REF2021

Institution: University of Edinburgh
Unit of Assessment: 32 (Art and Design: History, Practice and Theory)
Title of case study: The Value and Ethics of Data across Creative and Financial Sectors
Period when the underpinning research was undertaken: 2011 – 2020
Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s):	Period(s) employed by submitting HEI:
Prof. Chris Speed	Chair of Design Informatics	Speed (2008-ongoing)
Dr. Larissa Pschetz	Lecturer Design Informatics	Pschetz (2016-ongoing)
Dr. Dave Murray-Rust	Lecturer Design Informatics	Murray-Rust (2016-2020)
Dr. Bettina Nissen	Lecturer Interaction Design	Nissen (2018-ongoing)
Dr Debbie Maxwell	Research Fellow	Maxwell (2012-2015)

Period when the claimed impact occurred: September 2015 - December 2020
Is this case study continued from a case study submitted in 2014? N

1. Summary of the impact

The Institute for Design Informatics led five UKRI projects on the value and ethics of data, and how participatory approaches towards design thinking can foster engagement, benefitting over 190 companies and attracting over 44,000 attendees to its events. This research has generated the following impacts for companies in the financial and creative industries:

a. Increased understanding of the value of data, data-driven technologies and distributed ledger technologies.

b. Generated a shift in culture towards enhanced data literacy and more ethical and informed practices of data-driven innovation.

c. Created 6 new companies and 35 new jobs.

d. Developed new products and services, including 2 to be launched for the benefit of the 6,000,000 customers in Tesco Bank.

2. Underpinning research

The Institute for Design Informatics applies research in design thinking and prototyping to realise social and economic potentials of data and Distributed Ledger Technologies (DLTs). The Institute has pioneered a design approach to Human Computer Interaction (HCI), generating new insights into relationships between the flow of data, technology and design in the digital economy. Driven by the conviction that demystifying data is important for its meaningful adoption, the uniqueness of the team's work lies in its focus on practice-based research that develops toolkits and design prototypes.

The impact reported is underpinned by six key insights:

a. Changing the representation of value from money to data facilitates understanding of the concept of value. This insight was linked to the paper *GeoCoin: Supporting Ideation and Collaborative Design with Smart Contracts* [3.1], which reports on a location-based platform through which participants engaged with smart contracts to explore digital 'debit' and 'credit' zones within the city.

b. As blockchain and distributed ledger technologies reconfigure traditional value chains (from manufacturer to consumer), designers need to consider broader 'value constellations' in which humans and artefacts interact, create and exchange data in new ways. This enables a new conception of valuation as a social practice, and a new conception of data itself as a performative agent in processes of valuation [3.2] [3.3] [3.4]. One of the key papers, *Sorting out valuation in the charity shop*, investigates the notion of 'value constellations' through an ethnographic study of contemporary UK charity shops [3.3].

c. Design with data can reveal viable opportunities for the creation and use of new platforms and services that are powered by peer-to-peer validated blockchains [3.2]. Designers can create new systems in which people and things coexist in the production and use of data. The key paper was *Designing from/with/by Data* [3.4] which expands the notion of 'value-constellation' to present an innovative classificatory framework for designers to better understand how to work with data in a climate where human-data interaction is the key design challenge.

d. Organisational and public understanding of the principles of DLT and blockchain can drive the production of services and products based on these technologies and their attainment of critical mass adoption levels [3.2]. The key paper, 'Designing through value constellations' considered what it means to design value rather than products or services.

e. DLT and other data-driven technologies raise important questions about ethics, such as issues of privacy and consent. These are vital for designers, companies and end users to address in order to comply with legislation and develop responsible products that build user trust. The key paper, *Sensing Data in the Home,* explored ethics of human-computer interaction through an ethnographic case study of a smart toilet roll holder prototype [3.6].

f. Participatory activities and experiential prototyping through physical modelling using tools such as Lego can aid public understanding of and engagement with data and DLTs by making these technologies tangible and intelligible. The key paper was *'Effing' the ineffable: opening up understandings of the blockchain* [3.5] which reports on a toolkit that used simplified physical modelling to enhance understanding of cryptocurrencies such as Bitcoin and the transmission of data through Blockchain. Lego and coloured stickers enabled participants to simulate transactions on a Blockchain Lego 'block'.

