TECH REIMAGINED
AN ENDAVA PODCAST

Innovation In Focus

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BRADLEY HOWARD, ENDAVA HOST (BH): Hello. I'm Bradley Howard and I'm happy to welcome you back to a new episode of Tech Reimagined. Today, I'm thrilled to sit down with our very own Donegal based head of innovation, Joe Dunleavy. Joe brings his love for innovation, UX and UI design, and his diverse industry knowledge to our teams of clients, helping us to develop ever more innovative solutions while also enjoying the classic combination of football and beer, presumably not playing it at the time. Joe, welcome to the Tech Reimagined podcast. It's great to have you here. How are you today?

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JOE DUNLEAVY, HEAD OF INNOVATION, ENDAVA (JD): Hi, Bradley, how are you?

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BH: Let's dive straight into today's topic, which is about the world of innovation as one of your favourite topics. Let's start at the beginning. So what's the most innovative scientific or technology changes that you've witnessed in your career?

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JD: Good question. I suppose the Internet is a clear one. I was there. I was one of the geeks at 14, 15 years of age with the Gateway computer. With it singing back at me, trying to get anything more than a 15 kilobit connection. So clearly, the Internet at the very start of my career would have been, would have been a huge one. It's changed everything, right? I mean, e-commerce, their online sales, everything that goes with that. More recently I suppose, the two that probably would stand out would be the smartphone, or a mobile phone device, and what it's meant from an innovation perspective. It's changed a lot of how we sell, how we buy, how we communicate. It's changed a huge amount and then probably the most current, in the last couple of years is being cloud computing, and everything that kind of goes with that as well. But if I was to pin it down, ultimately from there, from the dark old days of the 56k modem, I'd say the Internet's changed everything, particularly from an innovation perspective.

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BH: You're quite lucky that you started with 56k!

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JD: It was a 56k modem, getting a 13.2 kilo-bits connection, if I remember correctly. And if I rolled the wheel of my chair over it, I think it went all the way down to 6 kilowatts and probably disconnected.

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BH: And how does that influence your career path, working with three major technologies? Because, you know, we could well be that first generation to go through massive change at that kind of scale?

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JD: Yeah, no. I suppose it's huge, particularly like I was having this conversation with the kids. Actually, just the other day. I have two kids, a 12 and a 9 year old, and I was telling them about the fact that you have to connect to the internet through a dial-up. And it was like, the concept was completely alien to them. Like that whole on-demand, I think speaks to everything, right. I mean, the Internet, the one thing that the Internet, the cloud, smartphone has in common is that it's on

demand. It's real time and whatever you need whenever you need it. And obviously there's the dependence on it now, is probably what's really interesting. There's probably the good side of that. And then there's obviously the darker side that also. So without too far getting down the rabbit hole on that, it's the immediate nature of the fact that you can get what you want when you need it and you have it within your fingertips, I think it's incredibly powerful. It also has massive implications for the world in general and technology. So happy to dig into any of them.

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BH: What got you interested in working in technology in the first place?

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JD: So, interesting question. I ended up going to secondary school and I was pretty decent at math, and accountancy was actually where I was originally contemplating. My mum worked in an accountancy office and an Irish mum, as anyone who knows, Irish moms are like, you know, 'good job, good solid job', the accountancy business. So my mom worked in the accountancy office herself, so I was originally thinking about going into accountancy, which is hardly surprising now that you know me from a personality perspective. But what happened was in secondary school. I sat down to see, right? It was going to be accountancy, and I had a career guidance officer who said, listen, you're quite logical in the way you're thinking, would you take a logic exam and would you contemplate maybe off the back of that considering computer science? So I did the logic exam, ended up in computer science and kind of never looked back. So I was a nerd in terms of like growing up with computers, always playing around with them. I remember like C Prompt, DOS, if you got that wrong, on the wrong level, at the root level, you knew all about it. So I was always interested in it and gaming, but I kind of ended up in it completely by chance. More the career guidance officer kind of guided me that direction and I never looked back. So it made sense, I suppose, in the way that I love technology and what it does. But yeah, in another world, I could have been an accountant. So there you go.

