Interactions with Valuescapes

Applications of extra-sensory values in everyday coffee personalization

Thesis submitted to the University of Nottingham for the degree of

Doctor of Philosophy, June 2024

Oliver Miles

4343156

Supervised by

Professor Martin Flintham, School of Computer Science

Professor Nora Wikoff, School of Sociology

Declaration

The work comprising this thesis was completed on 07/06/2024; examined on 16/09/2024 and edited on 20/12/2024. The work is my own, except where other works have been explicitly cited.

Signature: O.M.

20th December 2024

Word count: 83,556

Abstract

Personalization of consumables is increasingly grounded on extra-sensory as well as sensory qualities. Using the everyday example of coffee, this thesis addresses the challenge of creating a values-orientated personalization paradigm that maintains the descriptive and predictive capabilities of sensory product-preference alignment seen in mass market approaches, while also eliciting the extra-sensory qualities more likely evaluated by the consumer end-user as 'personal'. This paradigm is referred to as the 'Valuescape'; a theoretical, structural conception of the socio-technical world in which values themselves become objects for interaction.

This work begins by presenting a shared problem of values-orientated personalization in industry, human-computer interaction (HCI), and digital society **(Chapter 1:)**; a literature review framing approaches to coffee personalization in terms of industry norms, theories of social value, and interaction value **(Chapter 2:)**; and a methodology establishing a three-part approach to asserting, probing, and provoking values-orientated interactions, enabling a thematic analysis of participant retrospection on interactions with Valuescape(s). Designs for Valuescape(s) are presented here, along with 'CoffeeWizard' – a framework for producing 'personal valuescapes' used in two of three empirical studies **(Chapter 3:)**. In 'Contingencies for Valued Interaction', a timeline is used provoke the elaborations of hospitality workers on how they maintained preferred practices during the Covid-19 pandemic **(Chapter 4:)**. In 'Interactions with CoffeeWizard', the framework for generating personal valuescapes takes the form of a coffee selection box, surveying user preferences, provoking product choice, and eliciting retrospection on 'personal value-footprints' **(Chapter 5:)**. In 'Building Valuescape', novel graphs serve as the primary provocation to personal preference selection in speculative enactments with a prototype recommender interface **(Chapter 6:)**.

Four top level modes of interaction are found and set out as 'substantiation', 'practical application', 'evocative remembrance', and 'speculative co-design'. Personal valuescapes as constructions that provoke are delineated from Valuescape as a social structure that can be probed, with instances of interaction across studies contributing to four distinct 'archetypes' of Valuescape and associated implications for their use between consumers and corporate value experts as mechanisms, agents, and of democratising value agendas **(Chapter 7:)**. Finally, limitations are discussed, informing recommendations for revised study protocols and future works **(Chapter 8:)**.

Dedication

~ For Emily and Joshua xx ~

Acknowledgements

I would firstly like to thank my supervisors, Martin and Nora, for all their expertise, encouragement, and wise words; among the most memorable; "*I don't doubt your ability to produce content*", and "*don't think of me as a sociologist*"! Further, to Joel and Boriana, for their constructive feedback and guidance over various annual reviews.

I'd also like to thank Serafim, Nicolas A, and Nicolas P, for early collaboration in formalising the subject of coffee personalization as a real-word challenge in which to apply my questions of social values and digital society; Edgar and Kev in the Mixed Reality Lab (MRL), for help with early prototyping efforts; Andrea, Monica, and Laura in the Horizon CDT, for their practical and administrative support; Steve, Adrian, Sarah S, Sarah M, for convening and delivering wider doctoral training in digital economy; Max, for initiating me into his elite writing (coffee shop) group; and of course, the Engineering and Physical Sciences Research Council (EPSRC) together with United Kingdom Research and Innovation (UKRI) for funding this work.

Special thanks to the rest of the 2018 cohort too - Natalie, Shaz, Harriet, Luke, Pete, Matty, Mel, Neeshe, Jimiama, Kadja, Stan, Ioanna – for keeping me motivated both 'pre-' and 'post-Covid'.

I was also fortunate to work on other research projects alongside my doctoral training, and I'm especially grateful to Zack, Josie, and Christian in the Lab for UnCertainty In Data and decision making (LUCID) for early collaboration in a co-publication on novel measurement of consumer values [1]. Further, I want to thank Rene, Andy, and Luis at CityMaaS, for inviting me to explore values-orientated research methods in their mission for advancing digital inclusion and introducing me the world of the tech start-up.

More personally, I want to thank my family. To my wife, Emily, for her constant encouragement, kindness, and patience; our amazing son, Joshua, for being a rare, positive 'interruption to studies' since his birth; to our parents, our wider family; and to our church family in Nottingham, for keeping us firmly grounded in love of God and each other.

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List of Abbreviations

UNSDG – United Nation Sustainable Development Goals

CSR – Corporate Social Responsibility

CSV – Creating Shared Value

ESG – Environmental, Social and Governance

HCI – Human Computer Interaction

MRL – Mixed-Reality Lab

PCA – Principal Component Analysis

VSD – Value-Sensitive Design

VUI - Voice User Interface

WOz – Wizard of Oz (Method)

Glossary

CoffeeWizard	A novel interaction framework and artefact for facilitating interactions with Valuescape(s)
Evocative values	Value-attributes, -sets, and -objects that convey comparable, reminiscent interactions.
Extra-sensory values	Qualities beyond physical, sensory coffee product; e.g., personal, social, ethical [2]
Personalization	Products, services, or experiences made 'identifiable as belonging to a particular person' [3]
Post-hoc rationalization	Retrospective account qualifying a user's 'real' values post (initial) interaction [4], [5], [6]
Practical values	Instances '…people draw upon when reasoning about…nascent socio-technical infrastructures' [7]
Sensemaking	Engaging in '…an active processing of information to achieve understanding' [8]
Sensory values	Qualities pertaining to coffee consumption; e.g., taste, smell, aesthetics [9], [10]
Speculative Enactment	HCI design 'invit[ing] the empirical analysis of [interaction] amidst speculative but consequential circumstances' [11]
Speculative values	Value-attributes, -sets, or -objects that convey critical insight such as recommendation.
Structuralist	Theory of '…underlying structures behind the often fluctuating…appearances of social reality' ODS:642 [12]
Substantive values	Value-attributes, -sets, or -objects that convey descriptive meaning
Technology probes	'…mock-ups that simulate the experience that users would have from interacting with the proposed solution' [13]
Value-attribute	A specific quality integral to a value-set or -object.
Value-object	A real or abstract object assigned an explicit or implicit value status when framed by a valuescape.
Values	'…strong, semi-permanent, underlying, and sometimes inexplicit dispositions' [12]
Value-set	A discrete category of value-attributes distinct from other taxonomies.
Valuescape	A structural framing of 'the social' in which values-orientated interaction is made possible
Valuescapes	Depictions of an individual's personal value ontology, grounded on system and user valuations.
Wizard of Oz (WOz) Paradigm	HCI method for rapid prototyping, often including mocked-up interfaces and/or contrived socio-technical user scenarios. [14], [15], [16]

Chapter 1: An introduction to values-orientated personalization

In the following I'll introduce my motivation, aims and objectives for this work, the subject of values-orientated interaction, key concepts relating to and including 'Valuescape', and why coffee personalization was selected as a relevant case study. I'll set out a unified problem statement as an operationalizable research gap at the intersection of approaches to values-orientated personalization in the contemporary global coffee industry, human computer interaction (HCI), and the sociology of human values. Finally, I'll outline the main contributions of this work, drawing an early distinction between artefacts (personal valuescapes) and frameworks ('CoffeeWizard') for values-orientated interaction that by nature were a product of expert (researcher led) design, and emergent findings and implications for design which by nature were a product of using these for empirical study.

1.1 Motivation

'Interactions with Valuescapes' is an interdisciplinary doctoral research project funded by the Engineering and Physical Science Research Council (EPSRC) and facilitated by the Horizon Centre for Doctoral Training (CDT). The substantive research problem – coffee personalization – was formatively defined by me – Oliver Miles – in conjunction with Prof. Serafim Bakalis (food and sensory science) and with informal consultation from industry research and development statisticians. This was further developed with my supervisors Prof. Martin Flintham (Mixed Reality Lab, School of Computer Science) and Prof. Nora Wikoff (School Sociology), University of Nottingham. The work was specifically undertaken to proactively and creatively address contemporary issues of desirable personal data usage in the digital economy, and it is in this context that I present this and subsequent chapters as contributing to a novel form of personalization, specifically for digital coffee futures.

With experience originally in the social sciences, my own motivation for this work was initially to contribute to an understanding of what we objectively refer to when we invoke 'the social'; classically addressed through theories of underlying 'networked' or 'object orientated' structures [1], [14]. To this end and in response to recent debates about the inadequacy of conventional methods in the social sciences to describe the social world at scale [16], [17], I wanted to deploy a novel methodology, exploring how values as inherently social 'objects' might both describe the social world as well as themselves be

described. Ultimately, I consider that these theoretical and methodological interests have a specific application to solving a contemporary, everyday problem of in the digital economy experienced by corporate 'value experts' and the lay public alike.

Consequently, I identify values-orientated personalization as an operationalizable challenge at the intersection of mass-market product provision in the global coffee industry [18]; the sociological understanding of values pertaining to coffee and cultures of consumption [19]; and contemporary human computer interaction (HCI) emphasis on 'practical value' as a distinct category by which the personal utility of both objectified values and their mediating technologies are known and 'put to work' [20], [21].

1.2 Aims and objectives

RO1: *To understand the nature of personal coffee consumption, explicitly in terms of values.*

RO2: *To understand the nature of interaction with novel instantiations of valuescape*

1.2.1 Thesis Research questions

TRQ1: *What is the need for valuescape?*

TRQ2: *How is a valuescape made personally useful?*

TRQ3: *How might valuescapes address the practical priorities of an expert system and end-users in everyday coffee consumption?*

1.2.2 Research context & Covid-19 Impact

This work commenced in September 2018, with formative ideation of the research problem taking place while based at the School of Computer Science's Horizon Centre for Doctoral Research. During this time the supervision team was established, representing HCI and sociological interests. With a focus on HCI approaches to research design, deployment, and analysis, the work was completed between

September 2019 and June 2024, based at the school's Mixed Reality Lab (MRL).

The work suffered significant setbacks, not least due to the Covid-19 pandemic, resulting in a fundamental redesign of study 2 (Chapter 5) – originally a planned face-to-face project – to a remote project. The pandemic and associated lockdown prevalent contextual factor affecting the contemporary consumer context has of course been the Covid-19 pandemic. Covid-19 has influenced not only institutions, but the methodologies on which institutions rely on to maintain and create value [24]. Many have realised the COVID-19 breach to norms of interaction has furnished the opportunity to probe the contingent factors enabling their routine interactions, as well as understand the future trajectory of service provision [25]. For many, COVID-19 also represented an opportunity to try different business models, from reimagining business agreements to entire programmes of digital transformation [26], [27]. The need to focus analytical attention on the wider social context is more frequently being seen as part of coffee provider's essential value proposition [28]. Coffee shops with significant high street presence have asserted a post-covid challenges and contingency plans for their stores [29], and there are contemporary attempts to reframe these as opportunities for the sector as a whole, '... for lasting, positive change' [30], and consequently, my first study (Chapter 4) sought to address this.

1.3 Values-orientated personalization: a shared problem

According to social anthropologist Jason Hickel, as Western societies grapple with existential, values-orientated challenges such as how to make consumption more 'sustainable', the notion of value itself must be challenged: Evaluating consumable commodities such as coffee purely in terms of their symbolic or 'exchange' value (that which can be assigned monetary worth) is too narrow a definition given the importance of responding to global priorities beyond capitalist growth for its own sake, and consequently, 'use value' – or the practical, experiential worth of commodities must instead be accentuated [31].

The Valuescape, or landscape of values, is notionally the 'big picture' of all values personally and/or collectively asserted as integral to desirable coffee consumption whether connected to consumption of product, service, or experience. Before expanding on this working definition of Valuescape and how it might enable values-orientated personalization, it is essential to define what exactly is meant by 'values' and how these differ as social objects of interaction on the one hand, to the broader concept of 'value' itself. Before establishing Valuescape as a potential answer to the problem of values-orientated personalization at

intersection of the specific challenges in industry, sociology and HCI, this section elaborates on the value/values distinction, parallels with Valuescape (singular) and personal valuescapes (plural), and highlights the practical act of generating valuations as a unifying interaction to critically evaluate in this research,

1.3.1 Value and values; Valuescape and valuescapes

Interactions with Valuescapes is fundamentally about eliciting and operationalising coffee consumer's personal values, and the overarching utility of using the visualised product of these elicitations as touchpoints for interaction in everyday consumption when treated as objectified personal artefacts. Drawing on qualities of product, social impact, and practical interaction, the notion of values-orientated coffee personalization will be demonstrated as inherently multivariate.

On the one hand [value] can mean the work involved in giving a monetary worth to an object, as in valuing an antique piece of porcelain, and thereby becomes almost synonymous with price. On the other hand, it can mean that which has significance to us precisely because the one thing it can never be reduced to, is monetary evaluation, for example the value we hold dear in relation to family, religion and other inalienable possessions. [Crucially] 'values are not the plurality of value, but refers to inalienable as opposed to alienable value' 1123. [32]

When it comes to defining value itself, for digital anthropologist Daniel Miller, an essential distinction must be made between economic value, and all other notions of value; and broadly, it is the latter, 'all other' category that this thesis is concerned with [32] p1122. Central to Miller's proposition here is the value-values distinction, and that by working with 'colloquial' (everyday, social) conceptions of value found across everyday contexts, we might 'bridge the gap between economic and all other definitions' [32] p1122-1123.

Applying this to the concept of Valuescape, the assertion of there being a singular Valuescape – something inherently and structurally social to probe and elicit empirical evidence of – is as contentious as there being a singular concept of value itself. A Valuescape then, if not a structural, empirical reality is at the very least a construction of those seeking to

assert it for the practical purpose of personalization. Therefore, it is important to distinguish early on between Valuescape as a grand theory of 'the social', and valuescapes, as personal data artefacts that are constructed between the expert system that produces them and their consumer end-user.

1.3.2 The practical action of valuation: Coffee, sociology and HCI

Across the studies presented in this thesis, a further distinction is drawn between the values and attributes of values presented in personal valuescapes in terms of their nature as descriptive objects that provoke, and the practical interactions that result. As will be elaborated in the literature review, values that are likely pertinent to everyday coffee personalization are inherently qualitative and subjective, and do not easily conform to established models of quantitative sensemaking typically associated with the literal, physical properties of product. For Millar, this is not necessarily problematic: *'Value as evaluation is quite clearly not just a measurement but a constitutive part of that which is being evaluated'* 1127 [32].

As an example and imagining 'happiness' to be a desirable part of personal consumer experience, it is not enough to take a personal 'happiness score' – say 7/10 – and infer that that experience conveys 70% happiness. Rather, we might learn more about an individual's personal preferences for happiness if we both link multiple evaluations of other (contingent) values at the attribute level, and further, inductively qualify their practical and contextual meaning; i.e., what being happy was also contingent on; and what this personal knowledge (for the consumer) practically achieves when put to work. Millar sums this up by concluding that '…value is what value does' [32] p1131. This is particularly necessary given that the emerging field of 'social value' seeks to both qualify social values in terms of their empirical meaning, while also quantifying their salience for individuals and populations such that social impact can explicitly be accounted for [33]. With a growing literature on augmented valuation as a facet of everyday interaction, implications for personalized interactions and transactions can be seen to cross academic and industrial interests [34].

1.4 Why coffee?

It should be noted that the focus on coffee as a use case emerged somewhat incidentally – at least initially – in the early formation of this work. As stated in the previous motivations section, exploration of social values and values-orientated interaction were principal drivers

for developing the Valuescape idea. More practically though and considering real-world application, the nature of doctoral training in the Horizon CDT is rooted in interdisciplinary and industry collaboration. After a discussion of my proposition, informal collaboration with industry statisticians from Nestle (statistics, research and development) identified coffee in the broadest sense of consumer interactions, as an appropriate touchpoint for advancing values-orientated personalization.

As a domain, coffee is a perfect example of an everyday commodity that on the one hand is mundane and commonplace in everyday (UK) socio-economic interactions [35]. Conversely however, it is contentious and exclusive, delineated based on distinct 'brand communities'[36] ; not to mention the object of fierce debate regarding value priorities particularly relating to local and global sustainability [37]. Amongst these dichotomous portrayals of coffee as simultaneously mundane 'consumable' and 'cultural commodity' however, there sits the everyday practice of industry assertion of coffee values. As will be shown, while values pertaining to the physical, consumable coffee are something of an exact science, the same cannot be said for values pertaining to the abstract, cultural commodity [38].

By selecting coffee as a topic for focussing the empirical study of values orientated personalization, we can begin to move beyond the sensory insights into physical products, and towards insights into the extra-sensory qualities and dimensions of coffee more likely assessed by the consumer as 'personal'. For example, it has been known for a long time that coffee is contentious as a commodity when its status as a product of 'fair trade' is called into question [39]. By making assertions of values such as fair-trade status – which are abstracted from the product itself – we might learn what constitutes fair trade from the situated perspectives of individual consumers.

Moreover, the process observing interactions with coffee consumption that are explicitly values orientated offers the chance to explore the much broader, social, and contextual factors of consumption. Finally, while coffee offers a very specific case study as an instance of FMCG personalization, it is hoped that lessons learned both in the deployment of empirical studies, as well as the devising of novel study instruments, can inform a wider and contemporary debate about the relevance of social value in society.

1.4.1 Towards a unified problem statement

Interactions with Valuescapes is significantly informed by its conception as an interdisciplinary project. An early approach to formalising an operationalizable research gap was to consider the contemporary domain and intersectional challenges of everyday coffee personalization, the sociology of value, and HCI methods.

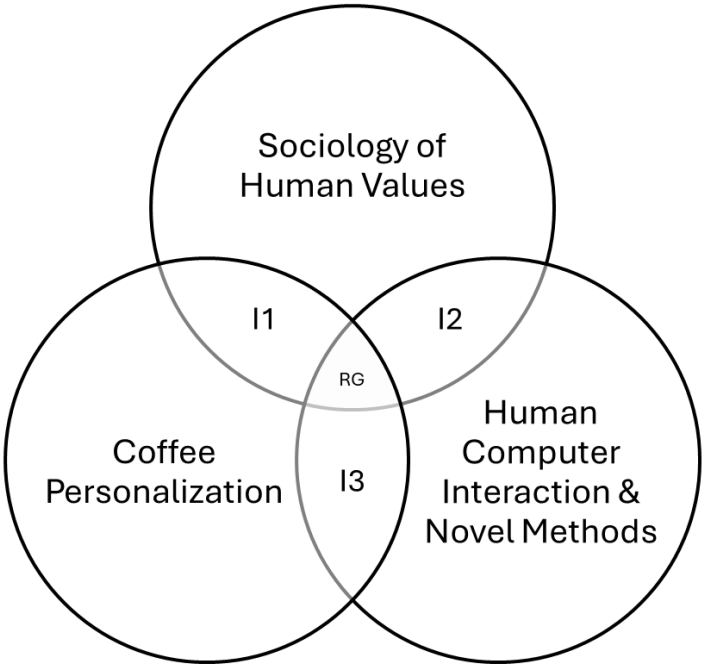


Figure 1-1Domains, Intersections, and Research Gap

Domain challenges can be summarised as the problem of harnessing values-orientated interaction in coffee personalization in the global mass-market (an industry problem); in probing theories of 'the social' (an academic problem); and in HCI methods (a technical problem). However, these challenges alone should not be considered equal in terms of the empirical focus of proceeding chapters.

Domain	Description
D1: Coffee Personalization	In the fast-moving consumer goods (FMCGs) sector, personalization is an important phenomenon fundamentally linked to the elicitation and multistakeholder use of personal data. The global coffee industry offers a case in point, an everyday commodity and feature in the lives of Western consumers already the subject of much corporate market research.
D2: Sociology of Human Values	Human values are an exemplary social object, yet they remain inherently subjective when compared to other 'types' of value. There contentious nature compared to product values for example, lend them to expert-participant, individual-collective, and pro-social applications that engender personalizable interactions.
D3: Human Computer Interaction (HCI) and novel methods	Human Computer Interaction (HCI) offers a unique approach to the conceptualisation, design, and development of technology propositions that compliment a sociological framework while contrasting with and challenging the norms of mass-market research favoured by big business. Specifically, the individual perceptions of a participant regarding novel artefacts and frameworks of personalization are of particular interest given their subjective nature.

Table 1:1 Domain descriptions

A problem statement is set out for each domain in detail above (Table 1:1). As mentioned, not all domains are equally weighted, for example, in terms of the subsequent design of studies or discussion of implications for and impact to stakeholders.

Intersection	Implication
I1: Extra-sensory Values	Extra-sensory (social) values are any qualities pertaining to coffee product that cannot be evaluated by the primary consumer senses, such as taste, smell, or sight. Consequently, Valuescape should focus on qualities which appeal not just to the primary senses, but to the considered evaluation of individual preferences
I2: Expertise	Expertise refers to the perspective of the agency which asserts value. Consequently, Valuescape should reveal the perspective of those that create/facilitate it.
I3: Practical Value	Practical value is a unique category of value in HCI and emergent from both real-time and retrospective interaction, qualifying the utility of objects [7]. Consequently, Valuescape should provoke practical value when users interact with it.

Table 1:2 Intersection descriptions

Instead, these challenges were instrumental in enumerating the state-of-the-art in each case, and moreover, the intersectional touchpoints between which they were likely most operationalizable (Table 1:2). For instance, the challenge of coffee personalization in the global mass market has a strong precedent for matching combinations of a product's physical attributes to established sensory profiles; while structural theories of the social emphasise a granular understanding of the actors, objects, and interactions between them [17], [18]. Substantiating the meaning of non-physical or 'extra-sensory' qualities of coffee consumption was consequently identified as a shared problem for industry and academia alike [2], [38].

Values-orientated personalization in everyday coffee consumption is either too narrowly defined in terms of sensory experience, too corporation centric in terms of framing, or too unsustainable in terms of methodology. For speculative future augmentation of coffee consumption to accurately address these problems, it must attend to them by more closely involving the end-user in the routine work of defining coffee qualities, curating consumer archetypes, and devising novel forms of interaction extrinsic to the immediate sensory experience itself

Operationalizing this statement as a research gap, practical value elicitation is addressed in this thesis in two ways. The first concerns valuescape as a novel data artefact, specifically for the augmentation of everyday coffee interactions. The second concerns

CoffeeWizard as a novel interaction framework, specifically for the elicitation of end-user preference, choice, and retrospective qualification of coffee product and associated experiences. It is in this framework that I argue, valuescapes become a useful proposition to multiple stakeholders in the interdisciplinary picture.

1.5 Introducing Valuescape(s) and CoffeeWizard

As the title suggests, valuescapes are the main artefact of interaction and discussion in this work. CoffeeWizard is the underlying interactional framework informing the functioning of various prototype technologies that offer values-orientated interaction via valuescapes in the later empirical chapters. Both are inspired by existing works.

1.5.1 Valuescape: A thematic model for consumer interaction

The term 'valuescape' has a varied usage since at least 1998, encapsulating definitions from early visions of a largely symbolic economy [40]; to more recent models for information system ontologies and consumer value creation at the intersection of digital technologies and physical retail space [41], [42].

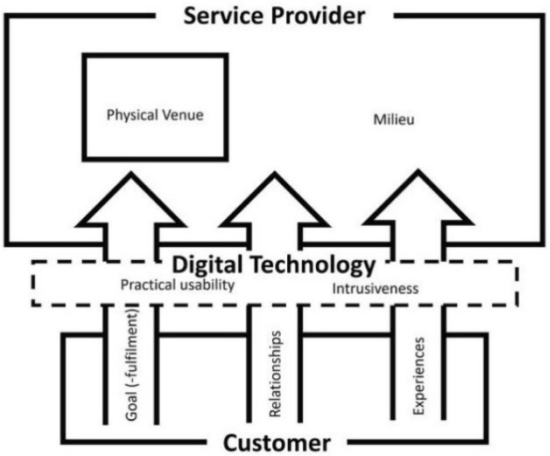


Figure 1-2 The thematic model of valuescape (Nöjd et al. 2020)

It is this most recent conception by Nöjd et al (2020)[1] that informs the work of this thesis, implying that valuescape in a literal sense can evoke

[1] Figure reproduced as per: https://creativecommons.org/licenses/by-nc-nd/4.0/

a broad view of the world in which service provider, customer, and digital technology co-operate [42]. Authors describe its main features, as follows:

- Valuescape comprises service provider, drivers (‘goal fulfilment, relationships, experiences), arenas (milieu and physical venue), and enabling technology.
- Consumer driver categories characterise the motivations to interaction, with three top-level drivers for customers: Goal fulfilment, relationships, and experiences.
- Interaction context ('milieu') represents the places of service provider control.
- Physical venues are well defined and controlled but situated in a ‘milieu’ or ‘constellation’ of other actors.
- Digital technology can enable creation of top-level ‘shared value’ themes, ‘moderating’ value between consumer and service provider
- Themes emerging from interaction with the technology itself, can appear to contradict (“Intrusiveness” vs “Practical usability”)
- Service provider’s ‘remit’ is consequently established

- Nöjd et al (2020) [42]

This tangible framework begins to operationalize the various actors and objects necessary for describing socio-economic interactions in terms of specific instances of value creation. However, all current definitions of valuescape ultimately fall short of a literal interpretation of a word that surely means ‘a landscape of values’.

1.6 Thesis Contributions

Contributions can be thought of as ‘designed’ and ‘emergent’; where designed contributions refer to researcher (expert) led creation of artefacts (personal valuescapes) and interaction frameworks (CoffeeWizard) as nascent technologies for values-orientated personalization. Emergent contributions are by contrast the re-imagination of Valuescape in a grand sense; specific modes of interaction observed during use of personal valuescapes and their theoretical implications for users as they were framed by CoffeeWizard.

1.6.1 Designed Contributions

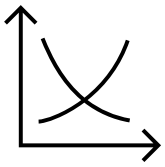
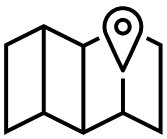
[2020]--[2021]--[2022]		
Study 1: Reverse Event Timeline	Study 2: Personal Values Footprint	Study 3: Personalised Graph

Table 1:3 Designing Valuescapes: Timeline, Footprint, Graph

Personal valuescapes: these are any visualisation of personally and/or collectively evaluated value-objects used to simultaneously probe the speculative 'Valuescape', and provoke novel, practical use in specific research tasks. In chapters 4-6, personal valuescapes are for example, a time-line detailing breaches to social norms in the UK during the Covid-19 pandemic (Reverse Event Timeline); basic infographics accentuating (in)congruencies between stated coffee preference and observed choice (Personal Value Footprints); and novel, multivariate cluster diagrams depicting orientation to emerging clusters of consumer end-users (Personalised Graphs). In each case, personal valuescapes are asserted as useful for their users based on the practical values that emerge from analysis (Table 1:3).

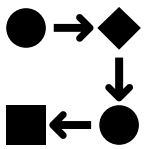
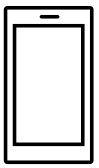
Study	Backend	Illustration	Front-end	Illustration
2	Interaction Framework		Coffee Selection Box	
3	Interaction Framework		Recommender Interface	

Table 1:4 Designing CoffeeWizard: Backend Frameworks & Frontend Artefacts

CoffeeWizard

In chapters 5-6, CoffeeWizard was developed and deployed as a necessary framework ensuring that personal valuescapes could become artefacts of interaction between (expert) system and (everyday) consumer end-user . Based on an established research paradigm (the 'WOz' method); CoffeeWizard was experienced by participants as a prototype coffee selection box (Chapter 5) and speculative recommender app (Chapter 6). From the perspective of the researcher who contrived it as an expert system, CoffeeWizard was more broadly a multi-stage interaction framework for managing three key components; value assertion, the probing of value in context, and the provocation of retrospective (user) qualifications (Table 1:4). These three stages are elaborated in the methodology (Chapter 3); and specifically, a part of CoffeeWizard in Chapters 5 and 6.

1.6.2 Emergent Contributions

Valuescape: Application of Nöjd et al's (2020) framework

In this first contribution to knowledge, Valuescape is formally distinguished from valuescapes: Valuescape is positioned as the outer frame of 'the social' structure; and the context which valuescapes – constructed by technologies like CoffeeWizard – attempt to harness and render practically useful (7.2.1).

Modes of interaction with valuescapes

In this second contribution to knowledge, interactions with personal valuescapes are discussed as being *substantive* in nature (revealing the fundamental grounds of values); practical in nature (revealing novel expressions of application); evocative (revealing comparable experiences or technologies) and speculative (revealing critiques and alternative routes to building valuescape) (7.2.1).

Theoretical implications

In this third contribution to knowledge, four characterisations or 'archetypes' of personal valuescapes are presented at the intersections of objective-subjective conceptions of values; and structured-constructed conceptions of Valuescape. Each has distinct implications for expert and end-user stakeholders in the case study of coffee personalization (7.4).

Implications for CoffeeWizard

A final contribution is presented in terms of implications for CoffeeWizard, in which it is discussed as 1) a mechanism for handling the high dimensionality of Valuescape; 2) a means of producing artefacts for critical engagement and induction of social value; and 3) a means of demonstrating potentially biased, corporate values-orientated personalization agendas (7.5).

1.7 Thesis structure

Interactions with Valuescape(s) is presented as an 8-chapter thesis. Following this introduction (Chapter 1), there is a review of literature discussing Valuescape in relation to industry, theory, and practice in HCI (Chapter 2). A predominantly qualitative, three-part methodology is introduced, focussing on the provocation of participant reflections on interactions with various instantiations of Valuescape(s) (Chapter 3). The first study, 'Contingencies for Values-Orientated Interactions' is introduced with a view to exemplifying the kinds of value-attributes that might constitute the social, extra-sensory dimensions of personal coffee consumption preference (Chapter 4). The second study, 'Interactions with CoffeeWizard', formalizes the methodology as a framework for interacting with personal value footprints, presented to the participant as a personalized coffee product selection box (Chapter 5). The third study, 'Building Valuescape(s)', develops the CoffeeWizard interaction framework as a means of rendering re-appropriated (industry standard) graphs, this time presented to the participant as the main interactional proposition in a speculative coffee recommendation

app. While contemporary works, designs, and findings of each of these studies are presented chapter by chapter, results are then critically discussed in respect of the opening literature (Chapter 7). Finally, limitations and future works are explored (Chapter 8).

Chapter 2: Valuescape in industry, theory, and HCI

The purpose of the following literature review is to establish Valuescape as an already latent reality in the coffee industry, in sociological theory, and in human computer interaction (HCI). In terms of style and critical focus, the chapter should be read as a narrative literature review, describing selected works across each of the domains previously outlined, and concluding with contemporary examples of similar works that go onto inform the methodology. Source selection intentionally used the 'literature funnel' approach [43]; beginning with broad, single disciplinary interpretations of key concepts, and converging on a working conception of artefacts and frameworks explicitly informed by the shared problems and opportunities identified. The chapter begins with an introduction to values-orientated coffee personalization, setting up a case for interdisciplinary study based on three identified contradictions in single disciplinary approaches to personalization; that it should be 'efficient'; that it should be 'objective'; and that it should be 'interactive'. The proposition of using values themselves as efficient and objective touchpoints for interaction is then introduced. Practical values are highlighted as a distinct category of qualities for describing interactions for the purpose in extra-sensory (social) applications of personalization. Finaly, technologies that produce what might be seen as nascent Valuescape(s) are discussed, together with the implications for their use for personalization in everyday coffee consumption.

2.1 Values-orientated coffee personalization: An introduction

In 2017 - the year prior to beginning this research project - the Boston Consulting Groups' 'Profiting from Personalization' report described the phenomenon of fast-moving consumer goods (FMCGs) personalization as '...causing a seismic shift across the landscape of consumer-facing brands...' [44]. An otherwise generic observation of the predominant mode of interaction in the contemporary digital economy, this extract is prescient in three regards: It points to the reality of 'brands' as the enduring archetypal vehicles for personalization in global mass-markets; to the desire for 'profitability' for consumers and corporations alike; and most crucially for this work, to a contingent yet intangible 'landscape' in which brand archetypes and profitable interactions operate.

In one sense, values-orientated coffee personalization is fundamentally about the qualities of coffee product itself, and their assemblage into identifiable, attractive, and replicable archetypes [21], [45]. In global industry, coffee is primarily described and operationalized in terms of its physical qualities, and by arranging those qualities into unique combinations, everyday archetypes such as 'caramel latte', 'decaf americano', 'double espresso' and so forth, can be repeatedly created and marketed to those whose preferences align with their chemically grounded, sensory profile [10], [46]. Yet in another regard, values-orientated coffee personalization is also fundamentally about what is considered profitable by the various stakeholders engaged in everyday coffee interactions. There are many factors such as emotional state, lifegoals, and sustainability goals, that comprise an additional, extra-sensory space in which motivations to consume takes place [47], [48], [49], [50], [51], [52]. It is this extra-sensory space that Valuescape conceptually encompasses. It is the contention of this thesis that Valuescape is a framing of all the value-attributes that qualify personal preference, from the sensory to the extra-sensory. Moreover though, it is the contention that Valuescape can be turned to provocations to interaction when applied as an augmentation of everyday preference and choice in coffee consumption [40], [41], [42].

'…discrimination of various possible modes of normative orientation is one of the most important questions…For the purposes of the theory of action the smallest conceivable concrete unit is the unit act…'

T. Parsons (1967), p*45-48*. [53]

A structuralist view of Valuescape – that it is literally a landscape of objectified values simultaneously descriptive of the substance of 'the social' and thus provocative of modes of normative or values-orientated interaction – suggests a conception of values themselves as contingent on integral 'units' [53]. Contemporary approaches to personalization in the digital economy typically use various methods of statistical inference to deduce specific consumer orientations, enabling novel functions such as personal behavioural sensemaking, product recommendation, and community building [54], [55], [56]. A structuralist conception of Valuescape holds that whether values belong to sensory, extra-sensory, or other top-level categories, it is desirable and necessary to seek the fundamental value-attribute or 'unit act' on which orientation is contingent [53].

While this structuralist epistemology is explored more fully later and in the methodology (Chapter 3), the distinction between sensory and extra-sensory values and their contingent attributes is important to keep in mind when considering how values-orientated personalization is currently conceived and performed in industry, in the social sciences, and in HCI. To discuss relevant works across these domains, the structuralist standpoint can broadly be thought of as a solution to three contemporary contradictions, identified as enabling efficient coffee personalization; advancing objective subjectivity; and applying retrospective (practical) interaction. Each of these contradictions are now set out in terms of the extent to which they are addressed in industry, theoretical sociology, and for HCI.

2.2 The contradiction of efficient coffee personalization

Coffee is one of the most globalised fast-moving consumer goods (FMCGs), analysed and understood on the grounds of myriad types or categories of value-attribute [37], [57], [58]. Alongside its primary function as a consumable, coffee takes on additional functionality in contemporary society as both a cultural experience contingent on routines of socio-economic interaction, and further, as a touchpoint for novel invention of technologies orientated toward the attainment of personally and collectively desirable socio-economic goals [35], [59]. This section expands on this industry norm of using physical, sensory value attributes as a means of personal preference-product alignment, first in reference to the contradiction of 'efficient personalization' in practice.

2.2.1 Efficient personalization is profitable personalization

When it comes to product preference alignment based on sensory qualities, efficiency is often cited as a key motivator [21]. An obvious implication of the corporate emphasis on efficient models of personalization is of course increased revenue [60]. Perhaps less obviously though, it reveals that personalization is contingent on additional, practical constraints. In mass-market coffee consumption, efficient personalization is ultimately a contradictory proposition, given the challenge of reconciling practical priorities of maximising unique preferences, while simultaneously maintaining minimal product portfolios [21]. Generally, and for corporations the purpose of personalization can be defined as the attainment of brand 'optimization', inviting the end-user orientated critique of *"what[is personalization] for?"* [61]. However, this is truer for personalization of

product qualities in their essential or intrinsic state, than it is the more extrinsic or abstracted these qualities become [38]. Personalization that attends to corporate priorities such as sensory product delineation and efficiency while addressing extra-sensory qualities represents a significant challenge. It is helpful to consider why this is a necessary challenge to address.

2.2.1.1 Towards an abstract, extra sensory space

The working definition of Valuescape encompasses both sensory and extra-sensory space. While researchers have attempted to recreate the conditions of 'real life' to ascertain optimum consumer involvement in situations [62], methodologies tend to move away from this kind of quantitative, attribute-score based analysis in line with the qualitative nature of extrinsic values. When products are instead thought of in terms moral or ethical qualities, description and communication move beyond the intrinsic attributes detectable through immediate consumption, and toward the abstracted or ‘eudaimonic’ [2] . A particularly broad and contemporary extrinsic value is that of sustainability, with corporations like Nestle must attend to the extrinsic factors of sustainability, which it has been demonstrated, enables the further practical value of 'trust' to emerge [63].

2.2.1.2 Sustainability and the UNSDGs

Sustainability encompasses a plurality of sub-factors [24], [63], [64]. The United Nation Sustainable Development Goals (UNSDGs) exemplifies sustainability as a value-set comprised of value-attributes:

Figure 2-1 The United Nation's Sustainable Development Goals

The UNSDGs are exemplary as an extra-sensory value-set as they thoroughly assert what specific priority value themes, or goals, substantively mean[2]. Thus, 'ending poverty' is not just a general imperative, but a specific objective comprised of 7 actionable targets and associated indicators of attainment [65]. For instance;

'By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day'

Indicator: 'Proportion of the population living below the international poverty line by sex, age, employment status and geographical location (urban/rural)' [65]

Positioning the indicator as a specific value-attribute, extra-sensory values – like sensory values – are given an objective quality, as well as being subjective matters of preference.

[2]Source: https://www.un.org/sustainabledevelopment (The content of this publication has not been approved by the United Nations and does not reflect the views of the United Nations or its officials or Member States)

2.2.1.3 Towards archetypes of extra-sensory values

Corporate brands exemplify value-objects in that extend beyond the generation of efficient portfolios, towards identifying 'brand communities' [36] [66], and it is useful to consider further archetypes that might be conceived from extra-sensory values. Thus far, personalization has been discussed predominantly as a corporate aspiration. However, it is useful to consider the role of the consumer end-user in everyday coffee interactions when considering the purpose of personalization and the requisite information and interactions required of them.

Values-orientated interaction can be framed by contexts of place, and contemporary consumer environments offer a rich environment for understanding the cultural values associated with consumption [25], [28], [35], [67], [68]. For instance, coffee culture's transformative impact on socio-economic environments is exemplified by McWilliams (2015) account of 'the flat white economy' – a characterisation of the nature of the City of London's technology scene and how it owes its existence, interactional norms and values, to coffee shop culture [35].

The success and ubiquity of the coffee industry's appropriation of the third space means that social value is thought of less as a passive product of interaction, and increasingly as an active variable to be operationalized. The potential for practical, 'pro-social' applications of values-orientated personalization in the third-space invites '...the conscious use of social theory, play, and imagination...' [69].This is already evident in the concept of social return on investment (SROI), where 'valuing the social' requires both a substantiation of the dimensions of social space, as well as a consideration of the practical values of interacting with in explicitly on valued terms [70]. Like the Creating Shared Values (CSV) agenda, this might be considered a more practical, participatory outworking of CSR and ESG agendas [22], [71], [72], [73], [74], [75], [76], [77], [78]. It is suggested that value co-creation is best conceived and managed in the 'customer-supplier relationship' [76].

