

Jun 8th, 9:00 AM - Jun 12th, 5:00 PM

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Boyeun Lee
The University of Exeter

Ella Tallyn
The University of Edinburgh

Ramprabu Thangaraj
New Jersey Institute of Technology

Chris Elsdon
The University of Edinburgh

Chris Speed
Royal Melbourne Institute of Technology

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Citation

Lee, B., Tallyn, E., Thangaraj, R., Elsdon, C., and Speed, C. (2026) Value co-creation, co-displacement, and co-destruction in design: Bridging value and values in human-data interaction, in Simeone, L., Gray, C. M., Verhoeven, A., de Götzen, A., Bakırlioğlu, Y., Zohar, H., Stead, M., and Buwert, P. (eds.), *DRS2026: Edinburgh*, 8–12 June, Edinburgh, United Kingdom. <https://doi.org/10.21606/drs.2026.1422>

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Value co-creation, co-displacement, and co-destruction in design: Bridging value and values in human- data interaction

Boyeun Lee^{a*}, Ella Tallyn^b, Ramprabu Thangaraj^c, Chris Elsdén^b, and Chris Speed^d

^aThe University of Exeter, United Kingdom

^bThe University of Edinburgh, United Kingdom

^cNew Jersey Institute of Technology, United State

^dThe Royal Melbourne Institute of Technology, Australia

*Corresponding author e-mail: b.l.lee@exeter.ac.uk

doi.org/10.21606/drs.2026.1422

Abstract: Data has emerged as a fundamental driver of value creation within design processes, shaping economic, ethical, and environmental outcomes across societies and socio-technical systems. Existing scholarship often frames value in binary terms of co-creation and co-destruction, overlooking the systemic complexities introduced by interconnected, data-intensive systems. This paper introduces the novel concept of value co-displacement to capture how alternative forms of value emerge and displace others within human–data interaction. Drawing on four design research case studies, we investigate how value and values are co-created, co-displaced, and co-destroyed across interconnected, data-intensive systems. We develop a framework that conceptualises the dynamic interplay of these processes, demonstrating how design actively redistributes value across socio-technical contexts. This contribution advances a more nuanced understanding of value as dynamic, contested, and relational, highlighting the need for more reflexive and responsible approaches to data-driven design.

Keywords: Value co-creation; Value co-displacement; Value co-destruction; Human-data interaction

1. Introduction

Design is, by its nature, influenced by *value* and *values*. Throughout the process of creating an artificial object, service or system, design decisions are shaped by the interests of multiple stakeholders, including users, organisations, and indirect actors (Bos de Vos, 2020). The concepts of *value* and *values* have long been central to academic discourse. Economists and social scientists have contributed to a comprehensive understanding of these concepts. While marketing scholars propose established frameworks for value creation, such as service-dominant logic (Vargo and Lusch, 2004), sustainability research examines tensions between value co-creation and co-destruction (Mancuso *et al.*, 2025). Design research,



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meanwhile, has explored how to integrate ethical considerations throughout design processes, with notable frameworks including Value-Centred Design (Cockton, 2006), Value-led Participatory Design (Iversen *et al.*, 2013), and Value Sensitive Design (Friedman and Hendry, 2019), alongside studies examining the opportunities and challenges designers encounter in creating value (Kronsbein and Mueller, 2019; Lee *et al.*, 2019a; Lee and Ahmed-Kristensen, 2024; Speed *et al.*, 2019).

Despite these advances, current literature remains largely focused on the binary framings of value creation and destruction, overlooking how design decisions may simultaneously and unintentionally displace or bridge multiple forms of *value and values*. Recognising this complexity, marketing researchers have called for new methodological approaches to better understand system-level dynamics (Jaakkola *et al.*, 2024). In data-driven contexts, these dynamics becomes even more complex (Lee *et al.*, 2022), as complex interactions between data, users, and organisations can shift value in unexpected ways.

Moving beyond a binary perspective of co-creating or co-destroying value (Engen *et al.*, 2021), this paper introduces the concept of value co-displacement. Drawing on four design research case studies, this paper investigates how *value and values* are co-created, co-displaced, and co-destroyed within interconnected, data-intensive systems. We develop a framework that captures the dynamic interplay of these processes, advancing understanding of how design redistributes value across socio-technical contexts.

