

CARISCA REPORT

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Innovations Lab team



Summit attendees



2023 SUPPLY CHAIN RESEARCH SUMMIT EARNS HIGH MARKS

The third annual Supply Chain Research Summit held in Accra, Ghana, in June was “incredibly successful,” in the words of CARISCA Executive Director **Dale Rogers**. “It was emotional to me at the end,” said Rogers after the event. “I couldn’t believe how good it was.”

Summit participants also gave the conference high marks, with over **60%** rating the event as excellent in a follow-up evaluation and another **35%** rating it as good. We asked attendees what they liked most about the summit. A few of the responses appear on the following pages along with some highlights of the event.

Fiber optic pioneer Thomas Mensah and CARISCA Director Nathaniel Boso



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The 2023 Supply Chain Research Summit featured **more than 90 presenters**, including top scholars such as Hau Lee from Stanford University (and a member of CARISCA's Academic Board) and entrepreneurs like Lebogang Letsoalo, founder of Sincpoint, a sustainable supply chain consulting firm based in South Africa.

Chief editors of three top journals offered tips on how to get published. And executives from Dell, MTN Ghana and the U.N. World Food Program talked about logistics and supply chain issues and solutions in their respective sectors.

A surprise guest at the summit was Thomas Mensah (pictured on cover), a Ghanaian-American who helped pioneer fiber optic technology. He spoke briefly about how his inventions made social media possible.

“The speakers were the crème de la crème in the various fields, which provided us with in-depth knowledge. I must confess CARISCA has organized the best event I have ever attended.”

Timothy Assam
Owner, Besigheid Investment
Accra, Ghana

“The CARISCA Summit had a really great mix of attendees who were all so excited to be there and passionate about the topic. There were many very interesting sessions that it was often hard to choose which track to attend.”

Michelle L'Archeveque Jones
Senior Science & Research Program Manager, USAID
Washington, D.C.

Although the Supply Chain Research Summit is primarily an academic conference, representatives from higher education made up only about half of the participants. Other attendees were from a mix of private-sector companies, government agencies, nonprofits and NGOs. In all, close to 300 organizations were represented.

In terms of programming, the conference offered 35 sessions in five tracks, including a track on practitioner and policy discourse on African supply chains.

“It brought together minds from different parts of the world.”

Dede Tsonyake
Pharmacist, Ghana Health Service
Akosombo, Ghana


Attendees at this year's summit hailed from:	6 CONTINENTS
	41 COUNTRIES
Compared to last year, the number of countries represented increased:	58% ↑

Not surprisingly, the largest contingent of attendees (56%) were from **Ghana**. Next largest, in order, were from **Nigeria, Kenya, the United States** and **Uganda**. Rounding out the top 10 were Ethiopia, South Africa, the U.K., Netherlands and Zambia.

▼ Heat map showing countries represented by attendees at the 2023 Supply Chain Research Summit



A popular feature of the summit each year is a **Dissertation Awards Competition**, which showcases the best logistics and supply chain management doctoral research being carried out in African higher education institutions. Three finalists are selected to present their dissertation proposal at the summit, and first, second and third place awards are announced at the conference dinner.



Taking first place in the 2023 competition was **David Antwi**, a PhD student from Kwame Nkrumah University of Science and Technology. His winning dissertation is on “Assessing Cold Chain Logistics Performance, Capabilities and Food Losses.”

◀ **David Antwi**

“The global blend of ideas as well as giving opportunities to the younger generation to present their thesis/papers.”

Larry Donkor
Founder, Slaff Ghana Limited
Tema, Ghana

“The variety of topics, but what really stood out were the discussions post presentations, the groundwork being done by the Innovation Lab, the collaboration work between academics and practitioners – really inspiring work.”

Assilah Agigi
2021 PhD Dissertation Award winner;
Lecturer, University of Pretoria
South Africa

This year's summit included an invited session featuring presentations from students developing projects in CARISCA's Innovations Lab.

The lab is an entrepreneurial training hub and innovation incubator at KNUST. It serves as a connection point for involving new stakeholders in supply chain research translation activities. See related story on [page 6](#).

continued on next page ▶

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It addresses real issues on supply chain. The breakaway topics are very timely. It gets better every year.

Rachel Apio, CPA

Supply Chain Manager, Program for Accessible Health Communication and Education (PACE)
Kampala, Uganda

As evidence of the summit's quality, attendance has grown significantly every year, and word of mouth is the primary way people learn about the event. The number of participants at the 2023 summit (**688**) was a **53%** jump over the year before.

In 2024, we are moving the summit beyond Ghana to further CARISCA's vision of becoming a pan-African hub for supply chain education, research and practice.

Make plans now to join us for the fourth annual Supply Chain Research Summit, hosted at **Strathmore University in Nairobi, Kenya**. It promises to be the best conference yet!

Summit attendance by year:

2023	688
2022	450
2021	300



CARISCA'S

2024 SUPPLY CHAIN RESEARCH SUMMIT

June 4–6 📍 Nairobi, Kenya

Africa's Supply Chain Resilience for Economic Transformation

Summit Keynote

ROLE OF WOMEN IN THE FUTURE WORLD OF WORK

“You cannot leave half of the population behind and grow your economy. You need everybody taking part in the economic growth of a country and the world at large.”

So pronounced **Gayani de Alwis**, then-global chairperson of Women in Logistics and Transport (WiLAT), during her keynote speech “Role of Women in the Future World of Work” at CARISCA's 2023 Supply Chain Research Summit.