Values are imperative in 'data-driven design' [79], and a conventional understanding of the term data-driven tends to focus on inferential prediction of purchase intention [80]. Delineating preference from choice becomes a more challenging task considering the multivariate external influences of context, but also leads to questions of the nature of the choice itself. Are participants really choosing based

on an assessment of attributes at an individual level, or are they learning a binary preference given two distinct products? [81]

In this first task of exploring personalization the sensory-extra-sensory, or sensory-extra-sensory divide will firstly be set out, leading to a further segmentation of the objects of personalization as distinctly product, service, and experience-orientated. Ultimately, industry might instead be applied to extrinsic aspects of service and experience, transferring the weight of personalization towards the agency of the end-user in settings which arguably, align with a more holistic sense of the personalized consumer experience [82], [83], [84], [85].

2.2.1.4 Substantive values: Towards taxonomies of sensory perception

Physical and sensory value-attributes of coffee can be understood and organised in terms of taxonomies, which are referred to in this thesis as value-sets. The World Coffee Research Sensory Lexicon (WCRSL) exemplifies a taxonomy of coffee sensory qualities grounded on physical attributes, and while not exhaustive, demonstrates what is fundamentally meant by the term 'intrinsic value' [46]. It's aim as a resource is to afford stakeholders 'description, quantification, and replicability' of sensory product experience such that 'An evaluator in Texas will get "blueberry, flavour: 4" just the same as one in Bangalore' [46] p4. In this way, coffee can be assessed, tailored toward preference, and ultimately personalized based on both a defined measure of what objectively constitutes a blueberry flavour, as well as the degree to which it's intensity ("4") is subjectively perceived on a scale of 0 to 7.

This operationalisation of value-sets holds important implications for similar treatment of eudaimonic value sets. While the experiential or ethical dimensions of coffee consumption may not be as objectively grounded as the hedonic, sensory dimension, value-attributes that comprise them may still be subjectively evaluated by end-users. Value co-creation and adjacent concepts like CSV, ESG, and CSR, are contested in terms of their overarching benefit to the stakeholders involved. This broadly provides a real-world problem across multiple domains to elevate value co-creation from a purely theoretical and computationally modelled endeavour to a mode of interaction exploring the affordances of means, ends, and the overall mediation of values as meaningful objects; not just subjects of controversy. [86]

For Nestle, their CSV report, 2008, demonstrates how taxonomies of value are curated together in the interests of a collective to evidence a commitment to values-orientated consumption: Certainly, there will be an increase in the quantity of information

shared, but crucially, it must be asked how much the substance of its meaning is retained by the corporation; versus how much it is given to consumers to decide meaning for themselves [74].

The Nestle CSV report was in its 12th instantiation in 2015 [75], with the multinational cited as a market leader when it comes to operationalizing the requirements of agendas such as CSV. Such conclusions should be taken as indicative of a neoliberal belief in the power of markets to address social and environment problems of course. However, the very nature of CSV is its invitation to participatory action. By demonstrating their interpretation and outworking of CSV agendas and including them in augmentations of consumer interaction, Nestle and others might stand a better change of evidencing alignment with consensus views on priority issues [73].

2.2.1.5 Practical values emerging from interaction with valuescapes

Practical values best refer to the affordances of consumer products, services, and enabling technologies that benefit stakeholders during the consumer journey. ‘Efficiency’ is one such value, for the corporation at least: statisticians must demonstrate that maximum number of consumers can be catered to using the minimum number of products [21]. ‘Sustainability’ is a further example: corporations must increasingly demonstrate how the very process of coffee production and supply chain management is sustainable [87][88]; as is privacy of the system itself [89]. The question may be asked, how do practical values of current methods of personalization benefit the consumer end-user?

An often-enduring fear among consumers around future technologies, relates to negative impacts on privacy despite other practical advantages. 'Retailers must address this fear…' and '…engage in open dialogue…' if they want new technologies to be consensually adopted [90].

'...we will increasingly see voice being used [as] an interface, especially in the kitchen As users get more used to voice interaction, and as home assistants, such as Siri, Alexa, and Google Home, becomes more common, it will likely become more natural to ask "Alexa, what should I eat for lunch?"...'the notion of a recommended, highly personalized smart meal kit, delivered to your door becomes a real possibility' – Carl Anderson, [91] *p13.*

With a view to operationalizing practical values, it is useful to frame them as the potential affordances of a Valuescape as experienced by a consumer end-user. A recent thematic analysis of corporate social sustainability literature has demonstrated how practical values like efficiency or sustainability have the potential to be manifest and operationalized as a 'thematic map'; a model that affords its users the ability to gauge '...partnerships....practices...[and] performance...', for instance [92].

Thus far, challenges for everyday coffee personalization have been set out as grasping and applying several categories or 'value-sets', attending to the eudaimonic qualities of coffee preference, and the re-appropriation of contemporary industry methods that retain their overarching or practical value or efficiency. Further challenges appear as issues of context, specifically, the framing of context as public, private, or 'third space'; the framing of interaction with Valuescape, and the framing of the contemporary study environment – (which was heavily influenced by COVID-19 pandemic restrictions at the time of writing). In line with industry's priority for efficient methodologies there is a tendency to favour statistical, 'big data' sources and associated algorithms for the deduction of collective trends [80], [81], [93].

2.2.2 Products of efficiency have latent, extra-sensory affordances

The move toward values-orientated personalization in the coffee industry has uncovered various products of corporate sensemaking that fall short of an adequate instantiation of valuescape, but nevertheless serve to demonstrate aspects of practical value that are potentially of use to consumer end-users. The following focuses on products of data and algorithms, archetypes and personas, and

mapping, as contributions to the overarching values-orientated consumption strategy.

2.2.2.1 The physical sensory space and its attributes

Investigation of coffee sensory preference is routinely based on inferential analysis of aggregated consumer perceptions of physical product qualities often uses visual mapping [94]. Such factors are presented and discussed as evaluating to archetypes of this 'sensory space', in which product attributes and consumer groups are aligned [95][96]. Visual depictions of this alignment such as graphs, charts, and cluster diagrams may be considered formative allusions to Valuescape in that they are literally a 'landscape of values' built on common ground. Again, the application to sensory qualities underscores the corporate interest and precedent for personalization of coffee as a hedonic product. It might be considered however, that making sense of sensory coffee product archetypes, predicting consumer alignment, and maximising efficiency in this way fail to maximise the affordances of the visualised sensory space as a tool for personalization.

As suggested, coffee is routinely understood by statisticians and food scientists as a physical, consumable beverage contingent on a well-defined, replicable combinations of chemical attributes [46], [57]. These attributes evaluate to perceivable, sensory qualities or 'hedonic' values, such as taste, texture, and aroma which, while subjectively preferable to consumers, are objective enough qualities on which to base product portfolios and assert segments of populations [21], [95], [97], [98]. An early consideration for this research is therefore the possibility that such assemblages are useful beyond the context of corporate product-preference alignment, and beyond the interests of corporate 'value experts.

2.2.2.2 Archetypes of physical space are understood as brands

It is known that archetypes of consumer preference are utilised outside of the process of personalization itself, and this is perhaps most obviously found in branding. Branding is perhaps the most overt mechanism communicating values from corporation to consumer, and a key means by which a corporation seeks to control its image [36], [66], [99], [100]. Exemplifying this, Nespresso is finely tuned to the communication of coffee explicitly in terms of artisanal sensory properties [99]. Conversely, this opens the possibility that corporations

can lean too heavily on stylistic factors of consumer image, which are not the primary, essential, and directly interactive part of the offering [99]. Consequently, it is likely that brands conceal and obfuscate other pertinent qualities potentially useful to a fully personalized representation.

2.3 The contradiction of objective-subjective values

A second contradiction of values-orientated personalization is the requisite goal of making inherently subjective values – the extra-sensory qualities of coffee consumption - objective. The implication of conceiving a literal Valuescape for enabling values-orientated personalization is that extra-sensory values, like their sensory counterparts, are presented as objectively grounded, despite their fundamental difference in nature. The following section, drawing heavily on theoretical, sociological sources, and unpacks the challenges and opportunities of this contradiction.

2.3.1 There are two 'sociologies of valuescape'

Valuescape can be thought of as a structure of both quantitative and inferential grounding, as well as a construction of qualitative and inductive interpretation. To the extent that one approach is preferable to another in the pursuit of description of social phenomena like values, this has been shown to be an unnecessary controversy: on the one hand, statistical approaches harnessing big datasets enable the combining of '…narrative, numbers, and images in ways that engage with, and critique, the kinds of routine transactional analyses that now proliferate' [19]. Conversely, big data approaches still fall short when it comes to establishing the requisite 'ground truth' for asserting value preferences and predictions are likely concluded to be truly personal [101]. As valuescapes become tangible, their objective nature is contingent on the inferential; but equally, their qualification and veracity is contingent on the inductive. It is hoped this compromise of standpoints will directly address the contradiction of making subjective values objective.

2.3.1.1 Conceiving landscapes of the social

There are many conceptions of the social world in which coffee interactions and personalization take place, and these are typically qualitative in nature. The similarly coined terms of ‘Brandscapes’ and ‘Consumptionscapes’ might be likened to formative valuescape best demonstrate this. [33], [37], [102], [103], [104], [105]. Brandscape is invoked as a perceived construct of 'local cultures produc[ing] cultural heterogeneity' in the case study of routine interaction in Starbucks stores for instance; specifically in expressions of aesthetic and anticorporate sentiment [102]. Similarly, ‘servicescapes’ and ‘consumptionscapes’ have been articulated to convey- the idea that a wider and extra-sensory phenomenon is 'being consumed'; for instance, when preference for coffee is ‘incidental’ to the popularity of a brand such as Starbucks, which offers multifaceted consumer experience additional to the literal product [105]. Harnessing the collective values of the social in these asserted domains implicitly a cyclical proposition however; not just a one-off characterisation of environment. Consequently, to retain a ‘culturally informed’ view of coffee consumption value, it is imperative that valuescapes capture interactions with product and services in dynamic rather than static methods [33].

2.3.1.2 Valuescapes have theoretical precedent

Thus far, Valuescape has simultaneously been presented as a structuralist take on the empirical, social reality, as well as a situated construction of ‘the social’ or framework [40], [41], [42]. In this section two sociological theories are drawn on to unpack these seemingly disparate definitions. The first – Baudrillard’s ‘System of Object’s’ – draws attention to the discrete taxonomies or value-sets intrinsic to the coffee industry’s portrayal of archetypal beverages and appeals to the idea that values can be seen as combinations of ‘original and series’ objects [18] . The second – Latour’s ‘Actor Network Theory – draws attention to the dimensionality of eudaimonic values in a broader sense, but specifically, appeals to the maxim of ‘making the social flat’ such that it can be comprehended or ‘traced’ [17]. Ultimately, it should be considered that these working definitions of the social are not mutually exclusive, especially when it comes to operationalising Valuescape as a means of values-orientated coffee personalization

2.3.1.3 The structural Valuescape as a ‘System of Objects’

If Valuescape is an empirically discoverable structure, it makes sense to expect values-orientated interaction to be contingent on an individual’s evaluation and appropriation of fundamental value-objects.

'…'atmosphere'…serves to reintroduce any conceivable element, whatever subjective associates it may carry, into the logic of the system. That this system is affected by ideological connotations and latent motives is indisputable…it is incontestable, too, that its logic, which is that of a combination of signs, is irreversible and limitless…No object can escape this logic, just as no product can escape the formal logic of the commodity' ~ Jean Baudrillard [18] *p.41*

Archetypal, physical coffee products – ‘flat white’, ‘caramel latte’, ‘double espresso’, etc., - can be described as both ‘original’ and ‘series’ objects [18]: Tracing archetypes from their ‘original’ through their ‘series’ instantiations is a common practice [89], [106], [107], [108], [109], [110], [111], [112], [113], [114] [115]: While variation may occur in their creation by a service provider or their subjective evaluation by a consumer through the series of their reproductions, they communicate an original form, contingent on a particular arrangement of components [18].

2.3.1.4 The constructed Valuescape as an ‘Actor-Network’

If Valuescape is constructed, it makes sense to expect values-orientated interaction to be contingent on the situated framing of value-attributes by those stakeholders invested in its use.

According to Latour, there is 'No group, only group formation;…Action is overtaken…Objects too have agency…Matters of fact versus matters of concern…Writing down accounts' B. Latour, 2007 [17].

Latour's 'Reassembling the Social' offers several principals useful to a structural account the interaction which occurs between both human and non-human 'actants'[17]. Of all his precepts, 'keeping the social

flat' is most prescient for envisioning a tangible valuescape, in that it speaks to how the multivariate, multidimensional nature of the social can be represented, if not as a reflection of reality, then as a provocation to uncovering it [116]. Actor-Network Theory (ANT) is a theory of social assemblage and interaction, devised by Bruno Latou and helpful for envisioning two major suppositions of this thesis; social construction, and the possibility of an empirical social structure [117], [118], [119], [120], [121], [122], [123].Social structure is frequently referend to in attempts to convey descriptive and causal relationships between actors in networks, with group and collective identity complimentary, rather than contradictory, to personalization [120] [121]. Commentators on ANT acknowledge its need as a grand theory, to be brought more into empirical reality. [124]

2.3.1.5 Making sense of multiple value-attributes

Conceiving personalized clusters of value-attributes invokes the mapping of information. Moreover, the data mapped in this instance is rich, qualitative, and contextual, revealing objectively the otherwise subjective nature of points of interest, for the population in question as well as individuals. Further, authors also demonstrate a solution in prototype, for which the next logical developmental step would be the inclusion of a time variable. [125] Many novel approaches exist for the effective segmentation of markets, such as k-means and hierarchical clustering [126] [127]. Multi-market preference mapping can be viewed as an attempt to retain qualities of 'personalization' while appealing to the collective at scale. [21]. It has been shown that certain value-sets (utilitarian) are more amenable to externally made choice (e.g. recommendation) than self-made choice in terms of propensity for satisfaction. [9]

2.3.1.6 Valuescapes for co-creation and finding common ground

‘Finding common ground' is not just an idealistic fringe endeavour of those concerned with shared values, it is a practical imperative for ensuring the empowerment of individuals in an increasingly digitised world, where real-world domains such as the 'smart-city' are not guaranteed to provide benefits alone [128]. Juxtaposing the presentation of an individual with that of a group in relation to values is not only important in terms of provocation to novel interaction: Additionally, it is reflective of the fact that not all groups, societies and cultures have the same outlook on personalization, and moreover, that the propensity to identify as an individual vs a group member changes with time and context [129].

Value co-creation is reconceptualised by Singh et al (2022) '...as a driver for societal benefits', based on their emphasis on sustainability of service: The practical qualities of sustainability in terms of sustainability of service are therefore of interest to future work [130]. Sustaining values- orientated interaction is not just a novel commodity and outworking of private sector interests. When it comes to technologies that offer consumables in public spaces, there is an argument that institutions hold responsibility for otherwise 'personal' choices regarding potentially harmful consumption. This is clearly truer of schools but raises a question for proprietors of coffee consumption both domestically and in third-spaces, with regard to extrinsic factors. [131].

2.3.2 Values-orientated personalization should be emancipatory

While boycotting is well known as an emancipatory reaction to undesirable forms of consumption, ‘buycotting’ is emerging as its positive opposite [132]. In this sense, the ability of a Valuescape to engage its users in desirable modes of personalization becomes a potentially positive and empowering proposition in a market saturated with technologies contingent on amalgamations of personal data.

Whether positioned as semi or fully immersive augmentations of real-world interactions, valuescapes are surely contingent on consumers’ digital footprints. Digital footprints are synonymous with the digital economy [133], [134], [135], [136], [137], [138]; however, if digital footprint is to be considered an asset, it is so because it makes visible connections between consumers and branded products based on what is termed 'practical esteem'. [133], or again, ‘practical value’ [7].

Global FMCG corporations have already established a precedent for and invested in digital acceleration of product and service, and it is likely that these corporations, in conjunction with conventional statistical teams, will be pursuing similar directions in values-orientated personalization [138]. Nestles attempt at leveraging brand management over digital ecosystems is an example of nascent valuescape, considering the interconnectedness of brands and products, and their communicability across social platforms internally [135] [136]. As it has been suggested that the ‘selfie’ photograph can represent personally curated depictions of the individual ‘brand’ [137]; so data depictions such as personal value footprints might be similarly imagined.

Emancipation as a practical value of Valuescape(s) is pertinent when considering O'Hara and Shadbolt's 'The Spy in the Coffee Machine', which highlights concerns over what has been termed 'Surveillance Capitalism' in the applications of personalization; a dystopian design future for coffee technologies that not only fail to improve the state of the world and human-technology interactions, but actively make them worse [59][139]. Sociologists might refer to yet another constellation of sensing and data streams as a 'surveillant assemblage', counter to the norms and expectations of personal privacy. This is why the grounds valuescape as a personal artefact are so important; presenting values and attributes as opposed to personal identifying information, as the primary source of interaction, colocation, and knowledge exchange [140].

2.3.2.1 Values-orientated recommendation and subscription

Situated technologies such as vending machines represent important touchpoints for socio-technical interaction. They are particularly good case studies for values-orientated consumption due, and the measurement of their 'value-added' contribution to society has been somewhat contested. This has led to a call for novel technology that is both informative and user friendly, at least in as much as its ability to 'support or refute' claims that threaten their existence [141]

To the extent that values orientated personalization in the global coffee industry has become routine in specific technologies, the Starbucks app is a case in point. Designed and debuted on a smart watch, the app features personalization in terms of aesthetic features, as well as rewards for purchases. There is a question over the appeal of style over substance. [142] Recommender systems encapsulate the operationalization of sensemaking orientated toward the end-user. Recommender systems would be expected to add value in terms of increasing sales, and certainly this has been found here. However, they also command a 'value-added' in terms of the augmentation of 'recommendation; itself. [143].

One business model mechanistically congruent with the idea of sustainability is that of 'subscription'. Anecdotally, coffee subscription services have grown in popularity in recent years, providing not only literal product, but personalized product, in a way which offers rich probing of other extrinsic factors of preference. [144]

2.3.2.2 Conversation as a means of eliciting values

Natural language where consumer values are subject is currently subject to much analysis, modelling and simulation based on uncertainty or fuzziness. As with statistical modelling in industry, this is exclusive to industry and academia, with the data subject often outside of this analysis. When it comes to apprehending the exact meaning of values, some progress in this area has been made [1].In this work, Osman identifies a 'value-taxonomy' as the manifestation of 'a formal model for value representation' [145] One conjecture of this thesis, particularly in Chapter 6, is that by opening a graph up to the lay person, value-taxonomies intrinsic to valuescape are more fully understood

2.3.2.3 Values are distinct from norms and institutions

Contemporary efforts to understand the nature of human values has extended to the adjacent phenomena of norms and institutions. Just like taxonomies of product value, human values can be treated computationally as 'sets' and presented for hierarchical preference evaluation. The most state-of-the-art methods currently explore novel approaches to qualifying these values however; something which cannot easily be achieved computationally and with discrete mathmatics alone. [146]. Carles et al. formalise a model for value alignment that instead focuses on norms, with the rationale that 'norms…govern behaviour' 1. The system itself is ambitious, aspiring to produce '…preferences of future states of the world' 1; however, the focus for valuescape is surely on the values themselves. [147]

2.4 The contradiction of retrospective interaction

The final contradiction, predominantly related with the HCI domain and associated technologies, is that of 'retrospective interaction'. An ethnomethodological approach to uncovering the practical utility of a technology affordances for its users necessarily situates the fullest understanding and substantiation of values in personal reflection [148], [149]. This implies that real-time interaction with valuescapes and the technologies that mediate them might never be considered truly personalized.

2.4.1 Values-orientated personalization provokes further interaction

The contradiction of retrospective interaction can be addressed by observing how values-orientated personalization is currently attained in the state-of-the-art; where contemporary technologies such as

frameworks for sensemaking and probing, frameworks for provoking, and devices for offering personalized goods and services demonstrate various affordances that go onto inform the methodology.

2.4.2 Frameworks for sensemaking and probing

In terms of frameworks for sensemaking and probing, there are various HCI approaches that enable end-user reflection on prior interactions, such that socio-technical phenomena may be understood [150], [151], [152], [153], [154]. Applied to values-orientated coffee personalization, it is conceivable that these are best suited to understanding the nature of interactions for the purposes of description; specifically, description of Valuescape as a social structure.

Probing addresses the fundamental requirement to describe and explain personal value preferences as they occur in the wild from a researcher perspective, while sensemaking has an added connotation of augmented, practical value for the participant as well. This participatory quality means that sensemaking can become both a designed and emergent affordance of research artefacts, such as 'SchemaLine' – a timeline tool for information visualization '…enable[ing interactive temporal schematic construction [and] integration with visual data exploration and note taking' [155].

Sensemaking can be both a personal and a collaborative interaction, often used to seek personal reflections for uncovering subjective preference, experience, or even impressions of the participants interaction and data mediation in the researchers work [150], [152], [156], [157], [158], [159]. Thudt et. al. employs personal sensemaking of 'visual mementos' as personal data artefacts; '…for the purpose of reminiscing, and sharing of life experience'; while Li et. al turn applies sensemaking of mementos to '…storytelling…through a tangible interface' [54], [160]. Envisioning valuescapes as personal data artefacts, there are parallels with the visual memento in terms of its designed affordances; to go beyond probing of use context and seek the user's qualification of sensemaking a potential practical value of its use.

2.4.3 Frameworks for provoking

As frameworks for provocation, there are various HCI approaches that broadly conform to the ethnomethodological tradition of uncovering the norms and values of interaction by 'breaching' them with a provocation

[148], [149], [161], [162]. Provocation, like probing and sensemaking, can be used to describe and explain Valuescape and values-orientated interaction. However, it can also be used to uncover an additional type or category of values – practical values – which further describe and explain interaction with how valuescape is mediated.

Practical values of 'provocative awareness' for end-users can include the exploration of '…new sensory and interaction possibilities [and] use [of] ambiguity to increase engagement…' [162]. However, these augmenting qualities remain contingent on the underlying proposition of the technology itself, which of course, can further be provocative in terms of the use cases and priorities they convey.

In the previous section, it was suggested that various corporate value agendas might make good candidates for an extra-sensory value-sets augmenting everyday coffee selection choices [163], [164], [165] . Likewise in contemporary HCI frameworks such as value-sensitive design, research can make provocative use of important but ill-defined concepts of 'trustworthiness', 'privacy', and 'consent' – for instance – in the ideation of new technologies [166], [167], [168], [169].

2.4.4 Devices for probing and provoking

In terms of devices specifically conceived to probe and provoke interaction for the purpose of advancing values-orientated interaction, these can be seen as tangible instantiations of the above frameworks.

In terms of sensemaking, devices for personal informatics a particularly useful proposition for values-orientated personalization where the link can be made between prediction of interaction and retrospection. Applied to mental health data, data streams normally directed toward expert analysis of stressors and coping mechanisms are repurposed as a novel tool - MindScope - for reflecting on one's triggers and enabling useful self-reflection [170]. Similarly, but applied to a different sector, personal reflection on visualizations of prior energy usage helped improve sustainability outcomes. [171]

Users of probes such as the 'connected shower' revealed that perceived 'intimacy' of their data was contingent on its contextual reflection using a [172]; while users of the 'BitBarista' engaged with a novel coffee machine augmented with the ability 'to track the provenance of [its] goods', provoking interactions aimed toward '…reducing intermediaries in the coffee trade' [173]

The vending machine has also served as a versatile technology probe and provocation to interaction, often due to the ability of manipulating

or repurposing conventional use through a novel interface or the accrual of ‘points’ for compliant or congruent use [174][175] [176]. Practical values of user privacy have been explored using embedded ‘security camera(s)’[177]; while a ‘robot vending’ device was instrumental in enumerating touchpoints of '... "Convenience", "Menu", "Automation", "Distant Interaction", "Aesthetics and Proximity", "Sustainability" and "Sound Warning", as valued components on which continued interaction was contingent [178]

Perhaps most obviously, recommender systems provide a clear and ubiquitous opportunity for probing, provoking, and overtly offering values-orientated interactions; especially FMCG contexts [91]. This is unsurprising, as their reputed affordances include among others, 'increas[ing] the number of items sold', ‘increas[ing] user satisfaction'; 'improv[ing] the [user] profile...’help[ing]' and 'influenc[ing] others' [179]. Recommendation can be thought of as personalized when, paradoxically, the individual's preferences are considered part of a 'group'. As social groups, just like social situations, are extremely transient, the concept of 'ephemeral groups' has been defined as a challenge both in terms of group definition and recommending contextually relevant products or services to emergent groups or based on their qualities for instance [56].

In this instance of a novel approach to group item (rather than a priori preference elicitation) in recommender systems, a cold start problem is addressed by considering clusters - the a posteriori product of recommender system analysis and visualization - as instead the source of value-attribute sensemaking. In this configuration, recommendation effectively works in reverse, with induction an important principle [180]. Questions of how to recommend in and for the present context remain [181].

2.5 The case for an interdisciplinary methodology

This chapter has presented and explored three contradictions of values-orientated interaction as associated with contemporary industry, theoretical, and HCI perspectives. The implications for the methodology is that it should seek to enable the contradictory corporate value of efficient personalization, by conceptualizing valuescape as an objective depiction of subjective, extra-sensory values, while also drawing on retrospective interactions to qualify their practical usefulness.

2.6 Using values as touchpoints for personalization

The following literature introduces key concepts of values and value-attributes in respect of coffee personalization, applications of values-orientated personalization such as the prediction of consumer archetypes and personas and the possibility of challenging these, and the concept of values-orientated interaction as a suitable proposition for personalization in everyday coffee consumption. I'll outline what is meant by 'personalization' here, and elaborate on the nature of 'personal values'; specifically, their intrinsic, extrinsic, and practical variants.

2.6.1 Personalization or Individualization?

Personalization in coffee consumption can be thought of as distinct from 'customization' or 'individualization', relying on the combining of 'context[ual] and personal data' inherent to product, service, or experience [182]. Just as 'individualized services' become distinct from 'universal services' when considering service provider use of 'context data' such as product attributes, time, and date of purchase etc.; personalized services are distinguished from the individualized in that they are further grounded on personal data, and prompt questions of user interaction and acceptability surrounding this data usage [182]. As such, ongoing exploration around consumer 'perceptions of benefits and costs of personalization' is crucial [183]. By devising a framework and artefact for the provocation of deliberately values-orientated personalization, these benefits and costs might be thought of in practical terms as the end-user perceptions of appropriation of their personal values data in the guise of the 'CoffeeWizard' technology probe.

2.6.2 Intrinsic (sensory) values

Intrinsic values are qualities which are integral to the literal or physical product itself [10], [46], [57], [95], [98]. Examples might include caffeine content or the flavours of a coffee beverage, and typically align with established taxonomies such as sensory profiles such as the 'World Coffee Research Sensory Lexicon' [46]. Accounting for the personal preferences and choices of coffee consumers in terms of intrinsic values is considered fundamental to most conceptions of personalized coffee, though as I'll demonstrate, the sufficiency of intrinsic values alone is contested [38].

2.6.3 Extrinsic(extra-sensory) values

Extrinsic values by contrast, are qualities which are integral to the symbolic or abstracted product, such as the consumer environment, personal experience and aspiration, or broader societal issues [30],

[38], [49]. Examples might include the FairTrade status or Organic certification of a product and might align with developed taxonomies such as specific charitable or ethical objectives [184]. In industry, extrinsic values are considered more difficult to operationalize as grounds for consumption, because in addition to subjective preference, an additional subjectivity is found in the definition of the value-attributes themselves [38], [84], [185], [186].

2.6.4 Practical values

A distinction can be drawn here between the conception of values as the attributes of products and services as defined above, and the attributes of an overarching experience in which those products and services are interacted with. Practical values therefore describe the instances '…people draw upon when reasoning about…nascent socio-technical infrastructures' [7]. In this sense, they cannot be known a priori to interaction in the same way as intrinsic or extrinsic values; rather, they in theory emerge from the appropriation of other (intrinsic/extrinsic) values when explicitly provoked and traced through a priori preference and real-time choice interactions. They are thus a speculatively important consideration for values-orientated personalization, given that they would likely frame how preferences and choices – for both intrinsic and extrinsic qualities – are personally accounted for, and iteratively made sense of during routine interactions.

2.6.5 Values-orientated personalization

It follows that values-orientated personalization can describe this intersection of value types and interactions, and to a certain extent, values-orientated personalization can already be seen in several approaches to providing consumers suitable products or services, grounded on some understanding of the constituent attributes of both product and personal preference alike. In conducting this study, I specifically focus on the tension between the elicitation and application of values in examples from market research and human computer interaction (HCI). Generally, while the former is conventionally based on the inferential alignment of product attributes with the sensory preferences of consumers to generate personalized offerings [21], [57], [187], the latter instead uses the inductive elicitation of consumer preferences as they emerge from real time or retrospective interactions [7], [153], [154], [178], [188].

As a description of personalization, 'values-orientated' might therefore be a useful definition of personal product and service alignment based not just on evaluations of their constituent attributes, but on further appropriates of these so that the process of personalization is itself is made accountable by the end-user during a point of reflection. As I'll

later demonstrate in an overview of contemporary works, there are various precedents for this, similarly emphasizing practical interaction and reflection through cultural and technology probes, natural language models, and existing manufactured vending/hospitality technologies [189][7][172]. Generally, though, while probing values-orientated interaction appears to require a distinctly HCI approach employing speculative design and grounded in a concern for 'practical ethics' [190], it nevertheless seems to require an element of embedded survey so that interactions with intrinsic and extrinsic qualities can be traced. Speculatively, I reason that at least two specific applications can result from this which appear useful to key stakeholders such as the end-user and researcher/expert service provider alike. These concern predicting consumer archetypes and personas, and conversely, challenging archetypes and personas.

2.6.6 Predicting archetypes and personas using values-attributes

For consumers and industry alike, the achievement of genuine personalization represents the pinnacle of personal data-driven augmentation product and service augmentation[60], [183], [191]. In pursuit of this goal, established forms of consumer and market research employing preference surveys, consumer panels, transactional data and so forth, have precedence as powerful and reliable means of creating consumer 'archetypes' for the purpose of coffee product-matching [21][97][192]. In the coffee industry these methods hold clear economic benefits for the product/service provider when considering the ability to predictively match concise product portfolios to cross-sections of broad consumer markets; and for this reason, industry statisticians exalt '*efficiency*' for example [21]; as an overarching economic benefit of personalization. (Incidentally, 'efficiency' may be considered a practical value here, in that the alignment of a minimal number of product types to market preferences on the grounds of product and sensory attributes exemplifies how emergent consumer archetypes sub-ordinate to the overarching priority of a key stakeholder – in this case, the corporation). An implicit benefit extends to the consumer too of course in that their own preferences are catered for by association to the archetype. However, as new, connected coffee technologies find data-driven functionality in smart technologies and the internet of things (IoT), how established routes to product alignment furnish more nuanced mutual benefit to coffee consumer and supplier appear insensitive to additional factors; notably of personal data usage, practical interaction, and reaction to the nature of personalization mediated by the technology itself.

From a global, corporate perspective then, if '*efficiency*' is one important consideration framing the tailoring of product offer to consumers [21],

this necessitates a practical limit to the extent of fine grain personalization attainable via conventional practice: While methods relying on top-down approaches to market segmentation can be shown to accurately match overarching values of the archetypical consumer to attributes of product, this kind of alignment of product is perhaps closer to customization (to archetype) rather than any real personalization.

2.6.7 Challenging archetypes and personas using practical values

By contrast, recent works exploring user experience of interaction with speculative technologies that employ predictive feedback and visualizations of user futures justify a focus not only on 'fine grain' predictive matching, but also on retrospection. Fuentes et al. (2019)- in their deployment of a mixed-methods predictive consumption tracking probe of 'home essentials' - identify practical 'contingencies' from participant explanations of *'…why items were used up earlier or later than predicted'; categories of 'routine', 'preference', and 'location' serving as examples of emergent drivers congruent or incongruent with a grounded, a priori sense of likely practical action* [193]. Similarly, Nilsson et al. (2020) enumerate '*practical values'* from participant exposure to and reflection on alternate, fictitious presentations of '*engaging'* versus '*calm'* scenarios of speculative systems for future interaction in connected homes; in *'food ordering', 'waste management', 'food delivery'* and so forth [7]. These reflections emphasize participant preference for, for instance, *'trust', 'convenience', 'privacy'* – when emergent from an iterative process of '*envisioning* [researcher speculation] and *contravisioning* [participant reflection]' [7].

In considering 'practical values' as a resource for design via 'values-orientated personalization' in coffee consumption, I similarly seek to explore the relationship between the *a priori preference* and the *a posteriori,* practical contingency with the prototype CoffeeWizard. This is inspired by an adjacent question; 'does digital footprint act as a digital asset?' [194]; and particularly resonates in terms of practical values, as co-creation of value between consumer and service provider is of growing interest as both an emergent phenomenon and practical possibility of ethical consumption in the digital economy [69][76][36]. Put simply, a mechanism that allows an end-user to 'talk back to' a system using their product/service evaluations to personalize consumer offerings, would seem to enable both ongoing qualification of consumer values, as well as critical end-user response to having been characterized as a particular 'type' of consumer.

2.7 Practical values and the pro-social application of retrospection

2.7.1 Stakeholder perceptions of interactions between the 'old-' and 'new normal'

Eliciting reflections of hospitality workers in rationalizing their adaptions to Covid-19 disruptions has precedent as in similar work surrounding archetypal third place settings such as coffee shops, showing them to be rich ethnographic contexts for uncovering practical priorities [195]. This has particularly brought into focus a study of the transitional period between the 'old and new normal' in terms of the common characterisation of the pre- and post-pandemic eras, and the need for a 'value co-creation' approach in response to the associated disruption [130]. The adoption of new technologies in consumer settings is perhaps an obvious manifestation of the new normal, and industry analysts have been quick to make the case for an optimistic embrace of emergent digital modes of consumption and community building, yet not necessarily completely in place of the physical:

> *'As coffee shops reopen, customers can expect a brave new world of digital transactions – from online coffee subscriptions to just-in-time ordering – designed to enhance, not supersede, the café experience. Using these new found digital tools, coffee shops and hospitality venues will continue to a play vital role at the heart of local communities'* [30].

As these digital augmentations of consumption run alongside and potentially replace aspects of the original consumer environment, we might ask on what grounds, and at which point, did they become desirable, necessary, or essential? This question of course has broader appeal outside of just the hospitality sector.

Institutions such as public libraries have also been used as rich environments for stakeholder reflections on the impact of Covid-19 related events, demonstrating a linking of chronology and situated interaction to explore contingency [196], [197]. Riggs (2020) highlights the practical requirement of institutions to look beyond the '…allure of physical buildings, materials and meeting spaces' and take seriously the question of 'virtual third space' as a desirable as well as necessary medium for meeting the needs of service users [196]. In her review of post-Covid19 practices in 'libraries and virtual third spaces after Covid-19', Riggs goes on to articulate several emergent instances of

contingency themes supported by specific instances of practical interaction that demonstrate pro-social initiative in public space, showing for example that libraries that have taken to welcoming their members via Zoom maintain a 'sociability' contingency theme; those that resort to 'live streaming' or 'breakout rooms' for events maintain a 'uses and activities' contingency theme; those that attend to the 'aesthetic of the virtual' world maintain a 'comfort and image' contingency theme; and those that manage to make universal services available to all while simultaneously engendering a personalized experience, maintain an 'access and linkages' contingency theme [196]. The emergence of such themes is of course descriptive of a particular period of interaction, but moreover, should be seen as demonstrative of shared value between stakeholders.

Remaining with analysis of Covid related disruptions to libraries, Kosciejew et.al. (2021) subject several official responses of the 'international library and information community' to documentary analysis, aligning emergent themes to a concentrated event timeline period of two weeks in March 2020 and establishing:

> '…a baseline to track the trajectory of …responses as they unfold and change…throughout the COVID-19 crisis.… analyz[ing] how circumstances were perceived and addressed at the beginning, during, ending and after the pandemic…' [197].

Consequently, they were able to evidence how contingencies such as 'digital migration of services' and 'countering dis/misinformation' aligned with both core values of the institutions as well as the interests of other stakeholders; most obviously the public [197]. As places of physical third space – the challenge of moving toward 'virtual third space' in libraries has therefore been actively embraced by some due to an inherently values-centric approaches and objectives, such as maintaining interaction and embracing new technology, 'encouraging community', or being able to track and describe transition [30], [196], [197].

2.7.2 The top-down rationale – the global expert

As the UK government actively sought to limit the spread of the Covid-19 from March 2020, the public became exposed to several restrictions on civil liberties explicitly tied to the health threat itself. As time progressed, it became clear that interventions were more complex – responding not only to threat of virus to human population; but additionally for example, to threats of socio-economic inactivity, loss of

work-life routines and associated mental health crises [198], [199], [200]. In this way, lockdown events that were universally applied at a 'global' or strategic level can be seen as grounded in the top-down rationale of the authorities imposing them. As such, individual events had specific intended targets in terms of sectors of society, economic objectives, and so forth. Interventions evolved from strict imperatives such as - '*you must stay at home'*; to more persuasive, invitational schemes such as - *'eat out to help out'* [198]. Assuming a near universal, population wide desire to reach the same end goal – i.e., an end to the threat of Covid-19 and its associated restrictions – the importance of intentionally and explicitly harnessing shared values or motivations had consequently become an applied exercise in social psychology [114]: The call for research into values of prosocial, utilitarian behaviour as necessary for complying with lockdowns or tending to the personal needs became apparent as follows:

> *'…research is urgently needed to identify ways of motivating individuals with higher openness or self-enhancement values to comply with governmental guidelines in order to enhance protection for vulnerable others'* [114]

Focussing on the hospitality sector as a domain for assessing values orientated contingency, the UK government's 'eat out to help out scheme' (EOHOS) – an incentive launched in August 2020, is probably the most iconic intervention exemplifying an attempt at prosocial compliance for a broader practical value [201]. This scheme was a prime example of intervention which on the surface had likely positive consequences; yet was enormously complex and potentially as it transpired, counterproductive to public health [201][202]. It is proposed that by presenting discrete moments like these for post-hoc rationalization, proprietors of third places might recollect distinct and inherently values-orientated decisions, exemplifying expected and novel interpretations of the top-down rationale.

2.7.3 The situated rationale – the local expert

Since the first announcements of Covid-19 transmission and consequent government 'lockdowns' in the UK from March 2020 to the time of writing, the public have become used to adapting to a variety of lockdown events. At a more nuanced level though, they have also been collectively exposed to the visualized infographic as an artefact communicating these events [203], [204]. Anecdotally this is supported by a British Medical Journal opinion piece, with the suggestion that in terms of the efficacy of data visualization in tracking Covid-19; '…real time dashboards have saturated and structured the public's

experience' in terms of both responding to the pandemic and anticipating its end [205]. While not seeking to undermine the importance of measuring and communicating progress in fighting the literal threat of Covid-19, a more unanticipated societal threat appears evident in over reliance on the one-way communication of the infographic. It is contested that in addition to the disruption caused by restrictions to civil liberties, the detrimental effects on a society of visual information saturation cannot be overlooked as factors prolonging the 'lived experience' of the pandemic; illustrating this by charting the prolonged and gradual 'return to normal' of historical pandemics in past societies lacking our present day analytic and retrospective frames [205]. This has led some to the following, perhaps overly dismissive conclusion:

> '…deactivating or disconnecting ourselves from… dashboards may be the single most powerful action towards ending the pandemic [as]…no single or joint set of dashboard metrics can tell us when the pandemic is over' [205].

While this may appear a compelling solution, it also should inspire the exploration of artefacts of Covid-19 information visualization for their utilities as sensemaking tools fit for prosocial applications, potentially countering the criticism of their negative effects in the wider population. In repurposing graphs, models, timelines, and the like as tools for provoking qualification of the information contained within them, this study seeks to counter the rather passive characterization of a public on the receiving end of a 'dashboard pandemic' or 'infodemic' [203], [204]. By operationalizing a timeline infographic that might initially be described in those terms, I instead seek a 'situated rationale' of practical interaction grounded in the interactions of hospitality workers as local experts.

