**00:04**
Speaker 1
Hello and welcome to the Human and Machine podcast. I'm your co host here with Lenny. Sorry, Jaco is my name. I'm here with my co host Lenny, back from a trip to KZN, the east coast of South Africa last week. We spent some time with some of our system integrator partners and obviously the team at Clover down there all working and building some incredibly new intuitive ways of working and managing their operations. It was a good trip.

**00:30**
Speaker 2
Yeah, we did a little bit of perspective training. We also did a little bit of canary training as well. Good to see some old faces haven't seen for quite a while. Quite nice just getting out of the office again, obviously following up from our Cape Town regional training that we did a few months ago. This time we headed up to Durbs. Yeah, always nice to be a little bit.

**00:52**
Speaker 1
Always nice catching up with the guys from Clover as well. They've been on a big drive to modernize a lot of what they're doing and it's looking amazing.

**00:59**
Speaker 2
Yeah, they're busy commissioning some new expansions to the plants in Queensborough, so they're quite busy running around a little bit.

**01:07**
Speaker 1
More detail than usual. Of course, the Human and Machine podcast is all about the industrial automation world, manufacturing, production, logistics, utilities here in South Africa. We aim to have some insightful and helpful conversations with people that are leaders in the industry and to share a little bit of news in terms of our perspective and our very humble perspective and things that we see. And hopefully you'll find some of the information helpful and valuable. Last week's episode was all about machine learning. It's of course a subset of artificial intelligence. We spoke with doctors McElrie Hoffman and Johann Fannie Marva at pre Lexus. They are crafters of machine learning.

**01:46**
Speaker 1
If you're new to the topic, you'll find it very insightful and helpful and understanding the practical steps to become a data driven enterprise from a machine learning point of, yeah, that was quite a good chat with the doctors.

**01:58**
Speaker 2
Yeah, I think one big takeaway for me from that one is the machine is not going to come and get your job. There's still that human interaction that needs to happen. So you're very insightful in how we can actually apply that same methodologies into our manufacturing environment.

**02:13**
Speaker 1
And again, reinforcing the role of people and the human decision makers, even from the crafters of machine learning. Very interesting. So today we're talking about one of our favorite topics here on the Human and Machine podcast. Embroiled in rich history and myth, beer is one of the oldest drinks humans have produced. Ancient chinese artifacts suggest the beer was brewed with grapes, honey and rice as far back as 7000 BC. And of course, today.

**02:40**
Speaker 2
Sorry, that's not before COVID Not.

**02:43**

Speaker 1
Before COVID Today, of course, beer is the drink that bring people together. And the brewing industry is a global business. It's served by several multinational companies and many thousands of smaller producers and home brewers, a lot of avid home brewers as well. And we're very excited today to talk about all things beer and more specifically the brewery of the future with ABMBF's Christopher Clark. Chris is the tech supply lead at ABMB, obviously a very well known, one of the leading manufacturers in the world. We're talking about brewery of the future and all things beer. And again, I think we're going to get down to that role of the human and people as the operator. But, yeah. Chris, thank you very much for joining us.

**03:27**
Speaker 3
Thanks so much. Thanks for having me and nice to chat to you guys.

**03:30**
Speaker 1
Definitely. I wouldn't say that we're experts on the topic of beer manufacturing, but we're certainly experts as consumers. Between Lenny and I, we're big supporters of your brand and your beer, but we've really been looking forward today's topic. I know that yourself and Naveen and many others in your team, this has been almost a strategic imperative for you to understand all the variables, elements, influences, technologies, and what you need to do in terms of brewery of the future. So, yeah, we're excited to hear a bit more about that, but maybe just to start off with you, Chris, you've been with Abmbev for quite a while. I think we met several years ago.

**04:19**
Speaker 3
Yeah, so I've been part of AbMbev and south african breweries for about nine years now. Starting off really in kind of typical industrial automation, cater, Plc, that sort of area. And I think over the last few years, it started to evolve with all the new technology that's kind of entering the world and entering the fray of manufacturing, and now looking at kind of our whole technology stack within supply, which is our manufacturing business.

