New national data centre to provide skills boost to UK businesses

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Newcastle will be the home of the UK's National Innovation Centre for Data (NICD) in 2019 when a new £30 million facility opens at Science Central in December that year. Co-funded by Newcastle University with an additional £15 million investment from Government, the centre is a huge coup for the region and will guarantee jobs and inward investment, as well as delivering much-needed upskilling to the local talent pool. Steve Caughey, who's been involved in developing NICD since its origins inside the University's Digital Institute, explains to Nigel Wright the untapped potential and visionary thinking behind the initiative.

According to Steve, academics working across several disciplines at Newcastle University have, for a long time, struggled with data analytics and data visualisation. Historically, he highlighted, people would approach IT for help in accessing the latest analytics technologies but solutions weren't always forthcoming. A leading group of data researchers based at Newcastle University discovered this sticking point in the journey of research and, a few years ago, they established a virtual team to assist other departments to analyse their data. This became known as the Digital Institute (DI) and since its inception, DI has helped to raise an additional £50-100 million pounds for the university, by helping academics produce better quality proposals and do better research.

Because of DI's success, Steve and his colleagues decided to approach local Government for funding to enable the team to take their solution beyond the walls of the University, and proactively approach businesses to see if they could help them better leverage data. Recognising its potential, Newcastle City Council together with the Department for Digital, Culture, Media & Sport, awarded

DI £1 million in 2015 which it used to build the Cloud Innovation Centre (CIC) in Newcastle.

As head of the Cloud Innovation Centre, Steve has spent two years meeting with businesses to explain how important big data analytics technologies are, outlining implications of these technologies on business models. Part of this engagement, he explained, included those involved with CIC leading 'design reviews' where firms could trial some of the analytics technologies used by researchers and see what they could achieve, as well as

Steve Caughey

learn some 'do's and don'ts' when engaging with data. The CIC engaged with over 250 companies and Steve says a consistent message emerged:

"All the businesses we spoke to were convinced, after seeing what's possible using the latest technologies and approaches to data science, that they needed help. The reality is that factors such as social media or the increased use of sensors and IoT, means companies of all sizes are collecting a vast amount of information on customers and employees. They know there's gold there somewhere — insight that would enable them to improve operational efficiency, products or services — but are aware that internal tools and skills are inadequate to tease wisdom out of the data."

The perspectives gleaned from those who attended CIC's workshops are reinforced by a CIO Insight study that indicated 66% of decision makers say they don't have the skills to implement Big Data solutions, despite 90% identifying Big Data insight as relevant for their business. Furthermore, recent OECD (Organisation for Economic Co-operation and Development) research demonstrated how companies that adopt big data analytics can increase productivity by 5-10% more than companies that do not. Given that, according to ONS, compared with the rest of the G7, the UK has below average productivity growth in both output per hour and output per worker, Steve was emphatic about the importance of marrying together data scientists with business, to unleash data potential:

"By only scratching the surface of their data, organisations risk failing fast in today's digital driven economy. Huge digital skills shortages, with data analysts and data scientists being particularly rare, means data scientists are now the highest paid graduates within 18 months of leaving university. Without the necessary tools and skills in-house, nor with those tools and skills forthcoming any time soon, the CIC model was clearly the answer to this business dilemma."

Steve notes that the data skill "sweet-spot" is combining computer science and maths — maths to understand the problems, computer science to find the best solutions. Those who study for a Ph.D. at Newcastle University's Digital Institute are either mathematicians or computer scientists trained in each other's disciplines for a year before they go on to do a formal Ph.D. Businesses, according to Steve, find it difficult to find these people; attracting them to Newcastle is another stretch, as is luring them away from big banks and other 'high paying' employers. He added: "The ideal for employers, therefore, is to train their own people in specific skills, using their tools, working on their data, and solving their problems — that's what we at CIC facilitated through our joint projects."

When Steve and his colleagues at CIC approached the Treasury, armed with stats and case studies from two years' worth of design reviews, they were awarded £15 million to build NICD (National Innovation Centre for Data). Newcastle University then matched the £15 million invested by Government. Steve says Government is willing to fund this initiative because it recognises a pressing need to break down barriers between business and academia. Academics, he argues, are measured and

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rewarded on research output with the result being a vibrant academic eco-system that rarely spills over into business:

"Researchers locked away inside universities largely don't understand the needs of business, and businesses don't realise what's available behind university walls. NICD is all about engagement. It's about creating links between universities and the public and private sector; bringing them together and helping them extract value from their data while providing them with valuable skills and even IP. There are few formal measures that determine the success of an academic career and organisation beyond its contribution to research. The situation is changing, though, and NICD is part of the solution."