The paper is structured as follows: Section 2 reviews related work, Section 3 outlines our research methodology, Section 4 presents four case studies, Section 5 discusses the findings from the case studies, and Section 6 concludes with implications and directions for future research.

2. Related Works

2.1 Conception of Value and Values

Since Aristotle, the concept of *value* has been debated. In pricing, *value* is defined as the balance between benefits and sacrifices for customers (Leszinski and Marn, 1997), while strategy research frames value as the price buyers are willing to pay for a firm's offering (Porter, 1985). Economic perspectives therefore often conceptualise value through measurable metrics such as price, exchange, or utility – thereby simplifying complex social relations into a single form of value – whereas social scientists have drawn an important distinction between *value* and *values* as related but conceptually distinct constructs. Rokeach (1973) defines *values* as enduring beliefs about desirable modes of conduct or end-states, while Miller (2008) contrasts measurable exchange *value* with inalienable forms of worth embedded in social and moral life (Miller, 2008).

In design research, this distinction between *value* and *values* becomes particularly salient, as design shapes how values are materialised through artefacts, services, and interactions. Friedman and Hendry (2019) argue *values* are what individuals or groups consider important in life, expanding discourse beyond a narrow, economic perspective. Similarly, Vos (2020) introduces six diverse types of value—human, cultural, use, social, economic, and ecological/environmental—highlighting how design decisions must often balance individual

wellbeing, cultural meaning, functional utility, social relations, economic outcomes, and environmental sustainability. The rise of service design further supports this view, integrating social norms and moral principles alongside economic and engineering efficiency (Kim, 2021), aiming primarily to bridge and align the *values* of users with those of organisations.

While management and sustainability literature often focus on measuring or governing value, design research emphasises how *value* and *values* (hereinafter *value(s)*) are negotiated, and materialised through the co-creation of artefacts, services, and socio-technical systems. Building on these perspectives, we adopt the broader conception of value(s) proposed by Karababa and Kjeldgaard (2014). This includes exchange value, perceived value, experiential value, identity and linking value, social value and value systems, value as co-created, and value as the co-creation of meaning, providing a lens for understanding how different forms of value(s) dynamically emerge in human-data interaction.

2.2 Designing for Value Creation

Traditionally, value creation has been conceptualised through a firm-centric and linear value chain model (Porter and Millar, 1985), often described as goods-dominant logic (Normann, 2001). With the shift toward a service-oriented economy, scholars have highlighted the limitations of this perspective, noting that it inadequately captures the dynamics of value creation in relation to intangible service offerings. In response, Service-Dominant Logic has been advanced as an alternative to the Goods-Dominant paradigm, offering a more systematic and network-oriented framework for understanding the co-creation and delivery of value in service contexts (Vargo and Lusch, 2004). Regardless of whether one adopts a goods-dominant or service-dominant logic, shareholder value is often prioritised above all else, positioned as the primary goal to which all other values must be sacrificed (Copeland *et al.*, 1994).

Daniel Miller's work on the '*Uses of Value*' (2008) is directly critical of such calculative efforts to reduce values to any single figure or metric. When value is represented primarily through monetary measures – such as the fungibility of fiat currency, which obscures where goods originate or how transactions unfold across supply chains – socially rich meanings can be flattened or rendered invisible, effectively camouflaging the environmental, social, and relational values embedded within transactions. Arguably, it is this loss which Value Centred or Sensitive approaches are seeking to address by centering particular values in a design process (Elsden *et al.*, 2019a). However, Miller is not simply resisting measurement – but instead provides an appeal for more plural approaches to valuation and a recognition for how the representation of value is made meaningful socially. For example, he describes how individualised mobile phone billing can make explicit the value people place on specific personal relationships. Value is hence co-created, not from the calculation of a phone bill, but from how this data can then be appropriated by individuals, in the context of their lives.

Following this thread, we can see the role of a designer in creating value, by enabling value to bridge, or be translated across various points or relationships in a network (Elsden *et al.*, 2019b). Similarly, (Elsden *et al.*, 2019a) provide a contemporary ethnographic study of how managers and staff working within the infrastructure of second-hand charity shops mediate and create value not simply by pricing to maximise a return, but by sensitively translating

value between local donors and shoppers on one hand, and more abstract, global beneficiaries of charity on the other. Notably, efforts to automate or accelerate aspects of this work risk destroying value, when their design fails to accommodate the diversity of value translation taking place – beyond facilitating a transaction.