Building on these research successes, in 2018 the DI team won major AHRC funding to establish the Creative Informatics Research and Development programme, set up to further drive the growth of a community of data-driven creative industries and talent in Edinburgh and its regions.

3. References to the research

These outputs are all linked to large peer-reviewed grants:

3.1. Nissen, B., Pschetz., L., Murray-Rust, Dave., Mehrpouya, H., Oosthuizen, S. and Speed., S. (2018) 'GeoCoin: Supporting Ideation and Collaborative Design with Smart Contracts'. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (CHI '18). ACM, New York, NY, USA, Paper 163. https://doi.org/10.1145/3173574.3173737

3.2. Speed, C. and Maxwell, D (2015) 'Designing through value constellations', *Interactions*, 22 (5), 38-43. https://doi.org/10.1145/2807293

3.3. Elsden, C., Symons, K., Bunduchi, R., Speed, C. and Vines, J (2019) 'Sorting out valuation in the charity shop: Designing for data-driven innovation through value translation'. *Proceedings of the ACM on Human Computer Interaction*, 3 (CSCW), 1-25. https://doi.org/10.1145/3359211

3.4. Speed, C. and Oberlander, J. (2016) 'Designing from, with and by Data. Introducing the ablative framework for Design Computation'. *Proceedings of DRS 2016, Design Research Society 50th Anniversary Conference,* Vol 1 https://www.drs2016.org/433

3.5. Maxwell, D., Speed, C. and Campbell, D. (2015) 'Effing' the ineffable: opening up understandings of the blockchain'. In *Proceedings of the 2015 British HCI Conference* (British HCI 2015). ACM, New York, NY, USA, 208-209 https://doi.org/10.1145/2783446.2783593

3.6. Speed, C & Luger, E. (2019) 'Sensing Data in the Home'. In H Schnädelbach & D Kirk (eds), *People, Personal Data and the Built Environment.* 1st ed, Springer, 123-142. https://doi.org/10.1007%2F978-3-319-70875-1_6 (Can be supplied by HEI on request)

4. Details of the impact

Through collaborative research on design with data, the Institute for Design Informatics (DI) has built partnerships across a range of organisations aimed at stimulating design thinking, enhancing the understanding of distributed ledger technologies (DLTs) and ensuring that questions of ethics are foregrounded in the use of data to create value. Impact has been generated through a range of activities including over 100 workshops, exhibitions, and events with over 44,000 attendees [5.1]. This has created "a strong community of practice among thought leaders across the financial and creative sectors which help spark ideas and create synergies across sectors" [5.2] and increased understanding of data-driven innovation within organisations, leading to culture shifts, new jobs and products. These impacts have included:

1.   Shaping methods and thinking in NatWest Open Experience (OX)
Through collaboration with NatWest Open Experience (OX), a creative, collaborative organisation dedicated to innovation, DI research has enhanced understanding and wider applications of data-driven innovation. The Head of Partnerships and Open Experience confirms that the research "opened our eyes to the wider applications of data driven innovation" and "informed our approach, particularly in the use of cultural probing methods for ideation and design across data-driven technologies." The partnership also provided OX with access to talent and the shaping of new posts: in 2015 they recruited a DI Master's

students, who had been a research assistant on several of the UKRI funded projects, into a new role as Creative Lead in OX. "His research methods and approaches were significant in shaping that role, and this has been sustained through the appointment of a new Creative Lead from September 2019" [5.2].

2.   Enhanced data literacy leading to new jobs and new products at Tesco Bank

In 2018 and 2019, DI delivered *Mercury*, a GBP165,840 contracted, co-designed and research-based training programme for Tesco Bank. The aim was to extend the data literacy of the Tesco design team and position the bank at the forefront of data-driven products and services within the sector. The programme consisted of lectures (attended by approximately 80 colleagues from the bank) and tailored workshops (attended by approximately 30) designed by DI, including Lego to understand blockchain [3.5] and Geocoin to understand smart contracts [3.1]. It culminated in a showcase during the Edinburgh Fringe festival (2018) that was reported by the BBC and four Scottish newspapers with a joint circulation of 1,700,000 copies [5.3]. The Director of Marketing and Customer Strategy stated that the programme led to a "significant and sustained culture change" within Tesco Bank. It prompted them to shift their focus "away from selling standard bank products" and, through analysis of customer demand, "toward more sophisticated ways of managing personal finances" and developing "user-centred data-driven solutions to that end" [5.4]. This in turn led to creation of 18 new jobs, including the doubling of the design team from 12 to 24 and the establishment of a new team of 6 to identify needs of their 6M customer base [5.4].

