand development through label and slogan initiatives such as 'Caretrace' (a website that helps customers to trace the story of the products). The brand awareness and competitive edge have been increased, and made it stay true to its commercialization approach to, 'select only the best fruit produced by local farmers, process and package at source without any additives, artificial flavours or preservatives'.

Discussion

Innovation capability building processes differed in micro-, small and large fruit processing enterprises. While the micro- and small enterprises relied on mostly informal and experience-based learning, the large enterprise focused on internal STI, formal science-based and external codified knowledge acquisition. In the large enterprise, the staff had higher level of education and therefore a better capability to understand the

Table 3. Large enterprise: learning mechanisms, core innovations and outcomes.

	Internal learning: STI, formal and science-based	External learning: codified knowledge acquisition and transfer	Informal and experience-based learning	Technological and Managerial Innovations	Innovation Outcomes
Blue Skies	R&D unit; Skilled engineers; New technologies; Annual capacity building events for all staff; Training for factory floor workers; Daily training in High Care department; In-house training policies; Departmental meetings thrice a week; Weekly reports on all units; Strict national and international standards for farms and factory	Training in technical universities; Accredited institutions provide training services at factory; Research by specialized institutions abroad; Frequent attendance of seminar and workshops; Short courses in Ghana and abroad; Upgrading of qualification through scholarships; Flexible work times for students; E-library for staff; Constant interactions with farmers; Social network page for feedback	Interact with fruit processing firms during fairs; Association of Industries meetings but no technology knowledge exchanges with others in the industry	*Technological* High-tech automated processing machines; New technology for ice lollies; Cold chain process; Waste water treatment; Biodegradable packaging; Various mixes of fresh fruit juices; Fruit-based ice creams; Refrigerated vans and containers for juice and ice cream sales at vantage points in the cities *Managerial* Customer care specialists for feedback; debriefing meetings Mondays and Fridays; departmental meetings on Wednesdays (departmental meetings); follow-ups and reporting on profit margins, health, staff welfare and safety, quality assurance	Eco-friendly production; Recycled waste water for washrooms; increased local and international market access; Increased productivity and income

Source: Authors' compilation from interviews.

advanced knowledge flows and product quality demanded by especially the international markets. The technically qualified staff contributed to learning to create and absorb new technologies. Thus, the food scientists, engineers and technologists in Blue Skies Ltd, provided valuable innovation capability that enabled the creation of new technologies and development of new products (fruit ice cream, lollies and juice), and processes (cold van street marketing of fruit juice) to respond to the changing market demand. This aligns with other studies (e.g. Blind, Petersen, and Riillo 2017), which reported a high significance of scientific knowledge for innovation performance in firms. The large enterprise made use of lots of formal training through seminars and workshops in country and abroad. Amara et al. (2008) also buttressed this point, indicating that firms need a sufficient knowledge pool of skillful workforces to introduce innovations. The stock of innovation capability was also enhanced continually through formal training, R&D, adherence to strict certified standard operating practices, but minimal informal learning on the factory floor.

The micro- and small enterprises relied on information from the internet and practical/informal learning to build their basic technological innovations. Formal STI science-based learning was not of much essence to them, because the resultant advanced technologies would not fit into their home-based or small processing unit set-up, nor did they have the requisite skills or high level of technical knowledge to manage them. What is interesting is that no matter the type/source of learning mechanisms predominantly utilized, all the enterprises generated technological and managerial innovations that led to positive outcomes (niche markets, increased productivity). The literature mostly highlights formal internal and external learning mechanisms as leading to capability to innovate. For instance, Nelson and Phelps (1966) asserted that, higher level educated workforce stimulates the capability to comprehend, create and process information quickly compared to those not educated. But, for these case studies, the micro- and small enterprises engaged a workforce with junior/senior high school education, which were also able to effectively learn through informal 'trial and error' non-scientific experimentations to build innovation capabilities. These enterprises focused more on informal learning processes, mainly directed towards incremental problem solving and experimentation on the 'shop floor' (Kim and Nelson 2000) to create both technological and managerial innovations. Thus, the micro- and small enterprises can be competitive in the agro-processing space by being supported to context-specific capabilities for unique products that give an edge over others, as in the case of Vineyard Exotics.