2.7.4 Timelines: Help or hindrance to retrospective sensemaking?

To ensure contingencies can be located and grounded in practical interactions tied to specific times and events, I am mindful of works such as Adams and Edy's (2021) '…how the past becomes the past', in which they demonstrate a tendency for participant narration of a sequence of events to be typically non-linear [206].

On the one hand, a timeline alleviates the natural tendency to go 'off track', providing a semi-structured object of focus for the participate to elaborate on instances of practical interaction, and provoking rich elaborations through a standardised and progressive presentation of lockdown events. The retrospective use of timelines has been

employed in the context post-hoc rationalization of design workshop activity, through collaborative sensemaking in which personal recollections are overlayed onto discrete events [207]. In adjacent approaches, use of retrospection such as in the life history calendar (LHC) method also report that the added structure enhances engagement, cooperativeness, and enjoyability of the interaction itself [208]. It therefore follows those individual reflections on otherwise 'universal' events, might furnish a practically useful application of a lockdown event timeline in that at the very least, individual interactions are understood methodically and in a collective sense. Conversely, a timeline might also stifle elaborations that reveal contingency themes as dependent on non-linear factors peripheral to the actual events in question.

2.8 Technologies that produce Valuescape(s)

Digital services and connected devices situated in the IoT provide a natural source of inspiration when it comes to operationalizing the previously mentioned elements; as do the paradigms for their development. Before introducing CoffeeWizard as a framework and technology probe, I draw specifically on technologies that enable values-orientated consumption; either by targeting consumer priority subjects such as sustainability or new product discovery; or by providing novel methods of digitally augmented consumption all together. I draw attention to the implications of capturing fine-grain product preference alongside mundane, practical, every day and situated interaction; particularly the propensity for facilitating 'co-creation' of new value while simultaneously delivering product/service aligned with stated user value preferences.

2.8.1 Surveys and Subscription models

Mail order and subscription coffee services represent an innovative section of the contemporary coffee market. In terms of practical values, '*recommendation and discovery of new product'* is fulfilled for consumers through these services; their success or failure as a feature of a service contingent on a valid operationalization of product value attributes in conjunction with those of personal and contextual data. Mail order and subscription coffee typically combines online presence, product catalogue, user contact/payment detail elicitation for delivery and subscription, and various 'back-end' analytical approaches to matching product to consumer habits and preferences [144]. These preferences are typically built on sensory or 'hedonic' value attributes intrinsic to the coffee itself such as particular tastes, aromas, acidities and so forth. Companies then vary in their focus on niches and

comparatively extrinsic values such as sustainability, narratives around ecology and farming, and/or novel approaches to consumer experience such as the emphasis on the consumer as artisanal expert or coffee connoisseur [144].

In this way, unique configurations of customization and individualization can be said to be achieved when considering the utilizing of product preference data alongside other sources used to create a user profile. This may include a simple preference survey at the start of an interaction establishing the terms of a subscription, or more 'longitudinal' approaches that seek to offer a greater degree of calibration to the user experience, building histories of past choices [144]. Analogous to statistical approaches of preference matching in the global mass-market though, this amalgamation of increased numbers of personal, habitual, and preferential data streams into inferential functions for recommendation still falls short of a 'personalized' interaction that would make use of practical values beyond basic marketing objectives'.

2.8.2 Smart vending and automated dispensing

Progress in terms of values-orientated interaction in the FMCG sector can also be evidenced in the development of technologies orientated toward alleviating a particular societal issue, such as 'NuiVend' – a vending machine 'integrating natural voice commands and gesture' enabling a more accessible user-experience for certain groups such as the blind [174]. App-based vending machines in which interaction with a machine is replaced with mobile device interaction and integrated product selection/payment may evidence enhanced 'consumer purchasing experience' [175]. Addressing the issue of recycling, the 'reverse vending machine (RVM)…equipped with microcontroller and collection of sensors' addresses environmental concerns by incentivizing recycling – [and] enables users to accrue points '…using [an] RFID point card' in conjunction with 'identifying user information' and the product 'weight' as requisite data [176]. Pshetz et al (2017) introduce 'BitBarista', a connected coffee machine designed to;

> '…reveal…social, environmental, qualitative and economic aspects of coffee supply chains….allow[ing] people to choose a source of future coffee beans, situating their choices within the pool of decisions previously made…[and attempting]…to engage them in the transactions that are required to produce coffee'[209].

Situated and deployed among participants in a workplace environment, BitBarista can be said to focus more on the probing and provocation of

'extrinsic' drivers to coffee consumption we mention above. Probing individual preference and observed choice, it could be said to use the cumulative values of the collective as a resource to future provocation. In this way, the 'fine grain' consumer values associated with actual product choice can be harnessed and analyzed within a system of overarching practical value to the consumer.

As an area of speculative added value, Mavropoulos and Chung (2014) address recommender systems in situated beverage consumption. They devise the 'Speakeasy – smart drink dispenser': 'a rule-based expert system' for decision-making in beverage selection and provision, that could 'make a pub smarter… eliminate mistakes from the waiter or the waitress …[and] give the customer more satisfaction and the exact drink that he/she ordered' [210] 'Speakeasy' adopts a decision-tree learning approach, enabling an expanding 'knowledge base' and parallel 'inference engine'; beverage ordering dialog between user and system treated as a synchronous input/output loop of user 'facts' and system 'expertise' respectively [210] .'Expertise' manifests in the machine ability to recommend, while 'facts' are the value-rich preferences and assumed informational asset(s) of the user, themselves an inherent resource to the growing functionality of the machine: While the researcher channels their expertise into the initial build and facilitation the 'system'; the user is equally considered to be an expert of the 'knowledge base'; providing response to a logical series of questions to determine desirable product attributes [210]. In this way, desirable attributes of a product are harnessed interactively, mutually, and from a situated context, demonstrating a system of overarching value to consumer and service provider alike.

In these examples, 'value' is a broad and multifaceted category of disparate objects and actions; as much inclusive of ideals of '*what'* attributes a product should consist of, as '*how'* such attributes should best be operationalized to perform the desired function. While it is anticipated that CoffeeWizard could similarly function like the previously mentioned vending technologies, it is neither sufficiently developed as an inference engine, or prototyped as a fully functioning device. As such, I turn to comparable examples in HCI research that seek similar provocation of valued interaction.

2.8.3 Cultural and technology probes

Cultural and technology probes have in common the ability to provoke interaction with researcher-contrived artefacts, in such a way that the social world may become practically understood. This could be described as 'an ecological approach to social interaction' – one which William Gaver in some of his earlier work argues; '…that just as

perception and action are best understood with reference to the lawful physical world in which they have evolved, so social behaviour should be understood as embedded in and shaped by its material context…' [211]. While the objective of this study is to describe the nature of practical interaction as it may emerge from values-orientated interactions, this a rather linear and predictable outcome in itself: In reality, there is much more likely a 'tension' between the emergence of findings from the empirical objectives of CoffeeWizard, and the emergence of a coherent methodology [212]

Cultural probes play a role in mapping out the initial territory of social interaction, perhaps for descriptive sensemaking alone, or for some later design work to take place. Describing a unique assortment of 'maps, postcards, and other materials [for participant use]' in understanding a particular community group, these have been neatly summarised as '…astronomic or surgical probes…return[ing] fragmentary data over time' [153]. There are many strengths to cultural probes, with the collection of 'fragmentary' data cited as one of them [188]: Cultural probes challenge the pervasive norms of generalizable aggregation of big data in the digital economy with the richness of creating 'provocative awareness' and provoking participant 'curiosity' [162][213]. While cultural probes help to describe the social however, technology probes go further in practically appropriating awareness and curiosity as a recursive, practical resource for design.

Establishing CoffeeWizard as a technology probe, the practical desirability of an artefact offering values-orientated coffee consumption might usefully be viewed along the lines of 'affordances' - a concept in design ethnography that describes the functional parameters of an object in terms of its intended vs actual use:

> 'In general, when the apparent affordances of an artifact matches its intended use, the artifact is easy to operate [while] when apparent affordances suggest different actions than those for which the object is designed, errors are common and signs are necessary' [214].

While this of course implies that 'ease of use' constitutes the predominant practical value, consideration of affordances is useful in ensuring that only the value-attributes of the coffee itself serve as signposts to interaction. Technology probes appear to be useful for testing the affordances of the CoffeeWizard concept in at least two distinct ways; they frame 'the social' rather than merely describe it, and they elicit the unforeseen as well as the predictable in terms of user interaction. Advantageously for this study and considering the distinct affordances of the technology probe itself, Hutchinson et. al. (2003)

offers the view that 'social science', 'engineering', and 'design' as interdisciplinary areas of contribution are well served through interactions with artefact as well as method [154], and this is evident in several probes informing elements of CoffeeWizard. In the sense that technology probes can 'speak to sociopolitical issues' of localities, the 'Datacatcher', a handheld probe that displays messages to the end-user drawn from secondary data sources, was used to provoke reflective interaction with the location as well as the utility and possible applications of the device itself [215]. The 'connected shower' – a technology probe combining shower sensor data for contextualizing personal domestic routines and probing sustainability and IoT technology adoption – was concluded to have provided contextualization instead through the work of post-hoc interviews, with participants qualifying the meaning of their data [172], [216], [217]. A suggestion that further work is needed to refine similar probes so that they function as 'mechanism[s]…whereby infinite regress can be terminated, and context be articulated', thereby 'engaging users in system dialogues that enable data work and reflexive[ity]' [217].

2.8.4 Eliciting practical values: The WOz method

The wizard of oz (Woz) has proven a common and trusted approach in several of the previously mentioned smart device prototypes and technology probes. As a method, it uses involves researcher and end-user performing speculated tasks of a future technology proposition, where 'automated' or 'artificial intelligence' elements of these tasks are not yet fully developed but are in fact the illusory 'orchestrations' of the researcher (Wizard) [218]. The Woz method has been used to reveal practical interactions, and arguably by extension, the practical values of end-users in a variety of socio-technical contexts, such as in the development of driver interfaces for smart vehicles [14], verbal and non-verbal 'mutual adaption' in human-robot interactions [15], and gestural control of and communication with robots [16]. This makes it a natural fit for experimental prototyping, where objectives may be to simultaneously develop a technology proposition while gaining a rich understanding of its apparent affordances.

2.9 Implications: Towards eliciting practical values

The above illustration situates ‘value themes’, the object of each of my studies, as emergent from participant interactions with value provocations, obtained through post-hoc rationalization and defined by myself as researcher through thematic content analysis.

2.9.1 Towards extra-sensory ‘ground truth’

'Ground truth' is referred to in this thesis as the underlying basis on which value preferences, choices, and reflections on the mediation of preference and choice are established and something which is hard to determine for sociological, extra-sensory values [19], [20], [219]. The best example is that of physical product attributes; the evaluation of which represents the 'ground truth' on which emergent product portfolios and other marketable phenomena arising from prototype valuescapes are based. It is a core assumption of this thesis that just as valuescapes render the ground truth of product evaluation, they may also render a ground truth of extra-sensory evaluation.

2.9.2 Assumptions

The following assumptions speculate on the utility of valuescape in relation to their informational content, the predominant mode of interaction, and their intended application ‘in the wild’.

A1 – Valuescapes enable personalization when comprised of extrinsic as well as intrinsic factors.

A2 – Valuescapes enable personalization when retrospectively qualified by the data subject.

A3 – Valuescapes enable personalization when sensitised to the practical priorities of ‘context’.

These assumptions are informed by the gaps identified in knowledge and practice across domain areas, previously shown in literature and contemporary works.

2.9.3 The nature of Valuescape and values

		VALUESCAPE	
		STRUCTURAL	**CONSTRUCTED**
VALUES	**OBJECTIVE** (Mediating the 'original and series')	Hedonic values = Material facts Eudaimonic values = Social facts CW = Unbiased expert VS = Depiction of reality	Hedonic values = Material ontologies Eudaimonic values = Social ontologies CW = Collaborative expert VS = Depiction of taxonomies
	SUBJECTIVE (Mediating the social 'made flat')	Hedonic values = Material facts Eudaimonic values = Social facts CW = Biased expert VS = Distortion of reality	Hedonic = Dynamic ontologies Eudaimonic = Dynamic ontologies CW = Nascent expert VS = Distortion of taxonomies

Table 2:1 Values and Valuescape: A cross-tabulation of implications for CoffeeWizard (CW) and Valuescape (VS)

Following previously outlined assumptions, it is useful to set out the theoretical implications for interactions that, according to sociological theory set out in chapter 2, inform the nature of valuescapes and the values they depict. It expected that interactions with valuescapes might contribute to understanding the characteristics of valuescape and values on the basis of their perception as more or less structural-constructed; objective-subjective, such that hedonic (sensory) values,

eudaimonic (extra-sensory) values, CoffeeWizard (CW) and valuescapes (VS) themselves begin reveal common practical values (Table 2:1).

Chapter 3: Probing, Provoking, and Speculating with Valuescape(s)

The following chapter introduces a qualitative, three-stage research methodology common to each of the studies in the subsequent empirical chapters. The selection of this methodology is introduced in respect of contemporary approaches to eliciting, representing, and provocatively applying values in contemporary work. After a briefly elaborating on the nature of the subsequent empirical chapters, research aims and overarching research questions distinguished from the more specific questions addressed by each of the studies. The epistemological lens is formalised and explained in terms of designed research frameworks (CoffeeWizard) and analytic frameworks (thematic analysis), resulting in the formulation of working assumptions for how personalization may be thought of in terms of both the objective-subjective nature of values, and the structured/constructed nature of valuescapes . Finally, an overview of the methodology in terms of its operationalization across the studies is given. It should be noted that this methodology is elaborated in each of the subsequent empirical study chapters, as it specifically informs the design of artefacts and frameworks for eliciting, representing, and provoking user's personal reflections.

3.1 Introduction: Setting up three distinct studies

The three studies presented in chapters 4, 5, and 6 are distinct in terms of focus and context of deployment but share an overarching three-part methodology. There was some tension over the decision to frame the methodology as 'mixed-methods' or 'qualitative' in its essential empirical focus. While in studies 2 and 3 there were elements of quantitative design, these served as instruments for generating visual provocations that were ultimately intended to generate rich, conversational data. As such, the thematic analysis of this data, together with its framing as emergent from a novel design, demonstrate a qualitative approach.

The following explains the rationale of a three-part design, positioning valuescapes as the main touchpoint for values-orientated interaction and by extension, personalization, in three separate everyday coffee interactions. Some parallels can be drawn with the approach of values-sensitive design (VSD); an HCI method which similarly uses a 'tripartite'

structure to conduct '…conceptual, empirical, and technical investigations' [220]. Used to explicitly attend to challenges such as ethical design of algorithms or the advancement of concepts such as 'informed consent' [166], [168], [169], this work could be positioned as a conventional VSD in the sense that the conceptual, empirical, and technical implications of valuescape are all attended to. However, the structure of the chosen approach fundamentally differs due to its need to not only understand user's value preferences for coffee and their interactions with a technology, but further, to provoke the emergence of new, practical values in situ.

Each of the studies necessarily contains elements of provocation by design. Therefore, the use of a reverse-timeline artefact in study 1; personal (in)congruencies in study 2; and coffee value clusters in study 3; fundamentally serve as technology probes when treated as research tools: Their deployment to specific contexts (S1, S2) or in specific scenarios (S3) can be seen to provoke the 'real' values of their users when selected values are qualified in retrospect.

Further however studies 2 and 3 also serve as prototype studies of interactive Valuescape, generated through the CoffeeWizard framework. The CoffeeWizard framework, while drawing implicitly on the Wizard of Oz paradigm, is not a methodology in terms of the studies. Rather, it enables the overarching methodology of value-preference, -choice, and -retrospection elicitation to be designed into specific probe artefacts, deployed either physically to the home, or remotely (online) as speculative 'mobile app' design fictions.

3.1.1 Objectives

There are two objectives in this work: RO1 - to understand the nature of personal coffee consumption, explicitly in terms of value; addresses the imperative to probe valuescape; and RO2 - to understand the nature of interaction with valuescapes as provocations to personalized interaction.

3.1.2 Research Questions

Whole Thesis	**TRQ1**	*What is the need for valuescape?*
	TRQ2	*How is a valuescape made personally useful?*
	TRQ3	*How might valuescapes address the shared priorities of service providers and end-users in everyday coffee consumption?*
Study 1	**S1RQ1**	Which social, technological, or other contingencies emerge as valuable from reflective accounts of maintaining business activity over a defined period of COVID-19 restrictions?
	S1SQ1.1	How did the participant react to Covid-19 restrictions as a service provider?
	S1SQ1.2	*In what ways have participants' clientele interacted socially over throughout the timeline?*
	S1SQ1.3	*In what ways have the participant used technology throughout the timeline?*
	S1RQ2	How do emergent themes align with specific provocations over time?
	S1RQ3	How does interaction with social, technological, and other 'objects' change over time?
Study 2	**S2RQ1**	What do coffee consumers personally value during everyday coffee consumption?
	S2RQ2	How do consumers articulate personal value during everyday coffee consumption'?
Study 3	**S3RQ1**	What do coffee consumers value across multiple categories of value-objects?
	S3SQ1.1	*How can preference data for value-objects be visualised as an interconnected constellation?*
	S3RQ2	What, if anything, do analyses reveal about how values can be mutually grounded?
	S3SQ2.1	*Is there an emergent, underlying grounding?*
	S3RQ3	What do coffee consumers offer in response to seeing their location in various valuescapes?
	S3SQ3.1	*Do they offer supporting, contradicting, novel qualification?*

Table 3:1 Research Questions

3.1.3 Ground truth, Probing, and Provocation

While thesis research questions speak to unifying concepts addressed across the studies, each study differs in terms of the specific area of focus. Certain approaches to working with human values in HCI formalise a three-part interaction design, which broadly reflects the 'before', 'during', and 'after' stages of interaction [166]. This can be seen as approaches such as value-sensitive design [166] that emphasise rich, qualitative description, but also in very tightly controlled quantitative studies combining a priori preference, real-time interaction, and a posteriori retrospection [208], [221]. Eliciting values from a 'cold start'; presenting them as practical choices, and presenting representations of aggregate a priori and real-time interactions affords a unique opportunity for this latter stage of qualification: The user not only confirms or rejects their original stated preference; but as an additional layer, they qualify the practical (situated) grounds for that confirmation or rejection; thus rendered a newly emergent set of 'practical values' [7].

It has been reflected that the formalisation of the three-part approach in all three studies has the potential to make a much more fundamental contribution to early notions of value 'ground truth', which was originally set out as a motivational notion in the introductory chapter[19], [20], [46], [219] . We know that coffee value-attributes serve as descriptors of coffee qualities, which have been shown to be fundamentally grounded on unique combinations of chemical profiles . Conversely, we know that extra-sensory values do not enjoy a similar basis in 'ground truth'. As such, it is the retrospective qualification of these values that serves to enumerate the possible contingent attributes of social values, such that they may become novel touchpoints for interaction.

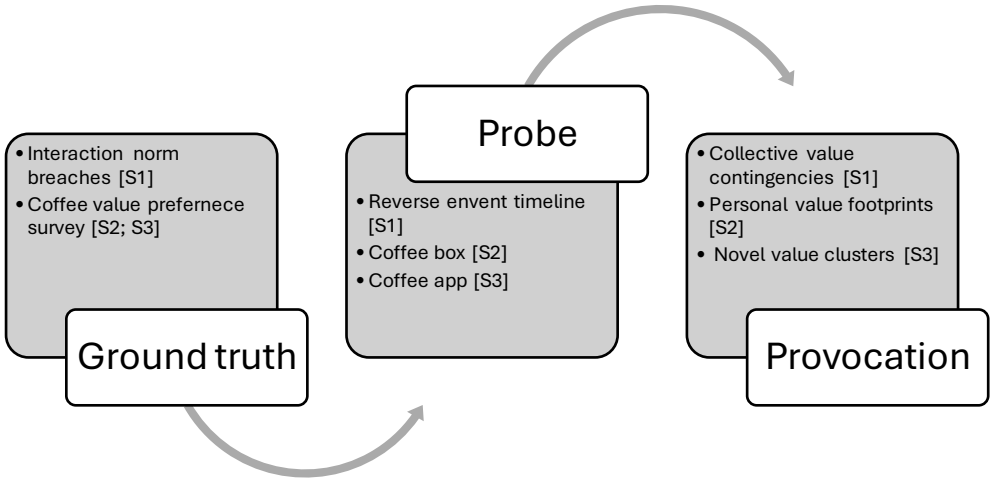


Figure 3-1 Three-part methodology

In each study, the asserted 'ground truth' of preferential values pertaining to coffee consumption; the probing of Valuescape as if it were structural, empirical reality; and provocation of further values-orientated interaction are combined. This three-part methodology was integral to the elicitation and presentation of Valuescape in various guises, and the provocation of the participant (Figure 3-1).

In study 1 (Chapter 4:) – 'Contingencies for Valued Interactions' - the ground truth of Valuescape is elicited from a secondary source as breaches to routine coffee interactions in hospitality settings during the Covid-19 pandemic [198]. Represented as a reverse series of events on a timeline infographic, this serves to both probe the contingencies of participants during this time, revealing overarching practical values, as well as provoking examples of specific instances of interaction; or the values-attributes on which practical values may be described as contingent.

In study 2 (Chapter 5:) – 'Interactions with CoffeeWizard' - the ground truth of Valuescape is asserted by survey of sensory and extra-sensory value preferences, allowing everyday coffee consumers to state preferences in rank order and in terms of consumption routine for a selection of product values and value-attributes. Later interaction with a coffee product selection box probes the (in)congruency of personal asserted choices, allowing basic visualizations of personal value (in)congruency to be generated. When used as provocations to conversation, these serve as personal value footprints that were designed to capture the practical value of a 'CoffeeWizard' technology that generates personal valuescapes.

In study 3 (Chapter 6:) – ‘Building Valuescape(s)’ - the ground truth of Valuescape is again asserted by a survey of sensory and extra sensory value preferences. Presented as a prototype mobile app interface, the ‘CoffeeWizard’ is now a probe for eliciting, calibrating, and visualizing personal coffee value preferences as novel appropriations of graphs typically seen in industry and academic research. As a provocation, these graphs serve as the main interactive component of participants’ personal valuescapes, used to order and recalibrate coffee product and services in a series of ‘speculative enactments’ [11].

3.2 Personal valuations: a reflexive epistemological lens

As this work is fundamentally interdisciplinary, this is intentionally reflected in an epistemological approach that on the one hand draws on structuralist approaches of social theorists such as Baudrillard, Latour, and Rokeach to objectify otherwise subjective, extra-sensory value [17], [18], [47]; while also holding to the post-structural, interactional approach of the ethnomethodological tradition, inspired by Garfinkel and contemporary HCI practitioners [149], [218]. Consequently, the approach developed can be described as a reflexive, post-hoc qualification of personal valuations, employing a research framework that seeks to present values-orientated interaction as a three-stage process of establishing coffee value ‘ground truth’, ‘probing’ of explicitly values-orientated interaction, and ‘provocation’ to further valued interactions .

'Only in retrospect did they decide what they did that made their decisions correct ones. When the outcome was in hand they went back to find the "why", the things that led up to the outcome, and then in order to give their decisions some order , which namely, is the "officialness" of the decision'

Garfinkel, 1991 [149]*114*.

This kind of rich, retrospective, qualitative enquiry informs elements of all designs at the intersection typically after predicted or intended interaction, revealing actual or novel interaction that constitutes user-led, practically evaluated outcome. [149]. Presenting valued grounds of interaction as 'routine' is provocative in the sense that users may more likely respond with how these routines have been breached. As such,

the valued contingencies for individuals and groups, are discoverable from a thematic analysis of interaction [148].

A value is an '...enduring...belief...refer[ing] to a mode of conduct or end-state...a preference as well as a "conception of the preference",...and its preference status can relate to the personal or the social

Rokeach, 1979 [49]

Rokeach develops and operationalizes multiple values that pertain to both means and ends in this way, by envisaging entire 'value systems' contingent on apparent 'instrumental' and' 'terminal' value-sets that for him, '..represent two separate yet functionally interconnected systems, wherein all the values concerning modes of behaviour are instrumental to the attainment of all the values concerning end-states' [49] p12. By similarly framing the value dimensions of everyday coffee consumption preferences as discrete sets contingent on specific value-attributes, it is hoped that Valuescape might similarly be operationalised as a kind of multifaceted value-system first as an assertion of ground truth; then deployed by means of a technology; and finally, and most specifically, as a provocation to interaction.

3.3 Analytical framework:

The analytical framework follows the rationale of the three-part research framework, comprising analysis and visualization of data from the first two stages for presentation to participants, and semi-structured interviewing of subsequent participant reflections.

3.3.1 Semi-structured interviews and thematic content analysis

In terms of thematic analysis across studies, several sources including and inspired by Braun and Clarkes work were consulted to develop an appropriate means of eliciting themes through the coding of participants verbal response. On the one hand, selection was based on the need to classify codes to (a priori) known categories. In a basic sense, it might be considered that just as a set of coffee value-attributes constitute an a priori value for coffee product, so it was expected that a newly revised set of values would be provoked through

interaction with valuescapes. On the other hand, it was important that codes were not so rigid as to be completely pre-defined.

Semi-structured interviewing was chosen to ensure the participant is less restricted in their interactions, encouraging them to address and experience provocation in every aspect of the designed affordances of the studies. This ensured participants had opportunity to fully elaborate on the interactive touchpoints of prototypes, while remaining within the confines of use-case scenarios [222]. To alleviate the risk of researcher follow-up questions '..compromise[ing] the standardization of the interview process and hence the reliability and validity of measurement' [222]; these too were standardised as simple prompts to elaborate answers, consistent with the design of an embedded survey and the real-time study.

Analysis of participant interaction with valuescapes used the well-regarded ‘6 step approach’, which is positioned particularly in studies 1 and 3 as an analogue to automated, algorithmic classification of conversational reflective interaction in a values-orientated coffee personalization system [223]. Thematic analysis presented the challenge of attribute level coding and saturation on the one hand conforming to a ‘code book’ interpretation of the method, while also enabling ‘reflexive’ and more subjective coding on the other [224], [225], [226]. Arguably, both approaches are important to hold in tandem, with the former relating more to known value-set enumeration, and the later, to practical value enumeration' [226][225].

While thematic analysis is predominantly discussed in terms of a posteriori sensemaking, it is also deemed appropriate to link findings back to the a priori stages of the prototype. This is instrumental in comparing designed and emergent affordances at key interactive stages of the CoffeeWizard design. [227]. Consistent with a structuralist conception of valuescape as constructed from taxonomies of values or value-sets, thematic content analysis was used to build an inductive understanding of both the substantive meaning of values conveyed through, as well as the provocation of a new, ‘practical value’ set; generating new taxonomies of the emergent affordances of valuescapes.

3.4 Valuescapes as technology probes:

The presentation of CoffeeWizard as a technology probe was as much a pragmatic choice as it was informed by the requirement to situate the WOz framework in a real, social setting. Prior to the Covid-19 pandemic where taken-for-granted face-to-face studies were the norm,

CoffeeWizard was originally designed as an interactive vending machine interface, allowing for the selection of combinations of product in an 'A/B' test setup. The revision of the design to remote coffee selection box enabled the selection-choice-retrospection mechanism to work as a means of expert to user recommendation system, albeit in a hybrid and asynchronous way. Moreover and considering its form as specifically a technology probe, its use was able to draw on its contextual surroundings, meaning that analysis of user retrospection could in turn be grounded in the valued-interactions of domestic consumption. A fundamental complication was always present when considering an appropriate methodology for on the one hand, eliciting data about participant's evaluations of values, and on the other, about participant evaluations of the system in its entirety.

'Speculative Enactments'; as demonstrated in the previous chapter with reference to studies employing personal data artefacts as provocative stimuli for interaction, generally capture how personal valuescapes were interacted with as technology probes (tools for research), but also as prototypical systems reflective of an explicit product/service: The HCI approach of Speculative enactments most accurately encapsulates the design of studies two and three [chapter ref], where a working tension was always the necessity to engage participants in '…speculative but consequential circumstances' [11] p5386.

Elsden et al. (2017) offer two contributions of speculative enactments as an HCI design method; first, its ability to 'prioritize…participant experience with speculation'; and second, a critical consideration of the 'forms of knowledge' produce[d] for HCI' [11] p5387. In the first case, the prioritisation of experience with a speculation fits well with the emphasis on eliciting personal, practical values as a reflexive and emergent value-set, capable of qualifying initial evaluation, real-world choice, reflections on any apparent (in)congruency between these, as well as the overarching experience of interaction. In the second case and considering how practical values can themselves be framed and understood as an output of values-orientated interactions, speculative enactments appear to invite participants to remain critical stakeholders in the process of working with values, consequently allowing them some agency in how those values final come to be asserted.

3.4.1 Towards speculative enactments: From practical values to practical interactions with personal valuescapes

S1 - The three-part methodology was realised in study 1 through participant interactions with a reverse timeline. It makes sense to

present this study first, as the kinds of practical values elicited point toward the social phenomena that need accentuating through the interactions with valuescape.

S2 & 3 – The three-part method ology in studies 2 and 3 can be thought of as more coherent and aligned to the specific approach to HCI research articulated as 'speculative enactment' [11], [228]. These studies have in common the development of valuescape as a personal data artifact that can be realised through the underlying CoffeeWizard framework. In study 2, this framework informs the first speculative enactment – the provocative (re)qualification of values through personal value footprints, elicited though an ostensibly 'valued' coffee selection box. In study 3, this framework informs the second speculative enactment – the provocative (re)qualification of valuescapes as a reappropriation of visuals commonly used in industry.

3.5 Studies 1- 3: An overview

	Stage 1 **Values Ground Truth**	**Stage 2** **Probing Personal Values**	**Stage 3** **Provoking Personal Values**
Study 1: Contingencies for valued interaction	Breaches to norms of interaction in third-space hospitality venues during a period of Covid-19 lockdown	Reverse event timeline	Personal reflection on contingencies for maintaining valued interaction
Study 2 Interactions with CoffeeWizard	Sensory and extra-sensory coffee value preferences	Values-orientated product selection box	Personal reflection on value footprints depicting (in)congruency of predicted choices.
Study 3: Building Valuescape(s)	Sensory and extra sensory coffee value preferences	Values-orientated product, experience, end-goal, and sustainability goal alignment.	Personal reflection by ordering/ recalibration of recommendation.

Table 3:2 Ground truth, Provocation, and Reflection across each study

The three-part methodology is instantiated differently across each study, but each instantiation is intended to focus analysis on the final stage of personal reflection of interaction with artefacts and frameworks. In the above (Table 3:2), ground truth data, visual provocation, and reflection on valuescape is summarised according to each study.

3.5.1 CoffeeWizard Interaction Frameworks

Based on the wizard of oz (WOz) paradigm, the CoffeeWizard interaction framework was devised to manage interaction between the service provider (researcher) and consumer end-user (participant). It is represented in chapters 4 and 5 as framework guiding the survey of preference, the mock-up of depictions of personal value (in)congruency and group alignment, and the use of these depictions to provoke further reflection with the participant.

3.5.1.1 Study 2

In study 2, CoffeeWizard is presented to the participant as a values-orientated coffee subscription service. Comprising online survey, calibrated selection box, and online interview, the week-long deployment of CoffeeWizard as a technology probe enabled the provocation of the practical values its use in the homes of everyday coffee consumers.

3.5.1.2 Study3:

In study 3, CoffeeWizard is presented to the participant as a prototype mobile app requiring initial participant calibration – again through online survey. Once calibrated through the rank-scoring of several value-attributes, CoffeeWizard generates clusters graphs locating the individual according to their preferences, using these as provocations to ordering and calibration of product, service, and experience in various scenarios.

'Tailored scenarios' directly support the rationale for an app-based design fiction in study three, with survey and retrospective interaction based on 5 scenarios of conceivably scalable, but relatively unintrusive and inexpensive compared to study 2 [229].

3.5.2 Valuescapes

Other than the framework offered by Nöjd et al [42], Valuescape had no prior precedent in terms of their instantiation as touchpoints for personalized interaction. While CoffeeWizard had certain necessary affordances to be designed into the framework, as artefacts for interaction, valuescapes were comparatively more speculative in nature.

3.5.2.1 Study 2

In study 2 valuescapes can be thought of as simple, graphical representations of the personal congruencies and incongruencies that CoffeeWizard detects through the preferences and choice.

3.5.2.2 Study 3

In study 3 valuescapes are presented as reappropriations of the kinds of cluster graphs used to communicate product alignment to market sensory preferences [21], [95], [97], [98].

3.5.3 Reverse Event Timeline

The reverse-event timeline presented in study 2 focuses on the final, personal reflection stage of the methodology. Based on studies employing similar visualizations, it is analogous to a valuescape in terms of the intention to provoke individual and collective sensemaking of contents [155], [207]. The LHC is a technique for acquiring and understanding retrospections on life course events, sensitive to a mixed-methods mode of enquiry. While in study two the emphasis is on the qualitative elaborations of participants as they reflect on a designated period, corroboration of events allows for the kinds of quantitative analysis useful for upscaled and automated application of otherwise 1-to-1 conversations [221].

Chapter 4: Contingencies for Valued Interaction during Covid-19

4.1 Overview

Nationwide 'lockdowns' and similar breaches to norms of interaction were commonplace in the UK throughout the Covid-19 pandemic. While virtually every sector of society was impacted, the hospitality sector exemplified a third-place setting particularly badly affected. As such, this chapter focus on the post-hoc rationalizations of hospitality workers in these settings as they reflect on a reverse timeline of lockdown events and recall their specific interactions at the time.

'Contingencies for valued-interactions' was designed and conducted after initial ideation of the CoffeeWizard framework seen in the following two chapters, with the express focus on isolating 'practical values' as an emergent set from personal retrospections on a probing and provocative infographic. However, its substantive findings – the various contingency themes that could be said to describe maintaining valued interaction during the Covid-19 pandemic and in the face of external breaches to interactional norms – mean that the study is well equipped to serve as an introduction to the empirical work, especially in terms of its motivation.

Thematic analysis of conversations with eight participants working in venues across Nottingham, UK, consequently furnished these six contingency themes, supported by several common practical interactions which might be said to manifest the underlying practical values of the population interviewed. Discussing these both in terms of their temporal and thematic meaning, it was found that interactions supporting the maintenance of 'corporate image', 'environment', 'social interaction', 'technological interaction', 'time management' and 'well-being', were broadly descriptive of emergent contingencies. These are discussed as priorities for participants which on the one hand would appear consequential of the top-down rationale of government authorities imposing lockdown restrictions as 'global experts'; and on the other, as reactionary and based on the initiatives of participants as 'local experts'. Moreover, and considering the method, the ability of the reverse timeline infographic to make visible a tension between intended and actual outcomes of breach and suggest that themes and the practical interactions on which they are contingent can themselves be

seen as a pro-social reconciliation of priorities during a challenging period of socio-economic disruption.

4.2 Introduction: Probing coffee preference beyond product

From March 2020, the UK hospitality industry was one sector particularly adversely affected by the Covid-19 pandemic in terms of disruption from official restrictions to otherwise routine interaction [25], [230], [231], [232], [233], [234]. Exemplifying what many in both academia and the hospitality sector itself recognise as active 'third places', it is reasonable to suggest that cafes, bars, restaurants, and the like are all settings that naturally encourage interactions rich in shared values and norms: 'Third places' are typically viewed as settings other to both the domestic and work spheres of people's lives [235], [236], [237], [238]; orientated toward experiential as well as traditionally product/service centric consumer interaction [100]. By extension then, routine interactions in hospitality third places might also be seen as intertwined with the closely related concept of 'third space', a comparatively more pro-active conception consumer settings that are concerned with promoting pro-social initiatives [239]. Any contingencies for interaction in hospitality venues aligned with official restrictions therefore could be said to reveal explicit or latent practical values of the workers who maintain them, and perhaps by extension, the contingent priorities of consumers and the sector as a whole [29], [68], [148], [190], [240], [241], [242].

A fundamental proposition in this study is that instances of interaction recalled by participants during the time of distinct lockdown events can reveal the practical values of those participants, and collectively, contribute to a sense of emergent contingency themes. Defining practical values as the instances '…people draw upon when reasoning about…nascent socio-technical infrastructures' [7]; an early hypothesis is that contingency themes to which valued interactions align can be classed as broadly social or technological in nature – or specifically, as having to do with interactions with people such as customers, and technologies such as purchasing and consumption devices.

4.3 Timelines: Valuescapes of personal significance

Timelines are more than just a chronological presentation of events. He and Zhu (2020) refer to significance of the fundamental dimensions of the data represented on timelines as of first dimension (time) and

second dimension (space), as the basis for grounding 'storyline visualizations' accounting for the additional dimensions of '…characters, actions and context' [243]. Characters, actions, and context should therefore be free to emerge from a basic depiction of the facts of lockdown events and their place in time and space.

Chen et al. (2020) develops a framework for 'story synthesis' that enables both 'explorative and communicative use of data displays' by participants, with the objective of making both infographic content and content presentation intuitive [244]. While not a timeline per se, this method emphasises the elicitation of the practical priorities of users as much as content they are engaging with. In this sense, it is the collection and aggregation of retrospections that a lockdown event provokes, rather than the event itself, that is of prime importance.

Nguyen et. al. (2014) devise 'SchemaLine' - a novel timeline method grouping ' [user] notes into analyst-determined schema'. This transforms the otherwise static and informative timeline infographic into an artefact for active and collaborative use, demonstrating a more 'dynamic and iterative' approach to sensemaking in a way that gives as much weight to the practical interactions of users as the written content[155]. Nguyen et. al. (2016) also devise 'SensePath' to assess 'browser-based online sensemaking', inclusive of a 'timeline view show[ing] all captured sensemaking actions In a temporal order' [150]. Again, practical interaction with the timeline itself appears to be valued for adding this additional, qualifying dimension emerging from interaction with content as originally presented.

Applied to Covid-19, it is easy to see why timelines might be an appealing method of making sense of the collateral effects of the pandemic, but it is worth keeping in mind how they may be made more intuitive, particularly if being used by a lay audience. Ionescu and Enescu (2020) demonstrate the creation of a country specific web-app for the geographic sensemaking of aggregated timelines of 'infected, recovered, deaths, and quarantined' cases in Romania, resulting in a dynamic heatmap of the country that is more intuitively understood [245]. Conversion of qualitative timeline events to variables of quantifiably 'more or less' significance is beyond the scope of this study, but the timeline presentation of lockdown events might still usefully reveal the ebb and flow of interaction themes if saturation levels of contingent practical values are considered [225], [246].

4.4 Probing Valuescape through Reflections on a Timeline

The overarching objective of this study was to uncover participant retrospective accounts of practical interactions, as aligned to specific

events displayed on a reverse timeline infographic. I devise two research questions and associated sub-questions to operationalise this objective, with the following informing a semi-structured interview script delivered in parallel to the timeline:

RQ1 - Which contingencies have emerged as valuable from retrospective accounts of maintaining business activity over the defined period of Covid restrictions?

> *SQ1.1- how did the participant react to Covid-19 restrictions as a service provider?*
>
> *SQ1.2 - in what ways have participant's clientele interacted socially over throughout the timeline?*
>
> *SQ1.3 - in what ways have the participant used technology throughout the timeline?*

Developing contingency themes necessarily required a thematic analysis of transcribed conversation, which was used to classify instances of practical interaction, consolidate into sub-themes, and ultimately, saturate the six emergent themes I report on.

RQ2 - How do emergent themes align with specific provocations over time?

Practical interactions were also analysed in terms of their temporal location. This invoked the timeline as not just a provocation to reflection, but as an artefact for sense-making based on external and universally applicable events.