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BH: I thought you wrote a blog article recently that said you wanted to be a surgeon.

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JD: Yeah, if I if I had the grades, I would have loved to have been a surgeon. Yeah, I'm fascinated by the whole, you know, I mean, particularly what you do in technology is really, really impressive. You can have a big impact on people's lives. But when I think of like what a surgeon does, I think it's incredible what they do day in, day out and I always have that kind of fascination. Now obviously, there's the very harder side of being a surgeon that when it doesn't go right, it's obviously a very, very tough career and job. But for me, I would have, I would have been intrigued by it. I remember when we did in biology, like working with frogs and stuff. I was really interested in kind of human anatomy. And then the whole idea of being a surgeon, I suppose, in terms of the impact you can have on people's lives, definitely stood out for me. But there's absolutely no way from a grading perspective I probably would have ever got there. So hence, I'm in there. I'm in what I'm doing. It is what it is, I suppose. But yeah, it would have been something that was interesting to me.

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BH: So on a personal note, then, what's your favourite bit of new innovative technology? Because you're really into technology. And you and I have conversations about what you've been doing to your home recently.

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JD: Yeah, I suppose kitting out of the home, right? That's a big thing, I'm a big IoT buff, like the little bit of programming, I suppose if you call it a programming that I still do - would have been a programmer, started as a programmer in my career. The little bit of coding I do now is this scripting around IoT devices and how they interact with each other. So that's really, really cool. But it's probably more novelty than anything else. In terms of what I'm really, really excited about and passionate about is what's coming with the whole autonomous vehicles.

Because it's not only about helping the green agenda, but I think it changes so much. If you think about, why would you even need a car? Would you need to own a car, if a car can come to you on demand to pick you up and drive you to Location X or bring you on holidays or even run to Tesco's for you, if you put your online order in and a car can pick that up for you and drop it to your door. I just think it changes so, so much. Obviously, there's a green thing. It helps a lot in terms of less cars on the road. Do you need to own a car? Does the ability to make money off your own car if you do have one, if you lease it back out to like, I don't know, Uber for pickups for your car, it;s driving itself. But I really think, look at all of the productivity we're gonna gain as the human race, if you're no longer having to spend hours on the road driving. Obviously, because of COVID things have changed. But I just think there's so much more we could achieve when people talk about you can't adjust the days, hours of the day. But certainly if you're commuting any distance or traveling for any great length, if you're in a car and that car is driving itself and you can put on other things, like most people are going to end up watching Netflix, I'm guessing. But the reality is, it will be nice to have a little bit of extra time. So I'm really excited about what it has for the green agenda, how it can help that, but also the excitement of truly sitting back and a car driving itself. I, for one, would be excited about that. My wife probably maybe would not see it that way, but that's one that really, really fascinates me because it takes a serious amount of technology, a serious amount of artificial intelligence, a lot of sensitive work, 5G connection. It basically - anything that's new in the space of technology, elements of it come together to make autonomous vehicles and autonomous driving a thing.

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BH: Do you think that autonomous vehicles really are going to happen in the near to medium future?

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JD: No, I think it will be motorway or freeway driving in the next five to ten or so years. I think around cities with crosswalks and traffic and bikes and people coming from out of in-between cars and stuff, I think we're years away from it being a reality - in terms of a true reality. But yeah, from a, you know, take a car from London to Edinburgh or take a truck from London to Edinburgh that is on a mostly motorway traffic, I can imagine yes, within the next five years, maybe ten, that will definitely be reality and probably not having the need for backup drivers like we have today. So it's not as quick as we expect, but I think that's the Mary's law thing where we overestimate in the two years and underestimate the ten years, I think Bill Gates is cited for. But I think that's definitely the case for autonomous vehicles and it's interesting. It'll be interesting to see

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BH: It's interesting what you were talking about with was driving around cities, because I've read a great article that said it's more likely, like you said, that we'll have to drive around cities, but on very fast roads like motorways, for example, they might be autonomous only, because there's not a lot of room for human error, cars can get really close to each other. They can become much more aerodynamic, which means they're much more fuel efficient. And it just makes a lot more

sense because humans aren't really good at concentrating for a long period of time on total monotony like a motorway.

