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Foresight Africa Podcast

"Advancing tech, innovation, and AI governance in Africa"

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Guests:

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Host:

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Episode Summary:

Rwanda has made impressive progress in driving inclusive digitalization across its economy. By harnessing data-driven insights, the country has empowered evidence-based policymaking, fostered innovation, and catalyzed digital transformation of Rwandan society. In this episode, host Landry Signé speaks with Crystal Rugege, managing director of Rwanda's Center for the Fourth Industrial Revolution (C4IR), about her journey from Silicon Valley to driving impactful technology initiatives in Rwanda and Africa.

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SIGNÉ: I am Landry Signé, senior fellow in the Global Economy and Development Program and the Africa Growth Initiative at the Brookings Institution. Welcome to *Foresight Africa* podcast, where I engage with contributors to our annual *Foresight Africa* report, as well as with policymakers, industry leaders and other key figures. You can learn more about this show on our work at Brookings dot edu slash Foresight Africa Podcast.

This is the last episode of season three of *Foresight Africa* podcast. It has been an incredible ride with fascinating conversations. To our audience, thank you for the bottom of our hearts for joining us on this fabulous journey. I am also profoundly grateful to our extraordinary Brookings team.

Today on the podcast, I am pleased to welcome Crystal Rugege. Crystal Rugege serves as the managing director of Rwanda Center for the Fourth Industrial Revolution, one of the 20 global centers of the World Economic Forum working to harness the power of emerging technologies for the equitable and human-centered transformation of the economy and society.

Prior to this role, Crytal led the establishment and growth of Carnegie Mellon University Africa campus for 11 years, now a pivotal institution advancing world-class engineering education, research, and innovation on the continent. Crystal serves on several boards and has been recognized for her leadership, including as one of the 100 Brilliant Women in AI Ethics, Women in STEM Leadership Awards from The Next Einstein Forum, and Inspirational Leadership Awards from Carnegie Mellon University.

Welcome to the show, Crystal.

RUGEGE: Thank you, Landry. Thank you for having me. It’s a pleasure to be here.

SIGNÉ: Crystal, I am particularly excited to host you today as Rwanda is one of the African countries I classify among the leaders or emerging leaders of the Fourth Industrial Revolution, especially when it comes to some of the innovations which are improving standards of living. And I mentioned those countries in my latest book, *Africa’s Fourth Industrial Revolution*, published by Cambridge University Press, and with a foreword written by Klaus Schwab, founder and executive chairman of the World Economic Forum.

The Fourth industrial Revolution is characterized by diffusion of digital, biological, and physical world, as well as the growing utilization of new technologies such as artificial intelligence, cloud computing, robotics, the Internet of Things, advanced wireless technologies, among others. The 4IR is transforming economies, industries, governments, and society around the world with economic disruption and complex socio-economic consequences for Africa.

Crystal, you have played a key role in leveraging the Fourth Industrial Revolution, which I will call here 4IR, for simplicity, for Rwanda and Africa as well. What was your journey to becoming the managing director of the Rwanda Center for the Fourth Industrial Revolution?

[4:51]

RUGEGE: Thank you, Landry. Thank you again. It's such a pleasure to be here with you today and with the listeners that we have amongst us. So, I started my career in Silicon Valley over 20 years ago working at IBM as a software engineer, just out of university. And it was a really exciting time to be in the heart of technology innovation.

But I felt compelled to do something more impactful with my life. I wasn't sure what exactly it would be, but that's usually a good time to pause and go back to school. And so that led me to pursuing a master's degree at Carnegie Mellon University, where I focused on this intersection of technology, policy, business, and society.

And following graduate school, I was presented with a super interesting initiative to establish a CMU campus in Rwanda to provide world class engineering education to students across Africa. And I really jumped at this opportunity because it connected my passion for Africa, technology, and the power of education. And I come from a long line of educators, so it's always been a passion of mine. So, I moved to Rwanda in 2011 to set up CMU Africa.