**04:48**
Speaker 1
Yeah, and although I'm assuming a lot of the basic recipes of beer, it hasn't changed significantly. There has been a significant focus on, obviously, things like regulatory compliance, time to market for changing market demands. I mean, I'd love to find out what happened behind the scenes when you had to pivot from beer to hand sanitizer, as an example. There's obviously efficiency improvements and then very importantly, obviously also reducing carbon footprint. So those are a lot of the things that are obviously very important to you as a business and specifically in your team. Do you maybe want to set the scene for us? I'm just labeling it brewery of the future. Do you maybe want to set the scene for us in terms of what that entails and some of the history behind that notion or that concept?

**05:41**
Speaker 3
Yeah, sure. Thanks. So, I don't know if you somehow got the background detail, but I'll prove the future initiative actually has three pillars, which you kind of just all mentioned perfectly. So the main ambition, I think, or output, is productivity, flexibility and sustainability. So those are the three key drivers. And we've got two main sides to the initiative, or three, actually, in Africa. But first is the physical transformation, and that's new technologies, sort of engineering, process technologies, and things that will actually go into the brewery from a hardware perspective. And those are focusing on this productivity, flexibility and sustainability. And then we've got another initiative that works very closely with that one, which is the digital transformation. And those two obviously go hand in hand. And that's the big focus of the tech supply team.

**06:34**
Speaker 3
And then in Africa specifically, we've got a team that we've merged in with our tech supply team, focused on the human element and the business transformation. So, with the introduction of all this new technology, how do we change the way that we work and make the technology part of our operations, rather than just going to a brewery and saying, here's a new application, or some new technology, doing some training and dropping it off, and then expecting that to give us results. So we've crafted a team of experts in bringing quality, packaging, maintenance,

energy and fluids, all of those areas. And they are ready, the change agents for this technology. My team, tech supply, delivers the application, builds them, configures them.

**07:20**
Speaker 3
And then we need to see how does this impact the day to day life of an operator, a team leader, a technician, and how do we change their daily work to get the most out of the technology and make their lives easier? So those are the kind of three main pillars, I think.

**07:36**
Speaker 1
Okay, fantastic. What you mentioned now, towards the end, is something that I love. Not the realization, that's the wrong word, probably, within your business. It's been a reality for a long time. But the role of the operator as an informed decision maker, how that has taken since stage. And again, realization is not the best word, but how do we support that person who has such a big impact on our overall business and our operations? And that just follows, obviously, the well known formula of technology improving processes to enable people and how people deliver. That is something that, from a little bit that we spoke about a couple of months ago, when you first explained the concept about, for example, your operator room or your control room, how that has changed and the role of the operator in that, and supporting that person.

**08:35**
Speaker 1
I love all of that stuff. And it's such a fundamental thing. Or understanding the impact that a person, that an operator, for example, has on your process, that you've pivoted, you've built everything from a physical point of view, even around that person, and supporting him or her.

**08:54**
Speaker 3
Yeah. The key principle of our brewery, the future program, and our key kind of motto and sanity check that we always come back to, is placing the operator at the center of our operations. Our vice president's got a sort of classic catchphrase. If ever something goes wrong in a brewery or you need some information, he says, just ask. And by that, he means just ask the operators. They're the people who are there on the front line every day. They've often been doing it for years. And they know better than anyone what the problems are, what they struggle with, what the daily issues are. And if you want to increase efficiency or productivity, those are the people that you need to empower.

**09:31**
Speaker 3
So we very much trying to focus on, I think technology allows us to give those operators more information and less kind of data, and elevate the decision making capability by providing them with the right tools, the right information. And then a big focus of ours has been the kind of mindset shift from management to actually say, these are the people that are there day to day, and they should be empowered to make the decisions. We give them the tools, we give them the training, we give them everything they need. And then you need to give them the opportunity to kind of work in that new way. And that's where I think the idea of the control room that you mentioned earlier, and the physical space we're creating also empowers that. So we're trying to change the role of the operator.