The literature is coherent on the benefits of external knowledge search for innovation. External interactions with other actors can provide useful inputs for the learning and innovation capability building processes. It was evident that the current industrial policy environment is not totally effective in helping enterprises build stronger partnerships and learning alliances. More so, the NBSSI training activities are largely geared towards creating managerial innovations. The study indicated that codified STI knowledge from external sources was minimal, information was largely sourced from friends in the same processing business and association meetings. Such external interactions supported the transfer of knowledge through the leadership of the processors' association, capacity building and training activities, on best practices and business planning. Goedhuys, Janz, and Mohnen (2006) confirmed evidence of the importance of industry associations in enhancing the innovativeness of enterprises. However, most outlined strategies,

towards capability building in the industrial policy document, pointed to formal STI learning mechanisms, while these informal interactions are not promoted.

Customers also shared with the owner-managers tips and ideas that helped in the innovation capability building processes. This aligns with Dufour and Son's (2015) assertion that small enterprises can utilize knowledge of users, suppliers and other partners to complement their capabilities, which are usually driven by market-related motivations. The search of information through the internet was used a lot by the micro- and small enterprises and this is particularly interesting in an era of digital innovations, to explore further how to support learning.

Conclusion

This paper sought to understand innovation capabilities building in three different scales of fresh fruit processing enterprises. The micro- and small enterprises built innovation capabilities through informal learning and practical experience sharing on the job to generate basic technological and managerial innovations. The owner-managers of the enterprises play several roles (food technologist, engineer and administrator) in the capability building process, even though they did not have the formal professional skills. Internet search was extensively used for acquiring technical knowledge on fruit types, safety measures and preservation approaches. Also, friends, processors' association platform and customers were important sources of knowledge on fruit processing practices and tips for market opportunities.

The innovations from these enterprises were largely on processes and market access, with incremental changes in processing equipment to improve productivity. Focusing on a niche market and the diversification of fresh juice products for different customers led to product innovations in one micro-enterprise. However, sustaining the market for such products required adherence to strict national quality and food safety standards and continuous acquisition of knowledge from a biochemist consultant. Currently, the organizational theory, as well as the innovation development literature for the West Africa context and specifically for agro-processing, is limited on the issues of building capabilities for niche-specific innovations and internet-based knowledge acquisition. This requires further research to provide more insights for bridging the gap in knowledge. Such insights could generate cheaper and novel practical technological knowledge that the processors' association and NBSSI can leverage on to assist micro- and small enterprises enhance the effectiveness of innovation capabilities' accumulation.

Insights from the paper align to the various factors that possibly contribute to the build-up of innovation capabilities in the literature (Romijn and Albaladejo 2002). These are internally driven such as knowledge and skills of management and factory staff acquired from formal qualification and experience, which were evident in the large enterprise. As it is well established in the literature, the large enterprise focused largely on internal and external formal STI and science-based learning mechanisms through employing high skilled food technologists, engineers and administrators. There were upgrading and accumulation of knowledge through skills training that built innovation capabilities for product, process and market innovations. The innovations were usually novel, and also incremental that led to more sustainable and

efficient processing practices, completely new fresh fruit processed products and effective marketing strategies.

Typically, the policy strategies were less aligned to the peculiarities of micro- and small enterprises' innovation capability building processes. As these enterprises thrived on informal learning mechanisms, it is important that decision-makers make space for practical and interactive training initiatives in the agro-industrialization policy process. Policy-makers need to also emphasize strategies that could effectively facilitate partnerships, technology development and knowledge transfer to create an enabling industrial policy environment for enhanced capability building towards better enterprise performance. Incentives must be created within the agro-industrialization agenda to promote start-ups with a focus on internet-based simple local fresh fruits processing tits-bits Apps to make the search for information easier for micro- and small enterprises. Knowledge and innovation supply organizations in Ghana must understand the learning needs of the different enterprise scales. They must also be financially supported under the government industrialization agenda to support the micro- and small enterprises with context-specific 'easy-to-understand-and-use' technologies and practical knowledge to ensure productivity.