And in 2020 I left CMU to start another exciting initiative, which was establishing the Center for the Fourth Industrial Revolution in Rwanda. As you said, it's a long name, so I will also just say C4IR, hopefully that that's a bit easier for your listeners to digest. But the C4IR network was launched by the World Economic Forum in 2017, and really created as a platform for global cooperation to accelerate the responsible adoption of emerging technology for the benefit of society. So, we're now in 19 centers across the world, and the center that I lead is is the only one in Africa. And our primary areas of focus are data governance and artificial intelligence.

SIGNÉ: Fantastic, Crystal. Will you mind further elaborating on the Rwanda Center for the Fourth Industrial Revolution key goals at the national level, but also at the continental level?

[6:51]

RUGEGE: Yeah, sure. So, when we started in 2020, our first three-year strategy was really focused on creating an enabling governance environment for responsible innovation with a particular focus on AI and other data intensive technologies. And so, we primarily were looking at what are the right laws, policies, governance framework that need to be in place to deliver Rwanda's vision for harnessing the power of AI and other emerging technologies to address national priorities.

And so, just this year, we recently launched our new five-year strategy, which is focused on three priorities. And that's first, accelerating innovation through the establishment of an AI innovation lab. And this is so we can build and pilot some of the most promising public interest use cases that can have an impact in sectors such as health and agriculture, where there is high social and economic impact. But also looking at key sectors like the MICE [meetings, incentives, conferences, and exhibitions] industry. This is one industry that is among the fastest growing in Rwanda's economy. And so, we see a lot of applications that can be utilized as well.

Our second priority is around AI talent development and knowledge circulation. This is building on some of the government's initiatives that it already has in place to build a critical mass of data scientists, coders, AI engineers—really that whole spectrum of digital talent. But we want to complement those efforts by creating a pathway for some of the brightest minds in Rwanda, across Africa or really anywhere else in the world to work on some of the grand challenges that can be addressed by the application of AI.

And we know that we have some of the best African minds around the world. I've met some of them working and focused on artificial intelligence, whether they're sitting in Google, Microsoft, AWS [Amazon Web Services], or in world class academic institutions around the world. And what I've often heard from many of them is this keen interest in being able to also channel their expertise to solve some of the problems for the communities they come from. So, we'll be creating a platform for AI experts to register their interests to collaborate with AI talent on the continent, whether it's through technical mentorship. But I think even more importantly, collaborating on research projects as well as business ventures.

And then our third priority for our five-year strategy is really to elevate Africa's thought leadership on AI and global governance. You and I are often in some of the same spaces and one observation is that Africa's often underrepresented in the global fora when it comes to AI governance. Yet we know that Africa is also home to the largest growing workforce in the world. So, that means that we are the world's future digital workforce.

And we know that there are such tremendous productivity gains that can be harnessed by AI, but we first need to fix some fundamental things like infrastructure. I think Rwanda serves as one example of how to do this. It's made significant progress on the infrastructure front. Now we have about 97% of our population with access to broadband. But there's still a lot of work to do in terms of adoption, in terms of usability. But it's it's a good foundation to start with, you know, in seeing how we can harness the potential of AI to solve some of the most pressing challenges that we have as a continent.

So, this was really our motivation to host the inaugural Global AI Summit on Africa in April next year in Kigali, Rwanda—for the for those of you that don't know where Kigali is—but it's really to serve as a thought leadership platform to surface these critical issues on Africa's AI journey.

SIGNÉ: That is fantastic, Crystal. And it is connected to the work you have done with Carnegie Mellon University, Africa. You have led this establishment and growth in Africa, in Rwanda in particular. Can you describe the genesis of Carnegie Mellon University Africa, which we can call here, CMU Africa, and the impact it has had after 12 years of operations?

[10:57]

RUGEGE: So, it really goes back to 2007. There was a conference in Kigali called Connect Africa, and this was hosted by the ITU, the International Telecommunications Union, the government of Rwanda, the African Union in collaboration with, I believe, the World Bank, and the United Nations Alliance for ICT

and Development. And one of the key outcomes of that summit was to endorse the establishment of five Centers of Excellence in Africa that would support the development of a critical mass of ICT skills required to fuel a knowledge-based economy.