**10:15**
Speaker 3
But then with that, you need to change the role of everyone in the brewery with the focus that their job is to support the operator. The operator is there kind of driving the car, doing the day to day operations. And everyone else's job should be to make sure that person's job is as easy as possible, that the issues are properly solved and removed. Any roadblocks are taken out of the way. So we're trying to design our control room to facilitate that and that sort of mindset and way of working.

**10:42**
Speaker 1
And also with you mentioned information, I mean, a couple of years ago, the challenge was getting information. Today it's dealing with the overload of information. You obviously had to, as part of your design, very cautiously approach that as well. To only provide what is absolutely relevant at any given time. Because we

have information and data, let's not just throw it out because we have it for the sake of putting it up. So everything, I imagine, had to be by design, which is why it's been such a meticulous process.

**11:18**
Speaker 3
Yeah, we've got a number of data information challenges. And it's really because in Africa we've got 28 breweries, all with completely different levels of automation infrastructure technology. In South Africa, we are quite fortunate to have very good sort of automation and information infrastructure, and a nice sort of standard set on top of that. So our program's got a few different threads. But in breweries, where we don't have that, we're starting off with the infrastructure, putting in the right network standard, all of the connectivity that's required, virtual environments, so we can actually start to put these systems in place and kind of focusing on the basics. And then in the breweries, where we've got that infrastructure, we can put in the more advanced systems.

**12:02**
Speaker 3
And we're starting with a company wide mes, because we had all these different systems, and often different breweries and operations were measuring things and managing in a different way, not because they should, but just because they had different systems and were getting different data and information out of them. So we kind of see the mes as that equalizer of this is our standard way of work. And then we've got a suite of digital tools that don't really tie into the control system, but facilitate our standard way of work, which we call the VPO. It's our management system. And those are the quick wins, where you can put in a tool that facilitates and makes the VPO easier to implement, and you can put it in broadly and quickly because it's a mobile app and it doesn't require this infrastructure and this huge investment.

**12:49**
Speaker 3
And then the fourth sort of prong of our approach is the more advanced technology, what we call the smart brewery. So if you've got the infrastructure in place, you've got a common MES platform and these common digital tools, every brewery is generating the same information. And that really allows us to start looking at machine learning and advanced analytics on top of a very big base of information that these plants will be generating. And it allows us to do it once and then leverage that in all our breweries, as opposed to kind of point solutions, brewery by brewery.

**13:21**
Speaker 2
On the.

**13:22**
Speaker 3
Design of the information and what we show to the operators in the control rooms. Yes and no. So, initially, we have done the kind of design work up front and put in what we think is important. But part of our journey is also to let the breweries tell us and enable them to decide for themselves what's the critical data they need to see. Because the operators and the guys at the plant know better than anyone else what they need to see, what they need to keep an eye on what their problem areas are. So we've done a kind of version one with the idea and approach to be that it's flexible and each brewery can customize and change what they need to see based on what's happening in their operation.

**14:02**
Speaker 2
I think that's probably a very important point, Chris. I want to come back to that. To be flexible and to be able to dynamically and update the type of information that we do display to the operators. Maybe just step one, step back. I don't know if all our listeners will know exactly what BPO stands for, but it is a very important concept. Because without that set standard of KPIs and PIs, that we can now compare all these different breweries against one another for truly benchmarking. Yeah, you're going to struggle to really understand which brewery is not performing as it should. So maybe just give a little bit of a background on BPO and actually what it stands for and what is the typical type of KPIs that is monitored between these breweries?

**14:49**
Speaker 3
Okay, yeah, perfect. So BPO stands for Voyager plant optimization. And it's the standard management system

that governs and sort of shows how to run any brewery. And the idea is that with all the breweries around Avnviv, I'm not sure how many exactly, but in the region of about 250 different operations, there's a lot of good practices and things that can be shared and leveraged across the group. So VPO is the means. It's how you do your daily operations and ways of working. And the idea is, if you put the effective means in place and you run the operation correctly, those results are going to follow. And every few years, the BPO is updated and best practices and learnings from around the business are taken and then incorporated into the new version.