So how will it work? Steve says NICD is "CIC plus" and will deliver data assistance to businesses but on a much grander scale. The centre itself will employ a core team of around ten experts in data analytics. Companies interested in partnering with NICD will identify problems and send employees to the centre who will work alongside these data scientists to solve them. Projects will typically last three to six months and the result will be a tangible data driven solution — such as a piece of bespoke software – with employees returning upskilled and enthused to train colleagues in what they've learned. In addition, NICD will host events and seminars aimed at a broad range of businesses and sectors, as well as provide commercial spaces where data analysts from companies

can hot-desk, and refresh their skills and upskill while visiting. "It will be an iconic, warm, attractive building. There are two floors of public space, seminar rooms, a 3D theatre, a TED-style theatre, workshop spaces, and a café on the ground floor. NICD will have one floor as will the National Innovation Centre for Ageing. Then the top floor is the commercial space."

Steve anticipates it will be bigger companies with large amounts of stock, distribution networks and supply chains and large customer bases that will benefit most from NICD services. Often, in these contexts, company data is still held on paper, spreadsheets or Access database format and isolated in silos. NICD will help these companies to get their data into one place and then perform analysis on it, discovering problems and gaps, patterns and anomalies, and ultimately, solutions. Examples include measuring the success of marketing campaigns by analysing unstructured social media data, interrogating UX data to fine tune products and services, and utilising sensor data to help manufacturers to achieve incremental improvements and efficiencies:

"These scenarios require 'scalable cloud computing' to crunch large quantities of data and the application of complex maths to achieve results. Those are areas where we can add value. We're not a consultancy, though; we're not doing the work for these companies, we're working with them to help them understand how to go about solving these forms of problems. NICD will be driven by the demands of business

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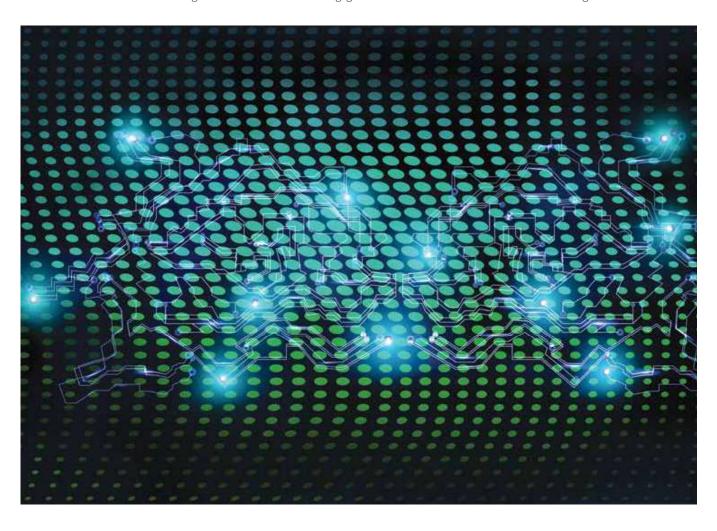and in working with us, they will learn things that will help them grow."

Steve confirmed that one NICD project is already live and enquiries are starting to come in from local businesses as well as companies considering relocating to, or housing data analysis practices in the region, to be near the centre. While NICD has a national remit, Steve pointed out that co-location will make it easier for firms to engage NICD on projects and in the wider data "eco-system" it hopes to create. This not only refers to the events, seminars, workshops and other learning and networking opportunities taking place but also to the specialist skills provided by SMEs who will be brought in to assist on projects, adding to the overall value chain. He explains:

"Large organisations are rarely agile or flexible. Rather than investing in R&D, many are primarily focused on being operational and efficient. The outcome is a lack of digital innovation taking place within these companies. So, the way big organisations can innovate is to engage with

SMEs doing innovative stuff, and then buy them or their products, thus creating a digital eco-system. With an SME based eco-system, you can get much closer engagement with the people doing innovative work — and they can transform your business."

At NICD, Steve envisions a vibrant community of technologists, business development, sales and marketing professionals, and venture capitalists, all located in the same space. The centre will also retain close links with other relevant bodies such as Scotland's Data Lab, the Alan Turing Institute, The Open Data Institute and the Digital Catapult, all which conduct research into data science and promote the sharing and access of public sector data, as well as digital transformation generally.

He added: "The question is not whether you could form a Google or a Facebook, but whether you can create an eco-system which might create a Google or a Facebook. We firmly believe NICD is an essential piece of the jigsaw to help release the potential of UK businesses and launch them onto the world stage."