In the context of the digital economy, scholars argue that value creation in digital innovation is far more complex, extending beyond the limitations of linear value chains and network-based models (Bhattacharya et al., 2017; Lee, 2022; Speed and Maxwell, 2015). In the context of health data, Fiore-Gartland and Neff (2015) introduce the concept of ‘data valences’ to describe how different communities value different forms of data in different overlapping and sometimes contested ways. One key role of a designer of such systems, especially through a systemic lens or as data-driven innovation, is to recognise the ways in which value is made visible, captured, flows and is translated between actors. However, crucial to efforts to design value creation, is to understand more critically where design can destroy, suppress or displace value, and how design research can be used to reveal this.

2.3 Co-Destruction of Value and Values

While Service-Dominant Logic initially emphasised collaborative value co-creation (Vargo and Lusch, 2004), subsequent scholars have examined resource integration processes that produce negative outcomes alongside – or instead of – positive value.

The conceptual foundation for value destruction emerged with Plé and Cáceres (2010), who introduced "value co-destruction" and "misintegration" within service systems. They argued that value co-destruction occurs when resources are integrated in ways that diminish well-being or fail to improve wellbeing for any party. This marked a departure from S-D Logic's initially optimistic tone, acknowledging that interactive processes enabling value co-creation can simultaneously produce destructive outcomes. Echeverri and Skålén (2011) further developed an interactive value formation framework positioning both creation and destruction as potential outcomes of value formation, arguing that "*value [is] interactively formed either as 'resource congruence' (co-creation) or as 'resource incongruence' (co-destruction).*" This dynamic is further illustrated by Engen et al (2021), who examine value co-creation and value co-destruction in service ecosystems (Figure 1).

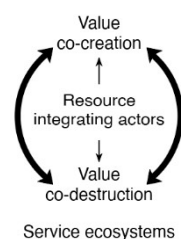


Figure 1 Value co-creation and value co-destruction in service ecosystems, adapted from Engen et al. (2021).

However, the relationship between value creation and destruction becomes particularly complex through systemic and sustainability lenses. Design theory offers crucial insights here. Tony Fry's (2009) concept of "defuturing" reveals how design decisions that privilege certain values actively destroy future possibilities. When data-driven systems optimise for efficiency and growth metrics, they "defuture" alternative values of care, reciprocity, or

ecological embeddedness. As Cameron Tonkinwise (2015) argues, such design decisions can actively foreclose alternative possibilities, a form of ontological displacement where the materialisation of specific values through design determines which futures remain possible and which become unrealisable.

The value co-destruction literature (Mancuso *et al.*, 2025; Vinuesa *et al.*, 2020) risks perpetuating binary framings that obscure subtler dynamics. Returning to Daniel Miller's (2008) anthropological work offers crucial critique: when socially rich gift-based economies encounter transactional logics, value may appear as displaced, rendered invisible within new dominant valuation frameworks. What appears as destruction may represent value translation into registers of worth (Appadurai, 1986). Value becomes illegible within particular accounting systems rather than disappearing entirely.

In this paper, we explore how design, and particularly the critical practice of design research, not only creates and destroys, but serves to disrupt, displace and critique how value(s) are recognised and made present in data-driven and networked products and services.

3. Methodology

To investigate the impact of design practices on value(s) we analysed a set of case studies describing value creation and loss through design research processes. These case studies were originally submitted to a 2025 ACM DIS Conference workshop “Mindful Value Creation and destruction” (Lee *et al.*, 2025). The Call for Participation guiding these contributions asked for experiences of data-driven value destruction in design research or projects. Background information indicating the workshop focus highlighted research such as Value Sensitive Design, that includes broader impacts on indirect stakeholders, and Worth-Centred Design, that considers experiential and social values alongside utility.

As part of the workshop, interested parties discussed the workshop contributions in relation to a theoretical and linguistic approach to understanding value destruction. Following this, four contributions were selected as case studies for further analysis. These were selected to offer a range of different approaches to design research. Cases A, C and D studied novel designs created as part of the research process, while B studied participants' personal data sets, rather than a design product. A, C and D differ in the type of design product studied, while all were data-driven, A was expressed through hardware, C through a software application, and D through an IoT platform. Although the project contexts and value(s) involved differ, each case focuses on how design intentions and expectations relate to the value(s) shifts that emerge during the design process.

