CENSIS Conversations
Whisky
Conversation transcript

Gemma Milne: Hello everyone welcome to CENSIS conversation. CENSIS is Scotland's Innovation Centre for Sensing Imaging and Internet of Things technology and as we all know the disruption that coronavirus has caused means that we can't be meeting so much at the moment in person. CENSIS normally does lots of events throughout the year to gather many different people across industries to network to share information and move everyone forwards and we normally talk about topics across the themes of technology science innovation disruption and of course being Scotland's Innovation Centre. Today we're going to talk about whisky, how technology is impacting the whisky industry and of course how technology can help with the current coronavirus disruption to the industry as a whole so with that let's get on with the show.

Hello everyone welcome to our discussion all about the whisky industry here in Scotland before we begin I thought it would be great to do some very brief introductions before we dive into the discussion. I'm Gemma Milne I'm a science and technology writer and I cover sort of all areas of science and tech but predominantly how business academia and government all intersect so I'm really excited to be here to be moderating this discussion today. I'm going to go round and just get you guys to really briefly introduce yourself before we get into the discussion so we're going to start with you.

Lindesay Low: hello there I'm Lindesay Lowe and I'm deputy director of legal affairs at the Scotch Whisky Association.

Kirsty Wainwright, Bottling Operations Manager at Beam Suntory based in Glasgow

Michael Fletcher, Business Development Director for CENSIS which is the Innovation Centre for Sensing Imaging and Internet of Things

Murray Blyth: Hi, I'm Murray Blyth and I work for Siemens and I want food and bev vertical and look after the distilled spirits sector

Gemma: Thank you guys so today we're going to be talking about whisky, that wonderful stuff. Before we kind of get into the future talking about technologies were obviously going to be starting to talk about some of the impacts of Covid as you can see where this remotely keeping up with it with the health and safety standards but before we get into all that stuff what I thought would be awesome as if we could start with a little bit of a view from the bridge; what's happening in the whisky sector right now where we are. I'm going to turn first to Lindesay for that.

Lindesay: Thank you very much. Scotch whisky is a global industry based here in Scotland it makes up 20% of the UK's food and drink exports and in 2019 exports worth 4.9 billion pounds and we have exports to 180 different markets and the industries positive. It's been growing year on year and obviously we've had a bit of a jolt in 2020 with Covid and I suppose normally Scotch whisky being a global industry we've always got some areas of growth but we pretty much everywhere have been on lockdown for the last few months, but I think the industry is positive it's going to survive it's always a long term industry the Scotch being made now won't be drunk for 12 to 15 years - sometimes even longer - so there's a lot of optimism and I think some of our members at the Scotch Whisky Association. I find that the hit is less extreme than they thought it was going to be so that that's all good.

Gemma: Thank you for that overview Lindesay really helpful just to, kind of, get that view from the bridge before we can start diving into some of the tech. I'm next going to turn to Michael and what would love from you Michael is giving us a little bit of the flavour of some of the opportunities and challenges when it comes to innovation in the whisky industry. Also, also let's pause for a second and rewind the clock back and pretend I was asking you this question in January. We are going to go a little bit into Covid but I'd like to start from that sort of you know perspective of, what are the opportunities in innovation for getting for a moment the fact that we have made a lot of changes over the past couple of months if you give us that little view it would be awesome.

Michael: Sure. I'll broaden it out to talk to food and drink generally because the challenge is there across the whole food and drink sector. Whisky is probably a bit further forward than a lot of the food and drink sector and it's already capitalising and investing and use of technology in different areas. The reason CENSIS and the Scottish Government generally are interested in this sort of area and in the last five years there's been huge advances in sensing and imaging and internet which allows people basically to gather information that previously had to be done manually: people have to go and take a temperature or make a reading or undertake some sort of measurement somewhere in the in the manufacturing operation, feed it back, have a look at it and then make decisions about how to optimise the process overall.

Michael: In recent times sensing technology has improved in virtually every area. The sensors are more robust, more accurate, they're cheaper, they're smaller and they can operate remotely for years on end. The communications technology likewise is improved and so too has the analysis of information machine learning in visualisation technology and all of those things together means that people can now get information in a real time or quasi real time basis 24 hours a day, seven days a week, 365 days a year, which allows them to make better business-informed decisions in a real time basis. There's a lot of interest in this sort of area just now. Some companies are already capitalising on it and they're making huge step forward. What we're interested in doing is to get the message out there and last year Kirsty was kind enough to speak at an event where we had a range of companies from across the food industry, and one of the most startling things was the interest from all the other food sectors and what was actually happening in the whisky industry, because they could see that people were already investing where they hadn't.

