Speaker 1:

The future of business is responsible.

Speaker 2:

[foreign language 00:00:04].

Speaker 3:

Conscious commingling and growth and impact.

Speaker 4:

[foreign language 00:00:12].

Ryan Caplin:

[foreign language 00:00:12].

Speaker 11:

[foreign language 00:00:12].

Speaker 12:

The future of business is intentional and transparent.

Speaker 13:

[foreign language 00:00:19].

Katherine Dellar:

Welcome to the Future of Business podcast, produced by Oxford MBA students. My name is Katherine. I'm your host for this episode, and I'm very excited to be bringing you this conversation with one of my classmates, Ryan Caplin. I'm going to let Ryan introduce himself. Go ahead.

Ryan Caplin:

Yeah, I'm Ryan. I am from the US. I am a father and a husband. I have three children here with me. I'm a one plus one MBA. Just finished a master's degree in sustainability, enterprise, and the environment here at the University of Oxford where I focused on waste and circular economy and agriculture, and I'm doing the MBA now and excited to be here. Thank you.

Katherine Dellar:

Thanks Ryan. So to get us started, we're asking all of our guests this first question to kick off. So what's a preconception you had before coming to Oxford or coming to the business school that has since been changed in your mind?

Ryan Caplin:

Yeah, coming to Oxford, I expected there to kind of be an intellectual barrier, maybe people stuck up, I guess you could say, and it is definitely intellectual and sometimes that's a barrier when I don't feel that

way, but people are incredibly nice, incredibly kind, incredibly open, and incredibly down to earth. I've been very, very, very impressed with the people who are here.

Katherine Dellar:

That's great to hear. So you mentioned that you're interested in waste management. I think you've required a bit of a nickname around the business school as the trash man or the garbage man. So can you actually tell us how you got interested in waste management?

Ryan Caplin:

Yeah, I welcome that. Garbage is my thing. So I originally got interested, it was back in 2008. This is dating me. I had graduated from high school in 2008 and then moved to Jamaica and that was the first time I had been out of the country. I was a volunteer missionary for my church, the Church of Jesus Christ of Latter Day Saints, and I found myself spending a lot of time in Spanish Town, Jamaica and in other areas of Jamaica, and it was the first time that I had encountered uncollected waste, waste lining these... It's a beautiful, beautiful island, beautiful beaches, beautiful forest, beautiful everything, but waste is lining the rivers and the roads. And I remember once coming upon a canal with water flowing down and there were children playing in the canal, and I could see the garbage just flowing down this canal that the children were playing in.

And I just got thinking and started wondering about all this, could something be done with this to take care of waste, to recycle it or make better use of it? And also thought about just the human connection. And lots of times we think about waste as an environmental issue, which absolutely it is, and I care about that, but it's also a very human issue. We think about waste as, or the environment as humans impacting the environment, but I also started to think about how the environment impacts us as humans, and if we can have cleaner environments around us, what does that do to our outlook and to potentially the opportunities that we feel like we can pursue? So I started thinking about all these things back then, and just over time it grew.

Katherine Dellar:

Interesting. So what was the next step in your waste management exploration journey?

Ryan Caplin:

Yeah, so I went back to the US after two years there in Jamaica, in the Caribbean, and started my undergraduate, my bachelor's degree. And I did projects on waste whenever I could, and eventually that led to doing some research with a Ghanaian PhD student who was studying urban development, and I researched waste management in developing countries with him. And his name is Ransford and he is so influential, I'm so grateful for Ransford. So we did this research over the summer and then at the end of it he encouraged me and invited me, said, "You've got to go to Ghana for yourself. You've researched this, but you've got to go to Ghana for yourself and see what it's actually like." So that stuck with me. It took me a few years, but I eventually did make it to Ghana on a Fulbright Fellowship where I researched waste management and waste disposal behavior specifically, and focusing on inner city areas, slums, and the areas of Accra in Ghana that were most well known for having waste management challenges.

Katherine Dellar:

And anything in particular that came out of your research there?