4.5 Designing and deploying the reverse timeline probe

4.5.1 Post-hoc rationalization as a methodology

In eliciting practical interactions, it is important to consider the 'before, during, and after' priorities of participants as subject to influence and change [247]. Consequently, a reflective and post-hoc rationalization approach was selected for its ability to promote collective sensemaking. Using a timeline for this, I represent a universal series of events, through a standardised tool by which specific instances of practical value, ultimately aggregating to contingency themes.

Post-hoc rationalization is often conducted through a combination of provocation by information visualization and semi-structured interview methodology [4], [5], [152], [248]. As I'll expand on in the methodology, I sought to uncover and locate values as they emerge in parallel with

chronologically ordered events, enabling focused, retrospective conversation with hospitality sector staff and a consideration of the significance of theme location relative to events. I'll argue that as invested stakeholders and observers, hospitality workers are uniquely positioned to comment on the impact of Covid-19 orientated restrictions as well as their practical responses to them. I particularly align sensemaking by means of reverse timeline with contemporary criticisms of the nature and effect of visual pandemic 'progress' mediation for the purpose of behavioural compliance, typified by use of graphical artefacts and information dashboards[203] . In terms of wider contribution, I link this explicitly to the following research motivations:

- For the hospitality industry, assessing immediate and longer terms priorities and challenging 'old and new normal' stereotypes appears to be a substantive application of findings.
- From a methods perspective, adding a quantitative, longitudinal element to thematic analysis increases dimensionality to already qualitatively rich findings.
- Finally, and in broader application of both the results and the method taken, I argue that engaging with retrospective timelines can involves participants in the critical co-production of infographics that allow practical values to emerge as pro-social solutions to competing challenges. I argue this might displace the negative societal effects some see as intrinsic to top-down and imposed uses of graphical artefacts contemporarily referred to as 'pandemic dashboards'[203].

4.6 Timelines: Valuescapes of event significance

The use of human values has increasingly become the focus for research across disciplines seeking to understand socio-economic change through the Covid-19 pandemic [198][114][30]. The various lockdown events associated with Covid-19 can be regarded in the ethnomethodological tradition as breaches to interactional norms, with contingencies to maintaining interaction potentially indicative at a top level of underlying practical interaction[7], [149]. Studies using timelines as a means to provoke rich retrospections on a defined event or series of events, such that both personal and collective qualifications of the thematic grounds of those events can be seen to emerge incrementally and beginning with the most recent memory [155], [207].

Communicating the breadth of measures imposed by the government between March 2020 and December 2021, the Institute for Government (IfG) produced a timeline visualization of various lockdown events, categorizing these as belonging to one of four types of breaches to norms; 'lockdown/restrictions introduced', 'lockdown restrictions eased', 'PM[Prime minister]/government announcements', and 'legislation/emergency powers' [198].

There is a sense that effect of this visualization performs at least two functions. First, it depicts a basic description of a factual event in time, designed by one authority – the government/legislature – in terms of an intended effect on the behaviour of the public. Second, it depicts a means of making sense of these events by another authority – the IfG research institute – as a trustworthy mediator and interpreter. Imagining this as a kind of embryonic Valuescape, this timeline might be turned to provocation of retrospective accounts of interaction that reveal practical values of hospitality workers as situated experts.

4.6.1 Ethics and recruitment

Research was granted ethical clearance from the ethics committee, School of Computer Science, UoN, reference CS-2020-R50. Participants read an overview of project information, data privacy notice, and gave written consent to participating in Microsoft Teams calls, recording audio conversation. Data were captured and stored in compliance with GDPR, semi-anonymised during analysis, and fully anonymised in subsequent write up.

Recruitment was done methodically, taking account of the geographic location of Nottingham and performing a GoogleMaps search for 'coffee' and 'café' establishments within a 4-mile radius of Nottingham City Centre. Many establishments were contacted, with the final opportunistic sample of 8 forming the population of study.

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4.6.2 Creating, deploying, and analysing interactions with a reverse timeline

In the following I'll discuss the creation of the reverse timeline artefact, the semi-structured interview script, and analytical, ethics, and recruitment procedures.

4.6.3 Creating a reverse lockdown event timeline

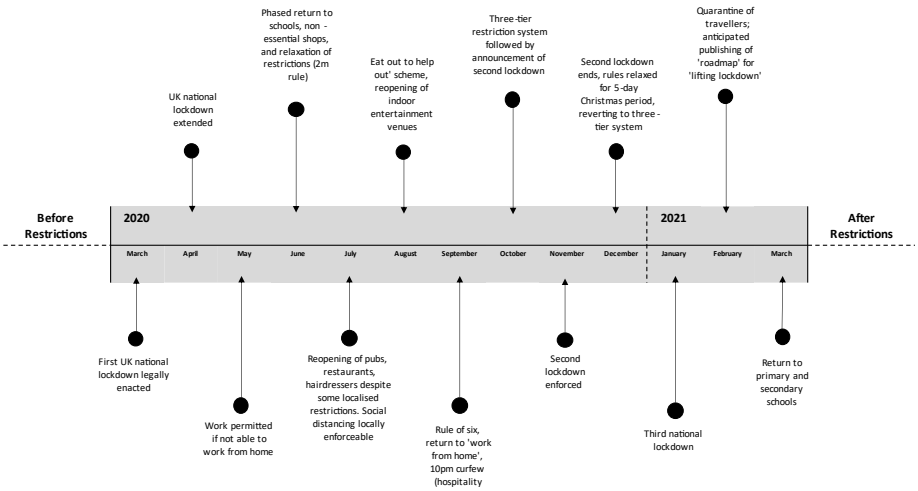
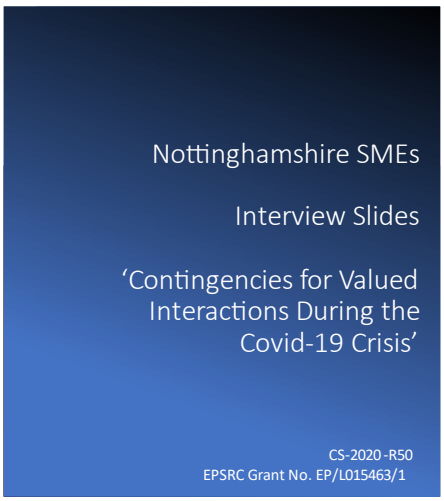


Figure 4-1 Reverse Timeline Provocation

Originally used by the Institute for Government (IfG) as an infographic to present and categorise various types of lockdown breach, I summarise key events, simplifying presentation and focussing on the 13-month period from March 2020 to March 2021.



The purpose was to reflect on how the participant responded to the challenges of various Covid-19 related restrictions. Questions were open-ended and prompted by the automated series of events, but

participants were asked to elaborate on or clarify points at the discretion of the researcher where relevant. As an initial exercise designed to get to know the participant and the context of their workplace, each were asked to describe their role, their business, and any unique selling points (USPs) of their organisation. Interactions with the reverse timeline at each of the presented stages was then enabled through a reverse order slide presentation.

4.6.4 Timeline presentation and parallel script

After the introduction I present an unpopulated timeline, with the 'after restrictions' period highlighted. I explained here that this period can include recollection of activity between from end March'21 to the time of interview and can be thought of as 'the present'.Participants were first presented with a reverse timeline comprising three sections from right to left: 'after restrictions', 'March '20 – March '21', and 'before restrictions.

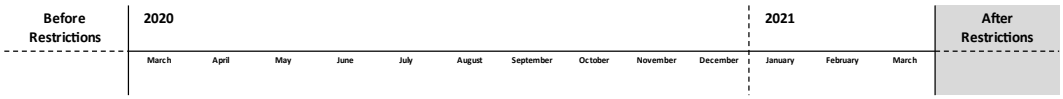


Figure 4-2 Timeline stage: 'After restrictions'

Participants were asked to reflect on the 'after restrictions' phase and told that this was the period they were 'now' in. They were asked to talk about present challenges, opportunities, and/or priorities for their business (Figure 4-2).

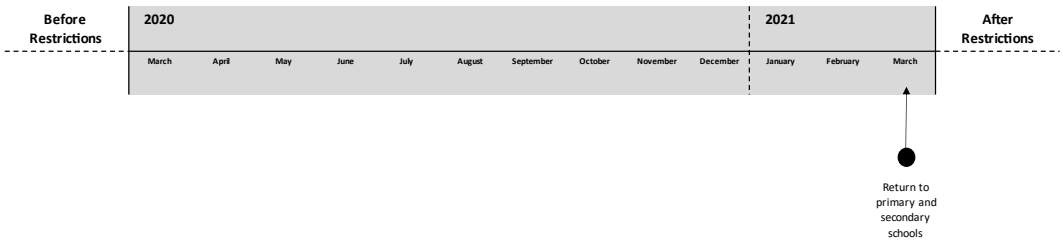


Figure 4-3 Timeline Stage: 'Restrictions'

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Participants were then asked to reflect on a series of events in the 'throughout lockdown' phase from March '20 to March '21. 13 event descriptions were aligned to each of the 13 months, and presented in reverse order, beginning with 'return to primary and secondary schools'

(highlighted). Again, they were asked to talk about challenges, opportunities, and prioties for their business (Figure 4-3).

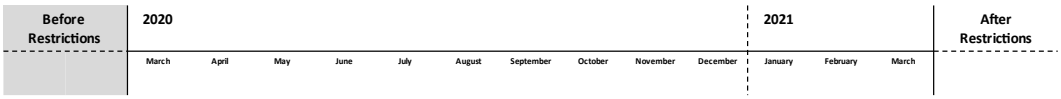


Figure 4-4 Timeline Stage: 'Before Restrictions'

Finally, participants were asked to reflect on the period prior to March 2020, again focussing on challenges, opportunities, and priorities for their business (Figure 4-4).

Interviews lasted c.1hr with each participants.

4.6.5 Analysis of interaction

Conversational interaction was recorded, automatically transcribed, and manually corrected for errors allowing for initial familiarisation. Transcripts were subject to thematic content analysis, and in the first instance, this took the form of Braune and Clarke's 'six stage' approach, inductively arriving at top-level contingency themes from an interpretive saturation of their contingent sub-themes [109], [223], [225], [226]. As this was itself contingent on an aggregation of instances of practical interaction (literally, sentences within the transcripts), I additionally saturate themes quantitatively in terms of % saturation for content alignment with stages of interaction and to address my second question.

4.7 Findings: Contingency themes and their grounds in interaction

I present findings thematically in the first instance, and then as demonstrative of saturation by stage of interaction, before, during and beyond the pandemic. In terms of theme saturation, I then breakdown findings by temporal stage, revealing priorities for valued interaction and suggesting applications for the timeline as a sensemaking artefact.

Participant	Role	Business Type	USP(s)
1	General Manager	Community Cafe	*'... independent cafe bar that supports the substance misuse community through providing incentives, a safe space and events for friends and families of those who've been affected by drug and alcohol addiction'*
2	General Manager	Bakery	*'we are a bakery, so we sell bread and baked goods...first and foremost. Last January we moved into bigger premises [and] started focusing a lot more on the seating, like indoor becoming a cafe and we got ourselves a coffee machine. ...For the one month of January [2020] and a little bit of February, we were really heavily focused on being a cafe, and then that sort of changed'*
3	Area Manager	Artisanal Coffee Chain	*'...I think the feel of the shops is very unique. It's a lot of kind of homely. ...interiors kind of relaxing space, which sets us apart from [larger chains] .... And then our coffee as well. We have quite a unique place in the market with our coffee so we kind of [act] like a introduction to specialty coffee so we can cater for [all]'*
4	Barista	Café	*'...it's definitely aimed more towards the youth,...students, and it's just a nice warm welcom[ing] area for people to hang out and do work if needed...The unique selling point is the fact that the manager...studied nutrition...you can see that heavily throughout the menu. She likes to put good, healthy quality food in front of customers and nothing that she would not eat herself'*
5	Business Owner	Café	*'... in terms of product we specialise in Belgium waffles, which is something that different from competitors and I think something that draws customers to us and we also really focus on having good quality coffee. Gonna say small and welcoming and friendly is another unique selling point of what we do'.*
6	Business Owner	Cocktail Bar	'...we're all about creating a fun atmosphere ...to save the need of going into town. So it's like a [local] city centre experience...when we first opened, we were the first proper cocktail bar in the area'
7	General Manager	Artisanal Coffee Chain	*'...we are a completely local business. We have obviously expanded into other cities now, but our roastery is a 10 minute walk away from my shop where we roast for all our shops or wholesale clients....I don't know of any other like local business that does something like that'*
8	General Manager	Artisanal Coffee Chain	*'I would say that it's specialty coffee. Served quickly'*

Table 4:1Participant Overview

Table 1 gives an overview of all participants; their self-reported job role and business type, as well their own summary of the business unique selling point (USP). As an example of how I classify content at a fundamental level, I underscore all instances of described practical interaction. These go on to form the inductive building of sub-themes and ultimately, overarching contingency themes across transcripts.

4.7.1 Contingency themes and their supporting interactions

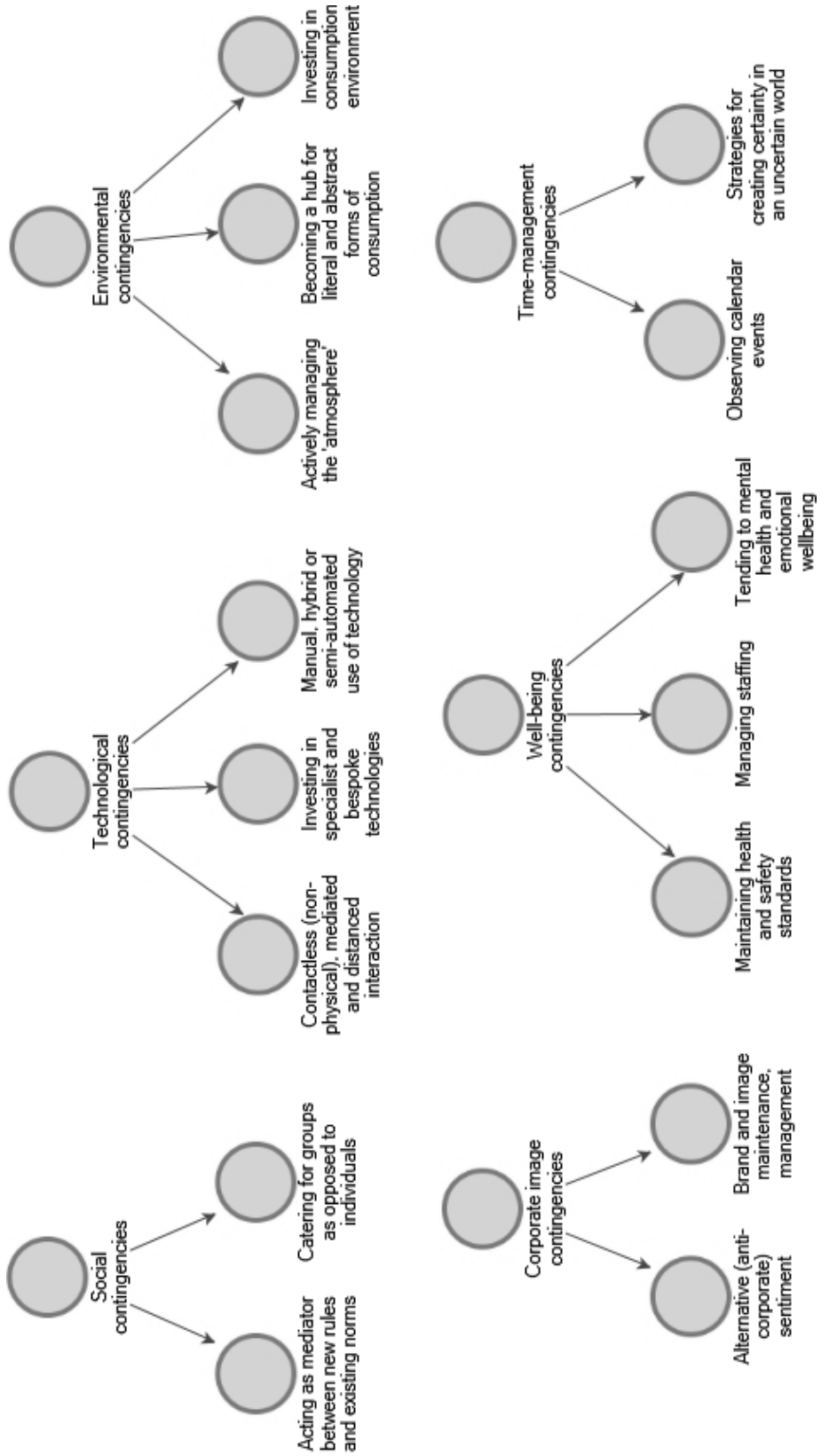


Figure 4-5 Contingency themes and sub-themes

As an overview, practical interactions appeared to suggest 6 overarching contingency priorities for participants, which I describe as social, technological, environment, corporate image, well-being, and time-management orientated. I'll now present each of these in terms of their supporting sub-themes in terms of the instances of practical interaction that could be said to support them (Figure 4-5).

4.7.2 Social Contingencies

Social contingencies encapsulated retrospection on breaches to interpersonal norms. Retrospection here revealed how participants interacted directly with both customers and each other, as well as their observations of customer-to-customer interaction. Instances here can be seen as belonging to at least one of two key sub-themes; 'Acting as a mediator between new rules and existing norms', and 'catering for groups as opposed to individuals'.

4.7.2.1 Acting as a mediator

Acting as a mediator meant that participants had to balance compliance with emerging new rules from the authorities with retaining a semblance of existing, organic social interaction for customers. As a clear example, the governments' 'eat out to help out' scheme (EOHOS) was invoked here as a contentious initiative and double-edged sword when it came to fostering the specific kind of social interactions desired at a local level, versus the general incentive of attracting financial custom. Beginning in August 2020, many demonstrated how this both breached the normal routines of interaction with customers in terms of failing to meet their service expectations, as well as internally with colleagues, in terms of adding various complications to workloads:

> 'That was an absolute nightmare. An absolute nightmare…We were literally running back and forth constantly and then…obviously you have to work out your claim back, so you have to make sure that the money was always right. You had a certain amount of receipts like data was input[ed] properly, so you could claim everything back correctly. So that was probably the most stressful month that we've had with your out covert to be honest' (P7).

> ‘We had to keep record of every single eat out to help out transactions that we would do, so at the end of the day, the managers had to input, sometimes over 200 receipt numbers - total price, how many items purchased - into a spreadsheet for us to send off to kind of prove that we had done it correctly. I have records to prove that we did it correctly and that would take over an hour a day for some of the sites to import those receipts. So obviously we were much busier, sold a lot more food and had to make sure we kept records well so that we could claim the money back so it was. It was a bit of a nightmare to be honest’ (P3)

> ‘…people wanted to sit in and couldn't get their heads around the fact that they couldn't just have a coffee and a cake, and that's not classed as a substantial meal. So you constantly have to have conversations with people saying you have to get like X amount of things in your order for it to class it as a substantial meal (P8).

Acting as a mediator was also evidenced through retrospection on events that required maintaining control over in-house decisions. In facilitating the EOHOS, benefits – if there were any - were universally financial, short-term, and limited to a narrow window of scenarios in which the participant had to ensure their clients made a qualifying order (i.e., a ‘substantial meal) for the scheme. Consequently, participants felt that their intermediary role between the authorities and the public was too authority-orientated to the detriment of routine social interaction, and a more pragmatic interpretation of rules and opportunistic outlook ensued. This was evident through novel sales strategies, and strategies for improving efficiency:

> ‘I think I seem to remember we had to give people bowls of chips… like 50p for a bowl of chips if they wanted a coffee… there[was] no kind of leeway given, so just trying to be flexible and trying to explain to people at the door what conditions we were under at that time was a big challenge’ (P1).

> ‘It has been a good opportunity to look at how we do things going forward because I think we're kind of in the best. In terms of systems and operations are in the best place we've ever been, were very organised. And yeah, there's, there's an opportunity to look at how we serve customers in the future to be more efficient and to ultimately bring a better service to our customers’ (P6)

> ‘….we've gone cashless. And the pandemic was a great opportunity for us to where we kind of used that as an excuse, but we're never going to go back to taking cash here were always going to be card. It's a lot cheaper for us to take [because] paying cash into bank is expensive and it's a lot more secure as well, so that's one opportunity’ (P6)

Another way in which acting as a mediator became problematic for participants was the way in which it formalised staff-customer relationships:

'We do have to tell a lot of people off….Can you not, you know, put your hands over the counter, that kind of thing. So there's a lot less telling people off before restrictions. And I think. Especially at the weekend now we have, or did have quite a big queue, so when they got to the front it was like okay….now leave[!] Whereas before restrictions [it was] a lot more casual…' (P2).

Participant 8, referring to October 2020 in which a 'three tier' system for restrictions was implemented, demonstrated that the practical value of acting as mediator appeared to be in the countering of mixed messages:

[October 2020] was probably the worst month I actually went through because it was it was painful…obviously people wanted to sit in and couldn't get their heads around the fact that they couldn't just have a coffee and a cake, and that's not classed as a substantial meal' (P8).

4.7.2.2 Catering for groups

An emphasis on catering to groups, as opposed to individual customers, was another sub-theme of the social contingency. This was particularly evident with participants whose business model prioritised social event facilitation as a USP:

'[we had] a lot more flyers out on tables or a lot more posters around, a lot more flies that people could take with them. Lots of surfaces that potentially then now will carry infection, et cetera, et cetera. We relied upon social media more than just for purely advertising. And highlighting offers and events and schemes not so much booking and engaging with us on a practical level…So, so yeah, things will look more chaotic and less controlled. [Our customers]…come from a meeting or a mindfulness group, so there's a lot more entropy, a lot more randomness involved in engagement and interactions as opposed to pre-planned pre booked. You know pre attended situations, so things were again less controlled, a bit more free and easy' (P1)

This example of collective spontaneity is something which continued to manifest throughout lockdown:

'…some tables take the rules very seriously, which is great for us because it means we don't have to babysit people.…They get the masks on when they need to, and then you'll have some groups where I don't know. They might have two tables booked under different names and they will try and merge the tables…' (p6).

Finding ways to maintain customers' natural social interactions while adhering to changing rules without 'babysitting' often invoked examples of use of technologies in distinct ways.

4.7.3 Technological contingencies

Technological contingencies comprised retrospections that emphasised a reliance on specific analogue or digital devices, supported by three sub-themes of enabling 'contactless, mediated and distanced interaction', 'investing in bespoke technologies (products)', and maintaining interaction through 'manual, hybrid, or semi-automated solutions.

4.7.3.1 Contactless, mediated, and distanced interaction

Contactless, mediated and distances interactions were made possible through digital sales solutions, click and collect services and/or platforms and such as 'Deliveroo':

'The Deliveroo system… allows more of a contact list an as in like I'm not interacting with them at all, but they are allowed to personalise it like we often get little notes saying please add hot sauce don't need any cutlery so that allows us to communicate with the customer even though I'm not actually talking to them' (P4)

In this sense, the use of the system was ostensibly grounded on the necessity of maintaining social distance, however, it also appeared to be practically useful in terms of order personalization and efficiency. Similarly, QR codes were used as a means of replacing the need for handling physical menus, and enabling efficient ordering through a 'staggered' relay of requests to staff:

'We have tried to engage with QR codes on tables and electronic menus and things that we shied away because we have to really manage the input to the barista and manage the input to the chef. So we have to kind of stagger. Order so people aren't Overwhelmed by the order? (P1)

When it came to taking customer payments, electronic point of sale (EPOS) systems were generally used routinely and themselves backed up by another (different) system:

'...our epos system...allows us to switch between table service and non-table service because you can have it on an app on an iPad. So that's been an important one, we use paymentsense card readers, which are fast, reliable. They run off the Internet. We also have iZettle as backups, in case the Internet crashes, which is only happened once. Yeah, we always like to have a backup for everything' (P6)

4.7.3.2 Investing in specialist and bespoke technologies

Before lockdown events began, participants evidenced instances of specialist and bespoke technology use outside of the conventional retail space. Describing a converted horsebox that was used for remote sales and marketing work, participant 7 stated:

'...we'd go and do loads of events in cities where we'd be thinking about opening a shop, handing out coffee just to get to know people. Obviously, the horseboxes are very small, enclosed environment and people would be coming right up to you. You would be handing stuff straight to them. But we obviously don't do stuff like that anymore. I'm not really going to events or anything like that like normally would do things like London Coffee Festival that's been cancelled. That's not happening. And anything that we do now is only a set amount of stuff and the same a lot of people kind of thing. The same regular people that go through. (P7).

'And the only thing that we. Not really, pick back up on but will be coming back and we've got tablets like I like a. Apple have the...iPads, And so we have that we used to have those at the tools to sell our Barista school classes. Okay, so you could go through with the with the customer at their table or like in front of the telly. You can book them on they compare, pay for it, and obviously that definitely got taken away because of you know contact and it's not necessarily something that we've brought back...' (P8)

4.7.3.3 Manual, hybrid, or semi-automated use of technology

Manual, hybrid, or semi-automated use of technology appeared in contrast to previous examples, as instances of interaction in which participants appeared to value maintaining some control over certain processes. Manual tracking of orders - again notably in the EOHOS, the creation of internal audits and sales reports on self-devised spreadsheets, the spontaneous 'filling of seats' as opposed to pre-booking, and personal delivery of takeaway orders to name some salient examples, were all cited by participants as desirable alternatives to adoption of known solutions that would seemingly alleviate the work of manual or even hybrid physical/cognitive effort:

'I made an Excel spreadsheet [but] couldn't figure out a system for how to make good records.... I spent a couple of days trying to make something work on the till system myself, which I did manage to do, but it was still a very manual process' (P3).

'I've got a booking list at the venue so people can phone, email, visit, drop in and book their space, which they do. So I keep a list of names and numbers and that's how I manage the attendance. An also literally tick people off when they arrive. And also it gives me an idea what recovery or not community they're from. 'Cause I like to keep a record of who were engaging with how many people are there from the recovery community are engaging with us' (P1).

4.7.4 Environmental contingencies

These concerned the management of physical and abstract spaces (e.g., 'atmospheres'), becoming a hub for specific kinds of consumption and consumers locally; and 'practical investment in furniture/equipment'.

4.7.4.1 Actively managing 'atmosphere'

Instances of active management of the subjective social experience such as creating atmosphere and ambience were important for many participants. Most obviously this occurred during descriptions of creating a 'warm' space, descriptive both in terms of a venue being physically comfortable and socially inviting.

'Warmth': 'Ideally I'd like to. As I said, I have been staying tonight in advocate people becoming more comfortable, more relaxed, more sociable in their old ways. I really like that, and I think I really missed it. Took the joy being able to provide the warmth. Away from my job, I'm not mad about the hygiene, I like' (P4).

Curating cultural space also contributed to a sense of atmosphere management, where efforts to organise entertainment or initiatives aligned with the venues USPs revealed a sense of profiting from social and cultural capital:

'So just cause our own community impact, so that's where it's not monetary value, which cultural cachet it's good recovery cachet. It's valuable to the community, and as outstanding as a community interest company. [We] recorded poetry events online that can only lead to positive impact for my live poetry events. When I do get them going again, which it did, so I suppose that can be seen that way. And also if I'm keeping our identity out there in the electronic community, it's still a form of advertising for one of the term. It's an advert for what we do and who we do it with and how we do it so' (P1).

Finding ways to recreate pre-pandemic 'hustle and bustle' became a practical priority as participants reflected on use of space to create atmospheres of liveliness, alfresco and continental cultures of third space, and 'cosiness'.

[Present] 'Very busy, the shop was constantly full. Weekends were insane just like having hustle and bustle inside of the shop, it's slowly getting back there, but obviously we're nowhere near what we was at before an but I guess that just takes time as well, doesn't it? And everyone else, I think because everyone's just been let back out and you can go wherever you want to go. I think people are spending more time in different places so it's just getting people back into their old habits' (p1).

' [It] made life a little bit easier than even just having a few less tables downstairs mate as a like running drinks... Aside from that I'm quite happy with the hustle and the bustle and it's quite nice to see a bit of liveliness back' (P8).

'We did our annual Oktoberfest event, which we didn't think would be able to run, but we managed to run the outside. ...We had quiz nights outside in the cold and we had a load of heaters in and. Managed to create quite a cosy atmosphere outside' (P6).

4.7.4.2 Becoming a hub for multiple kinds of consumption

Participants demonstrated a concern for the consumer environment by positioning themselves as 'hubs' of sources recreational activity. For some this had always been the case:

'[Our]barista school was shut the whole time. We've only just re opened them up again. I think we did one trial…maybe during the three-tier time actually, but the barista schools have only just opened up in all [venues] and in the last couple weeks till about…over a year…(P3).

Others tended to display their status as a source of recreation via home delivery of products and engagement in decentralized community initiatives, using social media or click and collect web apps to communicate and sell product, maintain consumer culture, and 'brand' consistency':

'…it was April that we started takeaway cocktails. So, we applied for a new premises licence so that we could do so that we could offer takeaway. It was previously it was just an on-premises venue, but now we have a takeaway lesson, so that gives us a bit of flexibility. And if we wanted to offer different products in the future' (P6).

Having a reputation as a source of a particular kind of consumer experience had its own challenge of maintaining that reputation, however:

'We focused kind of inside our box as it were to maintain that kind of spirit in the ethos of what [the company] was about, especially around its events, its creative output, its social output…We've got together with a [refugee] charity…So what we were doing is bringing a small crew [of] volunteer film makers I put together. We're making short video filmed to cook certain dishes, then [making] recipe kits…' (P1)

4.7.4.3 Investing in consumption environment

Investing in the consumption environment was also observed more directly, through retrospection involving changes made to physical aspects of a venue such as furnishings. Outdoor seating became a necessity, but with specific investment in semi-permanent fixtures of tables, gazebos and decking, opportunities to push new consumer

experiences were apparent. By October 2020, participant 6 reflected that:

'…we did like winter warmer cocktails,…I think because at that point for us we were forced to be trading outside I believe maybe we had…. the majority of our trade was outside so we had to be a bit creative with our cocktails so yeah, created some warm Irish coffee style cocktails, relied on, hired a portable PA system for our music, SONOS stuff like that, heaters, we needed our Wi-Fi to have a decent range so we could take payments outside and then we got a load of blankets in to keep people warm. Yeah, that was our October' (P6)

4.7.5 Corporate image contingencies

Corporate image contingencies include the observation of retrospections that point to active 'brand and image' management, and contrastingly, a conscious push-back against capitalist sentiment.

4.7.5.1 Brand image maintenance

Corporate image was primarily attended to through branding strategies, with reflections here closely tied to our participants' self-reported USPs. In recollections of interaction with clientele before the events of lockdown, general observations of queuing and business were a testament to good reputation (participant 8); and busy, popular, and profitable times a routine and predictable feature of the week: '…on a Saturday [we] would take around £3000 from 8.30 through till 6 o'clock. Now we barely make £1000 on that same day…' (participant 1). With disruption to these markers of reputational success, participants had to really concentrate on maintaining brand and image in new ways that in some cases, accentuated the enduring valued interaction supporting the USP.

Participant 1 reflects that, in February '21, there was a real effort to '…keep our kind of care giver brand'; which entailed engaging with volunteers to produce community and artistic events over Zoom 'without actually opening our doors, because we found…the takeaway business is a waste of time' (P1). While the failure of food/beverage takeaway services was partly attributed to location of premises for this participant, a prioritisation of maintaining the 'care giver brand' for clientele ensured viability of the business long-term.

4.7.5.2 Alternative, anti-corporate sentiment

Alternative, anti-corporate sentiment contrasted with the above in that occasionally, participants would appear to engage in practices antithetical to capitalist consumption. In October 2020, by which time EOTHOS had been operational for c. 2 months: participant 3 concluded that while the scheme 'was good for taking money [it] was terrible for everything else'. Supporting this, participant 8 reflected that by this time, despite also making a lot of money, 'due to repetitive conversations with clientele brought about by needing to explain purchasing conditions for the scheme [i.e., ordering a 'meal', remaining on premises] it was just frustrating' to implement and they 'would not like to do it again' (P3).

In these instances of retrospection, participants sought to evidence that they could not 'be bought' by schemes or initiatives that don't align with their existing norms of engagement, despite potentially significant profits. Instead, they highlighted non-financial opportunities such as 'manag[ing] our capacity [and] our stock levels better, be[ing] more diligent about our event management, [and generally] streamlining [processes]' (P3).

4.7.5.3 Wellbeing Contingencies

Wellbeing emerged as a contingency from sub-themes of 'maintaining [of] health and safety standards', 'tending to mental health and emotional wellbeing', and 'managing staffing'.

4.7.6 Maintaining health and safety standards

Maintaining health and safety standards was clearly a universal topic of retrospection, but as a contingency theme, it was also important for participants to convince customers their venues were as safe as possible.

[Present] 'current priorities I would say, is safety. While the government has lifted restrictions we're still aware that there is a virus out there. And It's vital for our business for our customers to feel safe. So we've we're keeping quite a few of the Covid measures in place so will keep in socially distance tables or keeping table service. We're keeping hand Sanitising stations and stuff are going to carry on. Wearing masks. So that's I say that's our current priority' (P6).

4.7.6.1 Maintaining staffing levels

Managing staffing was always an important aspect of maintaining a healthy workplace, but this took on additional meaning throughout the events of the timeline for participants managing teams.

'I'm sure you've seen there's lots of stuff in the news about how sensitive the [covid] app has been. So we've had lots of stuff having to isolate...We have to draught in cover from other shop' (P3).

4.7.6.2 Tending to mental health and emotional wellbeing

Instances of responding to mental health crises became a priority. Participants were generally more sensitised to the impact of poor mental and physical health, and consequently, had a renewed interested in attending to working practices and creation of environment that maximised staffing outcomes. This included a greater willingness to accept staff absence based on prevention of spread of sickness, initiatives to build teams and improve morale, and prioritising a sense of belonging and camaraderie.

[Mar 20] 'Just the sense of unease we just take on some new staff members. We had some staff members that were coming from [abroad] so there was an issue around them. Some staff members just left... to move the new organisation. But the new organisations furlough scheme did not include them. ...So resounding memories we're just trying to make sure that was OK. (P1).

'At that point, I'd very much I think reached my limit with it all I'm not like safe on a personal level like none of my family live in Nottingham. They all live in Liverpool so I couldn't go and see them again. It was me. It was feeling isolated again from everyone. So the fact that I was going to work and back was probably the only thing that actually kept me sane comes again. We didn't close in this lockdown. We were open throughout and I was working six days a week' (P7)

4.7.7 Time management

Time management as a contingency concerned interactions apparently designed to create certainty in an uncertain world, as well as observing

calendar events that arguably already provide that certainty. Reflections here on practical interactions are linked explicitly to acts of making predictions, planning, forecasting, and anticipating. Within these contingencies there appears an emergent juxtaposition of official events such as facilitation of sporting fixtures, religious holidays, cultural events and so forth, which can be set against the otherwise grassroots, self-organisation of in-house events to create a routine where this was externally absent.

4.7.7.1 Creating certainty

Participants managed time in that they would frequently devise their own timelines and schedules of internal events, which in some cases evidence a more proactive and prosocial approach than perhaps normal outside of the lockdown period. This had the effect of creating a sense of certainty, and for some such as Participant 1, was crucial due to the needs of their customer base:

'We had at least five [charity] meetings going on in the building or week from Monday through to Sunday. We had monthly socials. We had private events. We had gigs with the BBC, we had specific mental health charities looking to hire us out…' (P1).

For others, creating certainty was about creating new events and routines:

'At the end of the night we do take away drinks so there's a lot of people aren't quite ready to go home at 10:00 o'clock. Some people go back to their friends house, so it's all bottles of wine. We do pizza by the slice. So we have to be quite creative' (P6)

4.7.7.2 Observing calendar events

In contrast, observing calendar events entailed defaulting to the structure and routine of established seasonal events:

'Oh we have [St Patrick's Day] as well. So we delivered some Paddy's Day cocktail kits…' (P6)

'I think generally we had a really good. October…It was sad that we had to close. We did our annual Oktoberfest event, which we didn't think would be able to run, but we managed to run the outside….We had quiz

nights outside in the cold and we had a load of heaters in and. Managed to create quite a cosy atmosphere outside' (P6).

4.7.8 From interactions to contingencies via retrospection: theme summaries

Social contingencies emerged in terms of interactions in which participants acted as mediator between government and clientele, and in catering to groups more so than individuals. Technological contingencies emerged in terms of interactions where contactless and bespoke solutions were used more frequently, and contrastingly, where these were made to function manually or in a hybrid context. Environmental contingencies emerged in terms of interactions in which participants were actively managing the atmosphere, becoming recognised as a hub for local consumption, and investing in new furnishings. Corporate image contingencies emerged as dichotomous in nature, on the one hand supported by instances of brand and image management, and on the other, by attempts to be seen as anti-capitalistic in terms of ethos. Wellbeing contingencies emerged in terms of instances of maintaining health and safety, tending to mental health and emotional wellbeing, and managing staff. Time management contingencies emerged in terms of instances of participants creating certainty through events or observing calendar events.

4.7.9 Thematic and temporal saturation

		START	BEFORE	MAR20	APR20	MAY20	JUN20	JUL20	AUG20	SEP20	OCT20	NOV20	DEC20	JAN21	FEB21	MAR21	AFTER	Total
Contingency Theme	Environmental	6.21	16.38	19.77	1.13	2.26	2.82	2.82	2.26	1.13	3.39	4.52	1.69	3.39	1.13	6.21	24.86	100
	Technological	2.47	16.67	18.52	0.62	0%	1.23	4.32	2.47	0	0.62	3.09	7.41	0.62	1.23	4.32	36.42	100
	Social	4.72	11.81	11.81	0	1.57	0.79	2.36	7.87	7.8	7.09	0	0.79	1.57	0.79	2.36	38.58	100
	Well-being	4.76	10.48	19.05	4.76	2.86	0.95	0.95	0.95	0.95	0.95	2.86	2.86	7.62	3.81	1.90	34.29	100
	Time-management	5.66	7.55	16.98	5.66	5.66	0	1.89	0	3.77	7.55	3.77	7.55	3.77	13.21	5.66	11.32	100
	Corporate image	1.96	13.73	13.73	3.92	1.96	0	0	5.88	0	3.92	0	3.92	0	3.92	3.92	43.14	100
	General	0	11.11	11.11	0	27.78	5.56	0	0	11.11	5.56	0	0	0	0	11.11	16.67	100
	Stage Av.	4.33	13.71	17.03	1.88	2.60	1.44	2.45	3.17	2.45	3.46	2.60	3.61	2.74	2.60	4.33	31.60	100

Table 4:2 Saturation by Contingency Theme

Considering saturation across the timeline, I analyse content by stage and month, revealing periods of 'before' and 'after' as contributing to a combined 45% of reflection on each theme (Table 4:2Table 4:3). This potentially reveals that participants found it more compelling to elaborate given broader parameters, or on clear divides between valued interactions 'now' versus 'before' the bulk of Covid-19 interventions. I also include 'general reflections' – to include retrospection indirectly connected to valued interaction, ensuring complete coverage of transcript content Except for March 2020 – the beginning of UK-wide lockdown – I otherwise find similar levels of content saturation in the months in between.