**15:41**
Speaker 3
And that gets published and everyone kind of moves along with the new benchmark and the new best way of working. And the nice thing, as you said, benny, if you've got the standard way that things should happen to build tools to facilitate that and improve it is a lot easier than a scattered operation where each brewery has got their own way of doing things. And it becomes really difficult to kind of standardize and use technology, because you don't have a standard business practice behind it.

**16:08**
Speaker 2
And the nice thing about that for me is that doesn't matter on the lower end, right? The infrastructure, the architectures, the different types of systems that because as you mentioned, obviously there's breweries from Africa that got acquired with a whole set of brown fields, devices and networking. If you've got that layer on top of that, from the information perspective that's normalized across all the operations, then it's okay. Then obviously, if you can automate certain parts of the collection and the calculation of those KPIs, great. If the system is allowed to that obviously people can still manually capture some of those KPIs. The point is to have that normalized information perspective that everybody can obviously then support to track, to benchmark against. Yeah, exactly.

**17:04**
Speaker 3
And what we've seen, which I don't think is actually much of a surprise or infrastructure and VPO, you get a score, a maturity level. And the plants with a high maturity level of VPO have far better results than a plant with a low maturity level in great technology. So really what we've kind of found practice is very mature, then you can come along and automate and facilitate that with technology. You kind of use the technology to enhance the speed and the pace that people operate at and make decisions. And if that is chaotic before you get in and do that, you just have really fast chaos, as my boss would say. So it's important that you've got that solid foundation of work practices.

**17:49**
Speaker 3
And then the technology kind of makes things easier and facilitates it, and allows people to not focus on or kind of deal with the more advanced and bigger problems that haven't been solved, I think, by the proper work practices and ways of working.

**18:05**
Speaker 1
When you say fast chaos, I think it's probably one of the. Quite a challenge being presented with all of the tech. Let's just label it as tech. I mean, if we're looking at the world of what is available, probably think of every three and four letter acronym that's around right now. AIML, IoT, blockchain, Fintech, AR, VR, some new CIP types. I mean, there's just an incredible amount of new stuff available right now. I would imagine for you and your team and your business, you likely will follow a very structured approach to understanding some of the tech, the potential value and benefit selection, implementation, and overall long term return on investment. And total cost of ownership.

**18:57**
Speaker 1
I suppose it's very easy to get lost in all of that, which will lead you to a more kind of structured approach in terms of selection and what you need.

**19:09**
Speaker 3
Yeah, I don't think it's very different in a sense, from the same kind of dilemma we had with automation, or still

have with automation, where if you don't put a firm standard in place in the beginning, you get stuck in a situation where you've got all these different technologies in a plant, and it becomes an absolute nightmare to maintain and manage. And as you say these days, I mean, every vendor and OEM has some new technology, some exciting, sexy AI that can do something, and it can be a bit overwhelming. So our approach is actually to focus on platforms and capabilities. So yes, these point solutions can help, but they only help in one area and kind of incrementally. And we're trying to build a sort of holistic technology transformation program. So we're looking for fundamental platforms that we can put in place.

**20:04**
Speaker 3
And those platforms, for example, a machine learning platform, if we're looking for that, should be flexible and be able to do any type of machine learning that we might need, as opposed to let's just optimize for co2 emissions or one particular problem set. Because then you end up with this complete smarty box and the poor people at the plants who have to maintain and run this stuff on a day to day basis are just completely overwhelmed in terms of need, the skills, the technology, they need to know how do you maintain it? And then the cost balloon as well, in terms of Opex and supporting this stuff. So we've got an approach globally. On the converse side to all of that, though, you also don't want to sort of hamper innovation and good, exciting emerging technologies that might be out there.

**20:49**
Speaker 2
It is a balance.

**20:50**
Speaker 1
It's a balance between encouraging, but also approaching cautiously and sort of pragmatically.

**20:59**
Speaker 3
Yeah, exactly. So we've got a stream that we call tech explore, and they are purposely looking for those new technologies, but with the mindset that it would need to be something that can scale across 250 breweries. And then if they find something that has a business case and is attractive and fits the type of technology that we're looking for, then it'll get moved from that tech explore arena into the mainstream, which is our global tech supply program. And there globally, we're trying to standardize on what are the standard applications that perform a specific function. So if it's mes as an example, we want to have one MES platform across the business, so that all these breweries are generating data in the same format, and that'll eventually allow us to do all the machine learning and things on top of it.