Gemma: I think you're right in the sense of being able to showcase the potential of technology. A lot of time is actually just being able to get to grips with what it can do and then everyone

who's an expert in their own field can start to kind of brainstorm and think and make connections and go 'well how is this going to be relevant for us'. Of course today we're focusing on the whisky industry but there are so many different elements of this industry as we're going to get into and hopefully be relevant both in terms of people who are interested in what's going on with whisky, and speaking to Kirsty I want to come to you next actually. So as I said there's lots of different touchpoints and part of it you know it's quite a long chain shall we say in terms of getting out the whisky from one point all the way through to the consumer. Obviously you're focused a little bit at the earlier stages in terms of production and the bottling of whisky so I wonder if you could talk us through some of the challenges that you're seeing within the roles that you've had both in terms of kind of starting to think about doing things differently, keeping up with what's going on both in terms of technology as well as the competition within the industry if you give us a little bit of that overview from your perspective.

Kirsty: I think for me and it's interesting what Michael had mentioned there when I was even asked to speak at the CENSIS event, I was really surprised because I'm in no way an expert in this at all and I think that was one of the things that can put people off, so when you're starting to look the possibilities are endless and I've just been really lucky with all the networks and partners that we have and it really was just about getting out there getting to seek partnerships with, you know, working with Siemens and CENSIS among others. The challenge for me is whisky is a very traditional industry, it's that's part of the romance of it, it's fantastic in here in Glasgow at our Springburn site we do have traditional cask rolling, but we also have an automated line as well. There is room to improve on that and that's a really exciting opportunity that we have here in Glasgow, but things for me like asset care looking at predictive maintenance looking at our productivity through digital twins; these are all the kind of opportunities, but as soon as you start to talk about this people that have worked here for a very long time of great service great knowledge, it can make them a bit nervous you know, that kind of phrase of 'job replacement' can come up so we're very keen to see it job enhancement you know. We're still wanting to keep that skill and knowledge but we're looking to optimise peoples' roles in a big part of creating leadership for the future and terms of the future, it is about empowerment and autonomy me - all the digital skills and assets that we can have is only going to increase that, it's going to drive that, but it's doing it softly softly, and learning to see that vision as a collective so you're doing the change with the team and not scaring the life out of people and introducing all this take for not explaining the purpose behind it.

Gemma: Speaking of empowerment, I want to dive a little bit deeper into framing some of these challenges that technology has been able to kind of swoop in and help with that enhancement as opposed to replace it. Murray I'm going to turn to you. I would love to hear a little bit about were the sort of, I guess, challenges and therefore opportunities that the whisky industry food and drink more broadly is. Of course you cover big areas: what is it that automation and tech in general is actually solving? Give us a little bit of a feel of some of the challenges the whisky industry is up against.

Murray: Well one of the main ones today in the food and drink industry is variability and one of the things that were more recently addressed, Siemens, in collaboration with the whisky industry at the University of Glasgow at the National Manufacturing Institute for Scotland was variability in cask filling. Every cask is unique in size, its charring or its composite, each cask is different and you need to know how you fill that accurately. It's like filling your car at a petrol

pump; we worked on totally automating the filling process so it doesn't matter who operates it, you will always fill to the precise level, whether that be 100% or 99% of whatever. These kind of tasks where you have variability either through you know raw materials, the materials that are used in the production or just human intervention - some people are really good and skilled and others lack that experience – so automation can basically capture your best person and in sustain that output and that's basically what we try to do with the challenges. There may be areas where automation can do that, where it doesn't exist, or where we have automation but as we develop that and innovate with our technologies we optimise that and become more efficient at doing that task faster, better.

Gemma: how does that help then in terms of coming back to Kirsty's point around not wanting to people to feel like it is job replacement and rather than its job enhancement so we're talking about you know automating the kind of the factory line. Is it is opening up time for other tasks for people to take on, or are these tasks that were kind of already sort of semi done by technology but not done so well that they are now being enhanced? What's the kind of the state of that for you?

Murray: we've got a great example in Siemens ourselves cause we are a manufacturer and we have a manufacturing facility in the North West of England in Congleton and that has won awards for best in class, world class manufacturing, and all we've done there is adopt Siemens technologies and through modelling. We innovate and basically as we've developed that and we've automated. We brought in cobots to work with people, those staff that did those manual tasks now see that as an opportunity to develop themselves and develop more skills and move into other areas some of them actually worked in project development programmes where they've actually worked with these cobots. As Kirsty mentioned earlier the people that have the skill in manufacturing, they have that knowledge and you want to utilise that knowledge because they came up with the best ideas as to how they could make that task better. You know what the problems were for them, they did what they did and very well but how could they be done better, they would need XY&Z and that's where you can bring technology, so they work in these areas and then if you can sustain that and continuously use that model to improve then your business gets better and better and that's exactly what we do at Congleton.