		START	BEFORE	MAR20	APR20	MAY20	JUN20	JUL20	AUG20	SEP20	OCT20	NOV20	DEC20	JAN21	FEB21	MAR21	AFTER	Theme Av
Contingency Theme	Environmental	36.67	30.53	29.66	15.38	22.22	50	29.41	18.18	11.76	25	44.44	12	31.58	11.11	36.67	20.09	25.54
	Technological	13.33	28.42	25.42	7.69	0	20	41.18	18.18	0	4.17	27.78	48	5.26	11.11	23.33	26.94	23.38
	Social	20	15.79	12.71	0	11.11	10	17.65	45.45	58.82	37.50	0	4	10.53	5.56	10	22.37	18.33
	Well-being	16.67	11.58	16.95	38.46	16.67	10	5.88	4.55	5.88	4.17	16.67	12	42.11	22.22	6.67	16.44	15.15
	Time-management	10	4.21	7.63	23.08	16.67	0%	5.88%	0%	11.76%	16.67	11.11	16	10.53	38.89	10	2.74	7.65
	Corporate image	3.33	7.37	5.93	15.38	5.56	0	0	13.64	0	8.33	0	8	0	11.11	6.67	10.05	7.36
	General	0	2.11	1.69	0	27.78	10	0	0	11.76	4.17	0	0	0	0	6.67	1.37	2.60
	Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	100

Table 4:3 Saturation by Restriction stage

In terms of the saturation of themes across participants, I observe that practical interactions supporting consumer environment contingencies were the most prevalent; followed by technological and social contingencies. Contingencies of maintaining corporate image were least prevalent by comparison, excluding general reflections (Table 4:3).

4.8 Discussion: Describing contingencies and putting them to work

4.8.1 Uncovering contingencies for valued interaction

In this study I uncovered six contingency themes descriptive of hospitality workers' valued interactions over the course of the reverse timeline, grounded on retrospective talk of the various practical responses to lockdown events. Themes and sub-themes therefore can

in one sense seen as representative of the practical values that participants strive toward accomplishing and maintaining, despite the various instances of disruption that might otherwise hinder them. Examples in this case would include interactions supporting environmental contingencies, where participants sought to maintain social space despite limitations to group associations, interactions supporting technological contingencies, where participants invested in specialist/bespoke technologies such as ordering apps to replace communal and unhygienic objects such as shared menus, and interactions supporting time-management contingencies, where participants maintained the celebration of calendar events such as Christmas, Valentines day, Oktoberfest etc.

On the other hand, contingencies can as much be seen as consequential of the lockdown events themselves – and almost inspired by them, therefore representing newly emergent practical values. Examples in this case would include interactions supporting environmental contingencies such as becoming a local hub for emerging forms of consumption, interactions supporting technological contingencies such as embracing contactless interactions such as digital only transactions, and of course, interactions supporting social contingencies such as acting as a mediator between new rules and existing norms.

4.8.2 Participant perceptions of old and new normal

Generally, interaction with the timeline in terms of the extent of elaboration from month-to-month meant that conversation was somewhat polarised and at its most elaborative, either 'before lockdown events' or 'after lockdown events'. This finding, from interaction with the timeline as a provocative device as opposed to the content of interaction, is the best indication of the old normal – new normal dichotomy. Further, it perhaps demonstrates it was easier for participants to elaborate on a generalisation, as opposed to the specific events of the timeline, which required a concerted effort to recollect discrete activities at the time.

Nevertheless, where specific retrospections were provoked my lockdown events, they were clearly traceable to provocations themselves.

4.8.3 Associating contingencies with lockdown events

Associating contingency themes with lockdown events proved more challenging, as while it could be said that all retrospections were the result of timeline provocations, not all retrospections were confined to the event in question. In the following I argue that this linkage serves two purposes, the alignment of emergent contingency themes to the top-down rationale of the global expert (i.e., the government/authorities responsible for lockdown events), and by contrast, the emergence of a situated rationale of the local expert (i.e., the participants as spokespeople for their venues and the hospitality sector in Nottingham more broadly).

4.8.4 Top-down rationales and the global expert

Taken together, the 13 lockdown events paraphrased form the IfG and aligned on a timeline represent the implied rationale for actions of the government authorities which were their original source. Retrospections on the timeline gave participants the opportunity to talk back to this rationale, affirming or challenging its apparent motivations and intended consequences. The clearest example of this was the provocation of the EOHOS initiative, with participants revealing that despite short-term economic gains, the scheme was generally more of a hinderance to both the everyday logistics of business operations and an affront to the polite and common-sense norms staff-customer interaction.

4.8.5 Retrospective sensemaking and other applications

Retrospections had an obvious application in this study as being primarily to do with individual and collective sensemaking. This begs the question, 'what is sensemaking itself for?' At least three applications could be seen from the participant perspective, as being to do with coping with the impact of Covid of taking stock of the disruption and re-calibrating future activity, brining clarity through stage-by-stage provocation of reflection, and utilising the emergent contingencies themselves as themes for pro-social engagement with the timeline itself

4.8.5.1 To take stock and recalibrate

Post-hoc rationalization had an almost cathartic effect on some participants, who realized the enormity of the change they had weathered and adapted to during the process:

'…I think we're going to living with this pandemic for a while. I think the psychological effects on people have been quite damaging…We're just still getting match fit through these events' (P1)

In general comments and reflections on the exercise, Participant 1 reasons that the impact of Covid-19 and associated lockdown events will continue to have 'psychological effects' for some time, and it appears that reflecting on the events in this way can generally help to prepare for the future.

4.8.5.2 To bring clarity

Another way in which post-hoc rationalization on the event timeline proved beneficial, was to provide some clarity on events that otherwise might merge into one:

'you could say to me it was last month, but it could have been six months ago' (P7)

Participant 7 reveals that without a specific event's initiation being confined to a single month here, the perception of its inception would have been altered.

4.8.5.3 Pro-social timeline engagement

It was argued in the contemporary literature informing this work that, while necessary, lockdown events imposed in response to the Covid-19 pandemic have been as disruptive to norms of interaction as the pandemic itself. Particular examples of 'infodemics' and 'dashboard pandemics' highlighted the saturation of information the general public are now subject to [203], [204]. With no real means of recourse or appropriation of that information, a key contribution of this work is the positioning of the reverse lockdown timeline as a data artefact for individual and collective sensemaking. I argue this is achieved here by framing contingencies not just as affirmations of or challenges to the expert narrative, but as a collaborative exercise in understanding pro-social interactions desirable for all stakeholders.

4.8.6 'Contributions to overall aims'

'Contingencies for valued-interactions' was designed after the completion of the first study and with the express focus on isolating 'practical values' as an emergent set from retrospections on visual provocation. However, its substantive findings – the various contingencies for maintaining valued interaction during the Covid-19 pandemic and in the face of external breaches to interactional norms – mean that the study is well equipped to serve as an introduction to the empirical work, especially in terms of its motivation. (Moreover, this also allows the two studies presenting and working with the CoffeeWizard framework to follow consecutively in chapters 5 and 6.

Overall, it was found that 6 practical value-themes describe the emergent priorities of SME business owners during the specified period. These are prime examples of emergent, extra-sensory social phenomena that might be said to substantiate new and emergent value sets, descriptive of personal preferences and important to consider when aligning personal coffee preferences.

4.8.7 Informing the next study

The substantive results of this study reveal a set of practical values that more authentically represent the interests of participants and their patrons than the top-down set of breaches to norms could specifically anticipate. In a literal and substantive sense, we learn about the real-time priorities of local establishments and how these were met.

Inferentially, we learn that SME providers are the situated experts, and thus, should be consulted for their expertise. Moreover, and in terms of the methodology, we learn that the reverse timeline artefact serves as a rudimentary valuescape, in the sense that if simultaneously communicates preference value (of statutory authorities) while provoking the retrospective qualification of practical (real) value.

4.9 Conclusion: Towards a framework for extra-sensory value

In this study interviewed 8 hospitality workers representing various venues in Nottingham, using a reverse timeline infographic for the purpose of post-hoc rationalization of Covid-19 events. Thematically analysing conversational interaction with the infographic during interviews, six contingency themes – environment, social,

technological, time-management, corporate image, and well-being – were found to be broadly descriptive of practical value priorities. The inductive creation of these themes was achieved through a consideration the classification of objects aligned to these categories as being 'practically valued', and thus, contributory to priority areas or contingency sub-themes. In addition to evidencing descriptive sensemaking of the timeline period itself, I reason that the study exemplifies individual and collective appropriation of the timeline to affirm and challenge the rationales of the experts responsible for lockdown events, allows a new narrative to emerge from the local expert, and through the contingency themes and sub-themes, demonstrates new grounds for pro-social interaction between all stakeholders.

Chapter 5: Interactions with CoffeeWizard

5.1 Overview

Interactions with CoffeeWizard was a three-part domestic deployment study comprising coffee attribute preference survey, a selection box of contrived coffee choices, and a follow up interview reflecting on choices made and (in)congruences with original personal preferences. Taken together, these interactions allow for discussion of CoffeeWizard primarily as technology probe - an artefact enabling values-orientated consumption and additionally, furnishing practical values of its use. The underlying framework comprises elements of embedded survey, real-time product choice, and retrospective interaction with expert (researcher) mediated visual provocations of preference-choice (in)congruencies. This is deployed as a coffee selection box to the homes of 12 participants, for use over a 1-week fixed-term period. The work addresses questions of personalization by means of explicitly values-orientated preference, choice, and consistency of preference, and the emergence of the practical values that result from interaction with putatively expert system designed to offer this kind of personalized interaction. I find that practical values of 'situated context', 'brandlessness', 'novelty, fun, and luck', 'trust in agency, 'thoughtfulness vs cognitive ease', 'introspection vs self-surveillance', 'managing ethical consumption, and the 'importance of conversation' to be descriptive of the ideal properties of a CoffeeWizard system. Consequently, I also discuss CoffeeWizard as a framework for multistakeholder interaction, and the extent to which it enables two-way interaction between expert (researcher) and end-user (participant), whose mutual objective might be considered the personalization of product and service in terms of explicitly values-orientated qualities.

I'll begin by introducing this work as the result of initial ideation and prototyping in response to the interdisciplinary challenge of values-orientated personalization. I'll introduce this challenge as situated between specific disciplinary interests, and suggest that contemporary works, for example in fast moving consumer goods (FMCG) recommender systems development, lack an intentional mechanism for tracing valued interaction between expert service providers and the average end-user. In terms of methodology, I'll make a case for what is effectively a mixed methods approach, brining together elements of survey, interview, and the 'Wizard of Oz' paradigm, into a technology probe.

After outlining each of the stages of interaction I'll introduce eight findings – practical value themes which I find to be descriptive of observed interaction with values-orientated consumption as seen in the final, reflective stage of the CoffeeWizard framework.

5.2 Introduction: Frameworks and artefacts for values-orientated interactions

In the following I present and discuss eight practical values as descriptive of personal interactions with CoffeeWizard – a technology probe in the form of a coffee subscription box devised to probe coffee product preference and choice and provoke an explicitly values-orientated experience. Within the parameters of this study, it was principally envisioned to address the question; 'on what basis might reflections on personal value preference, choice, and emergent (in)congruencies be beneficial to everyday coffee consumers?'.

5.2.1 Invoking the WOZ method

The WOZ method (also known as the theatre method), fundamentally emphasises the use of a 'screen' between the researcher and the participant [249]. In studies 2 and 3, the screen is built into the CoffeeWizard framework such that the user is made to feel that they are interacting with an interface that is somewhat automated and computationally intelligent; while in fact, the artefacts of that interface are the mock-ups and design fictions of the researcher.

In addition to this specific instantiation of CoffeeWizard as effectively a prototype consumer product, the term more generally applies to an underlying framework for the behind-the-scenes provocation of values-orientated interaction, making implicit reference to the 'Wizard of Oz' (WOz) methodology. Using this human computer interaction (HCI) paradigm - known for its application to rapid prototyping of technologies and testing of systems relying heavily on use of analogues – interactions can be seen to emerge from the contrived expert system. I argue this is useful for informatively contributing to values orientated futures in personalized coffee [14], [15], [16], [218], [250], [251]. There are thus two ways in which CoffeeWizard makes this contribution:

As an artefact: CoffeeWizard is a specific proposition for calibrating personal consumer value preference, making explicitly values-orientated choices, and reflecting on the (in)congruencies of personal preference and choice when mediated by 'the system'.

As a framework: CoffeeWizard is a novel three-part interaction consisting of a priori survey, real time choice, and retrospection on

expert (researcher) categorisation of product, to ascertain user (participant) perceptions of practical utility.

The motivation for this work stems from a desire to operationalize product qualities beyond static descriptions of value preference, using the fiction of an expert system to provoke participant retrospections on the apparent congruencies or incongruencies that may emerge from preference and choice.

I begin with an overview of values-orientated personalization in the fast-moving consumer goods (FMCG) sector, focusing on the differing conceptions of what constitutes an empirical artefact of value; how such values might be elicited, and introduce relevant works in industry and HCI. I'll then give some definition to key terms used in my own work and outline our research questions, before expanding on CoffeeWizard as a methodology, as the prototype design, deployment, and subsequent findings.

5.2.2 Research questions

As a general objective, this study sought to elicit values-orientated coffee preferences, coffee choices, and personal reflections on those choices, using the CoffeeWizard interaction framework. To operationalize this objective, the following questions have been devised:

> What do participants personally value during everyday coffee consumption?
>
> How do participants articulate personal value during everyday coffee consumption?

The CoffeeWizard framework is an analogue of interaction between expert (researcher) and end-user (consumer) that essentially asserts an overarching value proposition; that to survey consumer values, provoke these through contrived choices, and to present (in)consistency, through the mechanisms of personalization, is itself of overarching benefit to the end-user. Therefore, as an overarching question, it should be asked, oOn what basis might reflections on preference, choice, and personal (in)consistency be beneficial?'

5.3 Embedding a framework in a technology probe: Designing CoffeeWizard

In search of an appropriate methodology, I return first to quantitative socio-economic, market, and industry practices of targeting matching tailored interventions - products, services and experiences – as effectively and reliably tied to agreed, fine-grain attributes of values themselves; especially when they are mediated as 'intrinsic' and 'sensory' properties [57] [96]. I consider 'taste' or 'strength' of coffee as reducible to physical constituent parts, using 'freshness' and 'caffeine content' to enable for example, the matching of a 'fresh-ground, decaffeinated' coffee to particular consumer preference. I refer to such as 'intrinsic values'; however as discussed, their use alone does not fully constitute a sense of real personalization consumers. I therefore also use 'social sustainability' and 'ecological status' as cases of extrinsic values, which speak to external contexts of consumption for the sake of illustration. I speculate that 'fairtrade' or 'organic' product status respectively, exemplify 'value attributes' of social sustainability and ecological status. In the following I'll demonstrate how these are operationalized through the CoffeeWizard framework, and the coffee selection box artefact.

5.3.1 From preference to choice: Designing an orthogonal values survey

In order to generate personal value footprints of both sensory and extra-sensory values, an approach to survey and product choice was sought that attempted to standardise the presentation of value-attributes to the end-user. For the sake of simplicity our value-attributes were chosen. In terms of sensory coffee values, these were 'caffeinated' and 'strong', while in terms of extra-sensory values, attributes of 'FairTrade' and 'Organic' were chosen.

	VALUES			
ATTRIBUTES	Caffeinated (V1)	Strong (V2)	FairTrade (V3)	Organic (V4)
ABSENT	0	0	0	0
PRESENT	1	1	1	1

Table 5:1 Orthogonal delineation of value-attributes

Two levels were ascertained that describe attributes when absent (0) and present (1) (Table 5:1).

	VALUES			
COFFEE PRODUCT	V1	V2	V3	V4
1	0	0	0	0
A	1	0	0	0
B	0	1	0	0
C	0	0	1	0
D	0	0	0	1
AB	1	1	0	0
AC	1	0	1	0
AD	1	0	0	1
BC	0	1	1	0
BD	0	1	0	1
CD	0	0	1	1
ABC	1	1	1	0
ABD	1	1	0	1
ACD	1	0	1	1
BCD	0	1	1	1
ABCD	1	1	1	1

Table 5:2 Enumerating mixed-value archetypes from 16 permutations

16 permutations were generated on SPSS using the orthogonal survey design function, derived from a full factorial design (Table 5:2).

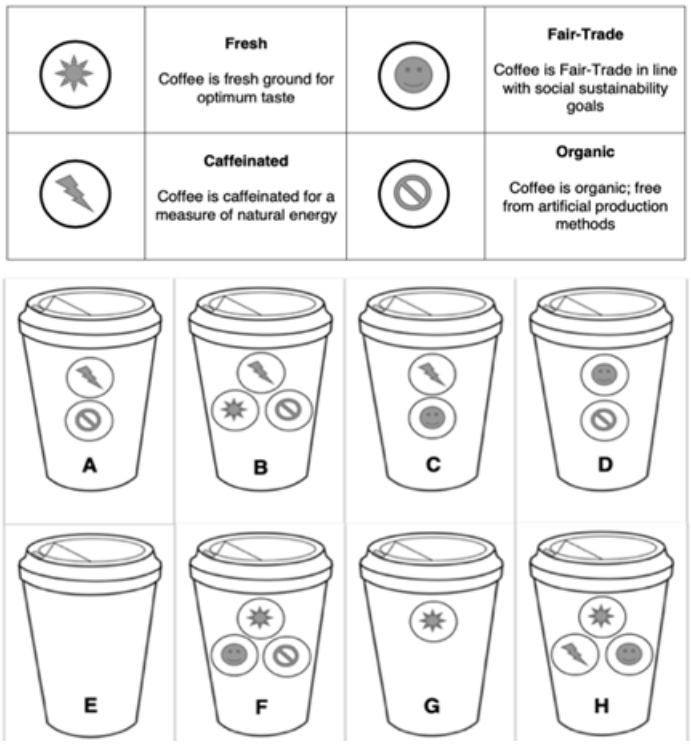


Table 5:3 Archetypes of Value: 8 provocative products

An efficiect orthogonal presentation of these permutations as 8 distinctive product archetypes ensured each value-attribute was present (and potentially, presented in comparison) the same number of times (Table 5:3).

REAL PRODUCT	COFFEEWIZARD'S VALUATION	VALUE ATTRIBUTE COMBINATION	CARD	COFFEE ARCHETYPE
KINGS MEDIUM	Caffeinated, Organic	bd	1	A
LYONS	Fresh, Caffeinated, Organic	abd	2	B
FAIRTRADE	Caffeinated, FairTrade	bc	3	C
KINGS DECAF	FairTrade, Organic	cd	4	D
FAIRTRADE	-	1	5	E
KINGS MEDIUM	Fresh, FairTrade, Organic	acd	6	F
KINGS DECAF	Fresh	a	7	G
LYONS	Fresh, Caffeinated, FairTrade	abc	8	H

Table 5:4 Aligning real products to CoffeeWizard fictions

To align real coffee product to CoffeeWizard's sensory and extra-sensory valuations, real coffee products formed the basis of value-attribute labelling (Table 5:4). Four brands were used, with each product conceivably having the underlying qualities that CoffeeWizard asserted. This resulted in the production of 8 'cards', or coffee archetypes A-H. Given that these values are either explicitly present or implicitly absent when combined as descriptors of coffee product, a means of presenting value-attributes for survey and later selection was sort. Initially, the proposition was to present values orthogonally, for example, a s in coffee that is 'caffeinated' and 'Organic'. However, to do

this for all four value-attributes would result in 28 different combinations according to the following:

$$C(n,r) = \frac{n!}{(r!\,(n-r)!)}$$

'The combination (C) of the sample (n) of elements (r) is equal to the factorial of the full sample of elements (n!) divided by the factorial of the sample (n) minus the selected elements (r), multiplied by the factorial of the selected elements (r!)' [252].

$C(n,r)=?$

$C(n,r)=C(8,2)$

$=8!(2!(8-2)!)$

$=8!2!\times6!$

$= 28$

ENVELOPE NO.	CHOICE 1	CHOICE 2	RANDOMISED COMBINATION NO.
1	E	H	11
2	A	F	4
3	A	E	23
4	A	C	3
5	B	H	2
6	B	F	28
7	B	E	25
8	B	D	21
9	E	G	8
10	C	D	7
11	A	B	6
12	C	G	13
13	B	G	5
14	D	E	10
15	C	H	17
16	D	F	22
17	C	E	12
18	E	F	15
19	D	H	14
20	D	G	16
21	B	C	20
22	C	F	19
23	A	D	18
24	G	H	9
25	A	H	1
26	F	G	26
27	F	H	27
28	A	G	24

Table 5:5 Combining and presenting provocative choices

Applied to the 8 coffee product archetypes derived from the original orthogonal design, there are consequently 28 possible combinations. To ensure their standardised but random presentation, each combination was further assigned a number 1-28 and subject to randomisation.To contrive (in)congruent value provocations, the 28 orthogonally derived coffee archetypes were randomised as pairs and presented as A/B choices (choice 1, choice 2) in envelopes (Table 5:5).

5.3.2 CoffeeWizard: A WOz inspired framework

In asking 'on what basis might an explicitly values-orientated coffee consumption technology be considered personally beneficial?', I reason that the evaluation of sensory and extra-sensory values via explicit

reference to their putative attributes, at key stages *a priori*, *actual* and *a posteriori* interaction, affords a novel window to values-orientated personalization through emergent practical values.

I develop a value elicitation and presentation system inspired by principles of cultural probes, technology probes, and the wizard of oz (WOz) paradigm, which I initially present as an interaction framework between researcher and participant. In practice this was deployed through an online consumer habit and value preference survey; a week-long home-deployment exercise in the form of a coffee selection box; and a follow-up, semi-structured interview using Microsoft Teams. I reason that this enables surveying of a priori 'ground truths' of habitual and value-orientated preference, recording of actual consumer habit and choice for the purpose of generating 'expert' comparison with participant 'ground truth', and rich participant reflection on us interaction with CoffeeWizard, revealing practical values of interaction. Adherence to and/or from a priori values is thus presented as a 'personal values footprint' in the reflective stage.

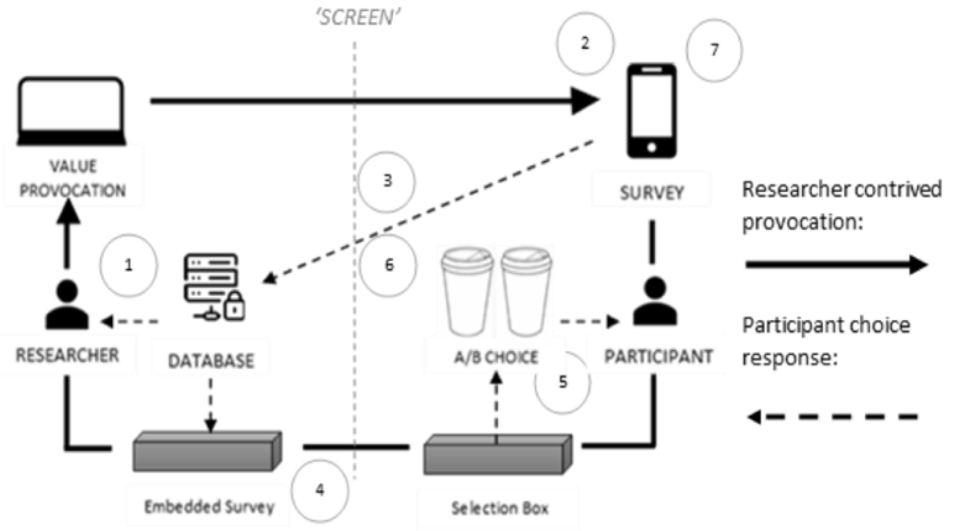


Figure 5-1 The CoffeeWizard Interaction Framework

While the proposition is tested in its entirety, I focus on the final interview stage and thematic analysis of responses elicited from conversational interaction between researcher and participant. Therefore, any statistical data gathered from survey and interaction in the first two stages should be seen effectively as facilitating a 'mock-up' of a scalable, automated system. I use the term 'CoffeeWizard' to refer to the overarching methodological framework for gathering, calibrating and qualifying users' choice-based value interaction inclusive of the physical selection box 'product' (Figure 5-1).

Overview of procedure

1. CoffeeWizard generates a combination of personal, habitual, and coffee attribute preference questions determined necessary for predictive personalization.
2. CoffeeWizard presents questions to participants in the form of a mobile calibration survey.
3. Participant's answers are analyzed by CoffeeWizard, with values-orientated future consumption 'predictions' generated.
4. CoffeeWizard sends a coffee selection box to participant homes, containing contrived combinations of coffee choices aligned to surveyed values.
5. Participant selects 1 of 2 choices from discrete, ordered choice envelopes each time they consume coffee, manually recording choices and times of consumption.
6. Participants send choice data to CoffeeWizard, enabling construction of a personal 'digital footprint' combining predicted and observed values.
7. CoffeeWizard presents data-driven visualization(s) of participant value (in)congruencies as provocations to reflection in semi-structured interviews.

The separation of interaction either side of the 'screen' makes use of a deceptive element inspired by the WOz paradigm: While delivered asynchronously, deception was constantly and necessarily present in the maintained deception that 'CoffeeWizard' – the unknown/'black box' technology rather than 'the researcher' – was in some way eliciting and interpreting values at levels intrinsic/extrinsic to coffee product and its practical consumption. This enables the researcher to speculatively 'play' the role of CoffeeWizard; eliciting participant perspective on what exactly that role *should* be.

5.4 Designing and deploying CoffeeWizard

CoffeeWizard as a selection box was deployed over two, 5-day working week periods; a pilot study in July 2020 with 4 participants; and a subsequent study in November 2020 with 8 further participants. Surveys were completed the week before deployment and interviews arranged for the week following. The purpose of the pilot phase was to run through the study in its entirety; ensuring it was both scalable in terms of results and practicably viable. Fundamental elements have remained the same, but for practical reasons, I halved the quantity of coffee envelopes available in the second phase as they were unnecessarily numerous for the duration. This made no qualitative difference to the end user experience; or to the logical operation of the choices insofar as they were relevant to the scope of this study.

5.4.1 Recruitment

A clear requirement for participant recruitment was self-identification as a 'coffee drinker' and the ability to consume various types of basic coffee product from a home address. The first 4 participants were recruited on a convenience basis and included departmental graduate, teaching and university support staff with expertise in technology and HCI particularly.

Participants				
COHORT	PARTICIPANT	AGE	GENDER	OCCUPATION
1	1	27	Male	Software Developer
	2	29	Man	Lecturer
	3	36	Male	Lecturer
	4	39	Male	Technician
2	5	27	Female	PhD Student
	6	30	Male	PhD Student
	7	39	-	Researcher
	8	26	Female	PhD Student
	9	30	Non-Binary	PhD Student
	10	52	Female	University PGR Staff
	11	-	Male	PhD Student
	12	26	Male	-

Table 5:6 Participant overview, study 1

The remaining 8 participants were more widely recruited from various university graduate schools; selected from response to a call for participants email on a first-to-respond basis. To this end, I acknowledge a bias in representation – that these participants are largely academic, in some cases have knowledge of HCI subject area, and as such, are already exposed to the 'back end' of the emergent socio-technical themes in this paper. While a weakness here potentially lies in the applicability of findings to a broader consumer base; I reason that an early-stage prototype among a relevant (coffee drinking) group of 12 peers enables sufficient identification and saturation of emergent themes for conceptual testing and development of CoffeeWizard in the first instance.

5.4.2 Ethics

Ethical clearance was sought from the University of Nottingham and obtained on 19/06/2020 under reference CS-2019-R53. Participants were informed of and consented to undertaking a study involving coffee consumption free from relevant allergies; that the real product

contained in contrived envelopes was correctly labelled, and that data collected from all three stages was stored and processed in line with GDPR data protection and privacy regulations. Moreover, due to the COVID-19 pandemic, UK government guidelines for safely re-packaging already sealed food and beverages were adhered to along with guidelines for the safe packaging and delivery of boxes to participants (S2.Project Information).

5.4.3 Stage 1 – The survey

Participants completed an 8-question online survey, providing basic identifying demographic data (name, email, age, gender); self-reported coffee consumption habit data (number of cups consumed per day, times of consumption per day); and self-reported values data by means of rank ordering (broad consumer values rank preference, specific coffee product rank preference). This facilitated a much-simplified mechanism of consumer profiling in which habitual and product attribute preference data can enable the creation of statistically intelligible models of consumer prediction. Here, we made the deliberately vague assertion in project information that 'CoffeeWizard uses this data to generate a personal values footprint' - sufficient to allow speculation on how and why such personalization based on footprints of consumer value may be personally beneficial. Both habit and values data were treated as self-reported estimations, to be used for initial calibration and prediction of choice in the proceeding coffee selection box exercise.

In terms of habit, participants were asked to report the number of coffees consumed, and times of consumption during a typical working day. Values conceivably relevant to coffee consumption were presented for rank order, accompanied by basic, single sentence descriptions: 'Taste – anticipated flavor(s) of coffee product'; 'strength – anticipated sensory impact of coffee product'; 'social sustainability – anticipated contribution of coffee to societal good', and 'ecology – anticipated impact of coffee on the natural world'. These were also deliberately vague but informed by notions in literature of 'extrinsic' and 'intrinsic' qualities of product I previously mention. Finally, I ask for coffee preference by means of ranking 'value attributes', for which I operationalize 4 variables – 1 for each value – as specific coffee product attributes to be considered in combination with others. These were 'fresh' (as an attribute of taste); caffeinated (as an attribute of strength); 'Fairtrade' (as an attribute of social sustainability), and 'Organic' (as an attribute of ecology).

Participants are asked to rank the 8 different 'coffee products'; delineated by various combinations of attribute symbols presented as labelled coffee cups. Thus, for the next stage we treat survey reported habitual data as predictive of personal consumption frequencies and times, value rank as predictive of priorities, and coffee-product rank as predictive of actual choice (Table 5:3).

5.4.4 Stage 2 – The selection box: Probing 'actual' values

In the second stage I seek answers to the same habit and values questions, this time using practical consumption task. Coffee boxes were delivered via mail or locally by hand to participants, containing instructions and description of coffee attributes, numbered choice envelopes 1-14, and a data entry sheet for recording coffee choice, time, and date. Pre-determined combinations of coffee product were presented on an 'A/B' product choice basis, whereby each time a participant wanted to consume coffee, they would need to select one and discard the other. Contrived coffee sachets containing real, corresponding product, were labeled with the same value-attributes used in the previous survey.

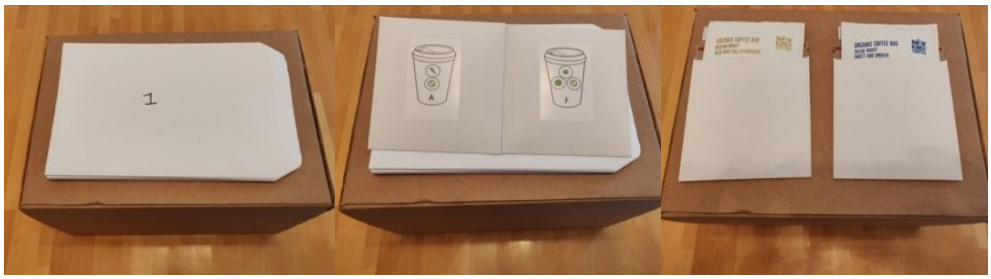


Figure 5-2 Selection Box: Sequence, Choice & Contents

Participants were instructed to open a numbered envelope containing these choices each time they wanted to consume coffee during the 5-working day study period. Personal administrative, habitual and value preference data from the survey allowed the creation of an initial personal 'profile' for each participant, conceptually grounded on a priori self-reporting. The example in figure 3 (center) shows coffee A (caffeinated & organic) presented alongside coffee F (fresh, fair-trade & organic) (Figure 5-2).

SURVEY				
Participant	Consumption Frequency (No. Coffees per day)	Consumption Time(s) (1=Before 06:00; 2=06:00 - 09:00; 3=09:00 – 12:00; 4=12:00 – 15:00; 5= 15:00-18:00 6= After 18:00)	Value Rank (Taste=Ta; Strength=St; Social Sustainability= So; Ecology=Ec)	Coffee Rank (Highest – Lowest)
1	2-3	3,4,5,6	Ta>St>Ec>So	H – A
2	3-4	2,3,4,5	Ta>St>So>Ec	H – E
3	2-3	2,3	Ta>Ec>So>St	F – E
4	>4	2,3,4	Ta>So>Ec>St	B – E
5	>4	2,3,4,5	Ta>Ec>St>So	H – E
6	<1	3,5	St>Ta>So>Ec	-
7	3-4	3,4,5	Ta>Ec>So>St	F – E
8	1-2	2	Ta>St>So>Ec	B – E
9	3-4	3,5	Ta>Ec>St>So	F – E
10	2-3	2,4	Ta>St>So>Ec	B – E
11	1-2	2	Ta>St>So>Ec	-
12	1-2	2	Ta>Ec>St>So	F - E

Table 5:7 Preference Survey Responses

This table below demonstrates how a priori habits and preferences enabled provocations of 'actual values' via 'digital values footprints' for the final interview. Ordinal frequency of number of coffees consumed per day and consumption times, along with hierarchical ranking of value and coffee preferences; enabled mock-up 'prediction' of routes of personal choice through the contrived order of the coffee selection box (Table 5:7)

5.5 Stage 3 – The interview

I use a final semi-structed interview conducted remotely with each participant over Microsoft Teams, as an opportunity to present several slides as visual provocations to rich, conversational reflection on the survey and consumption elements of CoffeeWizard.

Slide	Provocation	Question
1	Introduction/ Ice-breaker	What is your definition [of Coffee Wizard]?
2	Choosing Coffee	How was [exercise] different to how you usually choose coffee?
3	Attribute symbols	Do you agree/disagree with symbol meanings?
4	Ranking Preferences	What is your rationale for preference ranking? [show participant's survey response].
5	Ranking Values	What is your rationale for your values rank? [show participant's survey response]
6	Interpreting Preferences	Do you think CoffeeWizard should define what is meant by [attribute] in this way?
7	Comparison 1: Time/Frequency	Why did you consume more/less coffee than you stated during the survey?
8	Comparison 2: Time/ Frequency	What was special about [x] time? What additional information do you think CW could provide…'
9	Visualization 1: Prediction	How do you feel about a technology that can predict in this way? In what ways might this benefit you?
10	Visualization 2: Actual	Why do you think you chose coffee [x] on this occasion?
11	Re-Ranking Values	How do you feel about this? How do you feel about defining values? Should you have more of a role?
12	Participant Feedback	-

Table 5:8 Semi-structured Interview Questions

Standardized questions ensured participant reflection and elaboration on substantive areas of design and covered experience of practical interaction (slides 2,7,10,11); agreement/disagreement and interpretation of value descriptions (slides 3, 6) and rationale/response to predicted and actual consumption (slides 4,5,7,8,9,10). We additionally made space for any unstructured feedback (slide 12) (Table 5:8).

Interview transcripts were analyzed for thematic content using Braun and Clarke's (2006) well-regarded 'six-step' approach; methodically attending to 'data familiarization'; 'code-generation', 'theme search', 'theme-review', 'theme definition', and 'reporting' of

data [223]. Automatic transcription software was used to convert interview audio to text, with manual checking and correcting of errors in each response providing initial opportunity to familiarize with the data-set as a whole and specific content likely to be of relevance. Prior to thematic code-generation initial categorization of data began by separating text by speaker (interviewer/participant) to ensure improved usability and accuracy; followed by a categorization of content by interview stage (slide 1-12). This allowed any themes specific to direct provocations to be traced back to source.

Code generation was then completed by systematically annotating each participant transcript, allocating substantive words, phrases, and paragraphs as they were seen, as first-layer instances, grounded in the data itself. These codes form the substantive content of the data set, and reinforce themes either by evidencing their saturation, or by demonstrating particularly unique or novel response. The creation of a second, overarching layer of code here essentially enables 'theme search'; initial nodes of identical or directly related content clustered into a higher-layer thematic node. It was useful to separate themes first by their context of production, enabling a more efficient approach to eventual theme search.

5.6 Findings: Provoking practical value with substantive value

Areas of emergent practical value in participant reflections describe the importance of 'situated context'; experiences of 'brandlessness'; 'gamification, fun & novelty', and importantly for the CoffeeWizard proposition, 'trust (particularly in assumptions of 'agency' and 'automation'). Management of 'ethical consumption' was also apparent for many individuals, while the management of emergent dichotomies such as 'thoughtfulness vs cognitive ease', and 'introspection vs self-surveillance' proved subtle but significant across participants. Finally, the 'importance of conversation' at various stages of both practical interaction and conceptual features of CoffeeWizard offers an important challenge to the rationale of this study. I elaborate on each in turn:

5.6.1 Situated Context

Situated context refers literally to participant talk of spatial and temporal significance, which was of clear importance in anecdotes of actual choice as well as speculations of where CoffeeWizard should be situated as a technology. When presented with their actual

consumption choices, participant 11 drew on 'location', 'workload' and COVID-19 'lockdown' to aid their explanations of consumption habits: *'…there would be a difference in my sort of non-lockdown patterns between you have being at home [or] being… at [workplace]'.* The reality of spending more time in the home due to the current pandemic restrictions in the UK was perhaps unsurprisingly alluded to by others as well, but in the following anecdote the sense of relativity due to situated choice becomes apparent: *'…even more so during lockdown, we buy a kilo of caf and a kilo of decaf, and then they will last us a couple of weeks…so I'm thinking my choice is only do I want caffeinated or decaf? Not 'is this fresh?', Where does it come from?', Is it particularly strong or not, so that choice is taken away by a choice I make on the internet [or]in the coffee shop' Participant 3*.

Similarly, because CoffeeWizard was delivered as a domestic deployment, an obvious disruption to routine was seen in the relative increase in choice available within the home: *'I generally just drink through the one thing that I've got in the cupboard and then when I've run out of that, I'll either buy the same thing again or I'll buy a different thing and work through that. So, I don't have options at home' – Participant 5*. So, while CoffeeWizard in its current form is certainly limited in terms of choices, for some it still offers much greater choice and means of choosing than 'usual' at home, and opens a practical gap in terms of values-orientated choice at point of sale versus at point consumption.

An acute sense that situated context in consumption greatly affects values-orientated choice was often apparent, and an explicit reference to the preferred apparatus of coffee consumption demonstrates this: *' …I usually stay in my room and I have my kettle in my room, and I have my V60 (air pressure-based coffee filter) in my room as well. So like if I drink 2 different types of coffee with the same cup [its] less psychological feeling that you're not getting the exact taste from the second cup, because the cups contaminated from the first' - participant 1*. These reflections reveal situated context as a practical value on which other habits and values are contingent.

5.6.2 Brandlessness

Reflections on the way in which provocations to choose were contrived in the experiment frequently revealed 'brand' as conspicuous in its absence and ultimately as a potential proxy indicator of value-attribute properties. The use of value-attribute symbols effectively replaced

brand as a point of reference to product quality. Responses emerging from talk around the absence of brand thus also revealed what brand can or should signify: *'the difference is not knowing the brand …I'd be fairly discriminatory based on the brand. There's also less information in the icons than I would typically see on the packet…the country of origin, for instance…' -Participant 4.* Citing the disruptive effect on decision making, this participant revealing 'country of origin' as perhaps an important value to them otherwise.

Nevertheless, 'discovery of new product'; the element of 'surprise'; 'simplification' of choice; and disruption of ingrained routines were all cited as positive experiences relating to the same disruption*: 'I…buy certain brands. So, this way [it] sort of encouraged me to try different things.' – Participant 2. Referencing the actual coffee used within the experimental sachets: '…it gives me the opportunity to try [hidden] brands that I am unfamiliar with. I haven't tried any of the brands that were in this study…So yeah, I think that's a good thing as you know, it's nice to try new things'– Participant 4. Further and in terms of experimentation; Participant 8 reflects that ' … [for me personally I do not have like any particular brand I always go for, I'm always up for experimenting with things'.* Participant 8 reveals here that 'experimenting' is perhaps a more satisfying value in practice, although as we may see later, this is not without substantial qualification. Further, another positive of 'brandless' choice was articulated as an experience of simplification linked to alleviating time and effort associated with choice: *'…it takes a lot of the noise out of it. It can take a lot of time and effort to work out the coffee products in the shop…You have to understand the language and you have to make a lot of inferences, whereas this really simplified that' – Participant 5.*

More negatively, disruption to sensory means of 'seeing/smelling' content, and 'universality' of meaning in terms of value-attribute symbols used, were given as good reasons for retaining 'brand' prior to initial choice: *'… there's no sort of sight of what the product looks like, you know how it smells, how it looks and that you know those are quite often, I think, important dimensions of the sort of choice… you know if it's fair trade or organic, but you can't know for sure, which as someone who puts a lot of care into making sure I'm as much of an ethical consumer as I can is quite difficult'. – Participant 5.* For this participant, brandlessness compromises certainty – 'knowing for sure' – in a way that is better mediated through other senses than making sense of value-attribute information. This also alludes to importance of 'trust',

which is discussed in more detail later. This reveals though that concepts of 'trust' and 'ethics' are well linked here to known brands, and uncertainty around value-attributes used in the study that brand would otherwise convey can be problematic. Similarly, for some, industry standard iconography would have been more memorable and useful in making product choice: *'It did take me a little while to remember the icons, and I thought maybe using the kind of industry standard icons for fair trade and organic. Might have um, you know, I already know what those icons mean'. – Participant 4*.