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JD: Yeah, no. I think it makes a ton of sense. And I mean, even thinking of the safety aspect of it will be absolutely huge. And also, motorways are obviously congested and urban cities are on the outskirts of urban cities – if cars can move that bit closer together because they're autonomously driving, it's certainly, you would think, at least that could help from a traffic perspective. But other interesting things in the autonomous thing is, you know, Uber looking at intercity helicopters or small frames like flying taxis, for example. Like if that's something that becomes a reality, I think we all picture that, you know, by 2030, 2040 full of drones, flying taxis and all that goes with it. But the element of being able to get across a city like London, for example, on a flying taxi, if that's the reality in the next 10 or 15 years, I think that's going to be really interesting to see because it has so much wide scale implications for how people move and everything that goes with it.

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BH: Yeah, definitely. People often underestimate when they talk about electric vehicles and autonomous vehicles. The knock on effects of that are huge. So, for example, people talked about, well, what will happen to gas stations or petrol stations along the routes, because apparently that's where the majority of cigarettes and chewing gum is bought. But now seeing what recharging is like, maybe that will be an even bigger rise in coffee or tea shops along the routes, rather than the immediate purchases, it would be quite interesting.

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JD: And even if you think about car parks in cities, how much space in a city is given to car parks? And if you think if cars are not owned by the majority of people and you get a car on demand for when you need it, then what do we do with all the city car parks? You know, potentially you can grow herbs there maybe, you can put solar there, but you think of how much of a percentage of cities around the globe is given up for car parks for cars that sit 90 percent, 95 percent the time doing nothing if that is removed by autonomous vehicles, it's really, really interesting to think about what the implications that could be long term.

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BH: Yeah. Oh, you get out of your car, of course, if it's autonomous and it just keeps driving around the block again and again until you need to get back in.

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JD: Look at the end of the day, I think the underlying thing that everyone talks about from autonomous vehicles, but nobody clever wants to talk about it is, can I have a few extra drinks, get in the car and it'll drive me home and get me there safely? Because I'll be honest, if I can do that part. You know, definitely I'm all on for autonomous vehicles.

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BH: Definitely. So what other sectors do you think are ripe for much more technology innovation?

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JD: I think the overlap between innovation and the green agenda is huge. In order for us to be realistic about the targets we need to hit because, you know, the climate crisis is, it's truly that. I mean, I think our work, that's one we're definitely underestimating in terms of the actual impact. I think personally, and I've listened to a lot of podcasts and stuff on it. I do genuinely believe that one of the ways that we're going to help meet climate crisis and the demands of what's required tonight is going to be technology led. So innovation and technology will help in an abundance. Small example I heard recently, was artificial intelligence sitting in drones that are flying over sub-Sahara areas of Africa, whereby the water distribution is so key, can a drone fly over an area and then tell you basically from a farmer's perspective, if you've got such a limited resource in the water available to you, distribute it here, here and here on a map that a drone has picked up from an artificial intelligence perspective.

Rather than just like, you know, distributing the water evenly across the entire field that has huge impact from a climate change perspective. It also has the ability to save some water as well. But I do think if we're going to be meeting the targets that we need to, innovation and technology will be huge. The other thing that I think is really, really, important that's maybe not getting as much attention is the whole cybersecurity thing. More and more is going online. More and more of our presence, our data and everything is going online. The cloud adoption is getting larger. Companies are moving more and more data to the cloud. Clearly, cyber security is something that I think we're also underestimating, just how big of an impact that could have. The cybersecurity problems initially were because of quantum computing. The current form of encryption that we have, a quantum computer in theory, can crack in very little time compared to what we have from a computing perspective. So what does quantum computing proof encryption look like, as we adopt those technologies?