The four case studies were further developed by the authors 1, 2, 3 and 5 to draw out the salient points for this analysis. For each case study we provide an overview description of the project including the name, dates, practically what it was, the intended value creation, the value displacement/destruction that happened, and why. The scope of the cases also includes the study process and speculates on possible impacts beyond this.

Our analysis draws on the theoretical thinking around value(s) discussed in the previous sections and identified patterns in how value(s) are created, displaced, and destroyed in human–data interaction, with particular attention to the authors' perceptions of value shifts that resulted from the design or design process.

4. Case studies

4.1 Case Study A: Bitbarista

The Bitbarista, built in 2016, was a home coffee machine augmented with a Raspberry Pi, internet connection and a Bitcoin wallet to make and accept payment. Presented as with the finish and fidelity of a research product (Odom et al., 2016), customers paid Bitcoin in return for coffee and a vote for the origin of the next supply of coffee beans. It embodied concepts of *disintermediation*, connecting consumers directly with growers via data streams from coffee producing countries. Intermediaries, such as grocers and large supermarkets, who normally reconstitute the value of goods through marketing were bypassed (Pschetz et al., 2017). Using Bitcoin (Nakamoto, 2008) to enable consumers to contribute to the system and receive rewards for performing maintenance tasks, the Bitbarista also demonstrated *financial machine autonomy*. This built on the story of disintermediation, removing intermediaries such as coffee vendors and banks. In 2017 regular coffee machines in three different offices were replaced with the Bitbarista for a period of one month. The office inhabitants were given Bitcoin to participate, and at the end of the study their perceptions were explored in interviews (Tallyn et al., 2018).

The Bitbarista was intended to offer new value through greater consumer choice around quality and the impacts of coffee production based on trusted provenance data, and generate authentic connections with coffee and coffee growers, raising consumer awareness of consumption practices and ethical considerations. The study revealed that while new value was created for participants through a sense of increased ethical alignment, value was also lost through their irritation with the “barrier” that engaging with data and ethical choices presented, in order to get coffee. For example, some participants said their stance regarding ethical choices would remain constant, so they did not want to engage with this for each coffee. The responses to the machine autonomy were varied; for some participants value was created through the opportunity to earn coffee or Bitcoin from performing chores, whilst others noted the potential loss of community spirit that is normally supported by office colleagues’ contributions to coffee drinking practices; buying, making or cleaning up after others. In moment-to-moment interactions there appeared a direct trade-off between key values; ethical values interrupting utility and autonomy, and financial gain interrupting community values. Ethical considerations were prioritised in the design, limiting customers’ ability to opt out. While ethical values were co-created, this occurred at the expense of utility and choice, which were co-displaced and ultimately diminished. Where financial gain from performing chores was co-created, it also appeared that coffee related tasks were performed less for community benefit and more for individual financial gain. While this was not a direct trade-off, as community practice could still exist, there was a sense that the introduction of financial gain for individuals in these transactions would erode the community relationships, which creates a more subtle form of co-displacement leading to diminishment of community value.

4.2 Case Study B: Data After Death

In an increasingly digital world, individuals generate vast amounts of personal data—from photos and social media to messages and browsing histories. What happens to this data after death raises questions of value displacement, as the meaning and worth attached to

data may shift post-mortem. To explore this, an interview study with adults aged 65 and above examined preferences for managing five types of personal data: social media, messages, fitness data, photos, and digital trace data (e.g., browsing history). Participants discussed what should happen to their data after death, who should handle it, and why.

First, the study shows how experiential value(s) – the emotional, identity-based, or sentimental meanings individuals attach to their data-can be co-created and realised during their lifetime. However, once the data is inherited (by the heir), individuals lose control over how it is treated. Heirs may not share these sentimental attachments and may delete the data, illustrating how experiential value can become displaced when data is passed across generations.

Second, the study highlights how other stakeholders may derive economic value from personal data after death. Corporations may retain access to a deceased individual's data to continue generating financial gain (Ankenbauer and Brewer, 2025); for instance, a GPS provider may continue storing location histories after death (Holt *et al.*, 2021). In such cases, the continued exploration of data can compromise privacy, displacing social values and value systems associated with personal autonomy and dignity while enabling new forms of economic value creation. At the same time, other actors-such as relatives or public-good researchers- may attribute new meanings such as remembrance, legacy, or community benefit, creating further value complications.