Concluding the 'brandless' experience a process of 'obfuscation' was articulated by one participant to summarize their overall experience of coffee selection during the selection box exercise, suggesting that: *'…choosing …just based on qualities of a product rather than branding, marketing and how it's portrayed sort of um, obfuscates the stuff that we usually use to decide what to consume' - Participant 2*. Reflecting on value-attributes as a means of selecting product in CoffeeWizard, the significance of 'brandlessness' as an emergent experience affords opportunities of discovery of new product, a welcome disruption to routine, and the removal perhaps, of an allegiance to merely a 'proxy' indicator of inferential value(s) status. Conversely, benefits of brand retention relate to factors of familiarity and certainty based on trust, established conventions (symbols) and extra-sensory information. We thus highlight a potential for 'brand obfuscation' as practical value between consumer and supplier of potential mutual benefit.

5.6.3 Novelty, fun and luck

Increasingly specific application of obfuscation and product uncertainty is seen in respect of talk around 'novelty, fun and luck'. A surprising reason for positive sentiment around uncertainty was the fun and novelty of a new means of coffee consumption in itself, but also specific recollections of and recommendations for 'lack-based experiences': *'It feels to me a bit like a lottery, so it's a bit like a slot machine. …I don't know if it's like a luck-based thing you know…a bit like gambling so you don't know what coffee are going to drink. So, I think that's the most. That's the part that stands out most to me…I usually refer to these kinds of things as a 'gacha' [Japanese vending machine phenomenon] I don't know if you know the capsule machines…. it's a concept that's already transferred to a lot of mobile games. Actually, something like loot boxes. Alright, so you buy a box and*

you don't know what you're going to get. And then there's…just a sort of excitement to it when you don't know what you're going to get, so there's that kind of feeling. That's what makes it distinct, at least to me here. – participant 1. Generally, and in summarizing their feedback, participant 1 despite a general ambivalence toward the study and the proposition of CoffeeWizard, found this kind of 'novelty' a redeeming feature: *'I don't mind the technology generally, I think for generally in all kinds of personalization, like even if it's not 100% accurate, like it's still better than nothing and it's still a novelty factor to it'– participant 1*.

As seen in relation to 'brandlessness', acceptance of novelty has qualification and basis in underlying expectations: 'So choosing a coffee this way is definitely a lot more fun and exciting because I'm still receiving the values that I look for in a coffee, but I don't know which brand I'm going to get, so I think it's the element of excitement when I get to choose the coffee in this experiment' – participant 8. Here, the real (branded) product within the experimental sachet is referred to as the acceptable outcome of a 'fun'/'exciting' uncertainty contingent on falling within 'the values that I look for in a coffee'.

5.6.4 Trust in agency

'Trust in agency' is a comparatively broad and ubiquitous value present in all aspects of CoffeeWizard; whether trust in definitions of values, value-attributes and collection/analysis of data, or across the themes we've already discussed. Of particular importance though was sense of trust in relation to experiences of personal or technological 'agency' and the fiction of 'automation' that CoffeeWizard could be said to manifest. There were many qualifications on acceptable (trustworthy) and unacceptable (untrustworthy) kinds of interaction.

When presented with their 'actual' value priorities, a participant bases their trust in CoffeeWizard on the assumption that it merely 'reflects' personal values and does not 'make…judgements about me': 'For this thing to procure coffee for me and claim it is starting to know me. I like that. Yes, the other thing is it again…I kind of like…the nerdy side of things. I quite like to see my behaviour characterized like that. Again, I'm not assuming this system is making value judgements about me. I assume its just reflecting back [my] value judgements' – Particpant 3. The self-categorization by the participant as being 'nerdy' is perhaps a very appropriate qualification of what is meant here – that the acceptable role of the technology is merely to reflect back the facts of

interaction, handing the task of forming certain conclusions about 'self' to the participant. For participant 3, having their consumer values re-interpreted by CoffeeWizard did not, for them, constitute a sense of having been 'judged', but instead was a welcome feature of the design commensurate with a coffee technology that could 'claim it is starting to know me'.

Not all participants shared this sentiment however and were genuinely concerned by the prospect of having their stated values re-interpreted in the way CoffeeWizard presented. Impressions of 'unfairness' and 'permanence' were disconcerting when CoffeeWizard assertions of 'actual values' were seen as 'my label': 'I mean, ...when does that label get changed, never? I mean that's it. That's now my label for what kind of coffee I like. So, I think that's, it is a little too permanent. It's a little too. It's really not fair, I think. It's a little bit more complex' – participant 10. Some participants offered practical examples of how CoffeeWizard could navigate the acceptable and the unacceptable when it comes to agency and automation: 'You don't want to feel like you're [not in control] You want to leave the consumer the power to make the choices like you don't, if that makes sense. You don't want to seem like an authority figure.' – participant 1. Moreover, there was a sense that defining what is meant by values 'should be up to me'; the authority of definition in the following case resting on participant's superior knowledge of their own situated context of consumption: 'That should be up to me, definitely. ... Just because. Also, I do believe that my answers might be slightly different on a different day on a different day than the day that I did this questionnaire' So I'd like to have that control personally' - participant 10.

Sentiment around acceptable and unacceptable agency were not limited to evaluations of participant choice and interaction, and included definitions of values/value attributes themselves. Some picked up on the provocative, 'binary' nature of value presentation in the study; offering their own rationale for why qualities may or may not be best defined this way, the following in relation to 'fair trade' as a value attribute of coffee: 'Well under current laws, its binary, isn't it, you're either fair trade or not. I don't know if there are levels of Fair Trade or anything, I don't think there are, maybe there are. But I think with the general buying public, they either want a fair-trade coffee or they don't. So, I worry about how a ranking of a value would be interpreted by a system' – Pariticpant 7. However, for participant 7 this also led to speculation on how CoffeeWizard could better indicate value-

attributes, perhaps revealing trust in more established systems and institutions responsible for assigning attributes of value: 'There're the sustainable development goals of the UN. It could list the ones which it contributes toward. There could be more explanation of what social sustainability goals are. So are they, the United Nations ones or are they a UK version. Are they a commercial version' – Participant 7.

5.6.5 Thoughtfulness vs. Cognitive ease

The exposure of dilemma and dichotomy (we note as perhaps emergent as much from the orthogonal, choice-based nature of our design) – and more importantly how this was managed, revealed important contingency in values-orientated consumption. An important dichotomy was found in emphasis placed on 'thoughtfulness' vs 'cognitive ease'. These were both apparent as positive emergent values in themselves, but across various participants, there was an implication that one detracted from the other. Put simply, to be more a more thoughtful consumer was necessarily more mentally demanding: *'…for myself sort of unconscious choices [are]there in the background, so they're either not made of they're made sort of without conscious attention to them.' – Participant 11*. For this participant, CoffeeWizard exposing their unconscious choices was perceived as beneficial to more thoughtful consumption.

However, the mechanism of survey and selection box choice used in our study reveals that thoughtfulness and cognitive 'effort' is perhaps more welcome in the final 'reflective' stage as opposed to a necessary prerequisite for calibrating habit and preference; the following in reference to the survey: *' … if there are too many options then users may get a bit too exhausted to keep answering the questions' Participant 8*. We acknowledge then that one reason for greater cognitive effort in some cases was due to the low-fidelity, 'mock-up' nature of aspects of the study, as the following participant revealed: *'… I struggled at the beginning … I had to look up the icons very frequently…I think for me it would have been easier if it would have just been written'– participant 9. A resolution is offered here in terms of presentation of value-attributes; the use of word combinations apparently more preferable in this case.*

5.6.6 Introspection vs surveillance

Remaining with a sense of dichotomy concerning interaction experience, the presentation of interaction data as 'values footprints' led to discussions of the positives of 'introspection' and negatives of 'self-surveillance': *'I don't really know if I would want coffee wizard to do anything apart from maybe tell me if I drink 5 cups, to tell me maybe you should slow down a little bit!' [However] 'I don't know about this. It feels always a bit like self-surveillance stuff, I think I would still like to make my own choices or at least feel like I have my own choice that I can make' – participant 9.*

A potential means of managing feelings of authoritative self-surveillance was thus to suggest shared agency, particularly in the final stage: *'…rather than it being purely a machine telling me what to do, I would need to act on it in some useful way. So for example, if CoffeeWizard said your coffee generally isn't very socially sustainable…[it could] allow you to choose what to do with that information. So for example, you could say, well ok in future, I want to be…I feel like I should be more sustainable. Or I could just choose to ignore it even. So allowing me to do something with the information it presents I think would be interesting'– participant 2.* In its current form*, 'do[ing] something with the information [CoffeeWizard] presents'* is the role of the interview as a feature of study design and not yet integrated into the 'technologies' of survey or selection box. However, this reflection offers a potential solution to the management of dichotomous practical values such as those above, in which CoffeeWizard presents values footprints aligned with personal overarching values rather than 'absolute' values.

5.6.7 Managing ethical consumption

An assumption on the part of some participants was that CoffeeWizard was orientated around 'ethical consumption' and perhaps meant to promote it, although this was never explicitly mentioned in project information. Some consequently sought to separate their active participation in 'doing good' generally, from a sense of what for them, should be the core function of the proposed technology – providing (hedonistically) good coffee – revealing a hypothetical personal strategy for avoiding value compromise: *'Yeah like I mean like if I want to do good for the world I could just donate money to charity supporting them*

or give them money outright rather than buy the product if I don't like it right?' – participant 1.

Others came to reflect – when presented with their coffee preference rank alongside their observed choices – on an apparent absolute objective hierarchy of value; terming the attributes considered on a secondary basis as the 'ethical decision': *'So looking at that, B is the most appealing one to me because it got both of the things that I'm looking for. But then H as well. So I was looking into do I want it to be organic or do I want before a fair trade? Then I kind of went with taste before ethical decision I guess, so yeah, that's why I was B and then H' – participant 8*. For some – like participant 8 – this was a simple matter of fact; unproblematic because an 'ethical' component - 'do I want it to be organic or fairtrade'? - was included in the choice anyway.

For others though, there was more judgmental self-reflection: *'So very selfish choices I think, you know I want. I want the drug and I want the you know a sort of least…the least processed coffee, you know the best quality I supposed to my mind, and then the fair trade…' – participant 4*. Overall, it was felt that CoffeeWizard did provide *'a greater sense…[of] shopping ethically' - participant 11*. However, this returns us to unresolved questions of 'what constitutes a valid categorization of value?' and 'how is such categorization of itself turned to a valuable personalization during interaction'*?*

5.6.8 Importance of conversation

Conversation is an integral mechanism of eliciting retrospective values in this study via interview, but also proved important to participants in relation to early stages, establishing and negotiating value and value-attribute definition of coffee. In terms of product description, there was a desire for more 'nuance', 'cultural narrative' and 'backstory', and a definite sense that this could not be achieved with CoffeeWizard's current mechanism: *'…when I buy coffee online…they give you a description of [what] the coffee is like … where and how it's grown …Like say that there's this this one family in Colombia that's been doing this for 50 years and there's this all these small nuances that sort of that affect the choice in the end and that feels nicer in a way … it just feels more kind of humane and nuanced' – participant 12*. In regard to our broad value categories such as 'taste'; conversation appeared the

default preference for enabling the understanding of contingent attributes; rather than elaborations on how the system as presented could/should work for the participant: *'…I think there should be a conversation there. Because, um they don't know what are my taste preferences?'* – Participant 6.

The practical value of conversation also appears closely connected to the value of agency between participant and CoffeeWizard, in which participants seek a 'collaborative role': *'I guess the situation I'd like to be in is where that's the sort of thing is a sort of collaborative role…… If it has expertise in that built in. And it [could] be objectively taught something, like ecological impacts…' - participant 3.* If the future upscaling and automation of CoffeeWizard is envisioned as bringing the functionality of retrospection into physical technology inclusive of an objective, inferential and statistical element, a direct challenge to this ambition was found here in respect of the desire to retain conversation as an ultimate mechanism orientated to a sense of desired humanity: *'…just converting all of these things into just numbers and giving you the one that scores the most points or whatever. Yeah, I think. I think how to describe it, perhaps like it takes a bit of humanity out of the whole process'* participant 12. Despite the nature of CoffeeWizard as prototype, for this participant at least, an ideological reflection reveals a challenge for us in future scales/automated iterations no matter how advanced the method for *'giving you the one that scores the most points or whatever'*. Conversation then, was perhaps seen as the only means of adequately confirming what is *really* meant by preference, choice, and apparent congruity/incongruity between the two: *'…perhaps it could also be good if there is an option for them to [say]: "This is what we think you like. Can you please confirm if that is the case?" So it's about like confirmation. By the user could be good'.* – participant 8.

5.7 Discussion

CoffeeWizard was devised to address possible benefits of an explicitly values-orientated coffee consumption technology, which during its use answered questions of 'what' was personally valued by end-users, and 'how' these values were articulated. Each stage of the three-part technology probe provided opportunity to answer those questions, but it was the final reflective stage in which thematic analysis of conversational interaction furnished practical values of real insight. In the following I'll discuss emergent themes as the product of the CoffeeWizard artefact and framework: On the one hand, practical values demonstrate the affordances of the coffee selection box as a

specific instantiation of the CoffeeWizard framework. In this sense, values-orientated consumption is valued (or not) based on the extent to which practical, rather than intrinsic or extrinsic product qualities per se, are enabled by the nascent technology. Conversely, practical values also demonstrate the affordances of the framework in terms of their ability to reflexively contextualise or 'frame' intrinsic and extrinsic product qualities.

5.7.1 A selection box for augmented coffee consumer experiences

In terms of the first question, CoffeeWizard allowed us to go beyond an understanding of intrinsic and extrinsic product values and their contingent attributes as presented in its own ontological standpoint. I argue that if values-orientated personalization is to conform to earlier definitions and standards of 'true' personalization [5][6], this is in some form or other a requisite feature. The 8 practical values that are find to be substantive as emergent from retrospection, therefore augment the data-driven 'footprint' of combined a priori preference and observed interaction. This in turn reveals them both as rationales to conforming/non-conforming consumer action relative to prediction, and as contingencies to acceptable/unacceptable provocations otherwise grounded in service provider ontologies of value. In respect of a service capitalizing on such provocations we borrow a conclusion from Garfinkel, who considers '…the possibility that the person defines retrospectively the decisions that have been made. 'The outcome comes before the decision' [190].

5.7.2 A framework for negotiating intrinsic and extrinsic attribute meaning

In terms of these rationales and contingencies, the second question asked; '*how* do consumers demonstrate personal value in the course of everyday coffee consumption'? *References to the inability of CoffeeWizard to know 'situated context' – beyond basic understanding of the time and space of home deployment – were given both as contingencies for explanations of actual consumption as well as suggestions for technological improvement. Participants revealed their superiority as 'expert' of their context in the absence of a more 'situated' aspect of personalization.* By contrast, a necessity to envelope and present real sachets of coffee within contrived experimental sachets elicited expressions of a noticeably 'brandless' experience; provoking a reliance on brand as a proxy for the very product attributes sought as

indicative of broader consumer values. This uncovered divergent preferences among participants, some of whom were content with relying such 'proxies' as indicative of the discernment of other experts, while some more receptive to the prospect of becoming the expert via the necessary discernment required in making choices. However, and building on the notion of 'ambiguity as a resource for design' [253]; we find that the controversy of definitions of specific intrinsic and extrinsic values and agreement/disagreement over their constituent attributes to have been an engaging experience for participants in interview. Perhaps this affiliated with the theme of 'novelty, fun and luck-based experience', however, the parallel sense of importance of 'trust in agency' invites further questions of 'on what grounds and on what attributes specifically, should values be 'playfully' ambiguous?'

5.7.3 Towards mutually useful personalization: Value co-creation as a transcendent theme?

CoffeeWizard allowed the surveying of consumer value priority based on self-reported value rankings; observations and comparisons of those value rankings using a practical consumption exercise, and participant reflections on the acceptable and unacceptable forms of consumer values footprint creation. As a transcendent theme, value-co-creation appears to be both the object and the action on and through which participants convey their various reflections on provocations of their own interaction. We reason – particularly in respect of the HCI literature inspiring our design – that all of these themes could be summarized as an implicit need to understand the roles and responsibilities of 'expert systems'[210]; and indeed, expectations of expertise appear to be revealed to greater or lesser extent across each theme.

CoffeeWizard provided a greater understanding of the nuances of and conditions enabling 'value co-creation' between consumer and corporation/supplier. We of course envisaged the notion of value co-creation as an implicit interest of the study during its conception, and this was most obviously visible in the thematic analysis of content derived from semi-structured interview. What was less envisaged however, was the importance of management of practical dichotomies; or from an experiential point of view perhaps better termed 'practical dilemmas'. An obvious requirement of future work is the upscaling and automation of each of the three components of CoffeeWizard, particularly so that the function of the interview – value qualification – can be said to have occurred more dynamically during the process of

choosing and consuming itself. In this regard the conversational nature of the interview was perhaps the biggest challenge to the rationale of CoffeeWizard; as it demonstrated the necessity of conversation to qualify action (choice). Whether qualification occurred around participant agreement/disagreement with value descriptions, how they were re-evaluated by CoffeeWizard, or by the nature of the proposition itself, conversation is arguably the most content-rich means of negotiating acceptable terms of interaction. Facilitating an experience of 'conversational' choice-based interaction through the proposed CoffeeWizard mechanism thus remains a key technical challenge.

5.8 Conclusion

CoffeeWizard has enabled the provocation of an explicitly values-orientated interaction that gives rise to the possibility of value-orientated coffee personalization. Through the embedding of a conventional survey instrument in an otherwise novel technology probe, a priori preference and real time choice can be made sense of in a way that furnishes both end-user qualifications of the 'real' qualities of products, while furnishing newly emergent practical values descriptive of the a posteriori relevance of the artefact, in moments of retrospect. This contributes to the notion of recursiveness in interaction design, particularly in probing the affordances of contexts of domestic consumption apparently sympathetic to this instantiation of tracing personal values.

Chapter 6: Building Valuescape(s)

6.1 Overview

In this chapter I present Valuescape as personalized, visual artefacts for ordering and recalibrating recommended coffee and associated services. Crucially in this chapter, personal valuescapes emerge as distinct from Valuescape in a broader sense, where the artefacts themselves can be described as novel appropriations of the principal component analysis (PCA) driven 'cluster diagram', commonly used in marketing and consumer science for generating and aligning product and group archetypes.

6.2 Introduction: Towards speculative enactments

As in the previous chapter, a survey of various orthogonal factors of product/service qualities, representations of personal alignment to expert inferred emergent archetypes of 'product', 'experience', 'end-goal', and 'global (charitable) objectives' can be made. Used as provocations in a standardised product/service ordering and recalibration consumer fiction, four modes of interaction were identified:

1. **Substantive** interactions qualified the content of valuescape, for example providing elaboration on what various objects *really mean;*

2. **Practical** interactions revealed *how* valuescapes and their constituent components were put to work in the task of the overarching fiction;

3. **Evocative** interactions revealed parallel experiences with technologies that were perceived as similar to valuescape; and

4. **Speculative** interactions revealed suggestions for future direction as well as critical reflections on the proposition itself.

I discuss these findings from two perspectives; firstly, the alignment of expert-user perception of valuescape and its contingent features, and secondly, the emergent utility of valuescape in the specific use case of personalized coffee consumption as apparent from interactions.

This approach takes formative inspiration from coffee industry and market research practices, in which alignment of personal preferences to product portfolios is visually communicated via consumer archetypes for the purpose of sharing knowledge among experts [97],

[98], [254]. Introduction: problem, proposition, and expected contributions

The study uses a three-part design fiction based on the wizard of oz (WOz) paradigm, comprising a coffee values preference survey of everyday coffee drinkers; graphical visualization of participant preferences; and individual participant interactions with resulting graphs, or personal valuescapes.

Presented as a product of the wider interaction framework 'CoffeeWizard', I situate and maintain these three elements within a conceivable prototype interface of the same name. Here, I take on the role of the expert in the system presented as a mobile phone app for calibrating, ordering, and recalibrating expert recommended coffee choices across five scenarios linked to the consumer values present in the survey. In respect of these interactions, valuescape is used to answer the following questions of the end-user:

1. What is the nature of interaction with valuescape when conceptualized as a novel appropriation of clustered graphs?
2. How might interactions with valuescape be useful to the end-user?

From the initial survey phase, four valuescapes were created from participant evaluations of value-attributes in four discrete sets. These purportedly represented expert recommendations for products or services aligned to coffee product; personal experiences in life; personal end-goals in life; and global (United Nations) objectives. A fifth valuescape combined all evaluations in a further novel appropriation the data.

In the final interactive phase of the fiction, these were asserted as participants' personal valuescapes and used as provocations to verbally order from and recalibrate the CoffeeWizard app in a plausible consumer scenario. Interactions were voice recorded and thematically analysed as instances supporting sub-themes of one of the following themes:

> **Substantive** interactions qualified the content of valuescape, for example providing elaboration on what various objects *really* meant, such as value-attributes, archetypes (clusters), and individuals located within them.
>
> **Practical** interactions revealed *how* valuescapes and their constituent objects were put to work in the task of the overarching fiction, for example, in managing the various latent

priorities that come to the fore when not expressly catered for in the interface.

Evocative interactions revealed parallel experiences with technologies that were perceived as similar to valuescape by the participant, for example dating or gaming apps.

Speculative interactions revealed participants' suggestions for future direction as well as critical reflections on the proposition itself.

In the following I'll introduce the preliminary work that led to the conception of valuescape as an appropriation of PCA based clustering. I'll then discuss value-orientated interaction and personalization in other domains, demonstrating a link between theoretical literature and applied examples in contemporary works. In the methodology, I'll outline valuescape as a novel appropriation of PCA cluster diagrams and importantly concerning the wider thesis, the product of expert-end-user interaction via the CoffeeWizard framework seen in my previous work. I'll then unpack the four interaction themes as observed, and discuss these in relation to the literature, research questions, and practical expectations and experiences of conducting this study.

6.2.1 Problem statement

In market research, cluster diagrams based on principal component analysis (PCA) of consumer preferences are often used to decrease the complexity in multivariate datasets and visualise alignment of products, product attributes, and the consumers likely to buy them. They typically describe the various qualities comprising individual products, combine groups of products and consumers together in graphical space for the purpose of product-preference matching, and in general, act as an intuitive visual tool for peer-to-peer sensemaking [97], [98], [254]. They are in this sense a data artefact furnishing substantive value to a relatively small group of experts who routinely produce and interpret them. Applied in the coffee industry, PCA cluster diagrams directly inform the production, manufacture, and promotion of products to entire markets, and are generally considered reliable and reproducible tools for maintaining consistent product quality by extension, brand image [21]. In this sense, they take on a further practical value as a framework and methodological approach for consistently supplying tailored coffee choices to the mass market.

PCA clustering however tends to be neglected or at least underdeveloped as an approach to understanding and utilising the extrinsic factors of consumption: Conventionally, archetypal coffee

products known predominantly by their sensory profiles are based on aligned physical constituent parts or intrinsic factors, which is unsurprising, as the product itself is both the corporate domain of expertise and the object over which there is most control and scope for adaption. However, while efforts have been made to establish strong consumer archetypes on extrinsic factors such as brand allegiance, ethical preference, and even demographic data[33], [255], [256], these are rarely applied in the same way. Given that extrinsic factors such as those pertaining to an individuals' consumer experience seem integral to personalization, this study is largely focussed on ensuring that common clustering techniques aren't being overlooked in new augmentations of consumption fit for the digital economy.

A question summarising this problem, and which suggests a direction for the proposed valuescape might be as follows: if expert statisticians can generate consumer archetypes by aligning and visualising sensory preferences and intrinsic factors of product through a process of deductive reasoning, how might end-users similarly visualise and inductively reason about their own alignment among similarly generated archetypes based on extrinsic product and service factors?

6.2.2 Valuescape for substantive consumer choice

A novel application of PCA clustering focussing on extrinsic values most obviously focuses on the chosen values themselves. With corporations under pressure to account for their extrinsic value and broader impact the world beyond immediate spheres of influence, there appears to be renewed interest demonstrating commitment to initiatives such as the United Nation Sustainable Development Goals (UNSDGs) [52]. Consequently, factors describing personal experiences, life goals, and global objectives such as the UNSDGs have been chosen as a means of engaging participants with the kinds of extrinsic qualities descriptive of the wider consumer experience, and likely to provoke meaningful interactions aligned to them.

6.2.3 Valuescape for practical personalization

The proposition of PCA clustering for use by the end-user was initially seen as a contribution to the corporate problem of personalization; and more specifically, one which aligns with wider and well-documented creating shared value (CSV) agendas [22], [33], [52], [73], [74], [75]. Interactions will likely furnish other personal agendas however, which equally reveal other, unexpected instances of practical value.

Both aspects of anticipated interaction with valuescape rely on whether novel appropriations of common PCA cluster diagrams can be turned to effective devices for end-user coffee personalization in design fictions, if not eventually, in the wild. While currently they are devices for internal communication about consumer preference, they might instead be seen as enabling two-way communication with consumers themselves.

6.2.4 Contribution

Building valuescape is intended as an empirical instantiation of the currently theoretical valuescape seen in contemporary literature [40], [41], [42]. Two specific contributions of this chapter are anticipated as 1. a user framework for eliciting and substantiating extrinsic values in personalized fast-moving consumer goods (FMCG) augmentation, and 2. a visual artefact for engaging expert and end-user in the everyday practicalities of CSV. I propose that these contributions might be realised in answering the following in this piece:

> What is the nature of interaction with valuescape when conceptualized as a novel appropriation of clustered graphs?
>
> Why might interaction with valuescape be useful to the end-user?

6.2.5 From theory to practice: Valuescape and the multivariate cluster diagram

Valuescape is to date presented as a structural conception of the world in which everyday interactions are aggregated as a form of collective ontology [40], [41], [42]. The term is aligned with efforts to render the invisible world of socio-economic and technological interactions visible, exposing the nature of values and enabling multistakeholder applications grounded on practical ethics [257], [258]. Offering sets of values as objects for subjective evaluation of preference is one means by which valuescape might be constructed [49], [50], [259]. Further, applied to personalization in everyday coffee consumption, valuescape(s) might therefore enable values-orientated interaction between corporation and consumer at key stages, whether in surveying of preference, capture of real-time choice, and on reflection of those choices.

In this study, valuescape(s) are specifically presented as a series of five novel PCA cluster diagrams, built from a survey of coffee preferences and presented as the main visual artefacts for interaction

in a coffee selection design fiction. Moreover, valuescapes in this study should be thought of as the personalized data product of CoffeeWizard – a three-part interaction framework devised for values-orientated interaction between service provider and end-user as key stakeholders in mutually valued personalization.

6.3 Contemporary works: Artefacts, frameworks, or both?

This section defines valuescapes within the scope of the building valuescape study, focusing on two functional aspects; the nature of the interactions provoked in end-users, and the reasons why these interactions might be considered personally useful to end-users in the consumer scenarios given. In terms of the nature of interaction, I'll first discuss the basis and rationale for using valuescape to explore factors pertaining to coffee personalization (extrinsic consumer values) and provide a situated understanding of consumer preference and choice. I'll demonstrate why it might follow that valuescape can be used to make sense of expert mediation of user's values, and specifically, appropriate specific aspects of data visualization during interactions.

In terms of personal usefulness, I'll discuss how this envisioning of valuescape aligns with applications around multistakeholder recommendation in FMCG as an applied example of personalization. I'll discuss consumer values as a novel basis for personalization and their presentation within taxonomies; how the use of taxonomies leads to established archetypes, and how post-hoc rationalization based on interaction with those archetypes might furnish a better qualification of the values on which they are contingent. Returning to the issue of expertise, I'll discuss the importance of explainability and accountability in personalization, and the enduring centrality of CSV as both a method and a destination for corporations and consumers alike. Before outlining my conception of valuescape and the methodology in which interactions were studied, I'll also discuss the nature of valuescape as an artefact versus valuescape as a framework, and the necessity of participatory and co-creation approaches.

6.3.1 The perception of graphs beyond the expert user

Graphs as outputs of statistical analysis in product-preference-market alignment studies tend to be aimed at experts rather than the lay person. However, contemporary work in HCI and specifically, the domain of applied perception has endeavoured to explore graphs afresh, as devices that could better engage the end users in interaction

scenarios [5], [260]. As well as applications to sensemaking and ontology visualization, the prospect of seeing oneself within a graph takes on new possibilities considering applications in hybrid and augmented consumer technology propositions [54], [160], [261].

In terms of graphical data visualization, Lam et al (2012) describe the prevalence of seven scenarios commonly found in design applications: 'understanding environments… analysis and reasoning… communication… collaborative data analysis… performance… experience… [and] analyzing visualization algorithms'[262]. These all might be said to encompass a sense of the practical benefit to the end user. In terms of this end-user appropriation of graphs in HCI based applications, Thudt et al (2016) develop 'visual mementos' from individual and collective digital footprints, elicited during real-world user journeys and presented for retrospective sensemaking in mapping applications [54]; while Hogan et al (2016), use the 'elicitation interview[s]' to gather user perceptions of graphs and tables, emphasising the capture of '…genuine accounts of people's lived experiences…' [263]. In these cases, authors demonstrate how making graphs accessible ultimately enables novel and mutually useful forms of interaction for expert analyst and end-user alike.

However not all end-user reflections on graphs have been as rich in terms of the variety or quality of retrospective use. Koningsbruggen and Hornecker (2021) argue that post-hoc rationalization '…obscures people's initial connections and affective responses to visualizations' in terms of what is represented, with participants more likely to discuss '…aesthetics, legibility, and usability…' [5]. A major challenge therefore appears to be the elicitation of post-hoc rationalization regarding the subject of the visualization, as opposed to the objects within it. This is even more challenging for valuescape, as the objects of its composition are of integral importance.

6.3.2 Making sense of complexity: PCA clustering and the expert reader

While principal component analysis (PCA) and visual data clustering are complex, they also have a precedent for novel adaption. PCA generally holds that the 'variables that correlate highly with a particular principal component give meaning to that component' and was chosen as a basis for personalization as its visualization, frequently by means of graphical clustering techniques in industry, can potentially depict '…most of the information in the original set of variables' [264]. In this sense, all variables - or value-attributes - are accounted for in the analysis, but at best this still leads to the emergence of clusters representative of whole markets or group archetypes. While the

individual may be aligned with one of these archetypes, this is not personalization in terms of it's more specific definition.One of the ways to ask how a PCA based valuescape might become personalized is to question how they might be reverse engineered, or rather inductively qualified. To do this, I first consider their use in expert-to-expert communication.

In Ares et al (2011), authors investigate consumer liking of 'orange-flavoured powdered drinks' using several consumer profiling techniques across two studies [192]. They sought to demonstrate the extent of agreement among these methods, generally finding that:

> '…[studies] yielded similar information regarding the sensory characteristics of the products and consumers' ideal product, providing similar recommendations for product improvement [but] …differed in the position of consumers' optimum product within the sensory space defined by the sensory characteristics of the evaluated samples…' [192].

In one visualization of the data, which represents four emergent groupings of the 7 evaluated drink products, Ares et. al demonstrate that '…using PCA on averaged scores for sensory attributes …[principal components 1 and 2] 'accounted for 46.9% and 33.5% of the total variance of the experimental data, respectively'. [192]. The resulting graphic thus projects the qualities of evaluation variance as axis framing the graph, the products as vectors within the graph, and the groupings as quadrants overlaying the graph.

By contrast, Perrot et. al. (2018) investigates coffee product preferences using preference mapping, typically used for '…mapping product offers, understanding consumer segmentations, identifying liking drivers or determining ideal product offers'; particularly seeking to communicate efficiency in terms of how the minimum number of products can satisfy the maximum number of consumers in a target population of multiple markets [21].

Proposing a novel approach which handles 'all purposes' of preference mapping highlighted above, they conclude '…it was possible to design a product portfolio for ten markets with only three products instead of ten, moving from less than 50% to more than 80% of consumers who get access to their most liked product' [21]. The resulting graph depicts consumers 'according to k-means clustering', a means of visualizing PCA data to produce product portfolios, which in this case depicts 3 clusters labelled 'strong', 'delicate', and 'indulgent', grounded on individual evaluations of 8 separate coffee products. The graphic clearly requires much expertise in statistical interpretation, and further

explanation in terms of its constituent parts. Nevertheless, it is a rich picture of preference-product-market alignment.

In a further example, Ramsey et al (2018) investigate the performance of low alcohol beverages in terms of consumer preference, evaluating '…the influence of ethanol concentration on liking and sensory attributes of lager beer' [98].Demonstrating how consumers rate four different beverages of progressively increased alcohol concentration, authors propose a method of combining both temporal liking scores with overall scores elicited from a 'temporal check all that apply' exercise, generally finding that 'as ethanol concentration increased, the citation of sweetness, fullness/body and alcohol warming sensation increased'[98].

Their chosen depiction of PCA data is a biplot showing:

> '…[check all that apply] citation of attribute data over the 60s period for all beer samples. The arrowhead > indicates swallow time (at 10s) and shows the development of these attributes over the 60 s evaluation period. Beer sample trajectories are labelled with the ethanol concentration at the first 40 s of evaluation time. Time markers (dots) …are positioned along the remainder of each of the trajectories at 5 s intervals to show progression of evaluation time' [98].

In this instance, Ramsey et al. achieve both a novel depiction of PCA preferences in terms of the inclusion of a time variable, as well as a succinct explanation of the various components of the graphic. Nevertheless, the purpose of this graphic in the context of a peer reviewed paper is clearly to inform other experts. In this and previous examples, nothing about the clustering of evaluated objects within the graphic is rendered intuitive to the lay person whose preferences contribute to its construction, much less applied to any personalizing objective directly involving them.

In terms of possibilities for interaction, user-retrospections, and personalization, various novel approaches similar to the proposition in this study have been used [170], [265], [266], [267], but perhaps the most helpful example by Sugano et. al, proposes ‘graph-based joint clustering’ as a method to elicit 'semantic representation of images', by means of grouping fixations of gaze on regions of selected images [268]. In this instance, it could be said that the rendering of novel, clustered reconstructions of presented images was possible by combining practical interaction (participant gaze) and ‘ground truth’ substantiation (participant annotations)[268].

6.3.3 Towards archetypes of extrinsic values

The potential for personalization is realised when the expert creates and aligns product portfolios to emergent archetypes. In the same way and as with use of personas or user profiles in other domains [192], [269], archetypes might also describe aggregations of extrinsic properties such that an individual can be aligned with a particular aggregation of personal experiences, end-goals, global objectives, and of course, other individuals. The implications for these novel personas and profiles include the provision of replicable interactions with individuals and groups, novel forms of pro-social consumption, and qualification of conventionally hard-to-define extrinsic properties.

6.3.4 Aggregation of evaluations: From deduction to induction

Valuescapes have the potential to furnish inductive as well as deductive aggregations of both personal and collective preferences: While they are built on expert deductions of collective user evaluations, as far as this study is concerned, their greater potential lies in the end-users' inductive sensemaking during consumer scenarios. Therefore, when it comes to the situated meaning and qualification of consumer archetypes built from aggregations of specific value-attributes, this has speculative benefit to the corporate expert in terms of surveying preference and choice at scale. To the end-user, it is less obvious how and why the induction of value qualification (re-calibration) during interactions is useful.

6.3.5 Voice User Interfaces (VUIs)

In this study participants are asked to give verbal instruction to a voice-activated app, purportedly able to provide products or services aligned to valuescape archetypes. Thus, for the purpose of maintaining the fiction they are conversing with an app as opposed to the valuescape directly. Describing 'the misnomer of 'conversational interfaces'', Porcheron et al. 2018 demonstrate how easy it becomes to 'confuse…interaction with a device *within* conversation with an *actual* conversation' [270]. Similarly, conversation with 'CoffeeWizard' as expert that produces valuescape – as opposed to valuescape itself – is likely to become conflated without careful design.

6.3.6 Practical values beyond efficiency

Practical values differ from the value-attributes demarcated in the valuescape in that they can be said to emerge afresh from interaction and do not automatically form neat value-sets without further collation [110][7]. In design fiction they reveal how a speculative technology becomes practically useful to the participant within the wider context of use.

Clustering approaches have been cited as practically valuable to the corporation based on their demonstration of efficiency, but it seems unlikely the end-user would share this priority. Assuming individuals likely have myriad practical priorities, the involvement of participants in the routine collection of personal preference data must itself demonstrate some personal worth. It should be considered the likely advantages and disadvantages of becoming a part of what some have termed 'the surveillant assemblage' [140], [219], [271] is at best problematic. In my first study for instance, a fine line was observed between (desirable) experiences of thoughtful introspection vs the (undesirable) feeling of being subject to corporate surveillance: On the one hand, continued surveying is intrusive and arbitrary, detracting from an otherwise desirable consumer experience. Conversely, it has the potential to render valuescape both personally relevant and collaborative.

Presentation of a personalized consumer interaction task presents challenges to one of the central tenants of valuescape; that it is an all-encompassing representation. While valuescape on the one hand appeals to universal structural conceptions of the social, such conceptions are strongly contested [ref structuralism]. Therefore, it is anticipated that some framing of valuescape is required on the part of the expert in guidance of its practical application.

Inspiration for design fiction can be found in studies investigating similar phenomena in terms of novel FMCG interactions in the digital economy [48], [51], [54], [63], [98]. Moreover, inspiration for novel application of clustering is also relevant in devising basic instructions for interaction [54], [56], [57].

The purpose of the CoffeeWizard framework in this study is of course to bring together both the need to keep participants 'on task', while allowing freedom of expression required to elicit genuine and novel interaction. Thus, a semi-structured design would seem an appropriate balance.

A key proposition of valuescape is that personalization is achieved when individuals are aligned with individual attributes of value, which are contextually appropriated and displayed for interaction. As such, values are the main items of personal data required for its functioning. They are essentially a proxy, and might be considered attractive as a proposition to end-users reluctant to provide other attributes such as detailed demographics [111], [112]. As an alternative to other forms of personal data, this may also contribute to a general sense of enhanced transparency [14], [113], [114].

Perception of valuescape in terms of the meaning and function of each of its components is a crucial in terms of sensitising the study. While multivariate clustering is already valued for its simplification of datasets and intuitive visual sensemaking for expert audiences, it is likely further simplification is required for ease of perception in a lay audience [115], [116].

6.3.7 Multistakeholder recommendation

A recurrent theme across my thesis is value mutuality, based on the rationale that values-orientated personalization must itself be regarded for some overarching, practical purpose. Finding this practical purpose for individuals however is something of a 'cold start' problem [191]. Some inspiration can be found in the appeal to the use of values as grounds for personalized interaction in recent multistakeholder recommendation applications [61], [89], [126], [143], [180], [181], [191], [272], [273], [274], [275], [276], [277], [278], [279], [280], [281], [282]. For instance, in defending the interests of more than just the corporation: Abdollahpouri et al. (2019) find that while '…profit-aware recommendation strategies can lead to a substantially higher business value for the provider, at least in the short term…others consider more comprehensive models with time-varying adoption probabilities and limited consumer budgets' [191]. While valuescape and the CoffeeWizard framework are not presented as recommender systems per se, they should similarly be sensitised to the overarching practical requirements of the end-user.