Held June 20–22 in Accra, Ghana, the summit brought together nearly 700 supply chain scholars, students, practitioners and policymakers around the theme “**Africa's Supply Chains and the Future World of Work.**”

As de Alwis described it, the future world of work will look different in three critical ways:

- 1 **who does the work**
- 2 **how the work is done**
- 3 **when and where work is done**

Who does the work will involve more part-time employees, gig workers and crowd-sourcing, de Alwis said. How the work is done will be more through automation, robotics and artificial intelligence. When and where work is done will revolve around remote work, fluid work schedules and co-located work spaces.



“As organizations, as individuals, we need to understand these new developments and see how we can really fit into that,” said de Alwis. “In the next five to six years, there will be 12 million new jobs entering the world of work. So we have to be ready for this new reality.”

De Alwis said the future world of work is geared toward traits typically ascribed to women. These include compassion, humility, resilience, cooperation and emotional intelligence.

“Research has been done to show that women are more effective than men in all leadership measures,” said de Alwis. “But, we don't see many women breaking the glass ceiling and going up the career ladder and reaching to the top.”

This is especially true in male-dominant industries, such as logistics and supply chain, she noted. Currently, women hold only 21% of leadership roles in the field.

“But in the future world of work, when we move into highly technologically demanding environments, the traits that females have will really help to drive organizational effectiveness,” said de Alwis.

She said Africa is ahead of the game because female labor force participation is already higher than average when compared to other parts of the world. According to the 2022 Global Gender Gap Report, it will take 132 years for women to achieve gender parity globally, reported de Alwis. In Sub-Saharan Africa, it will take only 98 years.

Advancing women's employment could add \$12 trillion to global GDP and boost some countries' economic output by as much as 35%, she shared.

“The business case is very clear,” said de Alwis. “It's a huge benefit to economies, especially in our part of the world.”

“

You cannot leave half of the population behind and grow your economy. You need everybody taking part in the economic growth of a country and the world at large.

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◀ **Gayani de Alwis**



INNOVATIONS LAB TEAMS TACKLE BIG PROBLEMS

As an emerging economy, Ghana faces myriad challenges. For example, as much as 35% of its agricultural products are lost along the supply chain before reaching consumers. Unemployment is high. Only 10% of the solid waste generated daily in the country is collected and properly disposed of.

These are just three of the difficult national problems that students are developing solutions for in CARISCA's Innovations Lab at KNUST. The lab, created in 2020, serves as an entrepreneurial training hub and innovation incubator.

To date, the lab has supported student-led projects and provided a physical space for face-to-face meetings with key stakeholders and partners. In the coming year, the lab also will provide space and support for four faculty-led innovation projects that address specific challenges faced by industry.

“We expect the Innovations Lab to attract the interest of businesses, government agencies, civil society organizations and others who are trying to solve real-world supply chain problems,” says **John Serbe Marfo**, the CARISCA senior technical advisor who leads the lab. “It serves as a connection point for involving new stakeholders in supply chain research translation activities.”

At the Supply Chain Research Summit in June, the lab's five student teams presented on their projects and the impacts they hope to have. Following are brief descriptions of each project.

Team Inserviz

A system that tracks student experiential transcripts to address graduate employment challenges

High unemployment among Ghanaian youth hinders the country's economic prospects. It also is a key factor making young people vulnerable to extremism and terrorism, according to a recent United Nations Development Program report.

Team Inserviz is addressing this problem by developing a digital platform for youth to advertise their availability and experience for gig work. A key feature of the app is that it will provide an experiential transcript as evidence of the gig worker's qualifications. The team also is partnering with NGOs who want to advertise volunteer opportunities through the app.

“In that way, we are helping two parties: NGOs who need talent to work with but are low on budget and then people who need working experience,” explained Team Inserviz member **Joshua Addai Amoah** (speaking, in the photo above), a senior petroleum engineering student.

Team AREPO

Software to enhance supply chain audits and help the environment by replacing paper receipts with digital receipts

Paper receipts are problematic for several reasons. People often lose or discard them, creating a staggering 1.5 billion pounds of waste each year that cannot be recycled, due to the coating. Lost receipts also cause inefficiencies in supply chain financing, expense management and auditing.

Team AREPO is developing a mobile and web app that converts paper receipts to digital receipts using OCR (optical character recognition) technology and artificial intelligence. AREPO also will replace thermal paper printers with a QR code system. Instead of getting a paper receipt after making a purchase, buyers will scan a QR code with their smartphone to get a digital receipt.

“With AREPO, you can always access your receipts,” said team member **Machele Alhassan**



Ahmed, a senior computer engineering student. “You won't need to search your office, inside your cabinets at home or on some table any longer to find your receipts.”

Team Cleeve

An AI prototype designed to improve medical diagnostic services

According to autopsy studies, tens of thousands of hospitalized patients die every year due to diagnostic errors. Even absent the errors, getting lab results can take nearly a month, delaying treatment and risking patient lives. On top of the health care impacts, costs associated with inappropriate testing, wrong treatments and malpractice lawsuits can total over \$100 billion per year.

Team Cleeve has developed a prototype AI medical diagnosis system using a portable microscopic camera attached to a smartphone. Once trained, the AI tool can read a blood smear for parasites and render an accurate diagnosis in 10 seconds. The app then creates a report and sends it electronically to the doctor by email or SMS.