So, Rwanda spearheaded this effort. You know, it already had its Vision 2020 in place since the year 2000. And the guiding vision for that strategy was to make Rwanda a knowledge-based economy by 2020. So, the outcome of the Connect Africa Summit, this particular goal that they had outlined, was really perfectly aligned to Rwanda's national priorities. So, Rwanda engaged CMU's leadership and invited them to partner with them to establish this regional ICT Center of Excellence.

And I think it was a really strategic decision to establish a CMU campus in Kigali rather than building some other kind of educational partnership or building an exchange program. CMU had a successful track record with a global presence in Qatar and Australia, as well as Portugal, among other countries. And so, when I joined CMU in 2009, I was hired to to really bring this vision of the government and CMU to life. And in 2011, I moved to Kigali to launch the new campus. We had the first cohort of about 22 students, if I remember well, in August of 2012.

And when you fast forward to today, there are nearly 600 alumni from about 30 countries across Africa. And the recent investment by the Mastercard Foundation actually enabled them to establish an endowment for CMU Africa. And this will allow them to now support up to 200 students being enrolled every year. These are now young Africans getting world class education from one of the top technology and engineering universities in the world. Degrees in IT, electrical and computer engineering, and artificial intelligence as well.

And so, I often see LinkedIn updates from from some of the students that have gone through CMU Africa. And it's really amazing. Some of them have gotten Ph.D.'s from places like Oxford. Others have started successful businesses across Africa and in cybersecurity, renewable energy, and even AI. And some of them have become colleagues in leading the ICT sector in Rwanda.

SIGNÉ: This is a beautiful story of impact, Crystal. And how did your role working with CMU Africa prepare you for your current position?

[13:42]

RUGEGE: I would say the main lesson I carried over was how to become an "intrapreneur." When I started my role at Carnegie Mellon, and I was given a one page MOU between the government and the university to establish this Center of Excellence. And beyond that, I was just expected to kind of refine that vision, bring it to life, and then execute.

And so, in my current role at C4IR, it's a partnership between the government and the World Economic Forum. And similarly, the partnership was really kind of loosely defined in part so each center can have an operating model that is fit for its context and really driven by national priorities.

So, I would say in both cases, I had to build institutions from scratch while seeking to impart the DNA of the parent institutions and remain authentic to our cultural context and national agenda.

SIGNÉ: Fabulous! C4IR has played a central role in shaping Rwanda's data governance and AI landscape. How have Rwanda's policies changed in recent years given the emergence of AI and other unprecedented technological advances?

[14:55]

RUGEGE: So, Rwanda began drafting its data protection law in mid-2019. And this was following the ratification of the African Union's Malabo Convention on Cybersecurity and Personal Data Protection. And C4IR was established about a year later. So, one of the first requests we had from the minister of ICT and innovation was to review the draft law. And what we observed at the time was a gap in perspectives in how the law would impact the various stakeholder groups. And we're talking from major private sector players such as banks and telcos to the MSMEs [micro, small, and medium enterprises] that are the engine of our economy. But even cloud service providers that are often domiciled outside of the country.

And so, we led a number of multi-stakeholder consultations to ensure the law was not just benchmarking well established instruments like we used GDPR because, our economy and society is really structured completely differently. So, thinking about issues like how easy is it for an MSME to comply with the law or how to deal with consent when a portion of the population is not digitally literate?

And so, we supported the ministry in really synthesizing these various stakeholder perspectives with a goal of creating a law that is fit for our context. What I mean is both citizen-centered as well as innovation friendly. And so, the law was passed in October 2021, and it came in enforcement just last year.

And so, with artificial intelligence, it was a slightly different approach. For one, AI adoption in the country is still quite low and therefore strong governance instruments are not really appropriate. We don't know enough and how it will impact us in our context. And so, the government was really more interested in creating an AI policy and strategy that would stimulate innovation while, of course, putting the right guardrails in place to ensure that AI is safe, is inclusive, and responsible by design.