Really interesting. But for me, the two big themes, I suppose, I suppose at a society level is that whole, the climate and green energy and cybersecurity, until both of them directly correlate to innovation and technology. So I think that's what I'm excited about. But there's a lot of challenges there, too, Bradley, it's not - there's a lot of upside for what we can do to progress, but there's also challenges that we have to help meet as well. Clearly, more and more stuff goes into the cloud. More and more energy will be consumed to drive those data centers. So what that means and how we're going to be clever about, you know, managing the data usage, the energy uses for those centers as well - so those are are probably the two key things I think in the next 15, 20 years that are going to be really, really important. We don't have a choice but to get both of them very. We have to get them right. We survive on the basis of getting them right

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BH: On the green agenda, haven’t you taken your house off grid recently?

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JD: Yeah – so, I had when we spoke in the summer, not so much at the moment. I'm in Donegal, in the northwest of Ireland. So at the moment, sun's coming up around 8:40 in the morning and it’s gone about four o'clock in the afternoon. But yes, I installed a six and a half kilowatt solar array and another seven and a half kilowatt battery array, which has allowed me until very recently to be completely off the grid while I've been working from home here during the day, I've been able to be completely independent of the grid through just daylight. So again, I suppose it's the innovation, right, when you speak of innovation. A couple of years ago, it was very much sunlight that generated the power - it still is, I mean, sunlight hitting the panels will by far and away give you the most energy creation, but it is still daylight. So I got the latest panels I got there are still generating.

Even at this time of the day. I'm still getting electricity there, being generated off the panels on the roof, which is really, really nice from a green perspective.

And what's also nice is putting the battery array has allowed me to take a smart meter and I'm now able to power the batteries at night at half the day rate from a unit cost. And then I'm able to basically be off the grid now until about 7:00 in the evening time by charging the batteries overnight. So I never thought about that, as a kind of an off spur of the innovation of the panels is once you have a battery, you can actually be charging those batteries at the nighttime rate, which is pretty neat. So almost there - I have to do a little hydro station here, I have a stream that runs on site and enough water goes through it, if I put on a little German hydro station in the winter months when I have this spring that runs and build up ahead of water on it, I will actually be able to be completely off the grid. But it's - I move from one project to the next Bradley, unfortunately, and it's an ever evolving goalpost.

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BH: And then why can't you have wind energy?

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JD: I can, but by per kilowatt hour, it's the most expensive to generate. Where I am in Donegal, it's the windiest county in all of Ireland, actually. So the most amount of wind energy is generated in Ireland, out of Donegal. But the turbines, they have to go up on a height. They have - the big mechanics, right, these things move at a fair speed when the wind hits them, but from a cost of installation perspective in - and I'm not an expert on the green thing, but as far as I'm aware, the wind for domestic use is, the most expensive to put up, and the most expensive to create. So the buyback period is that bit longer.

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BH: OK, so at the moment, you were talking about that window between four and seven in the evening. Is that when the kids get home from school and start watching Netflix or something?

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JD: Yeah, pretty much. Yeah, when I'm sitting there on my own, I'm self-sustaining. But yeah, when the family comes, it's the usual right, the kettle goes on, the cooker goes on. That type thing, that's when the power consumption, you know, we as a family consume pretty much the majority of the thing in an hour in the morning when people are getting up and everything's coming on together and an hour, an hour and 20 minutes in the evening. Outside of that, the house kind of cruises along at about 0.22 of a kilowatt. So that's what the going rate is on a day like today. I just checked before the call here I was generating about 0.2 off the roof, so I'm supplementing slightly today from the battery

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BH: Has it change your behaviour at all, knowing that you're creating, you're generating your own energy?

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JD: Oh yeah, yeah, absolutely. It's changed my behaviour. I don't know, I'm not sure the rest of the family would agree that it's changed behaviour for the good, though, because yeah, I mean, at the start, you're watching it right? I mean, you're checking in. To put it in context, like, I love data, right? Some go by the grace of God. Everybody else brings data. I love data. So when we first got it, I was like, checking daily, oh, that's interesting, how much is generated. To give you like a stat that I like - I said, I'm a nerd, so I'll give you a stat that shows how much – November, the month of