“This tool will help promote health care services supply chain and also improve fast prescriptions



as well as reliable automated reports, which will help make our world a better place to live in,” said Team Cleeve member **Emmanuel Boafo**, a senior electrical engineering student.

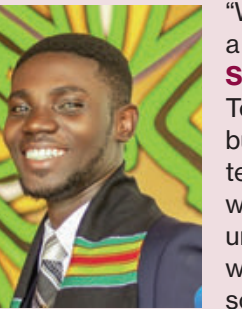
Team Signals

An Uber-like app to improve waste management supply chains

Uncollected trash poses serious health and environmental risks in Ghana. Many cities, rural settlements and slums lack adequate waste pickup service. As a result, people dump uncollected trash into drains, rivers and surrounding areas, or it is locally burned or buried.

Team Signals aims to solve this problem by creating an app to pair up waste producers and waste collectors, similar to how Uber pairs up drivers and riders. Waste collectors, including companies and individuals on tricycles, or aboboyaas, can register

on the app. Businesses and people who need their trash picked up can hire those collectors. The service also will provide job opportunities for youth who want to work as trash collectors.



“We want a cleaner environment, a healthy environment,” said **Samuel Kum**, a member of Team Signals and senior business information technology student. “So we want anywhere there is unattended waste, there is a waste pickup arrangement or schedule for you.”

Team Wellfed

A solution to post-harvest loss, particularly of tomatoes, due to poor storage facilities

Smallholder farmers in Ghana often live on less than \$2 a day. When their crops are perishable, like tomatoes, they're forced to sell at a low price or risk having the products rot. This situation reinforces the cycle of poverty. Further, the decomposing crops emit methane gas and carbon dioxide, contributing to climate change.

Team Wellfed is working to extend the shelf life of tomatoes from a week to 21 days, which can significantly reduce post-harvest losses. The solution is a mobile evaporative cooling chamber made of brick, sand and burlap bags. When cold water is poured into the sand, the bricks maintain the temperature, and it creates an evaporative cooling system.



"We are saving a lot of food and we are eliminating hunger," said Team Wellfed member **Frimpong Serwaa Theresa**, a senior biochemistry student. "Also, by preventing decomposition, it goes a long way to saving our climate."

Looking Ahead

Over the coming year, the Innovations Lab will focus on commercializing the five student-engineered solutions. Besides tackling serious national problems, the projects are expected to address graduate unemployment challenges by encouraging self-employment or new business creation by team members.

"The mission of the CARISCA Innovations Lab is to harness the brilliance, unique talents and merits of African students to foster innovations that transcend borders," says **Stephen Frimpong**, the lab's administrative manager. "We are dedicated to empowering students to redefine the future."



▲ **Nana Ama Tawiah**



▲ **Michelle Frempong**



▲ **Bridget Maame Dentu**



▲ **Felicity Aseidu-Appiah**

BUSINESS STUDENTS, COMPANIES TO BENEFIT FROM NEW CAREER SERVICES OFFICE

It's been reported that only about half of post-secondary school graduates in Africa land a job each year. In Ghana, only 10% of graduates find work immediately after completing their required year of national service. The others can take up to a decade to find permanent employment.

Supply chain management and other business students at Kwame Nkrumah University of Science and Technology now have a lot more support to help them land a job after graduation. CARISCA has created a Career Services Office within the KNUST School of Business (KSB).

Staffed with three employees and a technical consultant, the office's focus is to link students to Ghanaian and international employers. The Career Services team also will prepare students for the job search with resume writing help, job-application assistance and mock interviews.

"As a team, we get the opportunity to make a difference in the future of students as we prepare them for the world of work," says **Nana Ama Tawiah**, office manager. "I consider the Career Services Office a gift not just to KSB graduates but also to the region and nation at large."

Tawiah is herself a KNUST School of Business graduate. She holds a bachelor's degree in business administration with a human resources management option. She has over seven years' experience in recruiting, talent acquisition and management development. Currently she is pursuing certification in career guidance and counseling.

In addition to helping students land jobs after graduation, the office will coordinate internship programs and provide mentoring and career counseling. The team also will work to engage alumni and employers with the Business School. After all, the business community will benefit from having access to well-prepared job candidates.

Shortly after the office officially opened in July 2023, it held a work-ready summit that attracted 95% of all final-year business students. Upcoming programs include an orientation for freshmen, essential skills training for continuing students, a writing boot camp for postgraduate students, interactions with new graduates, and a networking event with industry players.

"The ultimate measure of our effectiveness is the employability of our graduates," says Tawiah. "I hope industry, alumni and entrepreneurs will partner with us by providing internship and employment opportunities as well as mentorships to provide guidance to our future talents."

Assisting Tawiah in the office are **Michelle Frempong** as a career services fellow and **Bridget Maame Dentu** as office assistant. Frempong provides personalized career counseling and activities for students. She holds a doctorate in management science and engineering. Dentu is a graduate student in marketing at KNUST.

Also supporting the office is **Felicity Aseidu-Appiah**, an associate professor in KNUST School of Business' Department of Human Resource and Organizational Development. She serves as a technical consultant for the Career Services Office, analyzing office practices and offering recommendations to improve its effectiveness.

One of the office's first tasks was to conduct a career needs assessment among business students. Fifty-five percent of the respondents said they plan to seek a job after graduation, while another 16% wish to start their own business. Eleven percent want to continue their education.

