



EP03: DIGITAL SUPERHIGHWAYS

AUDIO TRANSCRIPT

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Sachin Patel: Roads. They're arguably the biggest and most important piece of infrastructure in any country. In England, the move to a net zero economy may lessen the burden somewhat, particularly in urban settings. But the 4,300 miles of roads that make up the Strategic Road Network will likely remain at the core of the country's national transport system. And if you've recently traveled along a motorway or a major road in England, you have done so by the grace of National Highways, the UK government own company, that operates, maintains and improves these vital arteries.

But it's not just tarmac and asphalt that National Highways deals in any more, roads are now major technology projects containing the smarts to keep the country moving and goods flowing. So how is an organization of civil engineers turning into an engineering and technology company? And what does the future hold for England's motorways and A roads?

Hello, and welcome to Work That Matters, a show where we talk to some of the people involved in initiatives that have transformed organizations and people's lives will hear what drove them to embrace, change their experiences of working on these projects, and what they've taken away from them. My name is Sachin Patel, and in this episode,

I'll be talking to someone who has been leading National Highways on this technology journey. Vicky Higgin joined National Highways in 2019 as their chief digital and information officer. Since then, she has overseen a complete change in the way the company approaches technology, building a team that is defining its new digital strategy. Before joining National Highways, Vicky spent 22 years with National Grid, including as their chief information officer for IT transformation. And Vicky is a fellow of the British Computer Society. Vicky, welcome.

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Vicky Higgin: Thank you for having me Sachin.

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Sachin Patel: Thank you for joining us. So people up and down the country will probably have benefited from the work of National Highways without even thinking about it, I imagine. And I also expect that even fewer will think of the company as a technology company. Are people mistaken?

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Vicky Higgin: I think they will see as a civil engineering organization, perhaps someone that they see the roadworks out for, they probably won't think about the technology side of it until more recently.



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Sachin Patel: And I suppose you could say that no road is pavement alone anymore.

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Vicky Higgin: Not anymore. It's blended with technology. So there's no scheme that we deliver without technology. Any road that we enhance or we build, there is technology there. So for example, at the roadside, there are networks that connect to the CCTV cameras and the enforcement cameras. There are loops that look at speed and see when traffic is speeding up or slowing down, there's technology that spots if a vehicle has stopped. And of course all the things that you see such as the signs and the signals, and that all then connects into control rooms as well.

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Sachin Patel: Okay. So you've painted a picture of a company that actually delivers these projects that are a mixture of civil engineering and technology. What was the company like when you joined it from the perspective of technology? Was it embedded into everything that the organization does?

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Vicky Higgin: I would say that there was technology there. I think there was a lot of different parts of the business implementing technology, but the overall architecture of the technology wasn't there. IT played quite a limited role in this, and some might say that it was seen as the organization that provided laptops and mobile phones. Our purpose is connecting the country. And when I first got here, we couldn't even connect ourselves to our buildings because there wasn't any wifi.

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Sachin Patel: You say that people's perceptions was that IT does the laptops and the mobiles. Did people not see that as

the same aspect of the organization that was doing the technology in the actual road schemes?

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Vicky Higgin: Absolutely. People would ask the supply chain to come to the roads with their technologies without really being an informed client ourselves. And so what would happen is we would have a number of technologies that would be implemented, but no architect sector to join up. No big plan, so to speak. So that's what we've been doing in the last couple of years is certainly that systems engineering piece, where we look at the whole of the system end to end and architect it. And then the company was built up of regions. So regionally, everybody had their own IT director. They could buy the IT they wanted, and they would configure it in the way that they wanted regionally. So when you then come in to try and implement a national system over the top of that, that obviously brings its challenges with it. And that's why the systems engineering and the architecture is so important.

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Sachin Patel: And did that play into the challenges with properly resourcing some of these projects?

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Vicky Higgin: Absolutely. Everything was being delivered by the supply chain. To enable us to wrap our arms around this and look at that systems engineering and architecture and subsequent delivery and support of that, we soon realized that we needed to increase the capacity and capability of the team. And that's when we set out on looking at the changes that we've made over the last couple of years.

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Sachin Patel: So let's talk about that



organizational aspect. What was the IT organization like internally when you joined in 2019? And how did you go about transforming it?