4.3 Case Study C: Smart Donations

Smart Donations was a fully-functional mobile app that used smart contracts to enable people to set up programmable charitable donations, based on the live reporting of real-life events in the world – such as the detection of an earthquake, or an activist tweeting about refugees. The Smart Donations app was deployed with donors to Oxfam Australia, during an intensive study period. The results suggested how charities could use data and automation to generate greater engagement with donors; and how donors may gain greater autonomy and awareness in exactly how and when they donate. In a best-case scenario, the project envisaged charities and donors finding a kind of synchronicity and '*right time*' to give.

However, despite the promised value creation of programmability and automation, the effort to anticipate or consider the possible implications of different smart donation contracts was challenging for some participants. The findings showed complex emotional engagement, *"Users felt gratified and then guilty by the success of their contract design when donations were made. They felt disappointed then remorseful, and then sometimes relieved, when inactive contracts expired, and frustrated or excited to set up another."* (Bidwell *et al.*, 2021). What charities traditionally do is help mediate these contrasting emotions, by separating the process of giving from the unfolding and challenging processes of real assistance on the ground (Elsden *et al.*, 2019a). Despite broad desires for greater transparency in the charity sector, the value of this intermediary work risks being undermined when donors are too closely involved or connected to the end beneficiary of their donation – programmatically or otherwise.

In collaboration with Oxfam, Smart Donations was designed primarily as a way for a charity to tell better stories about how data they use can demonstrate 'true' need. But extending this 'end-to-end' and donor-centric logic risks delegitimising charities as trusted

intermediaries (Elsdon et al., 2019b). At worst, we can even see how charitable giving could descend into a perverse popularity contest, or form of gambling – where charities and beneficiaries are contorted to appeal to donors’ wants or guilt, rather than what is truly best for those in need. In this way, we can see how value is not necessarily destroyed, but displaced, or reoriented, to align with certain groups (donors) ahead of other (beneficiaries). When the mediation work of the charity is displaced by direct contact with unfolding disasters, the positive feelings of giving for donors may be interrupted by distress, long term this could have the effect of diminishing engagement with the system. For charities, this remains a delicate balance.

4.4 Case Study D: Silent Herdsman

The Agri-tech platform is a decision support system for herd management that combines real-time sensor data gathered from neck-mounted collars with GPS, machine learning technologies and cloud-based services. The neck-mounted collar monitors an animal’s fertility and health by detecting its eating behaviour, heat expression, and rumination patterns. The real-time data are then analysed, and meaningful insights are transmitted wirelessly to farmers’ devices to support decision-making and farm management (Lee et al., 2022). Using three qualitative research methods—semi-structured interviews, document reviews, and graphic elicitation—the study revealed how the value(s) associated with the platform continuously evolved in the design process.

The sensor-embedded Agri-tech platform collected real-time data on the animal behaviour, enabling a continuous value co-creation process in which value(s) are identified, reidentified, and co-created through real-time data (Lee et al., 2020). For instance, the team initially intended to co-create value through monitoring and increasing fertility of cattle, hence enhancing economic value. However, the collection of behavioural data also enabled the creation of additional ethical and economic value by improving animal’s health which in turn enhanced productivity.

The process involved multiple actors to co-create value, which include data specialists, veterinarians, geneticists, farmers, retailers, dairy producers, and feed suppliers. Although this was essential yet challenging (Lee et al., 2018), often resulting in value conflicts between the actors. While the system was intended to create economic value, it displaced and destroyed ethical value. For instance, farmers, with over a century of accumulated expertise and deeply ingrained practices, experienced tension between adopting predictive fertility monitoring to increase productivity and preserving their traditional expertise and trust in long-established practices. Furthermore, while monitoring animal fertility was intended to increase productivity, it had negative implications for animal welfare and increased animal stress.

In this presentation of the case studies, we extend the concept of value creation and destruction by reframing it as more subtle and nuanced form of displacement, which might be momentary, remaining in balance with or tensioned against value creation, or as a potential loss in the future, after events occurring or a long time period. The following section discusses these subtle dynamics within data-driven and networked products and services.

5. Findings and Discussions

Based on the case studies, we identify three key commonalities in relation to designing for value creation. First, value is not simply co-destroyed but rather co-displaced. Second, to extend on the simple binary concepts we have created four distinct categories of value shift that we observe in the case studies. Finally, design functions as a critical enabler of continuous value co-creation, co-displacement, and co-destruction through ongoing interactions between users, machines, and stakeholders.

