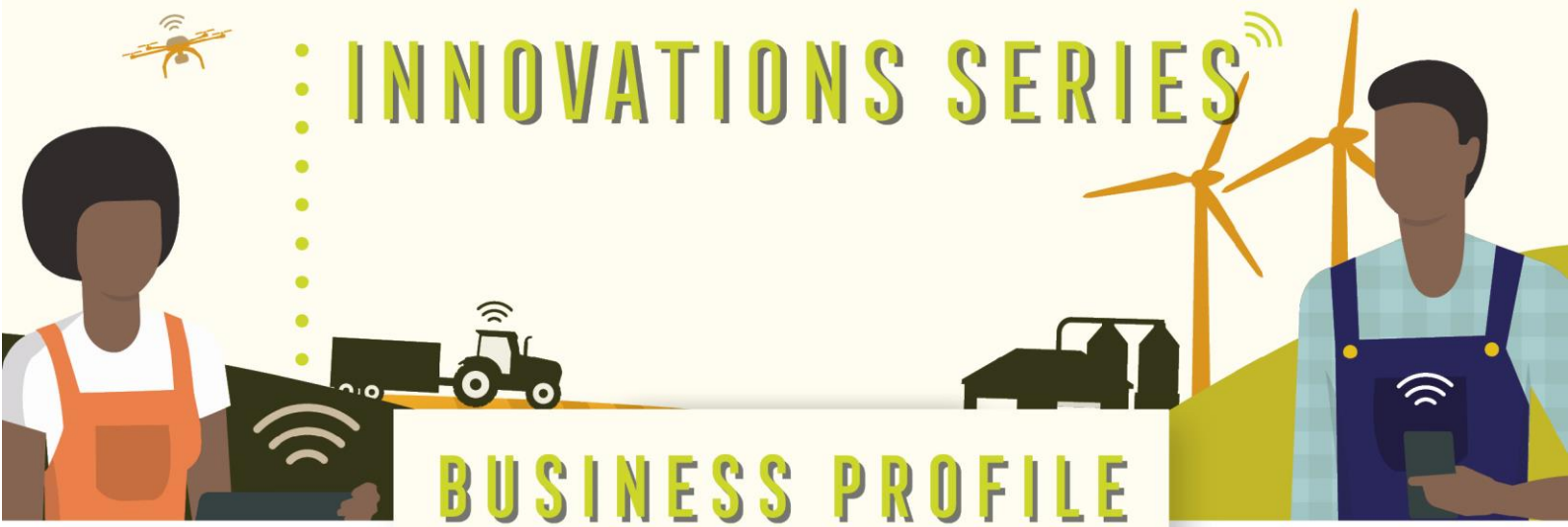


INTER-CONNECT POINT LTD

KIGALI, RWANDA

WEBSITE

ABOUT INTER-CONNECT POINT

- Company status: Limited company
- Year of registration : 2017
- Number of employees: 3

Abraham Natukunda, Founder and Managing Director

Abraham Natukunda has a background in telecommunications and mobile money and systems administration. He has a Bachelor's degree in Business Computing from Uganda Christian University, and received his Master's in Information Technology from Carnegie Mellon University, Africa, in 2018. His interests include the Internet of Things (IoT), infrastructure planning and management, design and maintenance of Low Power Wide Area Networks (LPWANS), mobile satellite systems, and delivering data analytics as a service.

BUSINESS MODEL

Mission: To build data analytics models for collection, cleaning, processing, monitoring, prediction, and activity actuation.

Vision: Connecting everything, anywhere.

Abraham grew up in an Ugandan family that harvested tea leaves and sold them to factories. He also assisted his father working in the local tea factory. He always wanted to use technology to improve the lives of tea harvesting and processing families in his community.

Funded by the European Union

With more than 10 million tea farmers and 400 tea factories in Africa, the African tea market is evaluated at $12 billion. It is estimated that consistent quality can improve tea farm and factory revenues by up to 50%, which represent an additional $1.5 billion in revenue from tea in East Africa.