Ryan Caplin:

It was super surprising. So I went in with some preconceptions or hypotheses around what might be the issue and that I would focus on plastics. That's the very public problem. And when asking people about why... First of all, I would take any opportunity I could get, whether riding in a taxi or talking with anybody on the streets there in Accra to ask them how is waste management? How do you view waste management here? Has it done well? And the answer was always, "No, it's not done well." So I would follow it up with why, what's the problem? And people would say typically two or three things. It would be, "Oh, education, people lack education, they don't know what to do." Or people have bad attitudes about waste management and so they just don't care. And I guess those are the two big things that I heard over and over.

And then when I actually went in and spent pretty much every day in these areas, just what I heard was not consistent with what I saw. People did care. People were out sweeping their houses every morning and tidying up, and people did know, at least at a basic level, what you should or shouldn't do with waste. And people did not like that waste wasn't managed well, but it was out of their control. So my mindset totally shifted toward, this is, in my view, not an education problem. It's not a behavioral or attitude problem. It's a problem with the system. There is no system in place to enable people to dispose of their waste properly.

People have to walk up to a half a mile carrying their waste, and when they walk that half mile, they'll get to an overflowing garbage container, a communal garbage container, and somebody will be there and ask them to pay money, and they'll pay the person money and they'll throw it on the ground or they'll burn it on site. People are smart. They know that it's in their best interest not to walk the half mile carrying their waste just to pay a lot of money so that somebody else can burn it. They'll get rid of it on their own.

Katherine Dellar:

All right. So we've heard some concrete examples that you've seen in a few different countries. Let's just take a step back and get the basics of waste management down. What are the different categories of waste? What are the different approaches we can take to waste management? Just complete waste 101 from Ryan?

Ryan Caplin:

Yeah, so I'm mostly focused on municipal waste, that's my interest. There's also industrial waste and nuclear waste and other kinds of waste. But within municipal waste, there's your typical paper, plastic, metals, textiles, cardboard, organics, and then a variety of other waste. But those make up the vast majority of the waste in a typical waste stream. And historically it's been viewed as a linear system where you buy something, you use it, and then you throw it away at the end of its life. So just very linear. But there's a lot more emphasis now on circularity, and that's my interest as well. So a couple of the basic frameworks are the waste hierarchy, which starting the optimal activity is to prevent waste, reduce waste, and then to reuse, to recycle, to recover energy from waste, typically, and then to dispose, in that order.

Katherine Dellar:

Okay, great. So if that's where we've been and we're trying to move away from this kind of linear approach to waste, what's a better direction we could head in? You mentioned circularity before. Is that a hopeful future direction?

Ryan Caplin:

Yeah, yeah, very hopeful. So circularity or the circular economy, the best known institution, in my opinion, pioneering work in this area is the Ellen MacArthur Foundation. So they put out this principles for the circular economy that include eliminating waste and pollution, circulating products and materials at their highest value, and regenerating nature. So those are three of the main principles of circular economy that they've put out. And they've also put out this really great graphic, the butterfly diagram, which breaks out the circularity or the waste material flows into a biological cycle and a technical cycle. So on the biological cycle side, you've got organic waste and agriculture and all of that, and ways of dealing with those materials and recovering the highest value from them and reincorporating them into nature, recovering the nutrients and eliminating waste there. On the technical cycle side, that's where the... It's manufactured products, so that's where reusing, refurbishing, or repairing, recycling and all of that comes into play to keep those materials in their best and highest use and continuous use over and over.

Katherine Dellar:

Excellent. So I'm going to try and get us to get some of these waste management frameworks a little bit more concrete. So we are here in Oxford right now, and just so we can have a better understanding of some of these practices around waste management, I understand you've looked into a little bit some of the waste management practices here in the city of Oxford. So really interested to hear what you've learned.

Ryan Caplin:

Yeah, there's some interesting things happening around here. My favorite one is on the organic side. So there is food waste collection, segregated food waste collection here in Oxford, at least for some subset of businesses and households. And the food waste here goes to a place called Severn Trent Green Power, which is just a few miles northwest of here, and I had the opportunity to visit there a few months ago and take a tour. And it was absolutely fascinating. It's an anaerobic digestion facility, which means that the food waste is prepared first and then basically put into these giant tanks where the food waste breaks down in anaerobic conditions, so without oxygen, and releases biogas, which essentially is methane mixed with a few other gases that are scrubbed out. And it is used to generate electricity. So they've got five large anaerobic digestion chambers, and the gas feeds into two one megawatt power generators. That's enough, I think for 3,500 homes in the area, electricity needs. So really, really interesting there.