Gemma: I love that that using the term cobot instead of robot

Murrray: Collaborative robot

Gemma: I've not heard that before. There is all this discussion about you know not calling robot female names and I think cobot should be the next thing that we that we advocate for. Michael I'd love to stay in the manufacturing space for the moment and as I say there's many different parts of the chain of whisky and food and drink, but sticking in the factory I wonder if you could take us through some of the, I guess, key opportunities that sensors have within that sort of factory setting. What can we do, I mean it seems pretty endless, but I'd love to hear some sort of examples that come to mind for you.

Michael: probably the first one is the one following on from Kirsty who mentioned their predictive maintenance and that's any sort of machinery that's undertaking any sort of process. It if has moving parts at all from time to time like a car, it will need to be serviced maintained,

and repaired. What you never want to happen is for it to breakdown while it's actually in operation because the costs associated with that are way out of kilter with planned maintenance. With vibration monitoring sensors, temperature sensors, even just monitoring the energy of them, you can identify when something is wrong or starting to go wrong before anything actually happens, so that you can have a planned shutdown or a planned replacement which saves cost, saves time and that's one example. Anywhere through the process where you're looking just to monitor any aspect of it whether it's pressure or moisture or temperature, you can monitor those on a real time basis just to reduce the variability that Murray was mentioning. This is about at undertaking the process in the same highly consistent fashion. You were talking about replacing what people do to free up their time. There are more and more environmental challenges, whether that's coming from waste product going out the door or from introducing things like renewable energy into the systems to minimise climate change, reduce carbon usage. People can diversify into different areas. I know as well that Kirsty mentioned digital twins, so taking real time information and actually feeding it into the sort of enterprise resource packages so that instead of looking at the end of the day or at the end of the week how you've been performing, you can be taking a live feed of data for how many bottles are actually going through your production line and getting that information in a real time basis with all sorts planning, even down to the logistics of when you can then be taking something out the door and sending off to put over all those different countries across the globe. So, those opportunities in virtually every area where people would have been taking or are currently taking measurements and just monitoring or checking how things are moving along, and that's even down to before you get into the factory.

Michael: The manufacturing process right back at the start when you're looking at crops - there's a lot of work now getting to monitoring soil moisture, the use of fertilisers or whatever, just monitoring the health of crops. It goes the whole way through to the delivery of the bottles, whether they have been delivered at home like during the Covid crisis or whether they have been delivered to a retailer, so there are opportunities the whole way along.

Gemma: I think the point about opportunities along the whole the whole chain comes back this idea of mindset doesn't it, being able to go, okay this is a technology that is going to enable me to, you know, as you say, whether it's to do with taking measurements where am I taking measurements across the whole thing or where is it that I'm doing a repetitive task or you know it's kind of shift your mind a little bit isn't it. I want to go back to Kirsty for a second because you obviously brought up the point around culture change. Whisky is a traditional industry which is part of the joy of the industry, part of the lore of the industry, but I wonder if you could maybe talk us through how you have managed to you know come into this industry or come into different companies and adopt both yourself this different kind of mindset but then you know be able to share that with your colleagues and lead projects that allow for digitisation in a way that makes sense in terms of keeping up with tech, but also keeps everyone happy and willing and on board at least as much as possible too.

Kirsty: I have an enthusiasm for it myself which I think helps because I think that it's easy to get people on board if you can explain but I have been lucky that within Scotland and all the network opportunities we have it's about going out and seeing it. It's easy to talk about it and it's easy to show someone a PowerPoint but I have been able to go and demonstrate. Murray mentioned Siemens Congleton: I haven't been myself but some of my team in my previous

company were down in there and wowed by it because you see all the possibilities and then it's about coming back to our site and manage expectation as well because you need to think obviously investment time it can be a bit overwhelming as well because you want to do everything but it is about sitting to try and make a road map and we were lucky to work with SMAS [Scottish Manufacturing Advisory Service] on that, the manufacturing road map, and they can reach out to places like CENSIS among others to guide you, but it's really about selling that, I said it before, selling the vision of what is it that needs to happen why do we want to change. It's about communicating and talking to people chatting to hear what the concerns are because I think I think it's a great idea but that doesn't mean to say everyone does so you just really need to work with project teams and hear all the stakeholder feedback. Again it's just getting that shared consensus of everybody that's a good idea this is what we're going to do but it's just not getting carried away. We are so often wanting to do everything yesterday.