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Vicky Higgin: So there were a few steps that we needed to take, and a lot of that to start with was about stakeholder engagement with my exec peers and the colleagues within the rest of the organization. And it was really about finding out what the business needed to be successful. So, that meant that we had to start really with business partnering. So how do we partner with the rest of the organization to deliver what was needed to be successful? Also, what that meant was allowing us to be the thought leaders in that.

So the key things that we did was put some basics in place first, and some of those basics were around cyber security. We bought in our first ever CISO and then looking at the connectivity piece. So I said earlier about the fact that we didn't even have wifi in our buildings. That was a fundamental thing that we had to do, and also program delivery. We had a couple of programs that weren't quite going to plan. So bringing somebody in to oversee the delivery of all the programs. Whilst doing that, there was a key focus on the diversity in the team as well. It was really important that whilst they had the ability to go out and recruit and bring new people in, that I consciously looked for diversity within the team, because ultimately I knew that would make us a better team.

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Sachin Patel: You mentioned that you brought in a CISO. So for the benefit of the listener, that's a chief information security officer. And I wonder people might think what's the cybersecurity threat for National Highways? Perhaps you could talk a little bit about that.

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Vicky Higgin: Absolutely. So if we start with looking at tomorrow, we will have highways where we have connected and then connected and autonomous vehicles on our highways. Our drivers, when connected, will take decisions based on the information that we provide to them whilst driving. And then when they are autonomous vehicles, the vehicles will be taking decisions based on the information provided to them. So actually our thought process around that was making sure that those connections and that data was secure. The other piece is around connected infrastructure as well. So we have assets that we manage, some of those assets have sensors on them, some of them will have more sensors of on them in the future. And it's just making sure that any connections into those are protected as well.

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Sachin Patel: Okay. So it sounds like you've been on a real major undertaking over the past couple of years. Can you talk a little bit about some of the specific challenges that you faced in that time?

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Vicky Higgin: There was a lot of negative perceptions about the organization. There was a lot of always feeling like we were getting in the way of things. So for example, if a team had set off on a project and they hadn't considered the cybersecurity elements and people were just getting in the way of that. Or for example, policing the technology that was out there. So where people had got shadow IT or bought laptops that were non-standard, they're very much seen as a policing function and the computer says no function. What we had to do was have a look and turn ourselves into an enabling function.

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Sachin Patel: And of course, sometimes perception can essentially become reality. So what did you do to really perhaps demonstrate the value of what you were



doing and really bring people along that journey with you so that the perception isn't there either?

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Vicky Higgin: Key things such as we've recently run a digital summit with the executive team. And that was taking people offsite for a day to an innovation center and looking at how we were going to digitally transform the organization and digitally transform our services to our customers. It's okay having a big ambition and plan that you put out there, but actually you need to execute against it. And the first step for me was getting the executive teams and the senior leadership teams aligned around that. You can read a lot of academic papers out there that talk about the reasons why projects fail, and they fail because of bad sponsorship, they fail because the business change elements aren't considered, as well as all the technology issues that you see. So one of my key things that I do when we talk about programs is making sure that we have business change elements called out in there, and we have a really good business sponsor that's willing to challenge us within digital services to make sure that we are doing what we said we would do.

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Sachin Patel: Are you starting to see the dial shift and people actually look at technology as that enabler and something that can help them do things differently, do things better across the organization?

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Vicky Higgin: Absolutely. And what we're seeing is people seeing the value in what we do, and instead of trying to do it themselves, which is what we've been able to do in this organization previously, they've come to us and said actually we see the value of the architecture, we see the value of building to operate, and so please can you help us please take this program and deliver it with us? Rather than them doing it and then coming later to say, can you

support this? We've just implemented it.

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Sachin Patel: And when you look back on the past two years, what would you say your biggest lessons learned have been?

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Vicky Higgin: You won't have it right first time. Coming into the organization, I was asked very early to give an assessment to the board about what I thought. I'd say I was probably 80% right on what I thought, but there was certainly things that I initially got wrong in my assessment and I had to go back and revisit. People can do amazing things. COVID certainly taught me that. I was only in the organization for five months before we locked down for the first lockdown. And it was just sheer effort and determination in that week up to lockdown that made sure that we were all connected, that made sure that we moved things to cloud really quickly, that we'd probably been putting off. It was big efforts. And then the change that people had to undertake whilst working through COVID. People can do things that they never thought they could do, and that's certainly a lesson to me.

