

Northumbria Research Link

Citation: Nissen, Bettina, Symons, Kate, Tallyn, Ella, Speed, Chris, Maxwell, Deborah and Vines, John (2017) New Value Transactions: Understanding and Designing for Distributed Autonomous Organisations. In: DIS '17 - 2017 ACM Conference on Designing Interactive Systems, 10th - 14th June 2017, Edinburgh, UK.

URL: <https://doi.org/10.1145/3064857.3064862> <<https://doi.org/10.1145/3064857.3064862>>

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/31417/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)

www.northumbria.ac.uk/nrl



New Value Transactions: Understanding and Designing for Distributed Autonomous Organisations

Bettina Nissen**Kate Symons****Ella Tallyn****Chris Speed**

Design Informatics,
University of Edinburgh, UK
bettina.nissen@ed.ac.uk
k.symons@ed.ac.uk
e.tallyn@ed.ac.uk
c.speed@ed.ac.uk

Deborah Maxwell

University of York, UK
debbie.maxwell@york.ac.uk

John Vines

Northumbria University, UK
john.vines@northumbria.ac.uk

Abstract

New digital technologies such as Blockchain and smart contracting are rapidly changing the face of value exchange, and present exciting new opportunities for designers. This one-day workshop will explore the implications of emerging and future technologies using the lens of Distributed Autonomous Organisations (DAOs). DAOs introduce the principle that products and services may soon be owned and managed collectively and not by one person or authority, thus challenging traditional concepts of user communities, ownership and power. The HCI community has recently explored issues related to finance, money and collaborative practice; however, the implications of these emerging but rapidly ascending distributed organisations has not been examined. This one-day participatory workshop will combine presentations, case studies and group work sessions to understand, develop and critique these new forms of distributed power and ownership, and to practically explore how to design interactive products and services which enable, challenge or disrupt these emerging models.

Author Keywords

Blockchain; Smart Contracts; Distributed Autonomous Organisations; Ownership; Value Exchange.

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author.

DIS'17 Companion, June 10-14, 2017, Edinburgh, United Kingdom
© 2017 Copyright is held by the owner/author(s).
ACM ISBN 978-1-4503-4991-8/17/06.
<http://dx.doi.org/10.1145/3064857.3064862>

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Theme, Motivation and Background

This workshop explores the novel forms and means of value exchange promoted by Distributed Autonomous Organisations (DAO). These are organisations such as business units underpinned by smart contracting rather than conventional institutions. Designers and data specialists are at the forefront of exploring new ways of exchanging value, using Blockchain, cryptocurrencies, smart contracting and the direct exchanges between things made possible by the Internet of Things. These novel technologies mean that concepts of value and value exchange are being challenged in a variety of ways, and, far from being neutral, these innovations are entangled with and are co-producing novel political, economic, social and material arrangements [4], raising questions of ethics, privacy and the sociopolitical implications of new forms of distributed authority. This workshop builds on established HCI research exploring the role of technology in financial interactions and designing for the rapidly changing world of technology and value exchange [3,5,6,10,10] to specifically address the questions raised by DAOs.

Though presently a rather slippery set of ideas and instantiations, we consider that the term refers to organisations and business models which are underpinned by smart contracts and distributed ledgers, operating somewhat autonomously. However, we anticipate that the workshop will critique, clarify and expand this definition. Initial examples include The DAO, an automated digital company which allowed decisions to be made through the agreement of

members via smart contracts, raising over \$120 million worth of digital currency before being hacked in 2016 [12]. DAOs have consequently captured the imagination of libertarian business proponents, who imagine a form of stateless organisation unmediated by bosses and governed directly by shareholders. As with the Blockchain more generally, DAOs are seen as models for distributed power and ownership because they remove the necessity for a centralised governing body. However, there have been very few attempts to synthesise and formalise definitions of what the various types of DAOs are. Professional services firm PwC has published a continuum that described levels of complexity for smart contracts, as shown in Figure 1. PwC envisage DAOs as a spectrum from simple cryptocurrency transactions that are recorded in a distributed ledger to Distributed Autonomous Societies (DASs), a model of exchange that could be described as post-national. Towards the middle of the spectrum we find Distributed Autonomous Business Units, entities that we may have previously considered as products or services that are owned by a distributed network of members and managed through smart contracts.



Figure 1: Definitions and properties of forms of distributed exchange and organization proposed by SNS [7].

Examples

Early small-scale forms of design-based DAOs are beginning to manifest. Examples include BitBarista (fig.2a), a coffee machine that initiates contracts with coffee drinkers to help itself stay longer in the world [8], and KASH Cups (fig.2b), coffee cups that operate as a pop-up digital currency, using smart contracting to highlight social and economic values in coffee transactions. These examples explore how automated systems are becoming 'smart' actors, and potentially DAOs.



Figure 2(a) BitBarista and (b) KASH cups

We consider that this fast-moving commercial and research agenda provides an opportunity for designers to question these novel assemblages both conceptually and in practice. The emergence of DAOs raises questions in many areas, inviting us to rethink current practices of ownership, value and ethical relationships and to reconsider “value constellations” [9] not as independent businesses but entangled networks of people, services and things. We anticipate the growth of DAOs as the subjects of design briefs and invite participants to explore design implications for HCI.