6.3.8 Interaction frameworks: Revisiting CoffeeWizard

Just as the term valuescape can been used simultaneously to describe frameworks of interaction as well as data artefacts[40], [41], [42], PCA cluster diagrams similarly take on dual meaning. As I'll discuss in more detail in the methodology, valuescape in this study is presented primarily as an interactive data artefact within 'CoffeeWizard'

- an interaction framework specifically designed in this thesis. Frameworks of interaction are important as they make a process of surveying and calibration of value-sets among a population repeatable, and present valuescape as the product of a standardised interaction scenario common to other participants [220], [283], [284]. In the final stage of thematic content analysis particularly, there are parallels to be drawn between processes of evaluation and sensemaking and the emergence of interaction themes [92], [109], [111], [223], [224], [225], [226], [285], [286]. Again, this will be elaborated on in the methodology.

6.3.9 Post-hoc rationalization: Users' real value preferences

The act of retrospection during interaction with valuescape is crucial in revealing the congruency and continuity of value meaning [4], [5], [159], [248]. This is because, while a priori stated preferences can furnish an indication of one's values, these are in essence hypothetical, whereas to capture and reason about one's choices in the moment of performing them offers opportunity for real-world corroboration. Valuescape offers a means of post-hoc rationalization in real-time, in the sense that all interactions with it can be said to furnish the 'real preferences' of users.

Concerning post-hoc rationalization in information visualization, studies tend to focus on this phase of interaction in a practical sense while neglecting the continuity of meaning. A contemporary study evaluating 'personal connection and emotional reaction' to graphs demonstrates the tendency of participants to reflect on '…aesthetics, legibility, and usability…' rather than topical content [22]. In terms of personalization by means of personal valuescape, there are two implications here. First, that the participant should be involved in graph production as well as interpretation to enable continuity of meaning. Second, the extent to which factors such as 'aesthetics' might be manipulated in favour of lay-person perception without altering graphs informational basis should be addressed.

6.3.10 Who is the expert and who gets to explain?

While the role of the expert in this study typically refers to the expert system in its construction of valuescape, expertise is equally sought from the end-user through evaluations of the importance of value-attributes. This has precedent in the contemporary development of 'value-aligned norm systems' optimised for qualitative input, which operate by individual scoring or ranking of value-attributes descriptive of the social or economic application in question [287], [288]. A

potentially provocative application of valuescape is therefore its presentation as an explicit expert ontology of individual and collective values, enabling explanation of evaluations and analyses between stakeholders. While the mechanism of individual scoring and collective aggregation of value preferences will be explored more in the methodology, the practical value of shared expertise appears to be a means to broader objectives, such as creating shared value (CSV).

Value mutuality is a key proposition of valuescape, with the CoffeeWizard framework purposely designed as a speculative means of achieving this. Personalization can be assumed to be desirable to the corporation and end-users for very different reasons, however, the maintenance of value mutuality should be considered a key practical factor in achieving this. In contemporary work this is expressed in several works pertaining to the maintenance of norms – for instance the norm of 'reciprocity'; the importance of 'trust', and the embedding of practical moral value into the mechanism of a system itself [17], [32], [106]–[109]. Again, it will be interesting to see if the intention of value-mutuality is perceived and valued by participants or not; or whether alternative expressions [such as authenticity] instead emerge.

Taxonomies of value lend themselves to interpretation and continual qualification depending on the contexts in which they are used. One of the practical applications of value taxonomies is in the creation of shared value (CSV), and certainly the UNSTGs have been used as touchpoints for CSV in parallel settings [8]–[11], [105]. [Give examples]. Here, values can be seen to be qualified in an elaborative sense, ranging from simple synonymous content to rich, reflective, and conversational interpretation [give quotes]. However, with corporations appropriating these values much as they would the intrinsic values of product in the creation of archetypal contributions to UNSTGs, one might ask if this is really an instantiation of CSV, or a one-sided appropriation of meaning. By extension, taxonomies thus also reveal the conclusions of the reputed expert who has authored or selected them. With taxonomies offering a window to both the meaning of values and the situated appropriation of that meaning, the role of elaboration is surely as important in substantiating meaning of value taxonomies on the part of consumer-participants.

6.3.11 Creating Shared Value (CSV) and participatory co-creation: Speculative applications for extrinsic value-sets

I've previously demonstrated that overarching practical values such as 'efficiency' and 'personalization' emerge as the mutually beneficial result of preference analysis when aligning intrinsic values-sets of products with consumers in the pursuit of archetypal portfolios and personas. In the same regard, CSV is helpful in conceptualising applications for extrinsic value-sets: Just as intrinsic value-attributes describing sensory properties of coffee as a consumable are combined to form archetypes of product, so extrinsic value-attributes describing experiential, aspirational, and ethereal properties of wider coffee consumption experience might be combined to form archetypes of consumer interaction. Applied to valuescape, there are two implications here:

First, that CSV emerges from interaction with valuescape, and specifically, substantiations of archetypes and contingent objects depicted within. Qualifications describing the nature of these objects allow participants to bring their expertise to the creation and maintenance of valuescape, affirming or challenging the official expert depiction.

Second, that CSV emerges as a practical value resulting from interaction with valuescape as a framework: The application of valuescape to a consumer context or scenario in some way is generative of newly emergent values, cited by the end-user as conducive to the scenario itself.It is important to point out here that the primary objective of the study is to learn about the nature of interactions with valuescapes when applied to scenarios that are inherently CSV / pro-social orientated, as opposed to definitively describe a value-set. If CSV describes a practical application of valuescape for enabling social and corporate trajectories of personalization in coffee consumption, participatory design and value co-creation, for instance through 'value sensitive (research) design' (VSD), 'knowledge co-creation' and so on, summarise the broad methodologies that aim to achieve it [69], [72], [82], [86], [166], [167], [168], [169], [220], [248], [289], [290], [291], [292], [293], [294], [295].

6.3.12 Interfaces for values-orientated interaction

Building valuescape necessitates the intermediary step of interfacing with various practical requirements at key stages[3] of (a priori) preference elicitation and (a posteriori) retrospection. Contemporary works in HCI and in perception of data visualization studies offer inspiration for a relevant fiction. Conversational interaction has been demonstrated in other technologies as a source of rich, descriptive data, likely useful .

Before presenting the rationale for the research questions and methodology that have emerged from the literature, contemporary works, in particular enabling technologies both in academia and industry that are similarly orientated towards values-orientated perception and interaction, are considered. Along with PCA cluster diagrams these have inspired the presentation of valuescape and the CoffeeWizard framework more broadly.

Many devices and frameworks exist for novel interaction during beverage selection and consumption. 'Speakeasy', an AI system for eliciting preference and recommending product, focuses on induction of user alcoholic beverage preference for recommending drinks in bars, emphasising the voice user interaction (VUI) component as a means of eliciting conversational description, storing and learning from these insights [210].The Reverse Vending Machine (RVM) framework for a novel recycling bin concept incentivises users to recycle through a tokenised reward scheme, aligned to user profiles [176].'BitBarista' – an office located coffee machine augmented with a graphical user interface (GUI) – combines cryptocurrency transactions with coffee provenance data for real-time purchase/reward, with a view to engaging users in meaningful interactions including machine maintenance and sustainable and ethical product replenishment choices [209], [296], [297].

What these technologies have in common are a values-orientated approach to interaction both in terms of each iteration of usage, as well as in terms contribution to consumer society more broadly; for example, through contribution to a knowledge base, incentivising a specific environmental intervention, or enabling routine consumer activism.

[3] In this study real-time choice and retrospection are combined in the post-survey interview stage.

6.4 Designing and deploying personal valuescapes

6.4.1 Overview

Building valuescape is positioned as a data-driven design fiction, which borrows from the WOz paradigm in order to provoke interactions with valuescape. It is devised as a three-stage procedure comprising a coffee values survey, analysis and visualization of survey data, and the use of those visualizations as a provocation to interaction and retrospection. While all stages inform the development of building valuescape as an empirical task, the final retrospective stage is of primary analytic focus.

6.4.2 Research questions

As previously outlined, the building valuescape study is intended to answer two key questions:

1. What is the nature of interaction with valuescape when conceptualized as a novel appropriation of PCA clustering?
2. How might interactions with valuescape be useful to the end-user?

In the context of a three-part research design, the following sub-questions were operationalized to direct and conclude each section so that what was effectively a prototyping of valuescape could progress.

6.4.2.1 What are the intrinsic and extrinsic value preferences of coffee consumers?

As a valuescape is intended to be a rich depiction of multiple value-objects, surveying initial preferences for each value-attribute is one means by which valuescape can be meaningfully constructed. To achieve this, I use a standardised survey in which participants are asked to evaluate attributes of the four value sets on a scale of 1 (not important) to 5 (very important), in relation to a hypothetical coffee ordering scenario. Within each set, appearance of attributes is randomised to eliminate ordering effects. By surveying a population of coffee consumers for their value-attribute preferences across value-sets, I establish a ‘ground-truth’ for the salience of those attributes that enables the location of individuals both alongside them as well as among others, in the context of a design fiction of an ‘app calibration’.

6.4.2.2 How might intrinsic and extrinsic preferences be universally visualized?

In keeping with contemporary approaches to values alignment in industry, principal component analysis (PCA) was conducted on the resulting dataset, primarily with a view to creating cluster graphs. These enable further analyses in terms of a priori individual and collective preference, but crucially, serve as the basis for constructing prototypical valuescapes for participant orientated interaction. Various visualizations and adaptations of multivariate analysis were considered, inspired by the models of principal component analysis (PCA) clustering in industry literature. Crucially, any visualization should be made to work as part of a design fiction and explainable to the end-user with no prior experience.

6.4.2.3 What do descriptive and multivariate analyses reveal about the potential utility of values when visualized as archetypal clusters?

I use the k-means approach to clustering based on its prevalence in coffee preference matching literature, and its explainability in terms of group creation. In this sense, emergent groups comprising individual respondents are mapped onto a graph comprising two principal components, which can be labelled as representing specific qualities in line with CoffeeWizard's intended provocations for interaction. PCA was performed four times – once for each of the value sets - enabling production of four graphics that ostensibly represent coffee product valuescape, personal experience valuescape, personal end-goal valuescape, and global objective valuescape. These are used as representations of collective preferences in which the individual is in terms of their 'ideal' preference location. Descriptive analysis of survey data should provide an overview of value-attribute and value-set salience; specifically, measures of central tendency and variance.

6.4.2.4 Is there an emergent, underlying grounding?

Additionally, PCA was performed across the data set to produce a final valuescape representative of all values. This differed slightly from the previous valuescapes in that the principal components were left blank in order to provoke further inductive sensemaking of the grounds for CoffeeWizards application of the graphic. More specifically, PCA clustering might reveal an underlying grounding for preference scores not visible in descriptive analysis.

6.4.2.5 How do participants use valuescape in 'CoffeeWizard' consumer fiction(s)?

Turning to participant facing applications, perception and use is captured via natural language interaction with the valuescapes as the main artefact for interaction in the CoffeeWizard fiction. As far as possible, interactions are intended to be with the prototypical app which is presented as voice activated, as opposed to with the researcher. However, all interactions and content about valuescape is considered. This informs the most part of the chapter discussion. PCA diagrams are presented to a selection of survey participants in a retrospective exercise, forming the central valuescape artefact(s) for interaction and decision-making in an extension of the CoffeeWizard design fiction.

6.4.2.6 How are valuescape objects (such as clusters) supported, contradicted, or appropriated in new ways?

The final question employs a combination of direct participant reflection on the exercise itself, as well as my own impressions of interaction. This will inform the limitations and future works. The 'correctness' of the valuescape in terms of how it reflects the personal preferences of the individual user is assessed inductively, through conversation 'with' and 'about' the valuescape(s) in the wider CoffeeWizard fiction. These questions broadly align with the three-stage approach outlined in the following methodology, although findings will clearly overlap in terms of their contribution.

6.5 Three-part design: Survey, analyse, interview

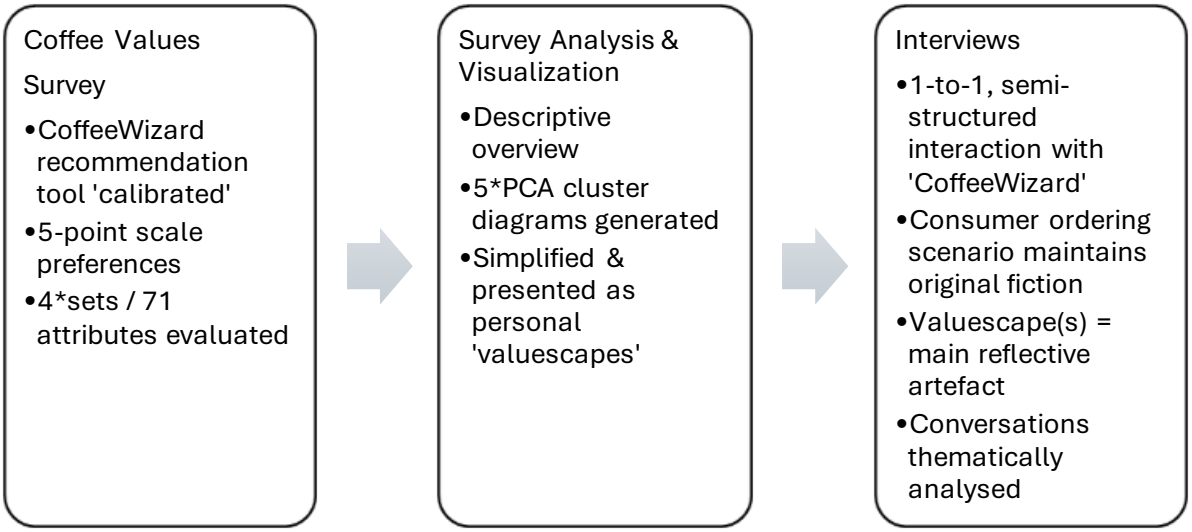


Figure 6-1 CoffeeWizard: Revisiting the three part design

The methodology presented here is a speculative enactment, based on a combination of ground truth elicitation (survey); expert aggregation and deduction (statistical analysis/visualization), and inductive conversation with the end-user (thematic content analysis). While borrowing ideas from both concepts here, I predominantly adopt the latter definition as it aligns best with literature and contemporary works. As discussed in literature, while valuescape can and should be thought of as a framework of interaction as much as data artefact, for the purpose of enabling a plausible design fiction, I make use of an adapted CoffeeWizard framework (seen in the second study) to enable the above stages (Figure 6-1).

6.5.1 *The CoffeeWizard Framework*

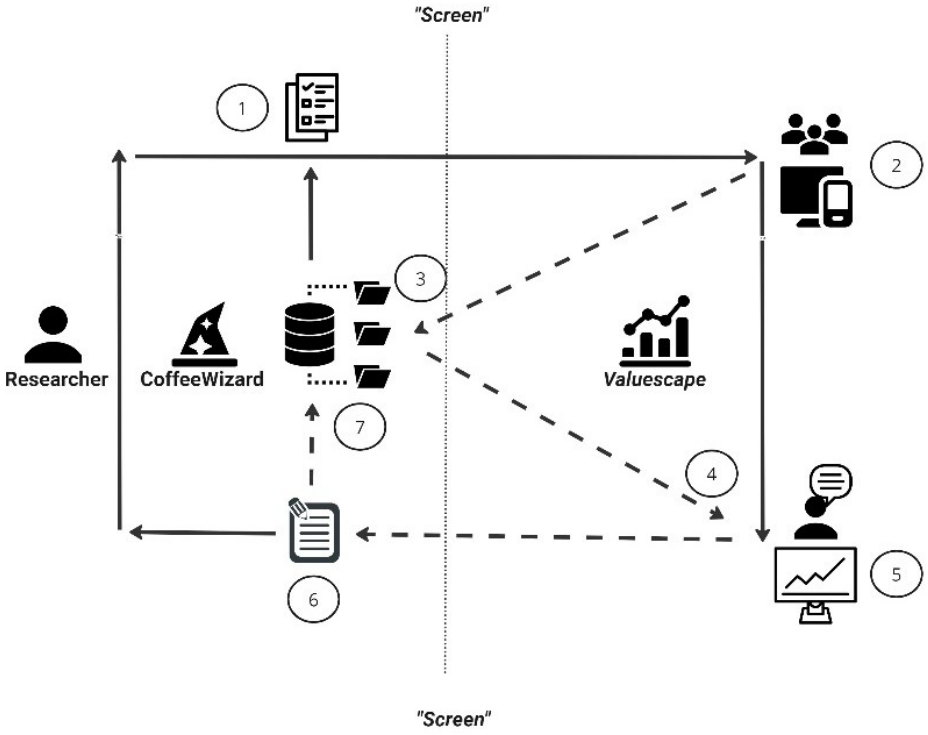


Figure 6-2 CoffeeWizard: Revisiting the Interaction Framework

Valuescape is a product of a wider framework, CoffeeWizard, which enables the contriving of plausible consumer fictions . Solid lines represent the flow of interaction as set by the researcher; broken lines represent the induction and appropriation of participant interactions, and the procedure is as follows (Figure 6-2):

1. CoffeeWizard generates a 'Coffee Values Survey' for personal evaluations of value-sets comprising consumer product/experience value-attributes.
2. Coffee Values Survey is presented and completed at population level as a 'CoffeeWizard app calibration' exercise.
3. CoffeeWizard performs PCA on results, producing a series of personalized cluster diagrams for corresponding individual participants.
4. Cluster diagrams are presented to a sample of individual participants as 'personalized valuescapes'.
5. Personalized valuescapes representing surveyed value-sets used by participants as provocations to conversation-based interaction with aligned consumer scenarios.
6. Interactions are transcribed and thematically analysed, inductively qualifying valuescapes and their constituent value-objects.
7. New taxonomies of value are generated for future iterations.

6.5.2 Ethical considerations and recruitment (surveys)

General Data Protection Regulation (GDPR) were followed in respect of eliciting participant data. Ethical clearance for this study was granted by University of Nottingham School of Computer Science ethics committee in October 2022 under CS-2021-RS8 100. Participants were recruited via the Prolific[4] platform and, after reviewing and consenting to procedures, directed to first to the 'Coffee Preference Survey' task, delivered on the SurveyHero[5] platform (S3.ProjectInformation).

6.5.3 Value-sets and Value-attributes

Four value-sets were selected pertaining to qualities of coffee product, personal experience in life, personal end-goals in life, and global (UNSDG) objectives as follows:

6.5.3.1 Coffee product:

Coffee Values	
Caffeinated	Chocolate (flavour)
Strong (taste)	Caramel (flavour)
Milky (taste)	Vegetarian (no animal product)
Sweet (taste)	Vegan (no animal product or biproduct)
Bitter (taste)	'Long' (a larger/bigger drink)
Hot (temperature)	Frothy (texture)
Acidic (mouthfeel)	Creamy (texture)
Nutty (flavour)	Floral (aroma)
Fruity (flavour)	Smoky (aroma)

Table 6:1 Hedonic (Personal Sensory) Values: Study 3

Coffee product values are taken from the world coffee lexicon [46], offering 18 intrinsic, sensory descriptions of literal product, potentially present during consumer interaction (Table 6:1).

[4] https://www.prolific.co/
[5] https://www.surveyhero.com/

6.5.3.2 Personal experience:

Experience (Instrumental) Values	
Loving (being affectionate, tender)	Broad minded (being open-minded)
Responsible (being dependable, reliable)	Helpful (working for the welfare of others)
Ambitious (being hard-working, aspiring)	Independent (being self-reliant, self-sufficient)
Imaginative (being daring, creative)	Polite (being courteous, well-mannered)
Courageous (standing up for my beliefs)	Self-controlled (being restrained, self-disciplined)
Obedient (being dutiful, respectful)	Clean (being neat, tidy)
Intellectual (being intelligent, reflective)	Capable (being competent, effective)
Honest (being sincere, truthful)	Logical (being consistent, rational)
Forgiving (being willing to pardon others)	Cheerful (being light-hearted, joyful)

Table 6:2 Eudaimonic (Personal Experience) Values: Study 3

Personal experience values are taken from Rokeach's instrumental values [47], [49], offering 18 extrinsic descriptions of personal experience, potentially present during consumer interaction (Table 6:2).

6.5.3.3 Personal end-goal

End-goal (Terminal) values	
Self-respect (self-esteem)	National Security (protection from attack)
A comfortable life (a prosperous life)	A World at Peace (free of war and conflict)
Mature love (personal and spiritual intimacy)	Salvation (saved, eternal life)
Wisdom (a mature understanding of life)	Pleasure (an enjoyable, leisurely life)
Freedom (independence, free choice)	Inner Harmony (freedom from inner conflict)
A world of beauty (beauty of nature and the arts)	Happiness (contentedness)
Family security (taking care of loved ones)	Equality (kinship, equal opportunity for all)
Social recognition (respect, admiration)	A Sense of Accomplishment (lasting contribution)
An exciting life (a stimulating, active life)	True Friendship (close companionship)

Table 6:3 Eudaimonic (Personal End-Goal) Values: Study 3

Personal end-goal values are taken from Rokeach's terminal values [47], [49], offering 18 extrinsic descriptions of personal end-goals, potentially present during consumer interaction (Table 6:3).

6.5.3.4 Global contribution

Global (UN) values	
Good health and well-being (to ensure healthy lives and promote well-being for all at all ages)	Peace, justice, and strong institutions (to promote peaceful and inclusive societies, provide access to justice for all and build effective, accountable, inclusive institutions)
Partnerships for the united nations' goals (to strengthen implementation of other goals through relevant partnerships)	Sustainable cities and communities (to make cities and human settlements inclusive, safe, resilient, and sustainable)
Zero hunger (to end hunger, achieve food security and improved nutrition, promote sustainable agriculture)	Decent work and economic growth (to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all)
Reduced inequalities (to reduce inequality within and among countries)	Gender equality (to achieve gender equality and empower all women and girls)
Affordable and clean energy (ensure access to affordable, reliable, sustainable, and modern energy for all)	Quality education (to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all)
Life on land (to protect, restore and promote sustainable use of land-based ecosystems)	Clean water and sanitation (to ensure availability and sustainable management of water and sanitation for all)
Responsible consumption and production (to ensure sustainable consumption and production patterns)	Life below water (to conserve and sustainably use sea/ocean resources for sustainable development)
Industry and infrastructure (to build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation)	No poverty (to end poverty in all its forms everywhere)
Climate action (to take urgent action to combat climate change and its impacts)	---

Table 6:4 Eudaimonic (Personal Sustainability Goal) Values: Study 3

Global values are taken from the UNSDG list of 17 extrinsic objectives and describe charitable contributions that consumers might want to consider during interactions (Table 6:4).

6.5.4 *Part 1: Constructing the survey*

The four value sets were combined and encoded in a preference survey, presented to participants in random order.

Coffee (CV)	CV Code	Terminal (TV)	TV Code	Instrumental (IV)	IV Code	Global (GV)	GV Code
Caffeinated	CvA	True Friendship	TvA	Cheerfulness	IvA	No poverty	GvA
Strong (taste)	CvB	Mature Love	TvB	Ambition	IvB	Zero Hunger	GvB
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
Smoky (aroma)	CvR	An Exciting Life	TvR	Forgiveness	IvR	Forging Likeminded Partnerships	GvQ

Table 6:5 Operationalising mixed value-sets

All four value-sets represent an expert ontology of both the requisite value sets for everyday coffee personalization, as well as expertise on the meaning of those value-sets and value-attributes in terms of their substantive meaning. In this sense, CoffeeWizard is asserting that it knows which value-sets to draw on to personalize coffee consumption; it knows what value-attributes within those sets substantively mean; and it knows how to apply personal preferences for attributes and sets in propositions of archetypal product/service recommendation (Table 6:5).

6.5.4.1 CoffeeWizard – An app for values-orientated coffee recommendation

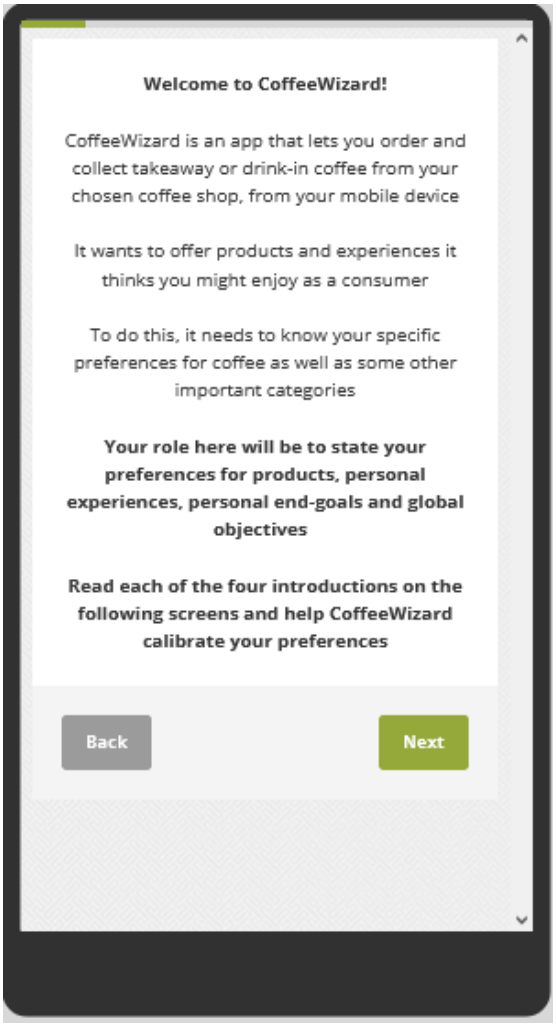


Figure 6-3 Revisiting CoffeeWizard: An app for ordering recommended coffee and recalibrating preference

Participants were introduced to CoffeeWizard as a prototype app, which required their input to 'calibrate' a personal preference profile (Figure 6-3).

6.5.4.2 Making a personal values profile

Each value-set was presented in order (see below), with constituent value-attributes randomised for preference scoring in terms of personal importance on a 1-5 score Likert scale – 1 being 'very unimportant; 5 being 'very important; and 3 being 'neither important or unimportant'. from value-attributes

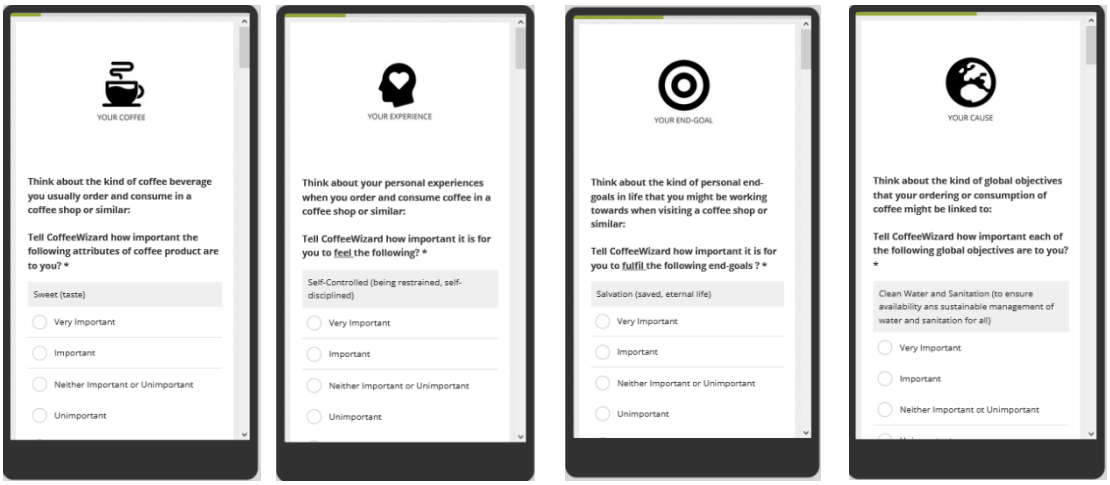


Figure 6-4 Eliciting rank-value preferences

Participants were encouraged to complete the survey on a mobile device if possible, maintaining the fiction of app calibration (Figure 6-4).

6.5.4.3 Presentation

Following an internal pilot study among peers (cite in appendices), the 'Coffee Values Survey' was re-deployed to a larger external sample (n=100), via a third-party participant recruitment portal. This achieved a 100% response rate in terms of the substantive questions (not all participants provided basic demographic details, but these were only necessary if opting into the follow-up interview).

The survey was presented as the first calibration activity in a prototype *'…app that lets you order and collect takeaway or drink-in coffee from your chosen coffee shop, from your mobile device'*. Figure 6 best demonstrates this from the perspective of a participant using a mobile device to complete the survey. Calibrating a prototype app as opposed to evaluating a contrived consumer scenario was the first major change adopted following the pilot, with the rationale being that the participant should have an initial first-person interaction with 'CoffeeWizard' as the presumed 'expert' on valued interaction and future recommendations.

Value sets remain the same, covering four discrete qualities of speculative importance to coffee consumption. These are coffee (CV) – intrinsic, sensory value attributes of the physical product; and experience (IV), end-goal (TV), and global (GV) – extrinsic, attributes of contextual interaction and wider world issues based on Rokeach values and the United Nations Sustainable Development Goals (UNSDGs).

Each set was presented in turn and accompanied by a simple infographic, with an instruction to *'think about [your routine consumption in a] coffee shop or similar'*. Participants were then asked to score individual attributes in each value set in terms of personal importance (Fig 2).

6.5.4.4 Question overview

Questions corresponding to each of the value-sets were as follows:

VALUE SET	QUESTION
COFFEE	Think about the kind of coffee beverage you usually order and consume in a coffee shop or similar. Tell CoffeeWizard; how important the following attributes of coffee product are to you?
EXPERIENCE	Think about your personal experiences when you order and consume coffee in a coffee shop or similar: Tell CoffeeWizard; how important is it for you to feel the following?
END GOAL	Think about the kind of personal end-goals in life that you might be working towards when visiting a coffee shop or similar: Tell CoffeeWizard; how important is it for you to fulfil the following end-goals?
GLOBAL	Think about the kind of global objectives that your ordering or consumption of coffee might be linked to: Tell CoffeeWizard; how important each of the following global objectives are to you?

Table 6:6 Scenario questions overview

Practical considerations for this aspect of the instrument include elimination of order effects and the wording of questions: Value sets could be randomised internally but not externally, meaning that the sets themselves always appeared in the same order. Scoring reflected participant assertion of attribute importance, indifference, or unimportance in relation to a general statement (e.g., *'tell CoffeeWizard how important it is for you to feel/fulfil the following…'*). Importance level was based on a five-point Likert scale, scores of 5 to 1 allocated to 'very important' through to 'very unimportant', respectively. At face value, the sum of these scores therefore should reveal a sense of the collective preferences of the population. These a priori data are effectively the first calibration or ground truth on which constructions of valuescape will be based (Table 6:6).

Value Set	Highest Scoring Attributes	Sum of Scores	Lowest Scoring Attributes	Sum of Scores
Coffee	Hot (CV6)	414	Fruity (CV9)	237
	Caffeinated (CV1)	404	Vegetarian (CV12)	237
Experience	Polite (IV13)	438	Courageous (IV5)	343
	Honest (IV8)	416	Imaginative (IV4)	340
End-Goal	Happiness (TV15)	436	National Security (TV10)	358
	Pleasure (TV13)	434	Social Recognition (TV8)	310
Global	Clean Water (GV15)	433	Sustain. Communities (GV11)	404
	No Poverty (GV17)	431	Industry/Infrastructure (GV8)	370

Table 6:7 Creating collective value-attribute preference scores

Findings from preference ranking are from the entire sample (n=100); who were surveyed on the four categories of values listed above. Initial analyses of these aggregated preferences was conducted to reveal a basic description of most and least preferred attributes per set. As an illustration, the following shows the highest and lowest scoring attributes on aggregate for each set (Table 6:7).

6.5.4.5 Towards valuescape(s)

Three techniques were used to identify emergent clusters from each of the five sets if possible (see appendices). As demonstrated, these varied by set; and with no emergent principal components it was decided that a standardised.

6.5.5 Part 2: Designing valuescape

Of course, many other multivariate techniques exist for the analysis of preference data: '...[PCA] has no underlying statistical model of the observed variables and focuses on explaining the total variation in the observed variables on the basis of the maximum variance properties of principal components. [Whereas] Factor analysis...has an underlying statistical model that partitions the total variance into common and unique variance and focuses on explaining the common variance, rather than the total variance, in the observed variables on the basis of a relatively few underlying factors' (Dunteman, 1989:9). [264]

A generic approach to principal component analysis (PCA) involving a k-means clustering approach to data visualization was

employed, following a suitable framework[6]: this involved scaling each of the value sets in order to account for their varying sizes; calculating a covariance matrix; calculating Eigenvectors/Eigenvalues; organising Eigenvectors/Eigenvalues; selecting appropriate principal components; and transforming the original dataset [re-word with supporting methods literature and include rationale.

6.5.5.1 Ethics part 2:

During the survey participants were shown the following:

> *"You are invited to *opt-in to being considered for a 1-hour follow-up interview. This will involve a recorded conversation with the lead interviewer over **Microsoft Teams (voice only) in which you will be shown the results of CoffeeWizard's analysis of your responses, and asked how you interpret these.*
>
> *Interviews are remunerated at a £20 p/h rate via Prolific.*
>
> *If you wish to be considered, please provide your Prolific email when prompted. This will be used for sending further correspondence and arranging a time and date.*
>
> **opt-in for shortlisting potential interviewees. Selection will be based on a representative sample and/or first to complete.*

9 participants in total engaged in the interview stage.

[6] https://medium.com/@zullinira23/implementation-of-principal-component-analysis-pca-on-k-means-clustering-in-r-794f03ec15f

6.5.6 *Part 3: Presenting valuescape*

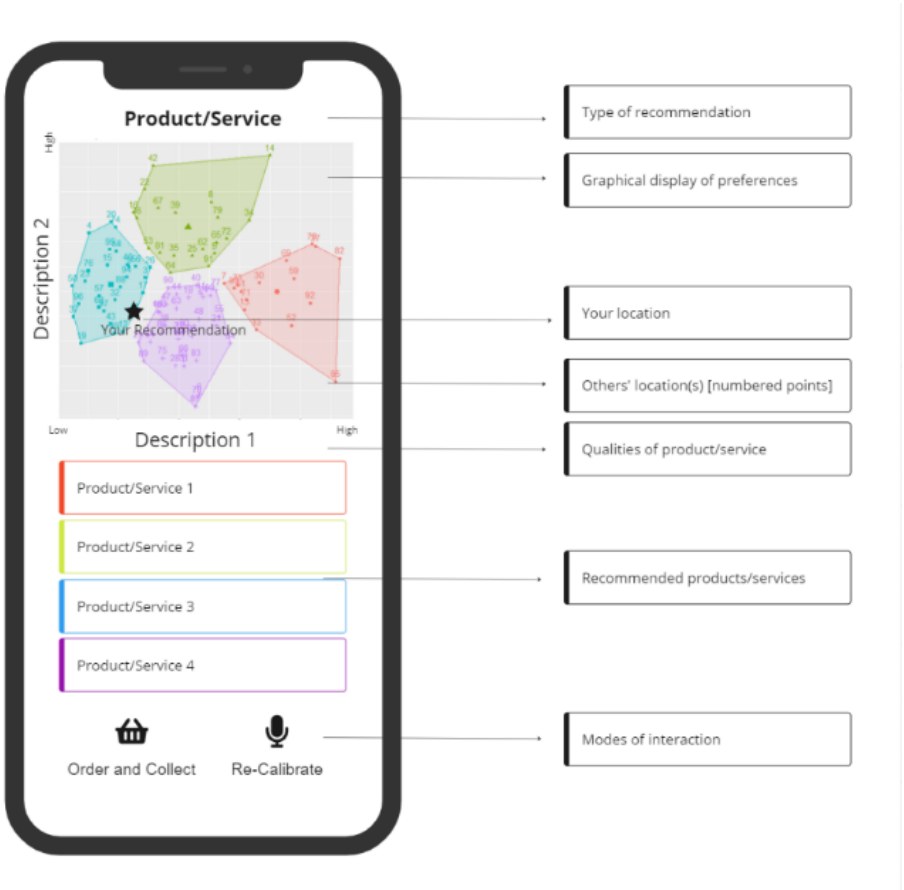


Figure 6-5 The CoffeeWizard App interface

Title: The first valuescape is 'Your Coffee'. In the first interaction, CoffeeWizard invites participants to 'order' a coffee based on the recommendation shown.

Graph: The graph comprises four coloured clusters, corresponding CoffeeWizard asserted archetypes.

Location: Participant location is highlighted as a star within the graph.

Others' location: By contrast, the location of others in the valuescape is demarcated by numbered points across all the clusters.

Components: The axis represent principal components highlighted by CoffeeWizard as the grounds on which archetypes are formed.

Products: The 4 product/service choices are colour coded and align to archetypes displayed.

Interaction: Icons for 'order and collect' and 're-calibrate' maintain a VUI fiction (Figure 6-5).

6.5.6.1 Ordering and recalibrating

6.5.6.1.1 Scenario 1

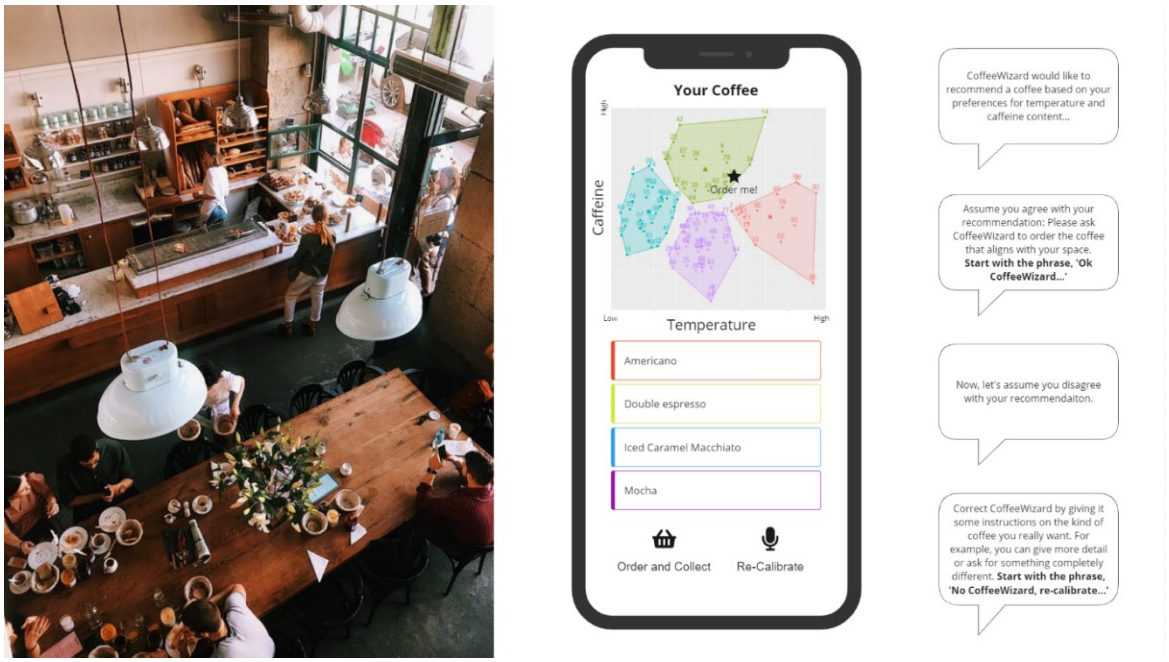


Figure 6-6 Scenario Provocation Screen

In the first exercise (Figure 6-6), valuescape is presented by CoffeeWizard as "Your Coffee". For the participant, it is an expert assertion of their preference for archetypal coffee product based on theirs' and others' evaluations of coffee value-attributes. They are guided through the following fictitious consumer scenario, and asked to order 'their' coffee based first on CoffeeWizard's recommendation:

> *CoffeeWizard would like to recommend a coffee based on your preferences for temperature and caffeine content...*
>
> *Assume you agree with your recommendation: Please ask CoffeeWizard to order the coffee that aligns with your space.*
>
> ***Start with the phrase, 'Ok CoffeeWizard...'***

By ordering 'their' coffee, CoffeeWizard seeks two interactions: First, the perception of what exactly is being recommended. Second, how that perception is verbally delivered.