**21:44**
Speaker 1
So that combined with a platform approach as well as the standards that you spoke of, I mean, that is really what will ultimately allow you to scale in the long game. That's what it's all about. I love the focus on innovation. I love the focus on the tech. I know a couple of years ago you had all of these, I can't remember what it was called, these innovation type workshops where you pretty much invited anybody from anywhere to work on a specific problem or challenge and submit something. It does seem like there is a very strong element of innovation within the ABMBF culture. And I remember from years ago, some of the south african breweries folks that we've known for a very long time, there was always an element of we're leading a lot of what is happening globally here in South Africa, proudly.

**22:40**
Speaker 1
And I'm so happy that is still the case, is a lot of this initiative and what you're doing, is that being led by you guys locally.

**22:50**
Speaker 2
Here in South Africa.

**22:53**
Speaker 3

Yeah. So there's certain kind of aspects that are, I think, our control room approach and building this, we call it the sort of inverted pyramid approach of where the operators are at the front of the control room. Directly behind them is their next level of support, which is kind of technicians and artisans. So if they've got a breakdown or an issue, they literally stand up and turn around. And the person that they need from help from is directly behind them. The next row back is the engineers and technical experts. So the technicians can't solve it. They literally stand up, turn around, and the next row of support is there. And then directly behind them is the plant leadership team. So we've got the whole brewery in one space, and everyone knows what everyone else is dealing with, struggling with what challenges they have.

**23:40**
Speaker 3
And all the support is provided right there for the operator. So that's a best practice, I think, that's come out of Africa. And then the nice thing with the way that we work is this global collaboration. So people from everywhere, from China to Brazil, North America, Europe, we constantly hearing and seeing and able to see what those people come up with and what their innovations are. And then we share those best practices between us. And then I think the other really kind of main place for innovation that often gets overlooked is the plants themselves. So often, maybe not with all the most standard technology out there, but people come up with great things on their own that solve their real problems right at the coal phase.

**24:25**
Speaker 3
And part of our job is to make sure that we find those and scale them, bring them into our standards and make them scalable and then roll them out to the rest of the plants.

**24:36**
Speaker 2
Cool. I want to step a bit back. We spoke about this whole control room concept.

**24:43**
Speaker 1
How many are more about the control room? I'm trying to visualize it. It sounds fascinating.

**24:47**
Speaker 2
We saw some pictures. It looks absolutely amazing.

**24:50**
Speaker 1
You can't talk about the pictures.

**24:52**
Speaker 2
But the concept that I want to just talk to Chris is we spoke about being able to be very flexible in what we display. How do we display it? Obviously, in our space, there's all these terms running around, as you mentioned, Jaco, the three letter acronyms. There's two concepts. Now that's very being pushed quite a lot, and that's obviously the whole concept of a data ops platform. Again, the whole concept of a platform that you can deploy on top of your solutions. Also the concept of a unified namespace kind of scenario. And Chris, I presume these type of concepts is something that you guys had to look at to be able to pivot quite quickly. Know, what do you display? What do you take off?

**25:33**
Speaker 2
What will beneficial today to show versus a new potential problem that comes up tomorrow, versus trying to build something into a particular SCADA platform, or build something that's just isolated to one particular problem, because everybody needs to see this new KPI or this new thing that you're trying to.

**25:58**
Speaker 3
So, I mean, I think what's been quite fortunate in the way that we've done it is that we've coincided these two control rooms with. We built one in Port Elizabeth at Ibay brewery, and the second one at Elrod Brewery in

Alberton. And both of those are coinciding with the implementation of this standard mes. And that's great for a lot of the kind of typical mes type information that you would have there, and it's visualized in a nice way. And obviously, these days, just everything being web based makes this whole concept a whole lot easier. You not necessarily have to go in on bold Scada graphics and things like you used to make information visible and to make the systems flexible.