To have better insights on innovation capability building we need to understand learning mechanisms that encapsulate both formal skill acquisition and practical learning-by-doing.

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References

Abramo, G., C. A. D'Angelo, F. Di Costa, and M. Solazzi. 2009. "University–Industry Collaboration in Italy: A Bibliometric Examination." *Technovation* 29 (6-7): 498–507.

Ackah, C., C. Adjasi, and F. Turkson. 2014. "Scoping Study on the Evolution of Industry in Ghana. Learning to Compete." *Working Paper 18*. Washington, DC: Brookings Institution.

Afful-Koomson, T., W. Fonta, S. Frimpong, and N. Amoh. 2014. *Economic and Financial Analyses of Small and Medium Food Crop Agro-Processing Firms in Ghana*. Accra: United Nations University Institute for Natural Resources in Africa. UNU-INRA.

Ajao, B. F., T. O. Oyebisi, and H. O. Aderemi. 2019. "Implementation of E-Commerce Innovation on Small Enterprises in Nigeria." *International Journal of Entrepreneurship and Small Business* 38 (4): 521–536.

Al-Ansari, Y., S. Pervan, and J. Xu. 2012. "Service Innovation and Performance in SMEs." *International Journal of Productivity and Performance Management* 63: 216–237. doi:10.1108/EBS-04-2013-0012.

Albaladejo, M., and H. A. Romijn. 2000. *Determinants of Innovation Capability in Small UK Firms : An Empirical Analysis*. https://pdfs.semanticscholar.org/346e/bc2b3a632cfda33c708818ce6ce81c6664dc.pdf.

Amara, N., R. Landry, N. Becheikh, and M. Ouiment. 2008. "Learning and Novelty of Innovation in Established Manufacturing SMEs." *Technovation* 28 (7): 450–463. doi:10.1016/j.technovation.2008.02.001.

Anaman, K. A., and C. Osei-Amponsah. 2009. "Determinants of the Output of the Manufacturing Industry in Ghana from 1974–2006." *Ghana Policy Journal* 3: 69–89.

Ariffin, N. 2010. "Internationalisation of Technological Innovative Capabilities: Levels, Types and Speed (Learning Rates) in the Electronics Industry in Malaysia." *International Journal of Technological Learning, Innovation and Development* 3 (4): 347. doi:10.1504/IJTLID.2010.039164.

Bell, M. 2009. "Innovation Capabilities and Directions of Development." *STEPS Working Paper*. Brighton: STEPS Centre.

Bell, M., and P. N. Figueiredo. 2012. "Innovation Capability Building and Learning Mechanisms in Latecomer Firms: Recent Empirical Contributions and Implications for Research." *Canadian Journal of Development Studies/Revue canadienne d'études du développement* 33 (1): 14–40. doi:10.1080/02255189.2012.677168.

Bell, M., and K. Pavitt. 1993. "Technological Accumulation and Industrial Growth: Contrasts Between Developed and Developing Countries." *Industrial and Corporate Change* 2 (2): 157–210.

Bell, M., B. Ross-Larson, and L. E. Westphal. 1984. "Assessing the Performance of Infant Industries." *Journal of Development Economics* 16 (1–2): 101–128. doi:10.1016/0304-3878(84)90103-2.

Blind, K., S. S. Petersen, and C. A. F. Riillo. 2017. "The Impact of Standards and Regulation on Innovation in Uncertain markets." *Research Policy* 46 (2017): 249–264.

Chandler, G. N., and S. H. Hanks. 1994. "Market Attractiveness, Resource-Based Capabilities, Venture Strategies, and Venture Performance." *Journal of Business Venturing* 9 (4): 331–349.

Dantas, E., and M. Bell. 2011. "The Co-Evolution of Firm-Centered Knowledge Networks and Capabilities in Late Industrializing Countries: The Case of Petrobras in the Offshore Oil Innovation System in Brazil." *World Development* 39 (9): 1570–1591. doi:10.1016/j.worlddev.2011.02.002.