Gemma: When you see something working so amazingly somewhere else in you're thinking why can't we just do this now but is having that, as you say, managing expectations and talking also about the positives and framing challenges in particular ways. I want to come to Lindesay, because I think one of the other really interesting areas where sensors and technology in general is really innovating within the whisky industry and is arguably quite an easy problem to vocalise is around counterfeiting and fraud so I wondered if you could talk us through a little bit about that what's the deal with whisky fraud and then where does tech come in?

Lindesay: Well, it happens. Like any successful product there are those that want to copy it and I'd say there's probably two broad strands. We in the Scotch Whisky Association are tasked with looking after the category, so we will be looking for a product on sale in the foreign market called Scotch whisky when it's not, and it doesn't copy a particular brand, so we do that for everyone. And then of course the second strand is and perhaps the most active one for our members, is protecting their own brands from counterfeiting. I think because of the nature of the problem we see technology having more immediate application to the anti-counterfeiting in brand counterfeiting. I think the key for that is quick results so we've seen a lot of technology coming in looking at spectrometers to get the colour of the whisky, and the electronic tongue which got quite a lot of press last year is another idea that's interesting.

Gemma: electronic tongue! That sounds a bit strange!

Lindesay: Yes, it can taste the various compounds in a spirit and you could programme it with a brand profile so that's something that's being researched but there already are other technologies looking at sort of dip tests where people can go into market. One of the big handicaps over Scotch whisky because it's a geographical indication it's got a very strict definition and you can't add anything to it. Other products have little traces in it which you can measure so you can put a little secret key in it that if it's absent then you know it's fake. We can't do that with Scotch whisky so that means we've got to be quite creative and going back to the Scotch Whisky Association's work, we're looking at products from now 130 different distilleries in Scotland. Many, most, of the products are blended and working out whether a product is Scotch whisky or not comes down to quite a lot of hard graft you know maintaining a big database and having knowledgeable scientists who know the sort of patterns that appear in whisky generally. We're still looking for the magical solution where you can just scan a bottle and find the contents are

fake or genuine. Unfortunately I think that's a little bit away yet but there are a lot of people working on it and yeah I'm the optimist.

Gemma: You mentioned there this idea of being able to, Michael mentioned earlier, looking at it from the whole chain and I wonder where sort of provenance comes in here too particularly to do with fraud and counterfeiting too. If know what exactly is happening every moment in the chain. I wonder if you could talk a little bit about provenance, then Michael, I'd love for you to chime in with up and coming technologies in this space too.

Lindesay: We really see two very important strands in proving that a product's fake. To a certain degree we're looking at chemical analysis. So, what is in the liquid? Is it genuine and it still is pretty old school, we're looking at the paper trail. You know, are there the documents? Is this company in China buying 10,000 litres of bulk Scotch and producing 100,000 litres of bulk Scotch? If that's happening you know there's something awry, so you've got the two sides and one of the things which has been a major development in the industry is verification of Scotch whisky and that's a requirement which is set down by the European Union and which I think is going to be carried forward as we as we move out of the EU where Customs and Excise are responsible for assuring that all brands of Scotch whisky are produced in accordance with the definition, and they do this by checking all facilities that are involved in the production and that starts off with the mashing and the distilling and it goes right up to bottling whether that's here in Scotland, or as in sometimes the case, overseas, and that's still being done on a fairly old tech basis, but it has been a huge assistance to us. It controls the product. I think bulk Scotch whisky is a risk point when bulk Scotch whisky goes somewhere for bottling that would be the prime opportunity for some sort of fraud, but under the verification scheme bulk Scotch whisky can only go to a company that is subject to, or to a facility that is subject to, the HMRC regulation and I think that's been really helpful in our work and you know we've been able to make big inroads. I think probably the question now will be can we build on that? A lot of people have talked about blockchain and whether that has a role to play. I think it's very interesting but we're still looking for I think the killer app you know where it can be cost effective and take us to somewhere better than we are now, but I think that probably will have a role in the future.

Michael: Blockchain is being used. There are I think, one or two distilleries that have already started to pilot it. It's really to do away with some of the need for some of the paper-based transaction history because effectively is it's a kind of shared ledger of transactions that will give you a history of how the whisky comes from the barley all the way through to the shop and it should give you confidence when you buy a bottle that this bottle has actually gone through this sort of process, it was started in this field, was distilled here, just produced there, was sent overseas here, it really takes away a level of doubt, particularly the very premium end. As time goes by the costs associated with all these things and acceptance of it will all come down, but like all technologies and all of these areas if it's attractive enough people find different ways to address them.