5.1 *The Multifaceted Dynamics of Designing Value Creation*

Across the four cases, the dynamic and complex nature of value co-creation, co-displacement, and co-destruction becomes evident. While prior research has largely focused on value co-creation and value co-destruction, we introduce the concept of value co-displacement to describe a distinct dynamic through the ongoing interactions of users with the system and data. Value co-displacement occurs when the emergence or prioritisation of one form of value pushes aside or suppresses another. Unlike value tension or negotiation—where multiple values coexist and are actively balanced—co-displacement refers to situations in which one value becomes dominant, rendering other values marginalised or less visible within the socio-technical system.

In terms of visibility, we categorise designing and understanding value into four distinct modes within socio-technical systems:

- Value is co-created and realised.
- Value is co-created but unrecognised.
- Value is co-displaced as an alternative value emerged and realised.
- Value is co-displaced so that other value is co-destroyed/diminished.

The multifaceted dynamics of value co-creation is summarised in table 1. For identifying and categorising value(s) in each case, we draw on the concepts introduced in Section 2.1

Case A highlights the multifaceted dynamics of value co-creation, co-displacement, and co-destruction. Design researchers initially aimed to co-create multiple forms of value, including social values and value system (ethical and environmental consideration), experiential value (enjoying high-quality coffee), and value as the co-creation of meaning (authentic connection between users and farmers). However, the intended authentic connection between users and growers was not recognised. In exploring direct and individualised machine-human relationships, several instances of value co-displacement became evident. For example, exchange value (earn coffee or Bitcoin from performing chores) emerged as an alternative to the intended value which was therefore co-displaced, whereas experiential value (a convenient quick fix) and social values and value systems (Community cohesion activities around coffee) were diminished and thus co-destroyed.

In Case D, economic value (enhancing fertility) and experiential value (improving farmers' efficiency) were intended to be created by multiple actors. However, experiential value was rarely realised, sometimes resulting in co-destruction of experiential value, as farmers' traditional expertise and trust in long established practices were undermined. The

continuous collection of animal behaviour data enabled co-displacement of both ethical and economic value (e.g., monitoring animal health associated prolonged pregnancy), but it also led to co-displacement of ethical value, as animal stress increased.

Table 1 The multifaceted dynamics of value co-creation, co-displacement, and co-destruction of each case.

	VCC-realised	VCC-unrecognised	VCD-realised	VCD-destroyed
Case A	Experiential value [quality coffee] Social values and Value system [ethical and environmental consideration]	Value as the co-creation of meaning [authentic connection between users and growers]	Exchange value [users earn free coffee or bitcoin]	Social values and value system [community cohesion activities around coffee] Experiential value [quick fix, convenience]
Case B	Experiential value [various value attached to data]		Economic value [financial gain obtained through data exploitation]	Social values and value system [data exploration compromising privacy]
Case C	Social values and value system [increasing engagement with and donations to charitable activities] [enhancing understanding of beneficiary needs and charitable responses]		Social values and value system [prioritisation of short-term donor attention over beneficiary need]	Experiential value [removes safe buffer between making donations and awareness of unfolding humanitarian disaster]
Case D	Economic value [increasing fertility of cattle]	Experiential value [Improving efficiency of farming]	Ethical value and Economic value [monitoring animal health]	Ethical value [Animal wellbeing] Experiential value [Farmers' traditional expertise and trust in long established practices]

Across the cases, value emerges not as a stable outcome but as a dynamic process in which co-creation, co-displacement, and co-destruction occur simultaneously and relationally. The findings demonstrate that design decisions redistribute value across actors and contexts, often producing unintended consequences where certain values are realised while others become marginalised or diminished. This resonates with Arturo Escobar's (2018) notion of "ontological occupation," which highlights how dominant design paradigms – particularly data-driven systems – can constrain the space of possibilities, making alternative value systems appear irrational or invisible.

5.2 Unrealised Alternative Value(s) as Co-Displacement Not Co-Destruction

We propose a framework (Figure 2) based on our observation of a distinctive displacement dynamic, whereby intentionally co-created value may unintentionally replace other forms of value or other stakeholders' interests that were previously unrecognised. The framework

captures the multifaceted dynamics of value co-creation, co-displacement, and co-destruction.