The workshops also contributed to the development of two new products currently being tested for launch in 2021. The first involves a new model for loyalty card use whereby points are converted to a pseudo currency enabling wider use than in-store discounts. This is informed by the insights gained through exposure to blockchain and distributed ledger technologies [3.5]. The second, inspired by [3.1], is an app based on smart contracts which uses data about customers' shopping habits to incentivise savings and spending, supporting customers to better manage their money. Tesco Bank confirms that "Neither of these products would have been developed without the research-based insights provided by the Mercury programme." [5.4].

3.   Raising awareness of the value of data in advertising

In 2018, the DI team was commissioned by the Data and Marketing Association (DMA), Europe's largest community of digital marketers, to write a white paper for their Value of Data campaign. The paper, launched in May 2019, presented new insights into the relationship between data and value in businesses, the co-creation of value within digital economies and the ethical implications and uses of data [5.5]. It was downloaded over 1,100 times, underpinned a series of nine talks with a total of 595 registered and 417 attendees/live views [5.6].

The Managing Director of DMA confirmed that the paper expanded DMA and its membership's thinking around data. It "opened up a much richer discussion on what responsible innovation and marketing means; with ethical considerations being part of the value proposition to customers. The result has been a shift towards responsible marketing, with businesses engaged in the value and ethics of data" [5.6].

Speed was invited as keynote speaker to two events hosted by DMA at the Scottish and UK Parliaments. DMA confirmed that "These events put the association in a stronger position to engage with policy. We have seen this in particular in follow up discussions on talent

development which now is framed around value of data." [5.6]. The campaign is ongoing: Luger was commissioned to provide a bespoke workshop for Samsung's legal, marketing and data teams, and an open webinar on data and ethics (May 2020, 103 views) [5.6].

4. Growing the creative industries through Data Driven Innovation

The launch of Creative Informatics (CI) at the start of 2019, a GBP7,700,000 R&D programme (AHRC, Scottish Funding Council, Edinburgh City Region deal) has further enhanced the establishment of a community of data-driven creative industries and talent in Edinburgh and its region. To date, over 190 companies and entrepreneurs have benefitted directly from the programme through R&D and the development of new skills and ideas, based on insights from previous DI research. 6 of these are new companies created as a result of the programme, and several others small start-ups using the programme to become sustainable businesses. 10 companies have already reported that the CI programmes contributed significantly to them securing additional investments and/or grant funding totalling GDP1,696,798, whereas 16 companies report 17.5 news job created, with another 19.5 being safeguarded as result of the programme [5.7].

One such company is SuperRational Ltd, a cloud-based digital rights management company. Following participation in the CI accelerator and resident entrepreneur programmes as well as producing one of the CI lab events, they went on to secure GDP375,000 private investment, leading to 5 full time and 6 part time/contracted jobs andthe development of a DDI product called Delic that enables musicians to have greater control of their work (to date, over 450 people have signed up to the Delic app, which will be launched fully Summer 2021). Speaking about the benefits of the CI programme, the Founder and Creative Director of SuperRational explained how it reiterated "the value of research-based, data-driven development", helping the company refine their research approach, evolve their thinking about data, and reconsider ethical issues around technology. "The session on speculative design was particularly inspiring and broadened the horizon of product development" [5.8].

5. Sources to corroborate the impact

5.1. List of events and attendances from Design Informatics

5.2. Statement from Head of Partnerships and Open Experience, NatWest Group

5.3. Press report from Edinburgh Fringe pavilion in 2018, including clippings and circulation numbers for each outlet

5.4. Statement from Head of Digital at Tesco Bank

5.5. *Value of Data: shifting values.* White paper commissioned by the Data and Marketing Association (DMA), authored by Chris Speed and Ewa Luger to launch the Value of Data Campaign

5.6. Statement from Managing Director, Data and Marketing Association (DMA)

5.7. Creative Informatics Partnership reports to AHRC

5.8. Statement from Creative Director, SuperRational Ltd.