There's a very high level of confidence in blockchain because it's I think, if my memory serves me, it was developed for things like Bitcoin and electronic currencies so it's very secure. Where we see technology really helping is where people really understand the process. At CENSIS we understand the sort of component technologies. The hard thing is always understanding where it can be applied to give the biggest benefit. What Kirsty was saying earlier about the knowledge

that said within the staff, within many of these traditional industries, it's utilising their knowledge to identify where the key touch points are that you can maximise the benefit from utilising technology. It's not a case of just saying here's all these range of technologies, we'll apply them, you have to be demonstrating some sort of return on investment. That might be a bottom line cash, it might be meeting a legislative requirement with regards to emissions, it might just actually be making the workplace a safer place, but you have to be identifying what the benefit is that you're going to achieve by applying the technology. We see it in different industries, what we've been doing in the last year and we've actually started to get a lot of traction in the food sector generally, and also starting into the whisky sector, is that our people are looking more broadly and they are saying 'yes we can adapt something that's maybe being used in aerospace or something it's been used in a telecoms company to help with profitability', so it's not any specific individual technology. It's more where it can have the benefit.

Murray: At Siemens we do blockchain, and back to the counterfeiting, you know using block chain the paper trail and digitising it right across the supply chain and industry, and taking that digital footprint and putting it on the bottle, and if it's a QR code or whatever that maybe I could pick up a bottle in the supermarket or up the Barras or in China, and just scan it and straight away get a footprint from that manufacturer of, you know, where the malt came from, you know, where it was made, whatever it is the whisky industry deems is a footprint or fingerprint if you like of that blend or malt. To me, the technology exists for us to do that but it's about looking at the return of investment what the cost will be, and evaluating to find the best solution to solve that problem.

Gemma: What does it look like sort of on the ground in terms of that bit by bit implementation?

Kirsty: I think for me I have to look at what your current state is do a bit of loss and waste analysis on where your kind of key issues are, and also your key aspirations in the road map, is the most important thing and that involves employee readiness assessments, you know, doing the kind of return on investment. What is the benefit going to be? So, there is a benefit analysis and then it is getting a multi functional team so that it is captured in every single person's input into the change. For example we've got a really excellent data capture system – a Harford system - which gives us real time data from our line. A team leader actually just recently said wouldn't it be good if we could just optimise this and make it paperless so it was a really simple suggestion but really effective, so that doesn't require a full assessment of readiness and things like that, that's a kind of just do it, but there are larger ones in the background like the digital twin to be used for future apprentices for training so that they can see about changeovers when they're not actually online and all that, that for me is a bigger programme where that's a project team, and doing that kind of stakeholder analysis employee analysis getting their input. And also, we've touched on it before going out to see what other people do so. In Scotland there's so many networking opportunities that industry, whisky industry itself, they share. There's no secrets, so we're happy to share best practice with each other, but it's great to go out till the other companies and see what they are doing and take your team out there and have them chat with the teams of implemented it and we can get the warts and all version of what went wrong what went well and if you were to do it again how do you do it different so we're really lucky that that's what we get to do. Beam Suntory as a global group they're really good at best practice sharing throughout the sites as well so it's another advantage with got when we're doing any of these kind of implementations of technology.

Gemma: It is I think it's that just keeping reminding everyone who's watching whatever stage you are technology can be implemented in small, medium, large ways and you can you can build up. It's not a case of it just being this scary thing that can't be touched or something that you know 'OK we've done a little bit we don't need to do anymore'. There's kind of always more you can be doing so as you say it's about really looking at where you're at and what your problems are. Speaking of problems - or challenges as we should we should say - obviously the sort of elephant in the room at the moment, or rather elephant in all our separate rooms because we can't be in the same room to share our elephant, is coronavirus and COVID-19 and I want to talk a little bit about both, you know, what are the sort of current challenges but also where do you see technology and IoT in particular being able to help you know the sort of back to work programmes, and also you know helping prevent this sort of thing the future. Murray you look like you're impatient to talk, so I'm going to come straight to you, you're like 'I've got an answer!'.