Aims

This workshop aims to bring together researchers and designers who have an interest in or have experience with community shared or managed resources, applied blockchain and distributed systems, and future challenges of new models of ownership, services and value. The workshop will combine conceptual and practical goals to generate thought leadership into this emerging commercial and research agenda, bringing new insights into what is presently being driven by a variety of different actors from large financial service organisations to independent designers. We also aim to synthesise and provide a conceptual framework, to encourage critique and divergent views, and position critical interactive design at the forefront of the DAO agenda. At the same time, we want to practically and tangibly explore how to design with and for this emerging space through a series of participatory activities and rapid explorative design exercises in which groups of participants develop concepts for applied uses of distributed systems. This workshop will form the basis for editing a special issue in Ubiquity (the research journal for Design Informatics at the University of Edinburgh) on defining new vocabularies

and design opportunities for interaction design presented by DAOs.

Key Themes and Position in Current Debates

The workshop invites submissions related to:

Defining and designing for DAOs: The concepts of value and value exchange raise several interesting questions for designers. There is an existing body of work in the field of human-computer interaction that has studied issues of the exchange of money between individuals and organisations (e.g. 1); however, little of this work addresses DAOs directly.

Ownership, power and governance: Central to the conceptual drivers to the workshop is the shift in concepts and practices raised by DAOs. The fact that DAOs are autonomous (and, we will also question what ‘autonomous’ means in this context) raises questions of responsibility, ownership and power, in particular, what kinds of power relations do DAOs embody and reproduce, and what changes in conventional power relations are brought about by peer-to-peer, autonomous exchange? Similarly, questions are raised around the governance of DAOs, which may transgress conventional notions of business ownership.

Agency, materiality and politics: The workshop also speaks to contemporary questions of the agency of things. Political theorists such as Jane Bennett encourage us to consider “a world populated by animate things rather than passive objects”, and made up of webs of complex and relational forces [2: i], where a variety of objects and assemblages shape the world alongside the conventionally imagined conscious human agent. We want to question how DAOs might fit

into this relational more-than-human ontology of people, things, data and ecologies, and use them as a lens to further advance our understanding of the world as shaped by animate and lively things.

Critiquing current and emerging work: The workshop will provide an opportunity to collect current and emerging work from the design community and beyond by asking participants to submit current examples. This will showcase the diversity of work that may exist in this area, pushing the DAO agenda beyond the financial services technology debate it currently dominates.

This workshop is extremely novel in offering interaction designers a platform to consider the implications of designing for a DAO. The main purpose of the workshop is to deepen our presently very limited understanding of this rapidly emerging technology in order to better understand what DAOs are, and how the data and transactions that occur between and with them might be a material for design. This will also expand our understanding of the ways in which DAOs may stimulate new social and commercial relationships which involve novel forms of design, manufacture and user engagement with data.

References

1. Carroll, J.M. and Bellotti, V. 2015. Creating Value Together: The Emerging Design Space of Peer-to-Peer Currency and Exchange. *In Proc. CSCW '15*. ACM, 1500-1510.
2. Bennett, J. 2010. *Vibrant Matter: a Political Ecology of Things*. Duke University Press.
3. Kaye, J., Vertesi, J., Ferreira, J., Brown, B. and Perry, M. 2014. #CHImoney: Financial Interactions, Digital Cash, Capital Exchange and Mobile Money. *In CHI EA '14*. ACM, 111-114.
4. Kinsley, S. 2014. The Matter of 'Virtual' Geographies. *Progress in Human Geography*, 38(3), 364-384.
5. Malmberg, L., Light, A., Fitzpatrick, G., Bellotti, V. and Brereton, M. 2015. Designing for Sharing in Local Communities. *In CHI EA '15*. ACM, 2357-2360.
6. Millen, D.R., Pinhanez, C., Kaye, J., Sardela Bianchi, S.C., and Vines, J. 2015. Collaboration and Social Computing in Emerging Financial Services. *In CSCW'15 Companion*. ACM, 309-312.
7. Morrison, A. (undated). Blockchain and smart contract automation: How smart contracts automate digital business. PwC Technology Forecast series 2015-2016. Available at <http://www.pwc.com/us/en/technology-forecast/blockchain/digital-business.html> (accessed 16 January 2017).
8. Pschetz, L., Tallyn, E., Gianni, R. and Speed, C. 2017. BitBarista: Exploring Perceptions of Data Transactions in the Internet of Things. *In Proc. CHI'17*. ACM, forthcoming.
9. Speed, C. and Maxwell, D. 2015. Designing through Value Constellations. *interactions* 22, 5 (August 2015), 38-43.
10. Vines, J., Dunphy, P. and Monk, A. 2014. Pay or Delay: The Role of Technology when Managing a Low Income. *In Proc. CHI '14*. ACM, 501-510.
11. Wang, Y. and Mainwaring, S. 2008. Human-Currency Interaction: Learning from Virtual Currency Use in China. *In Proc. CHI '08*. ACM, 25-28.
12. Waters, R. 2016. Financial Times: Automated company raises equivalent of \$120M in digital currency. Available at: <http://www.cnbc.com/2016/05/17/automated-company-raises-equivalent-of-120-million-in-digital-currency.html> (accessed 11 January 2017).