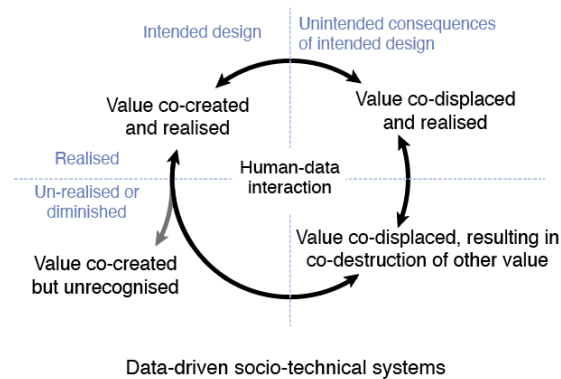


Figure 2 Value co-creation, co-displacement, and co-destruction in human-data interaction.

Unlike value co-destruction (Figure 1), which occurs when resource integration diminishes wellbeing for any party (Plé and Cáceres, 2010; Engen et al., 2021), value co-displacement arises when alternative value(s) emerge elsewhere as unintended consequences of intended value co-creation. For instance, in Case B, following an individual's death, personal values such as emotional or sentimental significance are not simply destroyed but displaced by the value(s) of other actors. Here, family members or corporations that inherit or gain access to the data may generate new forms of value, such as economic or social value. Extending this insight, Case C examines how being triggered at the 'right time', with the right data, an automated donation can neatly align the values and interests of donor, charity and beneficiary. However, the specificity and immediacy of this data present a risk of aligning too closely. By tightly binding the donation to a data-driven trigger, the system removes the traditional mediators of charitable organisations that usually frame and contextualise such events sensitively. Without this mediation, the meaning of the data—the catastrophe or suffering it may represent—gives rise to a visceral fear and guilt in the donor. This emotional backlash can clash with, and therefore co-displace, the positive value of having helped, over time leading to disengagement with the process of charitable giving and therefore leading to longer-term value destruction.

These displacement dynamics become particularly salient in data-intensive contexts, where different value systems intersect. Anne-Marie Willis's (2006) observation that "we design our world, while our world acts back on us and designs us" illuminates how digital economies create feedback loops that recursively reshape value itself. Data flows enable new value creation while systematically displacing other forms, shifting economic value toward platforms while dispersing social costs across users. In human-data interaction, designers function as mediators creating and adjudicating between alternative value systems, though data collection, representation, and prioritisation actively configure possible ecologies, displacing value across dimensions, temporalities, and stakeholders (Speed, 2023).

Data enables value co-displacement by allowing multiple forms of value to emerge across users and systems, resulting in a continuous, fluid and fast-paced design process (Lee, 2022). In data-driven socio-technical systems, value does not emerge as fixed or predefined but evolves dynamically through ongoing interaction. While a designer establishes the initial rules or infrastructures for interaction, the values that emerge are shaped through complex

engagements with data flows, leaving designers with limited control over outcomes. This dynamic is evident in the charity case, where automated donation contracts intended to increase engagement also generated unexpected feelings of excitement and guilt among participants. These outcomes illustrate how data-enabled interactions can reconfigure value priorities beyond the original design intentions, confirming that value displacement often occurs unintentionally as new values emerge through interaction.

5.3 Design as Enabler of Continuous Value Co-Creation, Co-Displacement and Co-Destruction

Design presents pathways or bridges between value(s), which are realised and made manifest through individuals' interactions with the design, making value a co-created, co-displaced, or co-destroyed outcome. While data enables continuous design for value co-creation (Lee et al., 2022), it simultaneously contributes to value co-displacement. Replacing a regular office coffee machine, the Bitbarista inadvertently prioritised exchange value relationships with the machine, over office relationships. Offering choices for participants to directly choose ethical value over experiential value (coffee quality), whilst providing a sense of ethical alignment, did not result in a more authentic connection with coffee growers. There were two intentions simultaneously driving the design. The first, to better understand how machine autonomy might impact socio-technical systems, through implementing this and exploring the result. The second intention was to explore if integrating provenance data could have positive effects within socio-technical systems. Inevitably these two intentions intersected through interactions, and the insertion of financial transactions with a machine displaced social value, which in turn seemed at odds with the ethical intentions. In Case C, we see conflicting values emerging from the triggering of donation contracts. When a donation was made, some participants felt both "gratified" and "guilty". In this case, the design which promotes disintermediation, has the potential to create new value by increasing engagement through gratification. However, by removing the protective layer provided by intermediaries, it can also induce feelings of guilt in donors, potentially undermining engagement.