Tea quality depends on many factors during the harvesting and processing of the tea leaves. These differences in quality can lead to significantly different prices, affecting the price by up to 50% of the same grade of tea. (Limited) Skill labor with basic hand tools, fluctuating price revenues for farmers and variable tea master skills affect the tea quality. Tea processing involves human sensory analysis to determine optimum production levels for desired quality. Yet there are inconsistencies due to the limits of humans' precision and the difference in perception. Moreover, most of the tea factories over-dry the tea leaves using a lot of wood, usually eucalyptus hardwood, a tree that needs lot of water to grow. Drying tea leaves too much does not only impact the tea quality, but also the environment when using natural energy sources. There is a gap in data analytics in the current manufacturing process to track what is happening at different stages of production. Additionally, consumers have different preferences depending on which global market they are located.

Through his research at Carnegie Mellon University in Africa, Abraham discovered that technology could play a vital role in improving the quality production process of tea manufacturing. He incepted Inter-Connect Point as a project with two other students, Sarah Muwanguzi and Benjamin Nabaana, then advanced the initiative into its own company. Inter-Connect Point reduces variability in tea quality using technology, which will in turn reduce price fluctuations, and enhance revenue stability for both the factories and smallholder farmers in East Africa.

Inter-Connect Point is pioneering the African tea industry by offering a "Data Analytics as a Service".

Their solution has been implemented in tea factory in Rwanda, Uganda and Kenya.

STRONG RELATIONSHIPS WITH SMALLHOLDERS, COOPERATIVES...

Inter-Connect Point is dedicated to incorporating everyone involved in the tea production value chain to learn how to produce an environmentally friendly cup of tea. The company supports responsible farming methods like the ones promoted by the Rainforest Alliance. Inter-Connect Point works with Rainforest Alliance-certified customers that aim at protecting endangered species and forest areas of high conservation value by securing land portions as forest cover using tea bushels. These customers also provide tea farmers with improved wages.

PRODUCTS AND MARKETS

Inter-Connect Point has developed a solution based on an Industrial Internet of Things (IIoT) data analytics approach to increase the tea processing efficiency and quality. The technology uses different gas sensors including oxygen, carbon dioxide, and hydrogen as key reactive elements that form an integrated electronic nose. In addition to this eNose, an image sensor monitors color patterns and the desired look of the tea leaves. Temperature and humidity sensors are also included to establish moisture content variations during the tea processing period.

This electronic solution can be deployed at different stages in production and supplements the human sensory conformity process by consistently monitoring

tea aroma, color, humidity and temperature during fermentation. It ensures that tea meets the appropriate levels and the consumer market preferences.

The data collected from the sensors is sent from (distant) tea farms to factories through long-range communications (LoRa® wireless modulation). A tailor-made one-stop data analytics application extracts the data via an Application Program Interface (API) and relays it for real-time monitoring through visualisations. They provide predictive analytics and actuation capabilities to end-user.

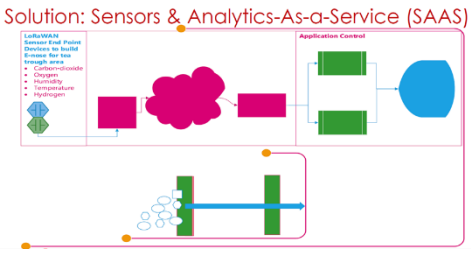
Tea factories can use the eNose similarly to a "Data Analytics as a Service" as they pay for the initial installation and for the ongoing analytics to be able to refine their processing. The price of this technology is designed for both tea factory and farmers to reap 10-times the value of their investment.