Murray: Yes I do! People from Siemens, including myself, have done some circuits around Industry 4.0 in digitalization and is an evolution it's slowly people start to see the advantages or you know more data we mentioned earlier about measurements are manually taking how we use sensors to digitally bring that information in, but there's also things that we can measure with sensing and imaging technology that maybe we don't just now but the data is valuable. The current situation I think is going to be an accelerator to digitalization and Industry 4.0. Look at what we're doing right now, normally we'd be in the CENSIS offices in Glasgow having this meeting and maybe recording it or whatever. It's accelerating things. We've seen a massive surge in requests for customers for our remote connection service so across the Internet of Things we're setting up a secure connection for their staff to access production. If you look at technologies that are available that were talking about when implementing, and Kirsty will know this. She is at her place of work today, and she was when we spoke last week, however she could operate she could function in her role and connect to our team and everything automatically from home you know it means. She could have everything that she needs at home she have full visibility in real time of what's going on in our production facility and meanwhile she could be working on our digital twin trying out new ideas and things with her team online like this and then implement them. Everything exists just now. It's just about how we get there. I do think the current situation is an accelerator to that, I mean we've looked to, you know, we are manufacturers as well. Siemens were involved with the UK's ventilator challenge with Airbus which is a great success. How did we do that? Well we used simulation modelling. We're doing this for a lot customers as well, you know, looking at optimising for return. Kirsty has a digital twin you mean she could be utilising that to look at people tracking for social distancing. She could have a real time people tracking solution in place so that she could be warned instantly if there's too many people getting too close to one another. It can measure peoples' temperatures of somebody's temperature start to go all the all these things are exist but are become more prevalent now under the current situation.

Gemma: Yeah I'm certainly seeing that you know as a tech writer, seeing that across all industries, the digitisation in general and digital transformation or whatever term you want to use is happening at a staggering rate. Just out of need, it's not this sort of shiny futures that innovation thing that we're talking about anymore it's 'well this is what we need for business continuity and to be able to be more resilient in future'. Kirsty I want to come to you. I wonder if you could

actually just tell us a little bit about what it's been like at the plant and what you guys are already implementing, or in the in the midst of implementing, to make things easier moving forward.

Kirsty: So we had at the very start of lockdown we had an operational pause where we stopped all production. At this point although office teams were working from home but myself and the team here that's doing production were on site until lockdown we had a two week operational pause where myself and other managers in the business world actually on site too look at capacity, look at how we can bring the operation back safely because we were always continuing to run whisky within the whisky industry in Scotland was running through lockdown as long as it could do so safely. It's actually felt quite normal because I've always been at work and I've been part of the process of setting up all the markers, the temperature check stations that we have here on site. Listening to people has been a massive thing as well. Murray is right, I could have been in the house, it was an option that was given to me but I just didn't think it was, you can't lead a team of people through a major challenge and not be here to reassure and into listen to feedback, so I didn't take that opportunity and I was glad to be here. Obviously volume has been impacted for us because we don't have that capacity – we're running with reduced numbers to keep everybody safe; that is the most important thing, so we have to do the social distancing. Everything seems really relaxed because although we do with standard dashboards off actually because we do not want the driver to be speed, you know so it's more about we're grateful to be getting something produced so we're not putting that pressure on the teams to say 'You've got this target and it's got to be by then', it's just that's not what we're looking for so we actually turned that visual screen off for the team so that they just feel that they are coming in to safely do a job and that's the most important thing, so have turned that technology off, but apart from that it's we've been quite lucky because we're not seeing too much of a difference, although the office is very quiet and you don't need to book a meeting room because there's no one else to take it!

Gemma: I think that's another thing I've been noticing too. It feels like a lot of businesses are going, I don't way to say back to basics, but being reminded of why we even bother with businesses in the first place and why we make stuff in the first place and not just trying to optimise for our production and profit. Lindesay, whisky is obviously a very, well at least for Scotland, an international industry an obviously travel is a big part of making sure the Scotland can export. I wonder if you could talk us through a little bit of that that high level impact of Covid and how you kind of see technology being able to help get things at least a little bit back towards where they were before if they aren't already.