**26:41**
Speaker 3
If something's web based, it's very easy to chop and change what's on the screen, but then there's a whole subset of information that is not kind of front of mind in the mes, and it's really the leading pis. So for us, I think the most critical thing is that if you don't have those numbers up and visible and in your face, those are the numbers that you can actually control and the levers that you can pull to affect plant performance. So it's really important that those are the numbers that are visible to everyone, rather than the big month end sort of financial KPI. Because by the time that comes out was issued, there's not much you can do about it. So we've got two approaches as well.

**27:21**
Speaker 3
I think what I didn't cover is a lot of our operations in the packaging side of the business are always going to remain in the field. Those people can't move into the central control room because they're physically working on a line. So we've also implemented what we call a digital operator workstation in the field, almost all of the elements they used to have out there. So sops, reaction plans. Access to the MES has been digitized and put at these digital workstations. And they've got two large sort of gaming monitors, those ultra wide. So they've got huge screen real estate, and now have all of this information accessible digitally at their fingertips. And it also allows us to link information from the field back into the control room.

**28:04**
Speaker 3
So if something's a manual number and it's not automated, something the operator captures out in the plant can immediately be available in the control room for everyone to see as it's entered. And obviously, if it's something digital and automated, then that same number, that same version of the truth that the person on the line sees is also available in the control center and in the monthly reports, et cetera. So we've got this kind of information chain, I think, from the process and through the different levels in the brewery, making sure that it's under control at each level, rather than the kind of month end KPI. And then having the tools to make that possible has always also obviously been a big challenge. But with all the technology we're putting in, it's now sort of starting to become possible.

**28:49**
Speaker 2
Yeah, I think technology. I mean, in the olden days, you're right, you have to build a Scada mimic, you have to do some integration. You have to build some hectic SDK integration between just some of the systems that's available in automation space. Not even talking about ERP and MEs type of systems. So, yeah, in the old days, it was quite hectic and quite a lot of work to try and make these things available and agile enough. I think you're right. With technology, everything is being driven by HMR five. So no more client tools really to need to install. It's configured.

**29:25**
Speaker 1
We're seeing obviously it concepts, if I can correct.

**29:29**
Speaker 2
And obviously the advent of not just UA, which is built on a unified architecture kind of concept, the whole notion of MQTT as a technology that can be used to kind of unify these little bit of silence of Internet. You don't have to talk to the specific device anymore, you don't have to. There's now open standard technologies, SQL, MQTT. I talk about this a lot. OPC, UA, that's really getting us there. So I think the tech is now actually evolving that we can actually have this. In the old days, we talk about the bus. You just throw everything on the bus and everything should be able to consume and get stuff from the bus. But it wasn't that easy in the old days. I think tech is actually catching up to us and that's great.

**30:12**
Speaker 1
Yeah, 100%. And obviously with all the tech, the challenge is exactly what Chris mentioned is to identify what's relevant, where helpful, valuable in the long run. So ebay is done. Chris, that's completed, functional.

**30:30**
Speaker 3
Yeah. So eBay is 100% complete. And they are kind of using the space. They're really our pilot plant. So ibai is a fairly small plant, and we call them our lighthouse, which is a kind of term borrowed from the World Economic Forum about manufacturing facilities that really lead the way for everyone else. We've got an internal lighthouse at Ibayi brewery, and they are figuring, know what's the best way to use this stuff on a day to day basis? What needs to change, what needs improvement. And then we take the learnings from there and scale them into the bigger breweries. And the first one of those is Elroad, and that's actually going to be complete in the next few days. And we're just planning the move to get everyone in there at the moment.

**31:13**
Speaker 1
Amazing. And what has some of the initial responses and feedback been like?

**31:18**
Speaker 3
Yeah, it's been brilliant. I think having everyone in the same space is the real game changer for us. Previously, I'm sure like many kind of plants, you had these little isolated control rooms, often kind of dark corners of.