Katherine Dellar:

Amazing. So what are we doing about non-organic waste?

Ryan Caplin:

Yeah, so recyclables, the recyclable materials are taken to, at least for the University of Oxford, and this may vary throughout the city, but the University of Oxford's recyclable materials are taken to what's called a MRF, or a material recovery facility, which is basically a sorting and recycling center just west of Oxford a little bit. So yeah, the materials go there, they're sorted out, and I'm not sure, because this varies region by region and site by site, I'm not sure exactly what happens to the materials there, if some of them are actually recycled locally or if they're just sorted out and basically batched up and sent somewhere else for recycling. So that's on the recycling side. And then the residual waste stream that isn't organic waste and isn't recycled goes to the Ardley ERF, energy recovery facility is a waste energy

plant or an incinerator north of Oxford. So the residual waste stream goes there and is incinerated and generates electricity too. And I looked into this a little bit more, so that is roughly the 15th largest ERF or waste energy plant in the UK.

Katherine Dellar:

Okay, great. Going back to that global lens, what are some of the challenges, opportunities, trends you're seeing in waste management? And I'm particularly interested to hear what for you the role of business is in these challenges and trends.

Ryan Caplin:

Okay, yeah. So one trend that I've seen is around corporate targets. So more and more corporations are issuing targets for both recyclability of the materials of their packaging or of their products, and also the recycled content that is incorporated into those products and packaging. And more and more the companies are actually receiving pressure to follow through on these commitments that they've made. There have been commitments made for a long time that haven't been met. So take any of these corporations with these targets that they now have to actually recover these materials, they need more materials as feed stock, recycled feed stock into their products, which creates a lot of opportunity for companies or startups who are able to do a better job of collecting these materials, separating them out of the waste stream, making sure that they are recovered, and supplying them to these corporations so the corporations can also meet their targets.

So this is a big opportunity area, and it's even more important right now for corporations, and corporations are even more willing to engage in this and to pay because of the high prices of virgin feed stock right now. Oil prices are high, which means that virgin plastic prices are also high, so there's more of a market for recycled plastics, and likewise with other materials. So that's one opportunity area, one trend that I think will continue. Another one is around design, just entirely designing waste or non-recyclable materials out of products. So much opportunity here. And that gets to the very core of the waste hierarchy of eliminating, preventing, reducing waste in the first place. So within that, there's potential for standardizing around certain plastics, the most recyclable plastics, and potentially even banning less recyclable plastics or hard to recycle plastics and other materials or laminates or composites that are extremely difficult to recycle. So that's a second opportunity area is in design.

And then third, extended producer responsibility, which means that companies or producers need to take responsibility for the materials that they produce or the packaging that they use in their products. And there's so much opportunity here, although it's a challenging thing. One of the challenges being how can you operationalize this? How does it actually work and how can you hold the companies responsible? Does it happen through some type of taxation or does it happen through some more specific implementation? And I think there's a lot of opportunity there for startups who are willing to figure out how to solve this problem.

Katherine Dellar:

Ryan, what's the role of government in managing or responding to these trends, these challenges, and opportunities?

Ryan Caplin:

So pretty much anywhere in the world, government has ultimate oversight over waste management, and that's both through the actual operations and implementation of waste collection and disposal,

which is typically done through contracting with a third party that handles the operation. And then the other side of it is the policy side. So enacting good policies and laws and everything around how waste is handled, what should be done with it, around corporations, companies, and what their requirements are as well. So the opportunity within government, I think there's a lot of opportunity to collaborate with the private sector. Of course that's often said, more government collaboration with the private sector to drive more innovative solutions. But one thing that you can see a lot in waste management is there are often some big companies that are in there, and it makes it difficult for startups or for smaller companies with more progressive or innovative ideas to really gain hold and gain traction and be able to change the current model of waste management.

So one opportunity is for government to open up that playing field, to do more to encourage that innovation from the bottom up with startups and new technologies to come in and add to what these established players are already doing. There's also a lot of potential around policy making, looking at things including the potential to ban certain materials or certain combinations of materials that really have no hope of being recovered in any way. So there's a lot of direction that government can provide in that way as well. But often they need to follow the lead of what's happening in science and technology that enables those new models.