Lindesay: we're here to talk about innovation and something we're very proud of in the Scotch whisky industry is how we turned our hand to making hand sanitizer. Very quickly, the industry set up a portal, played its role in dealing with the initial stages of the crisis and I think that's a great thing that we're very proud of, so it's been a real eye opener. I mean we're all today looking at each other in little boxes and there's two sides to this. I mean on the one side Scotch is our social drink you know, like to drink it with people and it brings people together so the sooner that we have the return of the on trade where we people get to meet their customers and their contacts, that's great, and we want to work towards that when as it when it becomes safe to do so, but equally I think technology has shown that it's got a lot to offer. I think probably I see more peoples' faces now than I ever did when you are free to get out and about so for example later in the week we have a working group which covers issues in Latin America and everybody will

now be set up to join Zoom or another application and we'll see each other and I think that's been really good bringing it together. On the consumer side people have started doing online Scotch whisky tastings and again some say well it's not as good as the real thing, but it also means that a master blender can sit in their place in Scotland, and they can speak to an audience all around the world who are drinking the same as them, so I think there's great opportunities there and I think also it's brought into focus e-commerce. The industry is taken a big temporary hit but it's partly made up by the fact that people drinking at home and trading up you know, they're treating themselves because they're not able to go out and a lot of members a lot of companies are now thinking about how they can reach people online can sell more of their products online. That raises technological issues, in many countries it raises legal issues too which is something that the SWA is working to address, but yeah I think we were looking forward to when we can get together and raise a glass with friends but equally I think it's been it's been a real revelation as to what can be done in your own room. I look before I finish I just add also the environmental side you know we're a two site office at the Scotch Whisky Association. We have colleagues in London and our main office in Edinburgh we also have quite a demanding environmental targets for the industry, and while it's great to talk about not using so much water so much peat, we've got to remember how much carbon we use you know going to a meeting in London, and I think again this ability to see people and communicate with them online has had a rethink and we'll be learning from that and hopefully reducing our carbon footprint accordingly even when we're back to normal.

Gemma: Yeah, you stole my next question. The environment one was where I was going to go to next because I think you're spot on. I think the lockdown in this sort of situation around in the world is really I think drawn quite a lot of peoples' attention, if it wasn't already there, to the work still needing being done when it comes to environment. Specifically for sensors and for IoT within whisky or indeed more broadly with food and drink, in terms of how can sensing technology really impact or enhance, or give super powers whether it's from measuring or insight or whoever, for companies that are operating in a space to ensure that they can reduce their environmental impact moving forward?

Michael: two things. One, I'll jump back to the impact of Covid first because the we've been asked to look at helping people go back to work in office or in manufacturing operations in terms of because there's lots of with lots of press about different sensors that people could use to identify if they are two metres away and whatever. There's also a lot about giving people confidence that they can go back as well. A big part is just to do with process and making people feel comfort about the way in which they operate in the work environment, but we've been undertaking some pilot projects with different organisations utilising sensors and small local networks that can identify how many people are in different rooms so that you don't get too many people going into one room or into different room, how many are in the corridors and just using systems almost like a red/green, you can go in, you can't go in, and some of these very straight forward applications can have quite significant impact on making people feel more comfortable about when they're moving back into the office. One the environmental side we've not done much as yet with the whisky industry. What we have done though is what with the likes of SEPA. Just now we are undertaking some projects for we're looking at water extraction which are important both to the environmentalists but also to anybody who is actually using water, and it's just actually monitoring how much water is in a river so that you can say, well look there's just plenty here, take as much as you want or take it however much, or there's not a lot here so it's just to manage

it. Again, it's just all about real time information to help people. Again on the sort of emission side, there are all sorts of sensors that can be used, whether it's for particulate emission or for effluent emission, both to identify or quantify what's going out the door but also to give warning if you are discharging, here a discharge about to happen, can help people manage and reduce spot what they're doing. Earlier you asked what technologies can actually have an impact. One of the big ones that can certainly, I think, can have an impact in this area is the use of machine learning, whereby just monitoring your processes and getting lots of information, you can sometimes get insights that you wouldn't necessarily have come up with yourself in the first instance. Having lots of data is useless unless you're turning into information and what machine learning can help people with is actually get as much information out the data, information they don't even see is being there in the first place, and that's one of the areas that I see a big impact coming down the line, not just in the whisky and food sectors but across the piece. I was over in the in Barcelona last year, it seems like a long time ago then there are conferences and people were attending, and it was probably the single biggest message I took from it was people utilising machine learning what they call at the edge so that's actually where the sensors are, to give back added value beyond just measuring a temperature or just measuring a pressure or measuring vibration that can actually help people improve their productivity.

Gemma: Now I'm glad I'm glad you brought machine learning and I guess more broadly AI as that tends to be the kind of technology that both everyone seems to know about, but it also baffles everyone at the same time. I think just laying out exactly as you've done, it's about being able to, I guess, be empowered by all that data capture as opposed to just 'go and put all these sensors in and we've got all these measurements now what on earth do we do with it'?