The types of assistance students are most interested in receiving are job search strategies, interview techniques and resume building. The survey also showed that less than a fifth of the students had engaged with the university's career services.

CARISCA's new Career Services Office will help alleviate the burden on the university's office, which lacks the capacity to serve KNUST's entire 80,000-member student body. It also will provide specialized services tailored to the needs and aspirations of KSB students.

"The fulfillment that comes with seeing the percentage of graduates employed after school move up and the socioeconomic benefits it brings cannot be overemphasized, and that's what excites me the most about my role," says Tawiah.

CARISCA HELPS CREATE GHANA'S HEALTH SUPPLY CHAIN MASTER PLAN

The government of Ghana has a vision to provide universal health coverage for its citizens by the year 2030. That means ensuring all people in Ghana have timely access to high quality health services regardless of their ability to pay.

Ghana's health supply chains are a critical factor in whether the country will be able to meet this ambitious goal. Recognizing that fact, in 2015, Ghana produced a five-year Health Commodity Supply Chain Master Plan. The plan identified challenges in Ghana's public health supply chain, outlined objectives for the future, and proposed interventions.



▲ **John Manso Frimpong**

While some progress was made between 2015 and 2020, additional challenges remained. So in 2021, the Ministry of Health began working on a new five-year master plan and involved CARISCA in the process.

Initially, CARISCA senior technical advisors **John Manso Frimpong** and **Abdul Samed Muntaka** worked exclusively on the private sector component of the plan. After producing that section, they were later added as technical consultants for the entire plan, which includes 11 technical areas in addition to the private sector piece.



▲ **Abdul Samed Muntaka**

The pair suggested multiple ways the government can increase partnerships among global, regional and local private-sector markets. These include:

- ♦ outsourcing some supply chain functions to private sector providers;
- ♦ acquiring advisory services from private sector firms;
- ♦ collaborating with the private sector on health commodities supply planning and replenishment;
- ♦ adhering to execution plans in the public-private partnerships, which typically involve a contract between a public authority and a private counterpart who assumes substantial financial, technical and operational risk in the project.

"Traditionally, health care provision has been the government's responsibility," the section of the plan on private sector engagement reads. "However, with governments' growing fiscal constraints, coupled with the private sector's growth in expertise and funding, partnership between the public and private sectors has become imperative in most countries."

Both Frimpong and Muntaka say they appreciated the opportunity to contribute to the project and derived benefits from their involvement.

"Being intimately involved in this project afforded me the opportunity to use my expertise to foster primary healthcare delivery in Ghana," says Frimpong, a supply chain lecturer at KNUST and an expert in strategy design, project costing, monitoring and evaluation. "I hope the master plan will spur private sector investments that improve health commodity availability for the citizens of Ghana."

Adds Muntaka, a senior lecturer and past chair of KNUST's supply chain and information systems department: "The engagement afforded us the opportunity to better understand the workings of Ghana's health system, and I have incorporated that into both my undergraduate and graduate courses. This furthers CARISCA's aim of improving the supply chain curriculum at KNUST."

To see the full Health Commodity Supply Chain Master Plan for 2021–2025, go to moh.gov.gh/wp-content/uploads/2022/06/Ghana-Final-Final.pdf

ADVANCING WOMEN IN SUPPLY CHAIN WEBINAR SERIES

This lecture was presented as part of CARISCA's Advancing Women in Supply Chain Webinar Series. The series is an ongoing effort to expand our work in access and inclusion. Promoting women in supply chain is a top priority to achieve CARISCA's goals and have a positive impact on Ghanaian and African livelihoods.

Empowering Women in the Cocoa Supply Chain



▲ **Ruby Amegah**

As vice president for global food product research and development at the coffee giant, Amegah's work involves a lot of cocoa. She knows from blind taste tests the company conducts that her native Ghana produces the best-tasting cocoa in the world.

But, as Amegah explained during her July 7 Advancing Women in Supply Chain webinar, the people who buy cocoa for Starbucks won't source it from Ghana. The reason they cite is the country's reputation for using child labor.

"That was really surprising," said Amegah. "Looking at Ghana and how child labor was defining our cocoa – not the flavor, but child labor – was a little bit concerning. So I started doing more research."

The issue of child labor is not as simple as one might think, according to Amegah. One reason is the distinction between "child work" and "child labor."

"Child work [is] when the child sometimes is helping out on the farm for a limited time doing work that is appropriate for their age ... under adult supervision," she said.

"The problem of child labor is when kids under the age of 15 are being exposed to hazardous conditions, like clearing land and applying fertilizers, or using heavy equipment that can be dangerous."

What screams out is poverty

Amegah said approximately 1.56 million children are working in cocoa production in Ghana and the Ivory Coast, the two top producers of cocoa. Ninety-five percent of those children are exposed to hazardous activities.

For most people, savoring a delicious bite of chocolate probably doesn't conjure thoughts about the source of the cocoa used to make it. But for Ruby Amegah, who was born and raised in Ghana and is now a vice president at Starbucks in Seattle, cocoa sourcing is personal.

“Women face inequality, and it makes us uniquely qualified to advocate for the rights and needs of vulnerable populations.”

"But the problem is not necessarily child labor by itself," explained Amegah. "It's not like most people are greedy and use child labor just so they can make more money. It's more complex. When you look at the root causes of child labor, what often screams out is poverty."

Those root causes include a demand for cheap labor, gender inequality, lack of education and limited job opportunities. Poverty is both an underlying and overriding cause.