Katherine Dellar:

And what are some of the kind of tech innovations that we're seeing in this space?

Ryan Caplin:

So there's a lot of work right now. One area is around sorting and recycling materials. A lot of work in robotics and AI, in being able to much more effectively different types of materials, recognize them using image recognition and robotic machinery to dramatically improve the... Dramatically lower the contamination rates of materials and make it much more effective to pull recyclables from a mixed stream of materials. There's innovation in blockchain, for example, in leading a lot of opportunity around tracking of materials and better collection and recovery of materials, and potentially feeding into extended producer responsibility and schemes around that, or return schemes that individual companies can operate. I'm no expert in blockchain, but there's a lot of interesting work upcoming in that as well.

Katherine Dellar:

All right, Ryan, we're going to talk to some of your more recent research. In your introduction you mentioned that you did a master's last year as part of the one plus one program, and I'd love for you to talk a bit about the research you did as part of that master's.

Ryan Caplin:

Yeah, so the reason for me coming back to school is to pivot back full-time into the waste space. That's what I care about, that's what I want to be in, and specifically in Sub-Saharan Africa. I absolutely loved the working there in Ghana and loved the problem, loved the people who were working on this problem who I was working with, and I just feel like there's so much opportunity to change the way things are done and to work with really great people who are on the ground doing this. So I knew coming into this sustainability program that I wanted to further my research and focus it somewhere waste related in Sub-Saharan Africa. And following my time in Ghana, my view started to shift away from plastic waste, which is a very public problem, everybody sees it, and toward organic waste, which is really what causes more problems for people.

If you think about as a household that needs to dispose of waste, which one causes bigger problems, the organic waste that rots and smells and attracts rodents and insects and can be a disease vector, and you basically have a couple days to get rid of it before it brings all these things, or plastics that may take up a little bit of space, but really are inert. And if you can pull out the organic waste and segregate the organic waste from the waste stream, then it also increases the value of the remaining waste or the remaining recyclable materials because they're not contaminated. So I started thinking much more about that and knew that I wanted to focus more on organic waste. So that's really what led me into my dissertation research this last year, and through a series of connections and conversations, ended up focusing on East Africa in Kenya and organic waste management using black soldier fly larvae, or you can think of it as maggots.

It is absolutely fascinating to me, very gross, which I think even adds to my interest in it. So I was able to go to... I spent the first half of the summer in Nairobi and also a couple weeks in western Kenya along Lake Victoria researching organic waste management using black soldier fly larvae. So what are these? Basically it's a certain type of fly, and in its larval stage it eats organic waste, and then over the course of a couple weeks matures and can be fed as a high protein feed source for animals. So fish, chickens, primarily. There's so much opportunity in this space, and I left even more convinced than I began of the potential for black soldier fly larvae as an organic waste management method. So yeah, I can talk a lot more about that.

Katherine Dellar:

I mean, it's a profound mental image. I suppose most people are probably going to be thinking, "Aren't flies harmful," but you've very assured me that black soldier flies are a specific type of fly that is optimal in this space.

Ryan Caplin:

They are a specific type of fly, and there are a few things that are unique about them, and one is that they're not a pest. So they only eat in their larval stage, which means when they actually emerge as a fly, they don't eat. They just live off the food that they've consumed as a larva. That means that they're not the same as a house fly, they're not a pest, and they don't spread disease like other types of flies might. And as far as how they're reared, how the colonies are maintained, basically you've got these flies that are in a, say, one meter by one meter or a couple meters by a couple meters netted cage. The flies mate, they lay eggs, you take the eggs and allow them to hatch into these little tiny larvae and then feed them with organic waste of any type. So food waste, agriculture waste, potentially even manure that's been treated, and they eat a tremendous amount.

To me it's mind blowing and just indicative of the potential for this, but a kilogram of these eggs, which admittedly is millions of eggs, it's a ton of eggs, but one kilogram of these eggs can consume a ton of organic waste. So a thousand kilograms. I think I'm getting ahead of myself instead of explaining some of the research that led me here, but instead of having to transport a ton of waste to a certain location to treat it, you can potentially transport a kilogram of these eggs to the ton of waste and treat it at the source of generation. And that is a thousand times efficiency gain in treating the waste.