**31:32**
Speaker 1
The brewery, sometimes in a basement somewhere.

**31:35**
Speaker 2
Yeah.

**31:37**
Speaker 3
And it wasn't at the same standard that you'd expect from a corporate hq. And now I think the biggest reaction has been that operators have seen, they've got the exact same facilities, the same chairs, the same desks that our zone president sitting in our corporate office has. They've got better technology than anyone in our head office. They've got all the information needed. So there's a lot of excitement. And I think for me, what's been most exciting is this idea that people don't have to do the technology innovation and bring it to you. If we give people the platforms and the tools, they can come up with their own innovative solutions that can then quickly be scaled to other places. They've got the information.

**32:21**
Speaker 3
If they can build their own dashboard or build something for them that helps them with their day to day job or to monitor their process better, that's now available at their fingertips, which before it was always, okay, well, the engineer will change your ScaDA screen and move this valve here or create a report for you, and maybe a month later you have your report. So I think the exciting part is this unleashing of the kind of technology.

**32:46**
Speaker 1
To everyone, that is incredibly exciting. And I mean, just having that fluidity to be able to craft and design that on the fly. And it's unreal given where processes, not your process specifically, but processes were, call it 20 years ago, how that has changed. You mentioned, for example, the zone president and other people within your business, having that transparency that across the business from operator to people that are tasked with responsibilities of leading and driving business initiatives. That is such an empowering enabler for an operator as an example. Just the mindset and the importance and what they mean to the business, they must be incredibly rewarding for them as well. I would imagine that some of them have been with the business for a while, recognizing the role that they play.

**33:45**
Speaker 1
I'm sure you're going to get some incredible feedback and stories from a lot of those people over the coming months.

**33:53**
Speaker 3
Yeah, completely. And I think the last time we did sort of anything on this scale was maybe the kind of initial introduction of really automation, and then it kind of stayed stagnant for whatever it is, 30 or more years with this incremental change. We'll automate a bit here or there, we'll give you a slightly newer version of the same Scada package, but we never did this holistic kind of step change. And I think that's really exciting.

**34:23**
Speaker 2
Yeah, you had 16 cutters to choose from. Now you've got 265 cutters to choose from, and now you've got over a million. So, yeah, I think you're right. It's actually going from industrial evolution three where automation was the big drive, and now actually where the big drive is an information drop. And I think we speak a lot about it. We speak a lot about it. That information is becoming a commodity and making that commodity available to everyone. That's great. In the olden days, it was always the guy sitting there in his office, and he said, yeah, I want us to be able to see the skater picture in my office. That was kind of what were faced with. And I think the whole concept of breaking that out, smacking down the door.

**35:09**
Speaker 1
Smacking down the walls, removing the barriers.

**35:11**
Speaker 2
Removing the barriers. It's not a technology barrier. It's actually just an information and sharing barrier. Yeah.

**35:17**
Speaker 1
And very often there's other barriers around that technology, whether it be cost barriers or adoption or complexity.

**35:25**
Speaker 2
I remember my first job. If my boss's office door was closed, you're like, can I go in or not? Almost too scared to ask the guy a question.

**35:32**
Speaker 1
Well, you had an office.

**35:33**
Speaker 2
I didn't have an office.

**35:34**
Speaker 1
No.

**35:36**
Speaker 2
I think that's a brilliant concept. And as you said, it's the same chair, right? Yeah, it's the same chair. It's the same desk. I think that's really making everybody feel that they are actually delivering almost to the same level, if not more than your manager or someone higher in the organization.

**35:57**

Speaker 1
Yeah, for sure. Trying to visualize what it looks like. And I can just imagine the sort of the excitement within that team sitting in this brand new technology environment with all this access and the new way of work. I mean, that's incredibly exciting. Hopefully, there's some things that, Chris, that you and the business can share over the coming months that you can make public. I think it's an incredible initiative, and I'd love to eventually, maybe one day see it live. And I imagine that you guys will also share some information around this publicly over the coming months.

**36:39**
Speaker 3
Yeah, absolutely. We're just kind of waiting to finish off Elrod, and we'll probably have an opening in a couple of weeks time. Unfortunately, when we opened up ibai with sort of COVID and travel restrictions made it quite difficult to get people there and to show it off in the flesh. And it's kind of one of those things I think you need to see in person and actually chat to the operators and the people using it and really understand what it means for them and what's changed and how things are different. Paper kind of doesn't quite do it justice, but, yeah, I would love to have you guys to see it when it's all ready, and we'll definitely be able to share some more information about it soon.