Diao, X., E. Magalhaes, and J. Silver. 2019. "Cities and Rural Transformation: A Spatial Analysis of Rural Livelihoods in Ghana." *World Development* 121 (21): 141–157.

Dufour, J., and P. E. Son. 2015. "Open Innovation in SMEs – Towards Formalization of Openness." *Journal of Innovation Management* 3 (3): 90–117.

Dutrénit, G. 2004. "Building Technological Capabilities in Latecomer Firms: A Review Essay." *Science, Technology and Society* 9 (2): 209–241. doi:10.1177/097172180400900202.

Egbetokun, A., A. Adeniyi, and W. Siyanbola. 2012. "On the Capability of SMEs to Innovate: The Cable and Wire Manufacturing Sub-Sector in Nigeria." *International Journal of Learning and Intellectual Capital* 9 (2): 64–85.

Egbetokun, A., R. Atta-Ankomah, O. Jegede, and E. Lorenz. 2016. "Firm-level Innovation in Africa: Overcoming Limits and Constraints." *Innovation and Development* 6 (2): 161–174. doi:10.1080/2157930X.2016.1224619.

Egbetokun, A., A. J. Oluwadare, B. F. Ajao, and O. O. Jegede. 2017. "Innovation Systems Research: An Agenda for Developing Countries." *Journal of Open Innovation: Technology, Market, and Complexity* 3 (4): 25.

Ehikioya, B. 2012. "Small and Medium Enterprises' Growth and Development in Emerging Economies: Evidence from Nigeria." *Management in Nigeria* 48 (2-3): 7–16.

Eisenhardt, K., and M. E. Graebner. 2007. "Theory Building from Cases: Opportunities and Challenges." *Academy of Management Journal* 50 (1): 25–32. https://www.jstor.org/stable/pdf/20159839.pdf.

Figueiredo, P. N. 2002. "Does Technological Learning Pay Off? Inter-Firm Differences in Technological Capability-Accumulation Paths and Operational Performance Improvement." *Research Policy* 31: 73–94.

Figueiredo, P. N. 2014. "Beyond Technological Catch-up: An Empirical Investigation of Further Innovative Capability Accumulation Outcomes in Latecomer Firms with Evidence from Brazil." *Journal of Engineering and Technology Management – JET-M* 31 (1): 73–102. doi:10.1016/j.jengtecman.2013.10.008.

Figueiredo, P. N. 2016. "Evolution of the Short-Fiber Technological Trajectory in Brazil's Pulp and Paper Industry: The Role of Firm-Level Innovative Capability-Building and Indigenous Institutions." *Forest Policy and Economics* 64: 1–14. doi:10.1016/j.forpol.2015.12.008.

Figueiredo, P. N. 2017. "Micro-level Technological Capability Accumulation in Developing Economies: Insights from the Brazilian Sugarcane Ethanol Industry." *Journal of Cleaner Production* 167: 416–431. doi:10.1016/j.jclepro.2017.08.201.

Goedhuys, M., N. Janz, and P. Mohnen. 2008. "What Drives Productivity in Tanzanian Manufacturing Firms: Technology or Business Environment?" *The European Journal of Development Research* 20 (2): 199–218.

GoG. 2015 . *Ghana Industrial Policy*. Accra: Gvernment of Ghana.

Haggblade, S. 2011. "Modernizing African Agribusiness: Reflections for the Future." *Journal of Agribusiness in Developing and Emerging Economies* 1 (1): 10–30. doi:10.1108/20440831111131532.

Hansen, U. E., and D. Ockwell. 2014. "Learning and Technological Capability Building in Emerging Economies: The Case of the Biomass Power Equipment Industry in Malaysia." *Technovation* 34 (10): 617–630. doi:/10.1016/j.technovation.2014.07.003.

Hilman, H., and N. Kaliappen. 2015. "Innovation Strategies and Performance: Are They Truly Linked?" *World Journal of Entrepreneurship, Management and Sustainable Development* 11 (1): 48–63. doi:10.1108/WJEMSD-04-2014-0010.