"When you have kids in extreme poverty, sometimes all they can do is work on the farm," said Amegah. "So their mothers may be good to have the kids go work on the farms to bring in some income to support the family."

In addition to the social issues of child labor and poverty, economic and environmental challenges also impact the cocoa supply chain in West Africa, explained Amegah.

On the economic side, low prices make it hard for farmers to make a living. At the same time, high costs make it difficult for them to afford fertilizers and pesticides that enable the crop to thrive. And poor infrastructure makes it challenging for them to get their products to the market.

On the environmental front, deforestation is a problem caused by the clearing of land to plant cocoa trees and make way for roads and other infrastructure. Climate change is impacting rainfall patterns, making it challenging for cocoa farmers to grow their crops and increasing pests that can damage cocoa trees and limit yields.

"This seems to be a vicious cycle, and it makes poverty very difficult to eradicate when these farmers have to go through all that," said Amegah.

It Starts With Women

Although the challenges have persisted for a long time, recent policy measures adopted by the EU, U.K. and U.S.

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aim to break the link between supply chains and issues such as child labor and deforestation, reported Amegah. As a result, companies are facing new requirements to ensure their supply chains are free of negative impacts on human rights and the environment.

Some companies will respond by not sourcing from countries like Ghana. Other companies want to source the best quality ingredients for their products, so they are working to help combat the long-embedded problems.

As an example, the Starbucks Foundation has partnered with CARE International and Cargill on a Women's Economic Empowerment Project in West Africa. They have declared, "It starts with women."

"Women, when they have the funds, are going to take care of the family," said Amegah. "They are going to make sure the kids are going to school, and they are also going to save. In this sense, they are supporting the household.

"That's why the target is women," said Amegah. "But it shouldn't be in isolation because we still need men as allies to make these things happen."

The key, said Amegah, is to involve women from the cocoa-producing countries in developing solutions. Top-down approaches do not work.

"Women face inequality, and it makes us uniquely qualified to advocate for the rights and needs of vulnerable populations, as well as to provide education on preventing exploitation," Amegah explained.

"We have empathy. We also have problem-solving skills. We have decision-making ability, communication, savvy, and we have strong collaboration to help tackle difficult supply chain challenges like child labor."

Women in supply chain can play a critical role in addressing the issue of child labor in cocoa production in a number of ways, said Amegah. These include:

- ♦ raising awareness;
- ♦ promoting responsible sourcing;
- ♦ supporting community development;
- ♦ collaborating with other stakeholders;
- ♦ monitoring and reporting on their supply chains.

"Like I said, it's really personal," concluded Amegah. "I want to make sure that when we talk about West African cocoa, it's about the quality. It's not about child labor. It's not about deforestation. It's not about women's inequality."

"Eight out of 10 times those deaths were related to some form of cancer," said Li. "They strongly believe the polluted water they drank and the polluted air they breathed in, it's a serious problem for the Chinese people."

To the Chinese government's credit, it, too, recognized and acknowledged the dire pollution problem. In 2015, through the Ministry of Ecology and Environment of China (MEEC), the country issued a mandate that every pollutant-producing facility in the country must install a Continuous Emission Monitoring System (CEMS) to track pollutants going into the air and water.

"So, technically, once you install these CEMS devices, the Chinese government will know exactly how much pollutants you're putting in the air or into the water. A big problem is solved, right? But that's not what happened," Li said.

When the mandate kicked in, air pollutant levels dropped drastically. However, soon after, the levels went back up again.

"According to MEEC, the information reported to them from the mandated CEMS systems said the companies were not putting excessive pollutants in the air," Li said. "However, according to satellite images, which cannot be manipulated, the levels of pollutants went back up close to the old levels. So, something didn't add up."

Making sense of bad data

The Chinese government approached Li and her project team with a request that they make sense out of the data. The Ecology and Environment Ministry gave the researchers the output from each pollutant-producing facility.

"The challenge for us is that you can't trust the data," Li said. "You suspect there's something funny going on with the data, but you have to make trustworthy, accurate predictions of who are the environmental violators."

To get to the bottom of it, the team used machine learning to predict who the cheaters would be.

"We used feature engineering, and we actually operated on the metadata, or the manner in which they were reporting, and we came up with an index to compute the data quality value," she said. "That value can predict who is cheating on their reported data."

Based on the prediction model, the team was able to create a list of companies they highly suspected were cheating. They gave that list to MEEC.

"The ministry sent people to manually inspect every single facility on our list, and guess what? Every single facility on our list, except one, was found to be making fraudulent claims on their data," said Li. "The one exception facility had done the right thing; they had made the investment to improve their machines and standards."

As an example of how the factories cheated, the environmental agents at one site found a hole cut into the

intake area of the CEMS device to introduce fresh air, which diluted the polluted air. As a result, the factory's CEMS reading seemed acceptable.

“The construct we’re trying to study is different from doing good or saying good. It’s actually ‘cheating good.’”

It's all about the Guanxi

After completing this study, Li wanted to investigate what types of firms are more or less likely to commit sustainability fraud. She developed another research study comparing newer firms with older firms and local companies with foreign companies.

She also looked at the moderating effects of the social/political and economic environments in which the firms operate. For instance, in China firms are categorized as either monitored by the state-level agency (state controlled) or by local agencies (non-state controlled). And economic development differs between coastal provinces and inland provinces. Li examined how those factors might impact a firm's tendency to cheat on sustainability measures.