And so, our primary role as a center in supporting the ministry with the policy was looking at the economic potential of AI in Rwanda and identifying key sectors that would benefit the most from AI.

And so, we worked with McKinsey to develop over 30 use cases across nine different sectors. And this informed the policy to make it less theoretical and really more instructive to guide public sector adoption and decision-making, as well as private sector investment.

And so, the AI policy was published last year. It has triggered a lot of enthusiasm from both the private sector as well as public sector leaders. So, I think the best is yet to come. And it's a learning journey.

SIGNÉ: I like the comprehensive approach and also the commitment to bridge the gap between the ideas and the strategies and your successful implementation. Crystal.

The C4IR Network is a global network of the World Economic Forum working at the intersection of technology, innovation, and technology governance. How has the center advanced Rwanda's ambition of becoming a proof-of-concept hub for safe and inclusive AI innovation?

[18:11]

RUGEGE: So, really building on the work that we did on the development of the AI policy as well as economic forecasting, we're we're building an AI innovation lab to pilot some of the use cases, particularly public interest use cases that we know can have high impact. And so, working with the Ministry of ICT and Innovation, we're building partnerships with other ministries to establish data sharing frameworks and curate high quality data sets that will really be the basis for piloting these AI use cases.

SIGNÉ: And what are some exciting projects you have in the pipeline and where do you see AI having the greatest impact in Rwanda?

[18:52]

RUGEGE: Yeah, there's so many, I think. But we initially focused on the health sector. It's actually been a priority sector of ours since the establishment of the center. I think it's really widely known that there's tremendous potential for AI in closing gaps in health care access and delivery. And when you look at some of the more advanced economies, they've been using AI for a while to enhance diagnostic capabilities where there're known human limitations.

And so, over the last year or so we've been working on a project supported by the Gates Foundation to strengthen clinical decision-making amongst community health workers. So, this is really kind of the backbone of our health care system. So, the first phase of the project started about a year ago in partnership with a Rwandan startup called Digital Umuganda. And we created a Kinyarwanda-English machine translation model to enable community health workers to use large language models, or LLMs as they're often referred to, for decision support and triage. But really being able to interact with these models in the local language. And this is both through voice-to-text and text-to-voice.

And so, we're currently testing the clinical performance of these models against the decisions of Rwandan doctors. And so, we're we're still observing what the outcomes will look like. But it's it's certainly, I think, a good contribution to the ecosystem.

The second phase of the project is something that we just began. And this is really on testing the efficacy of the model in a live setting through a silent field trial. This is in partnership with the Rwanda Biomedical Center, the University of Birmingham, Digital Umuganda—the local startup I referred to— and the University of Global Health Equity, which is hosted in Rwanda and has strong ties to Harvard University.

So, the goal is to assess if these LLMs can really aid community health worker referral decisions, one, by flagging high-risk use cases earlier or reducing the number of unnecessary referrals. So, you can imagine many of our countries their health care systems are overwhelmed, not having enough doctors and nurses. And so, this is the kind of innovation that can really help with building efficiency and really saving lives if we're able to get people referred to the right places on time.

And then lastly, we're establishing a research and innovation platform with Rwanda Biomedical Center. And this is initially focused on designing a data governance framework for the platform and then being able to pilot that platform with the data sets that we've created through our community health worker project. And so, I think it's kind of a robust piece of work that will really unlock a lot of opportunities and demonstrate how AI can help close access to both the access to care as well as improving delivery.

And aside from health, I think I'm really excited to explore applications in agriculture and education. These are sectors that have benefited tremendously from AI and other parts of the world. And so, my hope is that Africa can draw on these lessons and really create new and improved ways of deploying AI in these sectors.

SIGNÉ: Fabulous, Crystal. In collaboration with the World Economic Forum and the Ministry of ICT and Innovation, C4IR will host the inaugural Global AI Summit on Africa. Will you mind elaborating on the goals, participants, or expected impact of the summit?