**37:19**
Speaker 1
Definitely. You mentioned Covid. I wanted to chat about that briefly. And, I mean, Covid has been what an extraordinary, challenging year we had in 2020. And a lot of that sort of tale seems to be a bit longer than what we anticipated into this year for you guys as a business, it's public knowledge in terms of the impact that it has had on many businesses, including your own. I don't want to focus on that. I think just simply having the resilience to go through all of that and pivot and adapt and do what you have to do. What was some of the impact of that on your team, for example, and just having to adapt and change outside of the challenges that it presents to just business and numbers?

**38:10**
Speaker 1
I would imagine that your team is a team that works closely together, typically physically in the same proximity. What are some of the things that you had to do to overcome that? And maybe some of the constructive or positive learnings that came out of that.

**38:27**
Speaker 3
Yeah, were busy with summing at the time that, in hindsight, turned out to be extremely fortunate. The business was going through a bit of a sort of trial implementation of a new scrum agile way of working, and we decided that it was something that we thought could help us in how we work. And we had literally just started in kind of middle of January, February of 2020 with this new approach to how we structure our teams. Part of it was we had this brewery of the future business team and the tech supply team, and were going to completely integrate these teams, which had two different line managers or two separate business teams. But we're going to completely work together. But I think were fortunate in that it gave us a very good routine and structure that helped us work remotely in a common way.

**39:20**
Speaker 3
We weren't kind of trying to figure out a new way of work for remote. We just took what were doing and started doing that remotely. So I think that was quite fortunate and kind of eased that transition for us a little bit. And I think the people that really struggled working remotely in an office is one thing, but for a factory, it's a whole different ballgame where you have to have people there on a packaging line and things like that. So I think the real challenge was in the operations of the plants, and what was quite nice to see was how people used the technology that had available as solutions for some of the challenges. So doing team meetings or shift handovers over Zoom and in separate rooms, and how people.

**40:04**
Speaker 3
I think it was another example where if you give them the right technology as a platform and give them the ability to use it in an innovative way, people will come up with their own solutions that work really well. So I

think that was quite exciting to see and in a sense, sort of kick started this whole digital transformation journey just a little bit.

**40:24**
Speaker 1
Yeah. Imagine doing a ship hand over the zoom. I mean, crazy thought, but it was almost not even nudged. It was forced and the technology allowed for it. And it probably also eliminated a lot of the traditional thinking around what's possible and the way it works. So definitely a silver lining. And some of the output from after Covid gave us that.

**40:49**
Speaker 2
It's actually insane if you think about it, just that example shift. And it actually forced such a simple thing. More communication than traditionally. Traditionally what? Shift. And you write something down, a piece of paper, right, and you leave it there at the machine. Now you actually phone someone on Zoom, you talk to it. So in a sense, it actually made communication, I want to say, potentially better than what it was prior, which is actually a crazy thought.

**41:18**
Speaker 1
Yeah, that definitely is. So now we are in 2021, you're on the back of eBay, about to go live. Our road is next in terms of where you are, the overall process. This is obviously an initiative that over the long term is something that's going to scale. You're looking at rolling art, I would imagine, at some of your very first larger plants. What does the rest of the journey look like with brewery of the future? What are some of the time steps?

**41:48**
Speaker 3
Yeah, we've got these kind of main threads. So from an infrastructure perspective, our plan is to, in parallel to all of this in the breweries that don't have our current infrastructure standard, we're putting a lot of that in. So networks, all the required cybersecurity, connectivity, et cetera. So that's the one sort of track that's running ahead. And then closely behind that is our mes track trying to get around Africa over the next sort of, in total four years, covering all of our breweries. And then we've got that track of the kind of digital tools and that runs as quickly as we and roll it out to all the various breweries and it evolves. So over time, as those tools change and adapt, we'll put in new ones and potentially even remove some if something better comes along. And then what brings it all.