"Older, more established firms tend to cheat more," Li concluded from her study. "And foreign firms tend to cheat less in China."

Li attributes the reason to a Chinese concept that derives from imperial, dynastic China and is still practiced today. It is known as Guanxi, which means social ties. Guanxi refers to social ties used to build connections with government authorities as well as to secure favors in interpersonal relationships. The concept applies to relations between organizations as well.

"Guanxi is a crucial social capital to receive more favorable treatments and resource allocations from the government authorities," explained Li.

Guanxi also can be used to get away with unethical behavior, she noted. That's why young firms and foreign firms are less likely to cheat on their sustainability data. They have the liability of not having the social ties needed to escape accountability.

"If it's an older firm, they probably tell their buddy, 'Hey, I did this, the government didn't catch me, so go ahead, you do that, too.' A younger firm, without establishing that network, doesn't get that insider information of how to cheat," Li explained. "Therefore, they wouldn't be able to learn that trick, right or wrong."

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DISTINGUISHED LECTURE SERIES

Throughout the year, CARISCA invites top supply chain scholars and leaders to deliver presentations. These Distinguished Lectures give faculty and students access to inspiring role models, the latest ideas and approaches in supply chain research, and practical guidance for conducting and publishing research.

Dare to Cheat? Containing Sustainability Fraud in China

As stakeholder pressure to protect the environment grows dramatically, sustainability fraud – fraud and misconduct committed with sustainability data – has become a growing concern in operations and supply chain management. Many large corporations have been found guilty of making deceptive claims of being environmentally compliant.

Why do some companies cheat when reporting their environmental data, while others do not? This is the question Mei Li, associate professor of supply chain management at the University of Oklahoma, set out to answer through a research study focused on activities in China.

Li presented her findings at the August 24 Distinguished Lecture Series. She opened by sharing a personal story about what motivated her to focus the research on China, even though sustainability fraud exists at a global level.

Li's parents retired to Boston after living and working their entire lives in Beijing. Following their move, they maintained strong social ties with friends and colleagues in China. Sadly, it wasn't long before they began to receive what Li describes as "death calls," or those dreaded calls about the untimely passing of a dear friend or colleague.



▲ Mei Li

The social/political and economic environment are also important factors influencing sustainability fraud, the study revealed. For example, when firms are state controlled, they have less opportunity to capitalize on their social capital, or Guanxi, and thus are less likely to cheat.

“We found that state attention does matter,” Li said. So, the difference between foreign firms and local firms, the difference between new firms and young firms, will be lessened if the firm is under state control.”

She also found that foreign firms are less likely to commit sustainability fraud when the local economy is more developed. Li suggested that is partly because better-developed areas can afford to spend more on monitoring the environment. But economic development does not make a difference in whether new or older firms cheat.

Doing good, saying good and cheating good

In concluding her presentation, Li talked about the contributions of the research both to theory and practice. One theoretical contribution is to corporate social responsibility literature. Past research has examined what Li calls “doing good” and “saying good.”

Doing good is true corporate social responsibility. Saying good includes practices such as greenwashing and brownwashing, when firms decouple their actual sustainability practices from what they say.

“The construct we’re trying to study is different from doing good or saying good,” Li said. “It’s actually ‘cheating good.’ You’re cheating by saying you meet a standard.

“It’s a separate concept because it’s a much more extreme

case, where the firm has to violate environmental regulations. And on top of that, they’re masking their misconduct.”

Another contribution the study makes is introducing the concepts of the liability of newness and liability of foreignness into the supply chain literature. Li suggests that those liabilities – from lacking important social networks – may also apply in various supply chain functions.

“Does liability of newness play a role in sourcing?,” Li questioned. “That means that new firms actually have a harder time sourcing from suppliers than established firms. In operations management, can the new firm operate as effectively as older firms due to their lack of social capital? Does a newer firm have a harder time establishing their distribution channels?”

Li said these are all good questions for future research.

From an applied perspective, the study is enlightening for emerging economies where the legal and regulatory systems are not yet stable, Li noted. The lack of regulation leaves room for informal mechanisms to intervene with business operations and possibly encourage fraud.

For policymakers, Li cautioned that her findings should make them mindful of Gresham’s Law, which states that bad money drives out good money. In a sustainability context, it applies when older and local firms get away with fraud, while newer and foreign firms incur extra costs complying with regulations.

“If the policymaker does not intervene and lets this go,” Li said, “eventually the firms who can survive, the firms who stay, are those bad firms. So bad firms drive out good-behaving firms.”

Developing and Utilizing Relational Political Resources to Navigate Institutional Complexities

Counterfeit and pirated goods are a problem globally. The fake-goods market has been valued higher than the GDP of some major economies, including those of Ireland, Portugal and Israel.

In Sub-Saharan Africa, the problem is especially acute – and life-threatening. More than 435,000 deaths per year are linked to falsified or substandard antimalarial drugs and antibiotics alone.

The types of counterfeit products most likely to be found in customs seizures – footwear, clothing, leather goods and electrical equipment – may not cost lives. But they are costly for businesses trying to market their genuine brands.

“It’s a major issue that businesses and governments worry about a lot,” said CARISCA Director Nathaniel Boso, who spoke on the subject Sept. 15 as part of the Distinguished Lecture Series.

“This illicit trading activity substantially increases operating costs for manufacturers of genuine brands and diminishes their ability to generate and grow sales revenue,” said Boso. “It’s also been



▲ Nathaniel Boso

denying governments needed taxes that are required for development projects.”