Design researchers seek to create design products/systems that align with, or meaningfully resonate with, the value(s) held within individuals, groups, and societies. In practice, however, design decisions inevitably activate or deactivate, displace or bridge, multiple forms of value(s). Within data-driven socio-technical systems, designers should recognise that value outcomes may not unfold as originally intended, as complex interactions between data, users, and organisations can co-displace unexpected value shifts. Therefore, we recommend that designers invest time in exploring possible scenarios and using reflective or anticipatory tools to surface potential value tensions and displacements, and consider employing nuanced and sensitive frameworks and terminologies to identify and understand these configurations (as suggested in this paper), thereby raising awareness of the complex dynamics that may emerge during and after the design process. The critical role of design, therefore, is to materialise particular value configurations, shaping which futures remain possible and becomes unrealised, as noted by design scholars (Fry, 2009; Tonkinwise, 2015).

6. Conclusions

Adopting descriptive case study methods, this paper offers an initial step toward framing value dynamics through a systemic lens in design research. Moving beyond binary framings of value co-creation and co-destruction, we introduce the novel concept of value co-displacement and develop a framework capturing the dynamic interplay of value co-creation, co-displacement and co-destruction in data-intensive contexts. Value co-displacement differs from value tensions – where multiple values coexist and are actively balanced or opposed – by describing situations in which one value becomes dominant, displacing and marginalising other values and forms of valuation within a socio-technical system. We argue that in data-driven systems, value is not simply created or destroyed but dynamically redistributed, making value co-displacement a central mechanism through which design shapes value system.

Recognising value co-displacement as an inherent feature of design supports a more nuanced understanding of value(s), where intentionally co-created value may unintentionally co-displace or co-destroy others. We identify four modes of value dynamics in design: (1) co-created and realised, (2) co-created but unrecognised, (3) co-displaced and realised, and (4) co-displaced but diminished or destroyed. These dynamics highlight the importance of surfacing nuanced value(s) considerations throughout ongoing design processes, particularly within interconnected human–data ecosystems. We therefore encourage designers to explore possible scenarios and use reflective or anticipatory approaches to identify potential value tensions and displacements, supported by nuanced frameworks and terminology as proposed in this paper.

Despite these contributions, this study has limitations. The cases draw on design researchers' reflective accounts, which may constrain analytical rigour. Future research should therefore employ more structured and participatory methods to deepen understanding of how design decision shapes value dynamics in practice and further develop approaches that recognise value co-displacement alongside co-creation and co-destruction.

Acknowledgements: This research was supported by the Business School Transformative Research Fund at the University of Exeter, and the UKRI research projects: PETRAS (EPN02334X1), OxChain (EP/N028198/1), and DECade (EP/T022485/1). The authors gratefully acknowledge the contributions offered by the workshop participants at Designing Interactive Systems Conference 2025.

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About the Authors:

Boyeun Lee is a Lecturer in Design and Innovation at the University of Exeter. Her research explores how design shapes digital innovation, focusing on the use of big data and AI for value creation in product and service development.

With 15 years in HCI, **Ella Tallyn**'s current research focuses on translating design methodologies for decentralised systems. Within the DECaDE Centre for the Decentralised Digital Economy, Ella explores how decentralised, data-driven design reconfigures value, ownership, and equity in socio-technical ecosystems.

Ramprabu Thangaraj is a PhD candidate in Human-Computer Interaction at NJIT, Newark (USA). His research explores end-of-life planning, focusing on how older adults curate artifacts and how design and AI can support remembrance and intergenerational meaning-making.

Chris Elsdon is a Chancellor's Fellow in Service Design at the Institute for Design Informatics. Employing innovative design research methods, his work undertakes diverse, qualitative and often speculative engagements with participants to investigate emerging relationships with technology and value.

Chris Speed is a Professor of Design for Regenerative Futures and Director of the Regenerative Futures Institute at RMIT Melbourne. His research explores designing for pluriversal futures, cultivating relational thinking, and developing interdisciplinary pedagogies spanning design, data science, and social innovation.