[22:18]

RUGEGE: So, let's start with the opportunity. It's estimated that I can contribute 1.2 trillion to Africa's economy by 2030. But I think we also know that that just won't happen by chance. We need strong leadership from our governments. We need serious investment from the private sector as well as multilateral institutions. And we need catalytic philanthropy.

Africa is at an inflection point in its digital transformation journey. There's still so much to be done, but also so many opportunities that are arising with the exponential pace of, technological innovation. And so, we need to reignite our energy and focus on digital transformation and recognize the consequential role that Africa can play in shaping the trajectory of AI to drive productivity and innovation in Africa.

And so, when you look at what Africa has to bring to the table, Africa has two things in abundance that other parts of the world don't have. The first is talent. We will be the world's workforce. We need to make sure that we're future proofing our young people. The second is natural resources. Africa is naturally endowed with one-third of the resources required for the global AI supply chain. So, these are areas where Africa has a unique competitive advantage.

But the question is how can we position ourselves to really maximize the benefits and boost shared prosperity for the continent? And so, you know, coming to the summit, the inaugural summit, it's the first of many. We intend for it to be hosted on a regular cadence either annually or biannually. But we will really focus on talent for

this inaugural summit. And the theme is AI and Africa's demographic dividend, reimagining economic opportunities for Africa's workforce.

And so, the summit really seeks to underscore the urgency to leverage AI to boost Africa's rapidly growing population. So, we will be hosting a number of heads of state, several ministers, CEOs from Africa's private sector, as well as global AI thought leaders at the forefront of AI innovation. But we'll have a strong emphasis on showcasing AI applications that are currently deployed in Africa. And we plan to host about 100 African AI companies with amazing applications in education, health care, agriculture, among other sectors.

And so, the summit will be a platform for them to pitch their ideas to investors, public sector leaders, and really other stakeholders that are in the room that can help them to scale their businesses across the continent. And who knows, maybe across the world. So, I think for everyone that is listening, who has an interest in AI in Africa, please join us in Kigali April 3rd to 4th.

SIGNÉ: Fabulous, Crystal. As you know from previous *Foresight Africa* podcast episodes, I love finishing this session with a couple of questions for all my guest. AGI looks at Africa from an economic perspective, and we focus on how to maintain or accelerate economic growth and structural transformation while fostering inclusion, especially for youth and women on the continent. Building on your work and experience, what is one piece of advice you would give to African or global policymakers to ensure the best digital outcomes on the continent?

[25:46]

RUGEGE: So, I would say three priorities. I'm sure it's not a surprise to to many of them, but accessibility, affordability, and the third I would combine to say usability and utility. So, accessibility is really starting with the basics—power and connectivity. We can't achieve much if we're in the dark and we're disconnected. Right?

I think when it comes to affordability, even if we have this other infrastructure in place, we need to make sure that the internet as well as devices are affordable so people can can use them.

And then I think the last around usability and utility, it really goes hand-in-hand. We need applications designed for our communities. And this is whether it's from a linguistic perspective or other cultural, socioeconomic context. And so, we need to make sure that applications are both usable and useful and adding value to people's lives in a meaningful way.

SIGNÉ: Insightful! And given you a successful career and impact, what advice would you give to youth and women hoping to follow in your footsteps?

[26:54]

RUGEGE: So, so, earlier this week, I had a reflection. I received an email from a former boss of mine, Bruce Krogh, and he somehow came across a paper I wrote as a graduate student in 2008. And it had a short summary about me at the end that really amused me. It said, after graduation, I intend to focus my career on using

technology for sustainable development in Africa. So, 16 years later, I think I'm still on track.

So, my advice to young people listening would be to focus on a passion, not a profession. And I think that will guide you through your career as you try to determine the opportunities that you should embrace and which ones you have to pass on. So, find your passion and let that be your guiding light.

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SIGNÉ: What a beautiful way to end this show. Thank you so much for joining us again today, Crystal.

RUGEGE: Thank you so much for having me. It's been a pleasure.

SIGNÉ: I am Landry Signé, and this has been *Foresight Africa*. To learn more about this show and our report, visit Brookings dot edu slash Foresight Africa podcast.

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