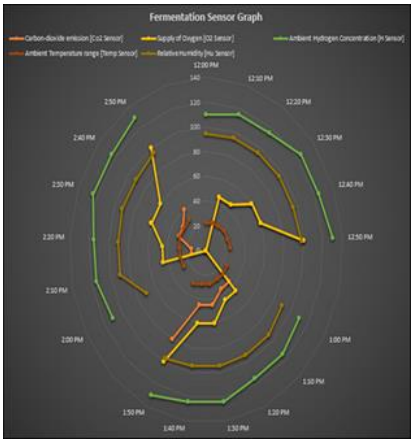
Inter-Connect Point has piloted their technology through multiple projects. One project takes place at Rwanda Mountain Tea, one of the top exporters of tea in Rwanda. The goal is to produce desired and predetermined black tea grades for customer preference and choice based on aroma and colour. The project also showcases proof of production quality to staff, trade partner, customers, and stakeholders.

The company also has ongoing projects in Kenya, focusing on environmental conservation and responsible farming methods. Working with customers in who are Rainforest Alliance-certified. They have also piloted and installed a number of proofs of concept in Uganda and Rwanda.

The company provides a IIoT solution to improve agro-processing and energy usage.

The company's ground industry research has been presented at the recently concluded Global Conference for Artificial Intelligence and Internet of Things (GCAIoT). Their research and implementation approaches have been published by the Institute of Electrical and Electronics Engineers (IEEE) accessible at: here





INNOVATIONS: MILESTONES AND EXPANSION PLANS

The solution developed by Inter-Connect Point can be expanded to improve the efficiency of many agro-industries such as coffee and cocoa. The current projects will help develop an approach to scale up the solutions to other countries and industries.

The company also plans to improve factory design and energy usage, including to optimise energy usage in burning wood.

In line with their mission of sustainability, Inter-Connect Point wants to help factories identify alternative sustainable sources of drying and powering the factory processes, reducing their carbon footprint.

SUCCESS FACTORS AND LESSONS LEARNED

The data analytics solution developed by Inter-Connect Point improves agro-processing and energy usage, and so contributes to generating higher revenues. The company was listed among the Top 10 Winner for the 2018 African Innovation Prize.

There is a large investment infrastructure for hardware manufacturing in Africa to assist manufacturers in Africa match global standards. Eventually, African manufacturers, like Inter-Connect Point, can export their own solutions to the developed world.

The innovation enables to increase and maintain the quality of tea produced in East Africa. Tea of improved quality can be sold at a higher price and so can increase payment for local tea producers, many of them who are smallholder farmers and are often paid below the cost of production with their labor cost factored in. In turn, higher incomes increase the farmers' focus on sustainable agriculture practices to ensure a continuous source of revenue.

A report by the Food and Agricultural Organization of the United Nations (FAO) estimates that there are approximately over 70 tea factories operating under the Kenya Tea Development Authority, employing over 10,000 people and 560,000 smallholder farmers in Kenya. Inter-Connect Point considers that there are an additional millions of people in other countries based upon production outputs. With each tea farmer likely supporting a family of 5, the solution developed by the company could benefit a total of approximately 100 million people with improved livelihoods from their primary means of income without significant changes to their behaviors or lifestyles.

The data analytics provided by Inter-Connect Point enables to identify the optimal amount of energy needed by the drying process. This solution contributes to reducing the carbon footprint of tea factories while encouraging the identification of more sustainable drying alternatives.

Inter-Connect Point collaborates with multiple factories that are members of a single association. The company also works with Inmarsat (now operating as Viasat), a British satellite telecommunications company that is

helping to provide infrastructure and connectivity. It is also helping to provide the needed sensors.

Between 2019 and 2023, Abraham has been Entrepreneur-in-Residence advancing technology academic research spin-off innovations to industry leveraging at Carnegie Mellon University – Africa. As a fellow of the Industry Innovation Lab and The MasterCard Foundation, he benefited from startup grants and cloud infrastructure subscriptions to create impactful research eco-systems.

In 2023, Abraham has been part of the IEEE Global Conference on AI & IoT (IEEE GCAIoT), the annual conference and forum for IoT innovation and research that was held in Dubai.

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