Iammarino, S., M. Piva, M. Vivarelli, and N. von Tunzelmann. 2012. "Technological Capabilities and Patterns of Innovative Cooperation of Firms in the UK Regions." *Regional Studies* 46 (10): 1283–1301.

Kafetzopoulos, D., and E. Psomas. 2016. "Journal of Manufacturing Technology Management." *International Journal of Productivity and Performance Management* 26 (1): 162–176. doi:10.1108/JMTM-12-2012-0117.

Kim, L. 1998. "Crisis Construction and Organizational Learning: Capability Building in Catching-up at Hyundai Motor." *Organization Science* 9 (4): 506–521. doi:10.1287/orsc.9.4.506.

Kim, L., and R. Nelson2000. *Technology, Learning and Innovation: Experiences of Newly Industrializing Economies*. Cambridge: Cambridge University Press.

Lall, S. 1992. "Technological Capabilities and Industrialization." *World Development* 20 (2): 165–186. doi:10.1016/0305-750X(92)90097-F.

Le Blanc, L., R. Nash, D. Gallagher, K. Gonda, and F. Kakizaki. 1997. "A Comparison of US and Japanese Technology Management and Innovation." *International Journal of Technology Management* 13 (5-6): 601–614. doi:10.1504/IJTM.1997.001683.

Massa, S., and S. Testa. 2008. "Innovation and SMEs: Misaligned Perspectives and Goals among Entrepreneurs, Academics and Policy Makers." *Technovation* 28 (7): 393–407. doi:10.1016/j.technovation.2008.01.002.

Mol, M. J., and J. Birkinshaw. 2009. "The Sources of Management Innovation: When Firms Introduce new Management Practices." *Journal of Business Research* 62 (12): 1269–1280.

Narula, R. 2002. "Innovation Systems and "Inertia" in R&D Location: Norwegian Firms and the Role of Systemic Lock-in." *Research Policy*. doi:10.1016/S0048-7333(01)00148-2

Neely, A., R. Filippini, C. Forza, A. Vinelli, and J. Hii. 2001. "A Framework for Analysing Business Performance, Firm Innovation and Related Contextual Factors: Perceptions of Managers and Policy Makers in two European Regions." *Integrated Manufacturing Systems* 12 (2): 114–124. doi:10.1108/09576060110384307.

Nelson, R., and E. Phelps. 1966. "Investment in Humans, Technological Diffusion, and Economic Growth." *The American Economic Review* 56 (1-2): 69–75.