Boso and one of his doctoral students have been studying the problem of counterfeit goods in Sub-Saharan Africa since 2016. His lecture was based on papers the pair published in 2022 and 2023 in two top journals, Journal of World Business and Journal of International Business Studies.

“It’s a big business that’s flourishing across the continent,” said Boso about the counterfeit goods market. “A question that keeps coming up is, what are governments, businesses and institutional leaders doing about it?”

Weak institutions drive high illicit trade

Boso said a number of factors underlie the problem of counterfeit and pirated goods in Sub-Saharan Africa. These include poverty, corruption, materialism and cultural issues.

“But what about institutional structures in Africa?,” asked Boso, who holds the O.R. Tambo Africa Research Chair at KNUST. “To what extent are these institutional structures potent enough to be able to regulate and ensure efficient functioning of markets, such that there will be no or limited incentive for people to engage in illicit trading?”

These questions are what motivated the research studies. Boso and his co-authors wanted to know to what extent institutional conditions in Africa drive the illicit trading problem and how businesses deal with that.

“The important thing about institutions is that they provide a stable elastic fiber that helps to guide, control and constrain societal behaviors,” Boso explained. “That condition is supposed to be happening in all societies, irrespective of their level of development.

“So whether you are in an advanced society or developing society, the expectation is that institutions must guide, constrain and control individual and organizational behavior. But largely, the institutional condition in Africa can best be described as weak.”

In formal institutions, Boso said, this weakness is exemplified by the following conditions:

- ◆ weak property-right protections;
- ◆ poor legal and regulatory environment;
- ◆ under-developed capital market;
- ◆ poor infrastructure;
- ◆ opaque industry rules of engagement.

“These weak conditions will give rise to higher illicit trading activities,” Boso said. “It is easy to see the property rights of genuine brands being violated.”

Informal institutional structures – shared norms, values and beliefs – also are weak in Africa, he noted. Thus, they too fail to promote stable, effective and efficient business transactions and processes.

“When those conditions are absent, or when their effectiveness is low, then there is a high degree of social exclusion and marginalization in society,” said Boso. “You also see the emergence of elitism, where powerful people are allowed to leverage their power to use resources any way they want, because of the belief that they cannot be touched.

“All this leads to a lack of trust,” Boso added. “If you push people to the margin of the society and exclude them from activities that allow them to improve their economic well being, then they are most likely to engage in illicit trading to feed their families.”

“Clearly we have a good argument and evidence to suggest to managers that it is important to build and leverage relationships with multiple political actors.”

It’s important to build relationships

The context of Sub-Saharan Africa offers a unique setting to try to understand how these institutional complexities and weaknesses enable trade in counterfeit goods, explained Boso. While industry players and policymakers have talked about the issue, scholars had not studied and theorized about it before.

Boso and his doctoral student, James Kofi Kutsoati, conducted two studies on the topic. One was an in-depth qualitative study of eight subsidiary firms operating in Ghana and 15 government, religious and local leaders. The other was a quantitative study of nearly 650 multinational subsidiaries operating in 23 Anglophone sub-Saharan African countries.

What they learned is that African society is highly complex when it comes to its institutional structures. To do business on the continent, managers need to deal with multiple institutional actors simultaneously. These include national, regional and local elected officials; local chiefs; religious leaders, plus political activists and opinion leaders.

“We argue that business success is a function of the extent to which businesses are able to develop and utilize relationships with these different groups of political actors,” said Boso. “Each one of these actors generates unique, but at the same time interrelated, resources that local and multinational businesses could use to minimize potential costs and risks associated with doing business in this environment.”

One example is a subsidiary of a multinational company that sells Scottish whiskey products. Boso said the sales manager related that he will go to a funeral and donate

the whiskey product to the local chiefs. When the chiefs display the whiskey at the funeral, it serves as notice to consumers that they should buy that brand of whiskey over other brands.

“That gives what you might call a moral justification to buy a particular brand or product,” explained Boso. “So, the relationship that businesses build with those local institutional actors provides the support that allows them to protect their brand from counterfeit products and illicit traders.”

In Boso’s studies, he found that businesses that invested in building these relationships experienced greater sales growth. Both sales and profits grew even more when the

firms operated in environments with a high incidence of illegal behavior and lack of adherence to market rules.

“Clearly we have a good argument and evidence to suggest to managers that it is important to build and leverage relationships with multiple political actors, at least within the context of Sub Saharan Africa,” concluded Boso.

“In fact, it’s not unique to Africa,” he added. “In many high-relational societies, like Latin America, China and Japan, where multiple institutional actors play a prominent role in shaping people’s and organizations’ behavior, an ability to build and leverage such multifaceted relationships becomes a source of competitive advantage.”

GHANA LMI FOR Q2 REVEALS SLIGHT ECONOMIC SLOWDOWN

Increasing warehousing and transportation capacity combined with decreasing prices in both metrics are driving an economic slowdown in Ghana. The data are revealed in the Ghana Logistics Managers Index report for the second quarter 2023.

The LMI summarizes the survey responses of supply chain and operations managers from multiple industries in Ghana. Researchers collected data for the second quarter report from April to June 2023 from 424 respondents.

The LMI for the second quarter (64.2) decreased by nearly three points from the first quarter’s 67.1. Any score above 50, however, indicates that logistics activities are expanding. A reading below 50 would reflect a contraction.