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Sachin Patel: And I imagine COVID is one of these, but have there been any other particular turning points over this time? Moments of real transition or where a switch suddenly flipped for the organization?

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Vicky Higgin: For me personally, it is about people again. And some of the things that we have been working on is capability build. A lot of organizations when they get a new person in, they just want to bring lots of new people in. And I did bring lots of new people in because it was needed to inject additional capacity and capability in the organization. But also the lesson is making sure that we look at the capability of our existing teams, look at where the passion is for certain things and also grow in your



own. And when I say that, I mean growing your own talent. So picking out areas where you think people will be really great. So for example, cybersecurity, we know that it's a tough market out there for cybersecurity. So there are people within our organization where we have moved them into cybersecurity and provided the training for them.

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Sachin Patel: As you said, people can do amazing things. But as you also said, it needs the right support structures, the right leadership. If we could just turn briefly to looking a bit into the longer term, you mentioned at the start the rise of autonomous vehicles, more sensors in the infrastructure, all this sort of thing. What's your long term vision for how technology adapts for National Highways to meet that changing landscape?

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Vicky Higgin: Well, I'd love to take credit for it and say it was my vision, but it's the organization's vision. And for us at National Highways, what we are looking to do is implement our digital roads agenda. So, that comes in three threads. It's about digital design and construction. So when you start to think about building a road or enhancing a road, that you look at how you digitally design it. A lot of what we do are repeatable patterns. You don't need to start from scratch in terms of how you do the enhancements, the construction, looking at construction techniques. So modular designs and build offsite and bringing them offsite. Using digital twins to be able to replicate what you're going to be doing. Using those digital twins thereafter to manage the assets as well.

Digital operations. So how do we optimize the use of the network? We will only ever need more capacity on the network. So how do you do that through the use of data and the use of connectivity, and particularly in a world where we will be having autonomous vehicles on the road? So being able to

manage the network better through those things.

Giving our operators the best information they can possibly have. So within our control centers across the country, making sure that we can give the operators the best possible experience when doing that and giving them all the data they need. And that includes our traffic officers as well. They're our frontline workers that you see in vehicles that look like police cars when you're out there on the motorways.

The other piece is digital for customer. So how do we make sure that we provide the right information and experience to our customers and road users using the network? And the kind of people that I'm talking about are the communities that we're working in. So are we causing a disturbance in a local area? How do we make sure we manage that better by the use of data and technology? Our freight users, we've got people that rely on our information, especially guys and girls that are driving up and down our network at nighttime, because nighttime is when we do our maintenance.

Then making sure from a customer perspective that we're giving the right information out. So using APIs to distribute information on our network, that companies like Google and Waze can pick upon, and it gets downloaded either into your phone or onto your sat navs. So one of the things that we've recently released where all of emergency refuge areas are. That's free and available now for those companies to pick that up and download it into sat navs.

The other thing is the data we can take as well. So what data can we take from cars that allow us to look at the state of the roads, that allow us to see what's going on? So there's quite a lot going on there.

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Sachin Patel: And Vicky, not to be too ambitious, but when will you know you've succeeded?



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Vicky Higgin: With technology, and you'll know, when you're implementing technology, it's just never ending because there will be a new technology that comes along. The life cycle of technology is three to four to five years, and then there's always something new coming out. When will we know we succeeded? I think for the customers, it's based on feedback, it's based on our customer satisfaction results. And for our supply chain, I have regular engagements with my colleagues within some of the tier one and tier two suppliers. And that's on the construction side, not the IT side. So I'll certainly know from those guys if we've succeeded or not. And on the operation side, for me, it is all about the operator. The operator sat there in the control rooms. How do they feel when they use our technology? Do they feel like they're able to see and deliver everything they need to do whilst working in those control rooms?

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Sachin Patel: Well, I'm sure our listeners will never look at motorways the same way again, Vicky. Thank you.

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Vicky Higgin: Thank you.

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Sachin Patel: And thank you for joining us for this episode of Work That Matters. We'll be back next time with another story about embracing change for the good of society. And if you enjoyed this podcast, please share it with your friends, family, and coworkers. Again, thank you.