Olsson, A., C. Wadell, P. Odenrick, and M. N. Bergendahl. 2010. "An Action Learning Method for Increased Innovation Capability in Organisations." *Action Learning: Research and Practice* 7 (2): 167–179.
Oyebisi, T., M. Ilori, and M. Nassar. 1996. "Industry-Academic Relations: An Assessment of the Linkages Between a University and Some Enterprises in Nigeria." *Technovation* 29: 498–507.
Oyelaran-Oyeyinka, B., and K. Lal. 2006. "Learning New Technologies by Small and Medium Enterprises in Developing Countries." *Technovation* 26: 220–231. doi:10.1016/j.technovation.2004.07.015.
Quartey, E. T., and S. Darkwah. 2015. "Factors Affecting the Use of Modern Technologies in Agro Processing in Ghana." *Academia Journal of Agricultural Research* 3 (7): 99–115.
Robson, P. J., and B. A. Obeng. 2008. "The Barriers to Growth in Ghana." *Small Business Economics* 30 (4): 385–403.
Romijn, H., and M. Albaladejo. 2002. "Determinants of Innovation Capability in Small Electronics and Software Firms in Southeast England." *Research Policy* 31: 1053–1067.
Saunila, M., and J. Ukko. 2012. "A Conceptual Framework for the Measurement of Innovation Capability and its Effects." *Baltic Journal of Management* 7 (4): 355–375. doi:10.1108/17465261211272139.
Sobanke, V., M. Ilori, and S. Adegbite. 2012. "Technological Capability in Metal Fabricating Firms in Southwestern Nigeria." *American Journal of Industrial and Business Management* 02 (4): 176–183. doi:10.4236/ajibm.2012.24023.
Subramanian, A. 1996. "Organizational Innovativeness: Exploring the Relationship Between Organizational Determinants of Innovation, Types of Innovations, and Measures of Organizational Performance." *International Journal of Management Science* 24.
Sutton, J. 2012. *Competing in Capabilities: The Globalization Process - John Sutton – Google Books (First)*. Great Britain: Oxford University.
Teal, F. 2002. *Background Information on Use of Dataset: Regional Project on Enterprise Development (RPED), Ghana Manufacturing Sector Survey Waves I-V (1992–98)*. Centre for the Study of African Economies, Institute of Economics and Statistics, University of Oxford.
Tether, B. 2002. "Who Co-Operates for Innovation, and Why? An Empirical Analysis." *Research Policy* 31: 947–967.
Wangwe, S. M., ed. 1995. *Exporting Africa: Technology, Trade and Industrialization in Sub-Saharan Africa*. London and New York: UNU/INTECH.
Whitfield, L. 2010. "Developing Technological Capabilities in Agro-Industry: Ghana's experience with fresh pineapple exports in comparative perspective." *DIIS Working Paper No. 28*: 1–44, Copenhageno.
Yin, R. K. 2009. *Case Study Research: Design and Methods*. 4th ed. Los Angeles: Sage.

Appendix

Three micro-enterprises

The Blossom Way started in September 2017 by an entrepreneur with 15 years' experience of preparing fresh fruit juice for a hotel. The enterprise engages 3 workers (a nutritionist, an accountant and a sales manager), all family members of the entrepreneur. The fresh fruit juice (pineapple-ginger, pineapple-orange, mango-ginger, pineapple-orange-strawberry-banana) is processed from a home kitchen.

Reggies Juice Bar enterprise was started in November 2017, as a result of the joint effort of two friends who sought to gain extra income. The entrepreneur has 4 workers, and makes fresh orange, pineapple, water melon, pineapple-ginger and pineapple-passion juices. The processing was initially done in a kitchen, but currently from an improvised small processing unit.

Vineyard Exotics enterprise started about 8 years ago. The entrepreneur produces pineapple-ginger, apple, passion-pawpaw, lemon and orange juices in a home-based processing unit. There are 3 core workers (an accountant, two processing assistants), but the services of up 10 temporal workers (depending on quantities of pineapple fruits to be processed), are engaged when

needed. The entrepreneur performs the functions of a supervisor, sales manager, and administrator.

Two small enterprises

Ayhow Fruit Juice Company Limited started operations in 2004, with a vision to create livelihoods for the vulnerable and help reduce poverty through the production of fruit juice. The enterprise has 10 employees and produces fresh pineapple, mango, orange, and watermelon juices in a small factory setting.

Nhyrah fruits started in 2014, as a result of recommendation from a hotel staff to the entrepreneur produce fresh fruit juice to his hotel. It is a pineapple processing enterprise with a vertically integrated pineapple (MD2, Sugar loaf and smooth Cayenne varieties) farm. The enterprise now operates from a small factory and produces pineapple-ginger, pineapple-water melon, pineapple-passion juices. There are 20 staff members (15 in the processing factory and 5 on the pineapple farm).

One large enterprise

Blue Skies Ghana Ltd is the largest fresh fruit juice producer in Ghana, and employs over 3000 workers in its operations. It was founded by a UK-based entrepreneur as a start-up and has its head office in the UK. Blue Skies Ghana Ltd produces fresh cut fruits and fresh fruit juices for both local and international markets. In addition to various pineapple varieties such as the Smooth Cayenne, MD2, and Organic Sugarloaf, other fruits such as mangoes, papaya, coconut, passion fruit, and banana are processed. Smallholder farmers provide the majority of the supply of pineapples to the enterprise, and the rest are sourced from a few commercial farms in Ghana.