Murray: I was just going to say it's very new, certainly in our industry. I don't know of any applications have been taken on board but artificial intelligence is embedded in certain controllers that can do things for you. Going back to like condition monitoring for example is an example of where sensors have been used to analyse and then predict things are going to happen with machines. If you look at a Siemens electric motor today it produces a lot of data because we've created algorithms around using sensors in the past, now we sorta can predict based on the type of use in atmosphere and temperatures etcetera when that's going to fail, and you know these if you connect if you connect to Siemens electric motor to the Internet of Things or the Industrial Internet of Things, if you used something like Mindsphere or even in your control system, so it would give you that diagnostic information, so you mean if you look at it on a much bigger scale the things that we have learned we can embed in controllers to almost give them intelligence, and it's that it's that sort of knowledge in that data that we've captured and putting into this going forward can be of real value.

Gemma: I always think of machine learning and data dedicated capability, it's kind of like being able to see the unseen. It's like giving you another sense if you will, being able to understand through the uses of physical sensors, but also these, you know data analysis algorithms and being able to find these patterns as Michael said, is literally giving people who are working – and again coming back to not replacement but empowerment - that extra sense. I'm going to go to you Kirsty. I'd love to hear a little bit about your sort of future vision to kind as we say we start wrapping up this discussion. How do you see the future of the whisky industry?

Kirsty: For us at Beam Suntory, our business models are moving a lot towards prestige. I know a lot of whisky companies or will be going into, and I guess that's more looking at obviously real prestige products that we're lucky to have, but also that customer experience as well because that is now - particularly with new generations - it's not just about the thing, the product, it's about that customer experience that comes with it, so from an external point of view, even things like VR for me, so for example if you're selling someone a cask, a single cask, how do you enhance that experience so much? Yes, you can come and see it being bottled but wouldn't it be great if you could have, you know, some sort of VR cave set up and also see the distillery but then taking into consideration you might not be able to get access over there for Covid, or something else, some environmental reason. It's just enhancing it so that from a customer experience point of view, that prestige product is matched by the prestige experience. From an internal point of view I'm really excited for, I would like my team to be really known to be development driven, project driven, and I think all these opportunities that we have it's really given us that opportunity to do it in just looking forward to working with you know the guys in the call and all the networks that we have in Scotland in all these projects and sharing how we do them, you know, how we do product innovation, process innovation, the opportunity is endless for us so it's really exciting to look forward to.

Gemm: You're getting me excited, even just talking about, I'm like, look at all these projects and opportunities. Lindesay let's go to you for your sort of future vision of the whisky industry.

Lindesay: Well I hope that Scotch whisky will continue to grow I would like to see it embedded in as the world's favourite premium drink. I agree with Kirsty that premiumization is key and that emphasising quality and I think that this growth must be balanced with sustainability. I think the industry should be a world leader. We already have a strong environmental policy. Scotch whisky is so closely linked to the Scottish environment, it's a natural product and Scotland's reputation as a clean pure place. I think we need to build on that on everything from packaging to the energy we use to how it's transported around the globe. Yeah I think I think those would be the two things - balancing continued growth with sustainability.

Gemma: Finally Michael obviously you being from CENSIS I want to give you the last word what's your sort of your future vision for the for the whisky industry?

Michael: I would support what Lindesay's said there, it's continuing to grow but in line with the sort of sustainable goals. Where technology can really help is it can it can help meet those goals in terms of reducing emissions, keeping the carbon footprint low, making the processes more efficient, linking into the whole environmental purity, if you like, of Scotland, but at the same time not diluting in anyway the traditional methods of that are seen as a key part of whisky, the drink it's been the same drink for 100 years or 200 years or whatever and it's managing that line. At a personal level I just hope they continue to produce very nice products!

Gemma: I think don't we all! Amazing, all of you, thank you so much for joining us for this conversation. We've touched on so many different things, from various different points in the supply chain through various different kinds of technologies, various different kinds of challenges, and of course lots on the current crisis that were that we're living through, so the final thing is just to say a big thank you for sharing your insights, keeping this network going while

we're in lockdown and keeping us - as Kirsty said - secret's out that are not secrets so that everyone can keep learning, so thanks for joining us. Thank you.

Gemma: I hope you guys enjoyed that conversation as much as I did. I learned so much and I was really pleased to be joined by such a brilliant panel of experts across the food and drink and indeed the whisky industry. If you've enjoyed what you've heard and you're interested in talking to CENSIS about some future projects that you might be thinking about or indeed somethings you're working on already, or indeed are just interested in a little bit more but what they do, go and visit their website, it's censis.org.uk. Get in touch, have a chat and hopefully you can move forward your own projects in technology disruption and innovation thank you very much for joining us.