Now, there's of course all the systems that have to be created around that, and there's a lot more that we could talk about, but that that's essentially what my research focused on, was the business models for producing these black soldier fly larvae. Should it be done centrally where all the waste is brought to a central point and processed with the larvae there, or should it be done decentralized where each farmer, for example, would maintain their own fly colony and their own black soldier fly larvae and feed them to their own animals, or semi decentralized or hybrid approach where the colonies are maintained

centrally, but then the eggs or the young larvae are then transported to the source of the waste and then the larvae treat the waste onsite. And I see a lot of potential in that model.

Katherine Dellar:

That's incredible. I think I've heard you describe this as the ultimate circular economy, so really exciting stuff.

Ryan Caplin:

I mean, there are a lot of problems to figure out, there are a lot of challenges to overcome still with this and figuring out how to scale it effectively, how to make it very cost effective, and a lot of other questions around it. But the tight circularity is really, really interesting about this, that you've got the food waste, it's consumed within a matter of weeks, and then it becomes a high protein feed source. There's also fertilizer that's produced from it that can be just used to replenish soils, and it's displacing fish meal and soybeans as the typical feed source for fish and poultry. And that has a huge impact on fish populations, on potentially deforestation, and there's a lot of potential for it.

Katherine Dellar:

And Ryan, you mentioned that fertilizer is one of the byproducts of this process of using black soldier flies with organic waste. So can you tell me a little bit more about that?

Ryan Caplin:

So basically you end up... After feeding these larvae, you end up with one part larvae, which can then be fed to animals, and then one part fertilizer, which can be... First has to mature, but then can be applied to crops, can be applied to soil to regenerate soils. So really it's helping on both sides there, both on the animal rearing side, but also on the crop production side. And I guess something that I didn't mention earlier, which is really important, and this came up very strongly in my research, is how the farmers are being impacted by this. Feed prices right now are through the roof, and that's happened just over the last couple of years as prices of everything has increased, but also as a result of the war in Ukraine, which has sent feed and synthetic fertilizer prices through the roof.

So these farmers, some of them are having to exit animal rearing entirely because it's just not productive. It's not profitable for them anymore because of the high prices of feed. So by introducing something like this black soldier fly production it's really interesting because it allows people to continue to rear animals. So either generates income through rearing animals, or through raising the larvae and selling them as animal feeds. So there's these economic opportunities that are generated to people who are having to exit an entire market because of global forces outside of their control.

Katherine Dellar:

Ryan, I'm interested in your next steps after the MBA. What's the plan for you?

Ryan Caplin:

I'll be going back to... It's not entirely decided yet, but I'll be going back either to Kenya or to Ghana and working in the waste space. So black soldier fly, definitely an opportunity there, and I'm continuing to look into that, potentially starting something in that space and working with the people that I was able to meet over the summer, or joining an existing company already doing interesting things. So yeah,

really it's open at this point, but definitely get back to sub-Saharan Africa and work in the waste industry.

Katherine Dellar:

Very exciting things to come for you. I'm going to start to wrap this up, so we do have one question that we're going to be asking all of our guests at the end of every podcast, and that is, what do you think the future of business will look like in 100 years? So in 2122?

Ryan Caplin:

I think the future of business will be defined by unparalleled cooperation. Up to this point, there's so much competitiveness in Adam Smith's invisible hand and being driven by self-interest, that's what the economy has been to provide by up to this point, and you can see that there are benefits of that, but there are also a lot of problems from that. So skipping forward a hundred years past, who knows what comes in between, but I think what will characterize it as less the competitiveness and more... I guess less the self-interest driving the economy and more the interest of each other and cooperation to solve problems and to address needs.

Katherine Dellar:

Let's hope so. That brings this episode to a close. Thank you so much to Ryan Caplin, my fantastic guest. You've been listening to the Future of Business podcast from the Oxford MBA cohort. If you liked this podcast, please jump on wherever you get your podcasts and subscribe and keep your eyes out for a future episode. I've been your host, Katherine. Cheers.