“The Ghana LMI is still in growth mode,” said Emmanuel Quansah, co-author of the LMI report and a member of CARISCA’s research faculty. “Nevertheless, growth is at a decreasing rate, with the current economic situation in the country not stable enough to generate increasing growth and optimism among industry players.”

Inflation has begun an upward trend, Quansah noted, and the appreciation of the cedi against the dollar in the first quarter has been lost, with the dollar gaining against the cedi.

The Q2 2023 report, the fifth LMI report to date, offers several new features. These include: more detailed perspectives on each of the three primary components studied (inventory, warehousing and transportation); a comparison of manufacturing vs. service sector activities; and quotes from respondents on challenges they face and the value of the LMI.

“The Ghana LMI helps us with our current strategy to achieve our KPIs,” said Thomas Yeboah, logistics manager for the World Food Program in Ghana and one of the respondents quoted in the report. “The trends and projections from the LMI guide the alignment of our logistics plans.”

The LMI researchers plan to replicate the tool in other African countries, beginning with Kenya in 2024. CARISCA is looking for partners to help expand the LMI across the continent.

Key findings from the Q2 2023 report include:

Decreasing **inventory levels** have contributed to slowing rates of growth for both warehousing and transportation utilization.

For the second consecutive quarter, **warehouse capacity** has shown improvement, moving from the previous quarter’s 52.0 to this quarter’s 57.3.

Logistics **cost indicators** seem to be stable with a slight increase in inventory cost and subtle reductions in warehousing and transportation prices.

For the first time, LMI respondents predicted a **future index score** (64.5) that is almost the same as the current score. They are slightly less optimistic than in the first quarter, when they predicted the LMI would rise to 69.3.

The **Electronic Payment System** (EPI) Index continues to see growth, increasing to 72.9 from the previous quarter’s 67.

STAY CONNECTED

To learn more and receive project updates and information about upcoming events, please visit CARISCA’s project website and subscribe to our mailing list:

research.wpcarey.asu.edu/carisca/mailling-list



The Logistics Managers Index (LMI) is a tool created by CARISCA to support decision-makers and improve businesses and livelihoods in Africa. By measuring combinations of inventory, warehouse and transportation activities and tracking the relationship between these variables, the LMI provides a timely measure of movement in logistics activities in Ghana.

Over six quarters since its inception, the LMI has proved to be a predictive indicator of the Ghanaian economy. The unique advantage of the LMI is that it is able to detect upstream activity, making it more sensitive to changes in the economy.

To download the full LMI report or past reports, go to carisca.knust.edu.gh/LMI

Senior executives and managers of Ghanaian organizations are invited to participate in the quarterly LMI surveys by visiting surveymonkey.com/r/Q3-23-LMI

Through surveys of logistics managers, the LMI measures the quarterly growth or decline of Ghana’s logistics industry based on **eight key components**:



Inventory levels



Inventory costs



Warehousing capacity



Warehousing utilization



Warehousing prices



Transportation capacity



Transportation utilization



Transportation prices

CARISCA HOSTS HIGH SCHOOL STUDENTS

More than 500 students from five area high schools converged on the KNUST campus at the end of September to learn about educational and career opportunities in supply chain management. The event was part of CARISCA's efforts to increase access and inclusion in the field.

Because it is not a subject taught at the high school level, the symposium offered many students their first introduction to the world of supply chain management. More than 60% of the students were girls.

The speakers, mainly industry personnel, spoke to the students about various career prospects in supply chain. A faculty member spoke about the requirements to study supply chain at the KNUST Business School. Students also were told about certification courses available to them through the Chartered Institute of Logistics and Transport.

Speakers from industry represented Newmont, the world's leading gold producer; VALCO, an aluminum smelter; and Metro Mass Transit Company. The president of the Procurement and Supply Management Association and the secretary of Women in Logistics and Transport Ghana also spoke at the event.

More than 90% of the students who completed a post-event survey said they were more interested in supply chain management as a result of the program. One student wrote in the survey "I never knew there was a program like that. There are many job opportunities."

Another wrote that she learned "this program can help in the development of mother Ghana." A third student said she discovered that "supply chain is a value adding activity. Everything surprised me because I love what I heard today."



▲ Alice Zu, president of Promas, speaks to girls from St. Louis Senior High School.



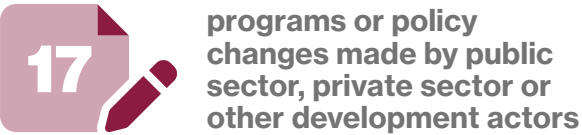
▲ Atoapem Frimpong Barimah from Newmont Ghana interacts with a group of students from KNUST Senior High School.



Photos by Immanuel_Offei

CARISCA DATA SNAPSHOT

Data are cumulative through Sept. 30, 2023.



CARISCA'S UPCOMING EVENTS

Dec. 4	CARISCA Training Series "Writing Business Cases With an African Context"
Dec. 8	CARISCA Training Series "Defending Your Thesis at VIVA"
Feb. 2	Inclusion in Supply Chain Training & Networking Series
Feb. 15	Distinguished Lecture Series "Research-based Innovation in Africa"

To learn more about and register for CARISCA events,
go to carisca.knust.edu.gh/events ➤



▶ ***Congratulations to these new KNUST graduates! They are among the 20 students who earned their master's degree in November with the support of a CARISCA scholarship.***

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