November - in one day in July, I generated 26.2 kilowatt power units of energy off the roof in one day. By three o'clock in the afternoon, the batteries are fully charged, we had all the hot water heated and we were giving back to the grid at a fair rate of knots. In November, the entire month of November, I didn't even - I generated 18 kilowatts in the entire month. That gives you the difference in terms of - so it has changed the behaviour, particularly not putting the washing machine and the dishwasher on at the same time, because if you stagger them, you can actually probably run them off the battery. Whereas if you run them, you know, an electric shower, a dishwasher and dryer and a kettle altogether are just zapping the system. So from a behaviour perspective, we have adjusted. And also with the night-time rate now, we also delay the washing machine and dryer to come on after midnight hours. But again, I'm pretty caught up on it. I'm not sure the family are in such agreement, like around when to charge devices and that type of thing. So I suppose it depends which side of the of the family you ask Bradley, in terms of their overall happiness with the behaviour change

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BH: And keeping with the theme of your of your lovely family, have you been talking to them about their career prospects? I know they're young, but are they into technology in the same way that you are?

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JD: They're into it in a little way. I mean, they have tablets. My son's a bit of a gamer. More recently in the last couple of years. So he's got an Nintendo Switch, but no, in terms of, yeah, we've talked about it, my son is obsessed with space like really, really obsessed with it. He gets into things, right. When he was younger, it was the Titanic. He was really, really into Titanic. We went up to the Titanic Museum in Belfast, which would be about two hours from here. Now, at the moment, he's absolutely obsessed with space, so particularly National Geographic and all of the content there. He'll tell you all the astronauts of the different Apollo missions, and he's really, really into it.

So right now, he would like to be an astronaut. Now he's nine years of age, right? That or a Premier League footballer, is where he's at. But no, in terms of technology, he's not as interested, maybe yet, but he certainly likes playing games and he loves the value of the internet. He loves Netflix, like in terms of – and the access to Disney+ for National Geographic, so he's able to - the on demand thing. He watches no live TV except for sport, which I find fascinating because when I grew up, that concept of like watching things back and everything is obviously a new thing for him. The only thing he watches live is football. Liverpool Football Club, pretty much. For Ava, my daughter - she's going to secondary school this year, so she has picked up, started doing some, some scratch programming, right?

So low level programming and is certainly interested in it. They're not going to grow up in this house and not be interested in technology and the impact it can have on you. So that's a good thing. But whether they end up in software engineering or computer science, I'm not sure. Ava is a big fan of teaching and helping others. Bit like my wife, Dervla and um - she's saying right now she'd like to be a teacher is where she's leaning towards. But she just started secondary school, so we shall see. But I think the thing for me that nailed it with kids and I'm sure anyone whose - I'm 40, so I think anyone who was around my age would picture the same. We bought - we had an iPad now that I had for work when we lived in the US and the kids got used to the swiping thing, and then we bought a laptop for an SD slot to be able to take photos off a digital camera onto the thing and edit them out and save them and that type of thing.

And my daughter went over as she was about maybe five or six at the time and swiped the screen to move to the next picture. And it didn't do anything. And she's like, yeah, forget about it. And she's never literally looked at the HP laptop ever since. And I just think it talks about how quickly the things move along. You know, the little story I gave you about the dial-up as well. So I don't know Bradley, if I was if I was to say right now would either of them end up in technology as a career? Possibly. But what I definitely think is, one thing's for sure, they're definitely going to be impacted by it. And I think that's the key right, innovation and disruptive technologies adjust and change and improve, hopefully people's lives for the better. So whether you're a geek, or like I was growing up and you go into another a career or not, I'm not sure. But the one thing you know, one thing you can rely on is the impact it's going to have on you and the human race as a whole.

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BH: Definitely. Definitely, there. So thank you so much Joe, for joining us on Tech Reimagined, and the chance to take a deep dive into what innovation means, talking about the many changes it's brought us and what's next, as well as your home electrical production system. To our listeners, I hope you enjoyed today's episode of Tech Reimagined, and thanks for joining. Show us some love and hit that like and subscribe button if you did enjoy today's episode. If you have any further questions or you want to reach out to Joe or myself, then please drop us a line at endava.com or message us on our social media platforms. Until next time.