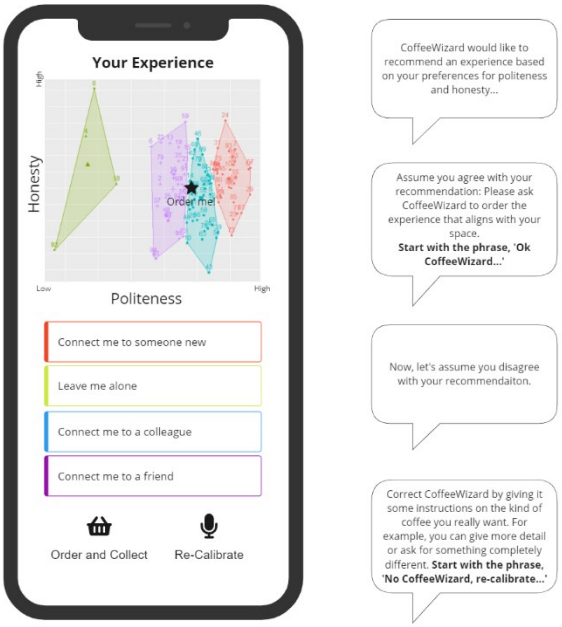
In the example above, CoffeeWizard recommends 'double espresso', based principally on the participant's evaluations of 'temperature' and 'caffeine' value-attributes. If ordering implies agreement with

CoffeeWizard, recalibration is designed to enable and provoke disagreement:

> *Now, let's assume you disagree with your recommendation.*
>
> *Correct CoffeeWizard by giving it some instructions on the kind of coffee you really want. For example, you can give more detail or ask for something completely different.*
>
> ***Start with the phrase, 'No CoffeeWizard, re-calibrate…'***

By recalibrating 'their' coffee, CoffeeWizard now seeks participant qualification of what exactly does constitute their location within the valuescape.

6.5.6.1.2 Scenario 2



In the second exercise, valuescape is presented by CoffeeWizard as "Your Experience". For the participant, it is an expert assertion of their preference for archetypal consumer experiences based on theirs' and others' evaluations of personal experience value-attributes. They are guided through the following fictitious consumer scenario, and asked to order 'their' experience based first on CoffeeWizard's recommendation:

> *CoffeeWizard would like to recommend an experience based on your preferences for politeness and honesty…*
>
> *Assume you agree with your recommendation: Please ask CoffeeWizard to order the experience that aligns with your space.*
>
> ***Start with the phrase, 'Ok CoffeeWizard…'***

By ordering 'their' experience, CoffeeWizard seeks two interactions: First, the perception of what exactly is being recommended. Second, how that perception is verbally delivered.

In the example above, CoffeeWizard recommends 'connect me to a colleague, based principally on the participant's evaluations of 'politeness' and 'honesty' value-attributes. If ordering implies agreement with CoffeeWizard, recalibration is designed to enable and provoke disagreement:

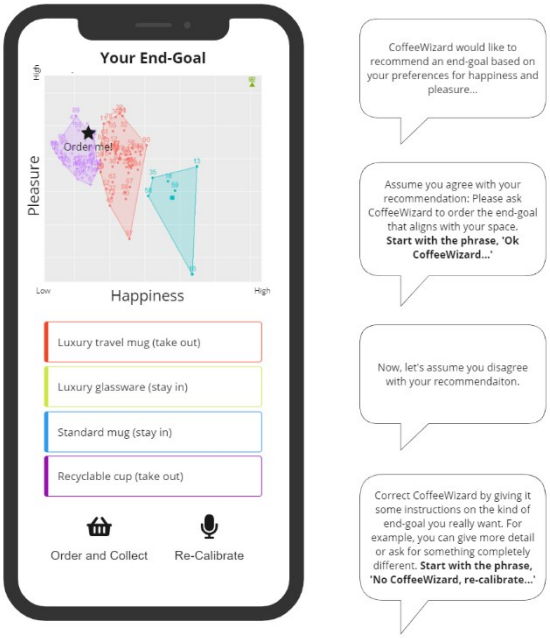
Now, let's assume you disagree with your recommendation.

Correct CoffeeWizard by giving it some instructions on the kind of experience you really want. For example, you can give more detail or ask for something completely different.

Start with the phrase, 'No CoffeeWizard, re-calibrate...'

By recalibrating 'their' experience, CoffeeWizard now seeks participant qualification of what exactly does constitute their location within the valuescape.

6.5.6.1.3 Scenario 3



In the third exercise, valuescape is presented by CoffeeWizard as “Your End-Goal”. For the participant, it is an expert assertion of their preference for archetypal personal end-goals based on theirs’ and others’ evaluations of personal end-goal value-attributes. They are guided through the following fictitious consumer scenario, and asked to order ‘their’ end-goal based first on CoffeeWizard’s recommendation:

> *CoffeeWizard would like to recommend an end-goal based on your preferences for happiness and pleasure…*
>
> *Assume you agree with your recommendation: Please ask CoffeeWizard to order the end-goal that aligns with your space.*
>
> ***Start with the phrase, 'Ok CoffeeWizard…'***

By ordering ‘their’ end-goal, CoffeeWizard seeks two interactions: First, the perception of what exactly is being recommended. Second, how that perception is verbally delivered.

In the example above, CoffeeWizard recommends ‘connect me to a colleague, based principally on the participant’s evaluations of ‘politeness’ and ‘honesty’ value-attributes. If ordering implies agreement with CoffeeWizard, recalibration is designed to enable and provoke disagreement:

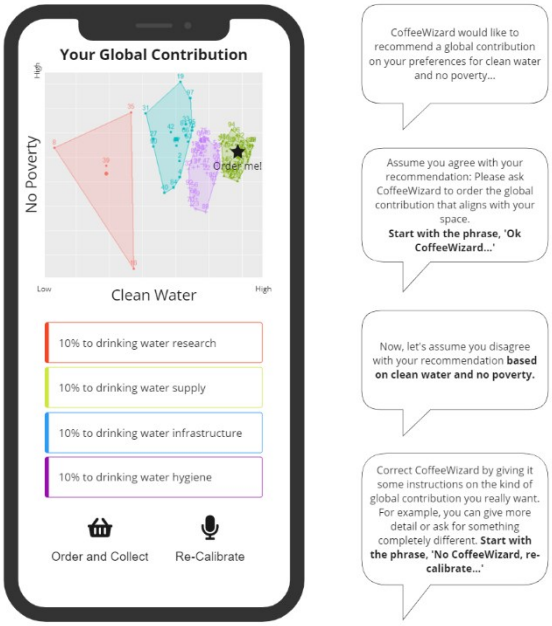
Now, let's assume you disagree with your recommendation.

Correct CoffeeWizard by giving it some instructions on the kind of end-goal you really want. For example, you can give more detail or ask for something completely different.

Start with the phrase, 'No CoffeeWizard, re-calibrate...'

By recalibrating 'their' end-goal, CoffeeWizard now seeks participant qualification of what exactly does constitute their location within the valuescape.

6.5.6.1.4 Scenario 4



In the fourth exercise, valuescape is presented by CoffeeWizard as "Your Global Contribution". For the participant, it is an expert assertion of their preference for archetypal charitable endeavours based on theirs' and others' evaluations of global (UNSDG) value-attributes. They are guided through the following fictitious consumer scenario, and asked to order 'their' global contribution based first on CoffeeWizard's recommendation:

> *CoffeeWizard would like to recommend a global contribution based on your preferences for clean water and no poverty...*
>
> *Assume you agree with your recommendation: Please ask CoffeeWizard to order the global contribution that aligns with your space.*
>
> ***Start with the phrase, 'Ok CoffeeWizard...'***

By ordering 'their' global contribution, CoffeeWizard seeks two interactions: First, the perception of what exactly is being recommended. Second, how that perception is verbally delivered.

In the example above, CoffeeWizard recommends '[give] 10% to drinking water supply', based principally on the participant's evaluations of 'clean water' and 'no poverty' value-attributes. If ordering implies agreement with CoffeeWizard, recalibration is designed to enable and provoke disagreement:

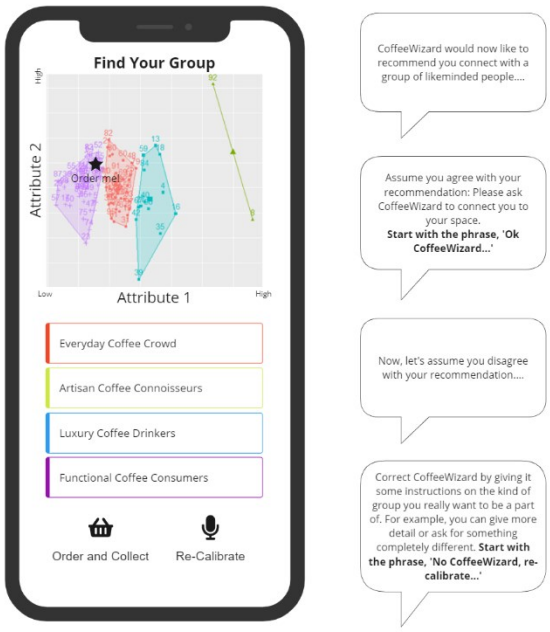
Now, let's assume you disagree with your recommendation.

Correct CoffeeWizard by giving it some instructions on the kind of end-goal you really want. For example, you can give more detail or ask for something completely different.

Start with the phrase, 'No CoffeeWizard, re-calibrate...'

By recalibrating 'their' global contribution, CoffeeWizard now seeks participant qualification of what exactly does constitute their location within the valuescape.

6.5.6.1.5 Scenario 5



In the fifth and final exercise, valuescape is presented by CoffeeWizard as “Find Your Group”. For the participant, it is an expert assertion of their preference for emergent clusters based on theirs’ and others’ evaluations of all value-attributes across all sets. They are guided through the following fictitious consumer scenario, and asked to connect to ‘their’ consumer group based first on CoffeeWizard’s recommendation:

> *CoffeeWizard would now like to recommend you connect with a group of likeminded people….*
>
> *Assume you agree with your recommendation: Please ask CoffeeWizard to connect you to your space.*
>
> ***Start with the phrase, 'Ok CoffeeWizard...***

In contrast to the previous scenarios, CoffeeWizard seeks two interactions: First, the perception of what exactly is being recommended (the group itself). Second, the specific grounds on which such groups might be distributed (i.e., their as yet unlabelled principal components).

In the example above, CoffeeWizard recommends ‘functional coffee consumers’. If ordering implies agreement with CoffeeWizard, recalibration is designed to enable and provoke disagreement:

> *Now, let's assume you disagree with your recommendation.*

Correct CoffeeWizard by giving it some instructions on the kind of group you really want to be a part of. For example, you can give more detail or ask for something completely different.

Start with the phrase, 'No CoffeeWizard, re-calibrate...'

By recalibrating 'their' group, CoffeeWizard now seeks participant qualification of what exactly does constitute their location within the valuescape in terms of the principal components (value-attributes) that are conspicuously absent.

6.5.7 Interaction themes: Content analysis

Thematic content analysis was performed on all the transcripts based on Braun and Clarke's 'six step' approach, with a particular emphasis on reflexivity and theme significance versus theme saturation [109], [225], [286].

	Braun and Clarke steps	Analytical stage
1	Familiarization	Instances by speaker and by stage
2	Coding	Coding 'in vivo'
3	Theme search	Value-attribute content
4	Theme review	Taxonomies of value
5	Theme definition	Value-set attribution
6	Reporting	Relations to empirical questions and theory

Table 6:8 Applying Thematic Analysis

The practicalities of each analytical stage are aligned and summarised with the six steps, moving from familiarisation to reporting (Table 6:8Table 6:8).

Initial coding of content by speaker and interaction stage, coupled with sentence-by-sentence coding in vivo (1,2) which enabled both a thorough familiarisation with the content, as well as the ability to trace themes back to their situated origin, not to mention their 'expert' classification. Initial theme search (3) was based on key words within the in vivo content, which might be akin to the concept of value-attributes. Theme review (4) enabled a construction of newly emergent taxonomies of content, which were not fully fledged themes, but thematically comparable instances of interaction. Theme definitions collated these instances in four meaningful categories. Finally, results are reported here in relation to the study itself as well as formative literature themes (6). Results from this produced a set of coded extracts (n=313) traceable to their contexts of speaker and interaction stage

production on the left, though two iterative stages of theme review; value-attribute emergence and value-set definition; and finally, emergent narrative theme(s) on the right. A visualisation is available in appendices (Findings

In the following I describe each of the four emergent interaction themes in terms of the sub-themes and specific instances of interaction that support and saturate them. I categorise these themes as 'substantive', 'practical', 'evocative', and 'speculative'. While some are stronger than others – substantive and practical interactions are far more saturated in terms of the proportion of content that supports them – all are presented as equally valid in terms of the emergent user interaction with valuescape in the given scenarios. Each theme will be outlined in turn, with concise instances of interaction exemplifying each sub-theme given in illustration. Particular attention will be given to the appropriation of valuescape objects, such as the specific archetypal clusters or individuals' locations. This will establish a basis for how these findings answer research questions and the salient points identified in previous literature. It is helpful first though, to consider participants first impressions of the valuescape and contingent objects as presented and framed within the CoffeeWizard fiction.

6.5.8 First impressions (descriptive interactions)

Participants were first shown a basic version of the app interface and asked to talk through their perceptions of each labelled object [1-7] in terms of what it might mean, and how it might work. As is evident from the following, certain objects were more intuitive than others.

Title/heading

CoffeeWizard uses a title above the valuescape to convey the product or service category being recommended. Participants offered possible labels they perceived to be suitable for the valuescape graphic depicted below it: 'Umm, the title. I think it could be the name of [the] coffee shop or a coffee shop place or brand (p2); '…is it the company [I'm} ordering from?' (p3); '…I presumed that would be the title of the product or service or the coffee' (p4); '…the name of the cafe or whatever' (p5); '…coffee products of varying kinds' (p7); '…the product' (p8); 'the main heading of what the page is about' (p9) .

Graph

A modified PCA cluster graph depicts both individual and collective value preferences for a particular category to construct valuescape. Participants intuitively understood this as one of three things: First and most frequently, valuescape appeared as 'a map':

‘…some sort of abstract…map or something’ (p1; ‘…probably where it's located. Different locations based on my GPS’ (p2); ‘I suppose that[s] your geography where you are and what's around you (p8). Second and more specifically, valuescape); ‘…a map potentially…telling you where you are’ (p4); ‘..the proximity… I think it looks like maybe… a little map telling you how close you are to [a physical venue]’ (p5)appeared to be a map for finding products/services: ‘I would say looking at that would be. And. It's either telling me some of the areas where I can get some of these products or services within a radius’ (p9). Third, as depicting intrinsic coffee qualities; ‘that's probably gonna be characteristics of the coffee, mild strong and so on. Intensity maybe (p7).Finally for two participants, its meaning/function was not visually intuitive: ‘I don’t have a clue!’ (p3); [unsure] (p6).

Star

A star icon depicts the location of the individual’s preference/ recommendation among those of the segmented population. For half of the participants this was unintuitive, with no answer or expressions of uncertainty given (p1,4,5,7). Others continued to explain their perceptions in spatial terms; ‘the star. It just one star, so probably the nearest one, I think’ (p2); ‘…maybe the one that you’re currently at’ (p6); while others focused more on the possibility of the depiction of a specially rated quality: ‘is that like a star rating for the app or something like that?’ (p3); ‘The star is the place you would want to go to or the highest rated one’ (p8); ‘it's either indicating where I am at the moment or where is the best (p9).

Numbered points

Numbered points depict within valuescape clusters to represent the other individuals comprising them. Again, most participants found this more specific aspect of valuescape very unintuitive (p1,3,4,5,6,7,8). Participant 2 again speculatively referred to depiction of a real-world location; ‘not sure what 5 the numbered like numbered points could be. Probably the location of different coffee shops (p2); while participant 9 cited ‘different…products or recommendations’ (p9).

Axis

The horizontal and vertical axis depict the qualities of product/service that explain the distribution of clusters within the valuescape in terms of specific qualities. Responses here varied more, but either described passive explanatory functions such as ‘high [to] low intensity’ (p7) and ‘low to high…in terms of my preferences [for] coffee’ (p9); or more interactive functions such as enabling product ordering: ‘…I guess the types of coffee you may want to order, whether

it's latte, cappuccino, something like that' (p3) and 'rating other people' (p5).

Coloured boxes

The coloured boxes depict the specific product and service options aligned to corresponding clusters of the same colour. One response was very literal in terms of perception of graph components, interpreting the boxes as a crucial to making sense of valuescape: 'So that's just a legend of what the top part in description to stands for'. Three participants gave generic interpretations; 'They're the different products categorized…' (p4); 'different types that you would like to buy, your different preferences' (p8). By contrast one participant gave a more specific speculation of product that might occupy the boxes; (p9). '…the names of specific coffee products. Maybe the beans or something' (p7); while two participants found this element to be unintuitive (p2, p6).

Order/recalibrate icons

The order/recalibrate icons depict alternate options in terms of applying the valuescape to the consumer scenario. Prior to the scenario, many found these to be unintuitive (p1,4,5,6,8). One participant simply repeated the on-screen options; ; 'So I could see it [and] order and collect and recalibrate' (p9). However, some indicated they understood the icons to mean the difference between accepting or rejecting what is presented in their valuescape: 'the order and collect one is this pretty good…recalibrate is probably where I can just go and that name [the] product…it will show me where it's available' (p2). 'I guess once you click on that you order what you want…And I guess the other ones just for speaking via microphone' (p3); 'resetting preferences' (p7).

On completion of this task, participants were given a basic overview of the intended meaning and function of each of the valuescape objects above from the CoffeeWizard perspective. During the subsequent consumer fictions, the following interactions emerged:

6.5.9 Summary of interactions: qualification of existing value-sets or provocation of new ones?

Substantive	Practical	Evocative	Speculative
Verbatim repeating of objects Reflecting on objects Elaborating on objects Comparing (archetypal) objects	Clarifying task Questioning authenticity Managing priorities Managing personal Assets Simplifying interaction	Dating apps An app for maintaining/ challenging cultural norms. Recommender/loyalty apps Gaming apps	A hybrid values map augmenting of physical retail space. A background 'AI' requiring little/no input. A time sensitive technology

Table 6:9 Theme overview

Interactions with valuescapes can broadly be said to elicit either qualification of objects within them (substantive values), or an application of them/the whole valuescape to consumer scenarios (practical values). However, some interactions were more reflective of the wider CoffeeWizard framework, either evoking similar digital consumer experiences (evocative values) or critical suggestions for improvement of the proposition (speculative values) (Table 6:9).

6.5.10 Substantive interactions

Substantive interactions are interactions that qualify exactly what is valued by the participant in terms of either the whole valuescape or specific content within it. Such interactions could be seen more specifically as substantiation by sub-themes of reflective content; by elaborative content, by archetypal content, and by verbatim (or repeated) content. Substantive interactions accepted or challenged the veracity of the valuescape in four observable ways. These were through 'verbatim repetition' - repeating basic on-screen attribute descriptions; 'reflection' – conversational description from outside of the official ordering/recalibration fiction; 'elaboration' – alternative, novel, and rich descriptions based on valuescape parameters; and 'archetype comparison' – descriptions based on group clusters.

Substantive interaction concerns the content of valuescape; specifically, the attributes displayed, the archetypes, and other features used to make sense of the overall presentation of product or

service choices. As such, aligned literature broadly relates to the appropriation of taxonomies of value, 'original and series objects', and perceptions of sensemaking tools. Substantive interactions are characterised by their appropriation of values-orientated content, serving to qualify the meaning of value-attributes, archetypes and the like, and challenge or affirm their reputed meaning. Moreover, as their reputed meaning reflects the expert ontology of value alignment, participants can be said to use substantive interaction to bring the valuescape in-line with the situated context (in this case the ordering/recalibration scenarios) they now find themselves in.

Verbatim repetition

Verbatim or repeated content typically emerged from interactions with valuescape during ordering. Participants, on being prompted to order the product or service they perceived to be aligned with their location in the valuescape, gave very limited responses amounting to a repetition of what was on screen. The first and most obvious form of value substantiation was that of verbatim or repeated interaction. Qualifying the meaning of valuescape objects 'as instructed' was somewhat expected given the semi-structured nature of the scenario. This occurred exclusively during the 'ordering' stage of each valuescape fiction, with the following extracts exemplifying the repetition of on-screen content:

> My Coffee*: 'OK, coffee wizard. Could I order an Americano' p3*
>
> My Experience*: 'OK, coffee wizard, connect me to someone new' p4*
>
> My End-goal*: OK, coffee wizard. Uh order me recyclable cup take out' p1*
>
> My Global objective: *OK, coffee wizard. I['ll] donate 10% to drinking water supply' p8*
>
> Combined*: 'OK, coffee wizard connect me with luxury coffee drinkers' p4*

In the recommender fiction, these applications of valuescape make functional sense, and are useful in corroborating expert-end-user perceptions. However, they also reveal that participants do not elaborate on the qualities of value-attributes without further provocation.

Reflective content

In contrast to verbatim interactions with valuescape were instances in which participants brought reflective content to bear on the meaning of value-objects. This occurred outside of the semi-structured script, but offered a detailed view of what might constitute individual attributes.

Considering the experience valuescape, 'not being rushed' and 'comfort' were therefore seen as an appropriate qualification of a participant's location relative to happiness and pleasure attributes in the experience valuescape:

'...the happiness could just be being allowed to sit in a coffee wizard [shop] and not be rushed into vacating a table, and I know pleasure could be slightly down to the comfortableness of the seats...' p1.

Similarly, customer service orientated interactions with staff were implied as necessary to achieve politeness '...I want a polite barista' p6; while independent businesses were seen as the proper instantiation of politeness and honesty;

'...I'd want to go not so much a chain, but sort of a place that's... run by an individual, maybe rather than a big...company' p8.

Further, and considering global contribution, substantiation of no poverty and clean water was given as:

'...how fair trade is that the coffee that is being used. And then sustainability...one hopes that you know, forest aren't being cut down to farm coffee. I mean sort of off the top of my head...I was thinking of the sustainability of the coffee farming' p1.

Taken together, these reflective substantiations of valuescape content emerged from conversational interaction with the researcher as opposed to with the valuescape per se. However, they reveal the kinds of rich descriptions, (re)qualifications and negotiations of acceptable grounds for valued interaction ideally provoked through retrospective use of valuescape.

Content elaboration

Elaborative content could be seen to expand on the nature of value-objects within the valuescape. Situated between verbatim and reflective substantiation in terms of the conversational detail of interactions, elaboration occurred almost exclusively during participant recalibrations. Elaborations here could be said to operate on a continuum from simple alternative choices to novel and richly descriptive ones. Alternative elaborations substantiated a participants' actual preferences in the sense that they chose an alternative option on

the screen which they felt best aligned with their preferences for the attributes presented:

'No CoffeeWizard, recalibrate. I'd rather be a part of the artisan coffee connoisseurs' p5.

Like verbatim responses in the ordering scenario, alternative elaborations qualify real or actual preference simply through selection of another visualized choice. By contrast, novel elaborations brought external preferences to bear on aspects of valuescape:

'Not sure what experience I want now. No coffee wizard, recalibrate to going to the park'p6.

In this instance, participant 6 provides a recalibration of their personal end-goals valuescape with a tangible example of an ideal consumer environment, thus substantiating end-goal qualities of 'happiness' and 'pleasure'.

Finally, and exemplifying the most detailed instances, rich elaborations substantiated participant preference in a notably detailed way:

'Uh, so no coffee wizard, recalibrate because I don't want to spend too much on a luxury travel mug....but I want to be still sustainable...recyclable cup please, to take out' p9.

In this instance, the personal end-goals valuescape causes participant 9 to reason that sustainability is an important end-goal to them, but one which must be balanced with a perceived financial cost. While their choice is one of the options available on screen, they can still be seen to provide rich, external qualification to their preferred location in the valuescape, thus further qualifying it's meaning.

Archetype comparison

Comparison of valuescape clusters which represented product/service 'archetypes' demonstrated an alternative means to value-attribute substantiation. In this scenario, participants relied on the relative locations of archetypes to each other in the following instances, as well as other valuescape features; most obviously the axes:

'If you at everyday coffee drinker or you're interested, it's going to a place doesn't have to be. Costa Nero, Starbucks. It can be a local one. You're interested in getting a coffee. Doesn't have to be the best [or worst]...p6'

From participant 6 we see that everyday coffee consumers are defined by a lack of loyalty to specific brands or locations. In this sense, as with

the following examples taken from the combined valuescape, it is possible to infer the value attributes or axes on which clusters are grounded:

I don't know if everyday and functional are actually different. Aren't they the same[?]... and Artisan would be well, luxury would be expensive coffee types and artisan would be perhaps experimental coffee. P7

For participant 7, the comparison of archetypal consumer groups 'everyday' and 'functional' challenges the expertise of CoffeeWizard ['...aren't they the same?']; while 'artisan' and 'luxury' are more easily delineated as 'experimental' and 'expensive'.

Similarly, others reflected on the implication of cost being a factor:

'so functional coffee drinkers, coffee consumers. I mean, I don't know if this is wrong and it's more of a is it more like I would say what comes to me is like a cheaper thing. Because that is that makes sense. Yeah' p6

The nature of the 'find your group' valuescape, which predominantly contributed to the archetypal comparison sub-theme of substantiation, meant that without a (reputed) a priori knowledge of principal components, presentation of axis was deliberately vague. This had the effect of emphasising the axis as a sensemaking feature of valuescape, and potentially focussed attention on the justification of cluster positioning moreso:

On the qualities represented by the axis, participants suggested:

'Maybe one could be like price of coffee And then attribute. 2. Umm. Like the different tastes of coffee, like from bitter to sweet', p5;

'Probably the availability maybe' p6;

'Quick versus slow consumption...Yeah, my where my preferences are. So for example, I'm everyday coffee crowd. So I think time would be. And like. I was thinking how much time I have, but I guess it depends on the time. I guess more like time of the day perhaps' p9.

For others, the sizes of clusters were also significant in influencing their interpretation of what might constitute an archetype:

'...because...everyday coffee crowd is like a smaller square, [so] they don't really care [about] that many different things. Whereas luxury and artisan try loads different things, I guess' p5.

6.5.11 Practical interactions

Practical interactions are interactions that demonstrate how participants pro-actively applied their valuescapes and the value-

objects depicted within them. In this sense, they serve to contextualise the previous substantive content emergent from the study.

Clarification of task

A large part of spoken interaction during the fiction was with the researcher (as opposed to directly 'to' the valuescape) and was necessary for clarification of the task. Despite the warmup exercise involving description of the valuescape artefact, some participants still needed clarification of which components to refer to, when, and what to say – especially in the early stages.

Participants often wanted more clarification on whether to explicitly use the axis for example, as opposed to the named coffee products in the first valuescape, when ordering or recalibrating:

'Is that what I'm supposed to go by an….I'm not too sure if I understand this correctly' p1.

After some practice they reflected it was more intuitive:

'…now I've tried it once, as it were, it, it seems pretty clear [but] how are the Parameters set for example on the screen I'm looking at now Americano, so it goes the X axis [and] the Y axis'…p1.

As can be seen however, more clarification on the position of archetypes relative to the axis is clearly needed for a more intuitive interpretation.

Authenticity

Authentic recommendation emerged as a practical value as participants sought assurances that their valuescape was really providing a true reflection of personal preference, revealing examples of inauthentic interaction such as upselling:

'The only thing other thing is I like recommendations. I don't like upselling' p7.

Anecdotally participant 7 supported this with their experience of frequently going to a café chain

'… on the train platforms and they always try and flog you something else…' p7.

Priority Management

The management of personal priorities can be further broken down into instances of location, time, community, expertise, and mode of interaction, which all appeared significant. For recommendations shown across the valuescapes to be personally useful, attendance to these factors appears to be a necessity.

Location

The preference for managing location was notable in the perception of valuescape as a 'map', which was very common among participants assuming it depicted a literal landscape indicating proximity to coffee shops or similar. This location orientated terminology persisted through the fiction, with participants talking in spatial and geographical terms about their preferences:

'And it's not. The coffee is gonna ask me. Oh, by the way, you have, you know, friends around. I mean, if you just put on little maps similar to the Starbucks app and you have access to, let's say, the stores here in a green dot, you're a blue dot and' p4.

This demonstrates a desire for valuescape to be grounded in location-based terms and connected to the real-world environment, in this case for the purpose of meeting friends.

Time

The preference for managing time and interacting with a valuescape sensitive to time was manifest in three distinct ways: First, that time taken during interaction with valuescape should be synchronous to the time a real-world interaction would take. Participant 1 reflected that valuescapes seemed to only handle '...brief interactions....maybe I'm being as a slightly insensitive to these situations' p1. They felt that as ordering a coffee is a brief interaction, too much was made of the significance of that interaction for it to contribute anything meaningful to a substantiation of ones' values in that time.

Second, that time of day significantly impacts one's preferences:

'... you know all that stuff that's not really related to my choice of coffee in the morning, let's say, or in the afternoon' p6

Participant 6 felt that they would choose different options or be part of different archetypes relative to morning or afternoon, and this was not captured in the current set up.

Third and contrasting with the first point, that time taken during real-world interactions is asynchronous to time taken with valuescape interactions:

'...[in my country] you sit down, you have a coffee, and you have an espresso for an hour and a half, which sounds outrageous. Where in the UK usually you go to a coffee shop to pick it up and go [or] work there... alone' p6.

Participant 6, in contrast to participant 1, suggests that valuescape should be sensitive to, and perhaps sensitise users to the possibility of a much longer real-world interaction.

Community

The priority of community in interactions with valuescape, particularly in the 'find your group' scenario, revealed valued features of valuescape though their conspicuous absence, with participants suggesting that connection to others on the grounds of geography or social stratification might include specific practical interactions with valuescape in the first instance.

'...so this kind of app, it shows ...like other people in your community. Do you mean like geographically, community. Or do you have to...add buddies like on the app[?],' p5.

Participant 5 suggests that this might be automatically achieved by a further sensitisation of valuescape to geographic location. In terms of 'adding buddies', and similarly, others went further in suggesting how this might be achieved:

'...maybe just depends on how wide...you can stratify with all sorts of groups, I guess' p6.

Participant 6 alludes here to group stratification as a means of identifying communities, would likely extend to demographic data. Additionally, participant 7 reveals how reasoning using visualized archetypal communities works:

'I would assume that the three [groups] are pretty similar levels of people and then the 4th one...artisans...there's a lot more artisan coffee connoisseurs than the other three' p7.

Here, the artisanal coffee consumers are differentiated within the community as dominant in terms of their quantity but separate on other factors common to the other three groups.

Expertise

The practical priority of managing expertise was expressed both in terms of their being an objective 'correctness' to the assertions of valuescape and of a desire to know or be made aware of that correctness.

'for the last [valuescape], when there were no attributes and you asked me what I thought they were, I was asking like was there a correct answer for that. Because I [was] actually really curious as to whether or not I got it right' p5.

Participant 5's assumption of 'right' or 'wrong' answers reinforces the presumption of valuescape as the product of an expert system, but more than that, suggests expertise can be practically applied to the satisfaction of curiosity. Of course, this juxtaposes with the idea of negotiated expertise as a transcendent quality of substantiation.

Preferred Interface

The mode of interaction – i.e., conversational instruction to/with valuescape – revealed a desire for a more tactile proposition on occasion. Due to the design fiction presentation, participants referred to 'tapping' on-screen options, as opposed to verbally ordering/recalibrating.

'I'm not overly sure if it just needs to be voice activated. I think sometimes you could just…click [the options]' p4.

Like the challenge of eliciting rich qualifications with minimal provocation, a non-verbal mode of interaction would significantly challenge the current framework from which valuescapes are produced.

Interaction to manage personal assets: Money, belongings, data

Personal assets – specifically money, consumer items, and personal data – were assumed as assets that participants would need to part with to enable interaction with valuescape. In some cases, valuescape options and their relative positioning among alternatives provoked a sense of a premium or more involved interaction:

'…so would a luxury travel mug be something that would have to be paid for separately. Or is it something I bring in myself' p1.

In these choices, offered as potential fulfilment personal end-goals, participant 1's response indicated that they appear to be influenced by the possibility of greater financial or practical engagement.

This was also evident in respect of the possibility of needing to provide additional data in the personal experience valuescape:

'... Leave me alone. Connect me to a colleague. So there you have to have. Details of people's employment. And connect me to a friend. Someone you've previously met, perhaps in a Coffee wizard place' p1.

The practical value of managing personal assets such as data and money appears to be provoked when objects of archetype appear to be described as 'luxury' or reside in premium locations.

Simplicity

Simplicity in terms of how intuitive the task appeared was of practical value for most participants. Like the importance of overall task clarification, simplicity of ordering or recalibration of valuescape was ultimately a trade-off between visual perception and intuition, and semi-structured guidance.

'I'm thinking of things in a far simpler way...would you care to sort of rephrase the question' p1

In this case, participant 1 is confused by the phrasing of the guidance augmenting a scenario, and this is also the case for participant 3:

I think mainly just the last [valuescape] one needs probably to me to be explained a bit better or just it just seemed pretty complicated to me the last one we did....Just I just would like to ask just straight forward questions. And maybe not go so in depth with it p3.

Likewise, participant 4 summarises by expressing similar sentiment regarding a lack of simplicity of the interaction:

I think it's it wouldn't. It's something I wouldn't particularly use. It just seems to be something in this day and age which would overcomplicate things p4.

6.5.12 Evocative interactions

Evocative interactions were interactions with valuescape in which a particular subjective experience of the participant was evoked,

perhaps from interactions with comparable technologies or in similar consumer settings. While evocative interactions were not saturated to the extent of their substantive and practical counterparts, they evidence a novel kind of interaction potentially rich in values-orientated content.

The first instance of evocative interactions concerns **dating**. Some participants felt that valuescapes seemed particularly applicable to pro-social consumer interaction, either by design as in the personal experience scenario, or incidentally, for example in terms of alignment to likeminded others in similar consumer archetypes membership. In this way valuescapes were generally reminiscent of dating apps (p1, p7).

In another instance, by **challenging 'cultural norms'**; one participant (previously cited under 'time' management as a practical interaction) suggested valuescape might be used to navigate and provide alternative to the prevailing culture they reside in:

> '…in [my country] you sit down, you have a coffee, and you have an espresso for an hour and a half, which sounds outrageous. Where[as] in the UK usually you go to a coffee shop to pick it up and go, and some people…go there alone' p6.

Further, valuescapes were comparable to **existing digital coffee technologies**. Unsurprisingly given the context of the valuescape presentation, some participants reflected on their use of existing loyalty apps for high street coffee shops. Commenting on the strengths and limitations Starbucks' offer, participant 6 reflects that:

> '…It has favourite drinks, so that's good. It tells you which Starbucks place is close to you. And that's it. You can add money, no rewards. That's it….' p6.

Finally in terms of evocative instances, entertainment and gaming was a comparable application. Participant 7 reflected that the proposition reminded them of both Pokemon Go (AR app) and Disney (online forum) they used to use.

6.5.13 Speculative interactions

Again, speculative values were not as saturated as substantive and practical interactions, but they are perhaps useful in suggesting what might be valued in future development of the valuescape prototype.

An improved survey tool: Whether it'd be better to. Or one idea I'm not saying it's better. I wouldn't use that sort of slightly judgmental word, to offer people sliders from zero to 10.And asking them to choose on that. Whether that would be clearer so to speak. P1

A physical space/ hybrid proposition: It is the idea to sort of personalize the experience. In great detail so that. The people behind the counter at the coffee wizard, bricks and mortar place. Say right, this guy wants to be left alone so that they know that, and they'll know to. Just maybe p1; All can think of in in a coffee bar or sort of almost any retail situation. Connect me to someone new. I mean sort of it goes from connect me to someone new. It is that within the coffee bar. P1

A Background AI: I mean, if that can work in the background somewhere like a little AI tool to recommend stuff.~~Then yeah, but it doesn't. I mean, if it's like in front of my face all the time sending me recommendations on ohm go go to this place. P6

A time-sensitive recommendation: I'm thinking if I'm on my own. In the morning, then you know. It's different from. On my own, but in the evening' p9.

6.6 Discussion: the usefulness of personal valuescapes

For the most part, substantive and practical interactions can be conceptually aligned with contemporary work themes such as lay person graph perception, novel application of PCA in consumer sensemaking, building taxonomies of value, working with extrinsic values, creating archetypes of extrinsic values, and the inductive (as opposed to deductive) aggregation of evaluations.

As I move to discuss 'why interaction with valuescape might be personally useful' in the second part of this discussion, I'll focus on the emergence of practical values beyond (corporate) efficiency, the possibilities of multistakeholder recommendation, valuescape as an interaction framework, strengths, and limitations of post-hoc rationalization, negotiating situated expertise, and ultimately, the usefulness of creating shared value (CSV).

6.6.1 Valuescape as a personal artefact: substantive and practical interactions

A hypothesis of this study was that the subjective perception of the participant end-user of a cluster graph likely stands in contrast to

the objective intentions of the expert producing it. Before any application of valuescape, initial perceptions of its meaning and function showed that there was intuitive alignment in some areas and not others. There are two conclusions to draw from this. First, that the more specific an object was, the more its subjective meaning appeared to vary. Second, that not all objects were strictly presented 'within' the valuescape, and therefore, interaction with them is more aligned to the role of the framework. It's with this caveat in mind that the following discussion should be understood.

6.6.2 Graph perception:

While most participants were able to suggest that valuescape represented 'a map' of coffee consumption options, they mostly did so with the expectation that this would align to real-world locations and proximities. On this finding we might conclude that valuescape is particularly aligned with the practical priority of 'understanding environments' as summarised by Lam et. al. [262], but more specifically, the physical environment given in the scenarios. The expectation that valuescape constituted a 'visual memento' of past interaction (i.e., with the survey) was also supported in this regard [54], [158].

Knowing exactly which components of valuescape were being invoked was more challenging, and only really made possible through the contrived fiction of the re-calibration exercise. On the one hand, reliance on axis labels combined with clusters aligned to products/services meant that most participants grew more confident in elaborating on these broader components, making sense of their relative positions and qualifying their meaning. However, such reliance on the lists of product/service options residing 'outside' of the valuescape (within the CoffeeWizard app interface) obscured an ability to more closely scrutinise attention afforded to individual graph objects as in similar studies [268]; however, this flaw in the GUI design is likely more responsible for a greater focus on 'useability' and task clarification [5].

PCA was used as it exemplifies common practice in industry and market research when it comes to handling large datasets with multiple variables. In this sense, all variables - and value-sets – could be accounted for in the analysis. Nevertheless, valuescapes still presented preference alignment at the level of the four exemplary product/ service archetypes.

A key rationale for PCA cluster diagram based valuescapes in terms of user-interaction was to maximise the opportunity for participants to use all components of the visual, particularly the more specific 'numbered points' and 'star' components representing individuals and the participant's position, respectively. These were initially found to be very unintuitive, with most participants not able to suggest a meaning for their use in the descriptive exercise. During scenarios, they were also not overtly referred to during qualifications of preferences. This does not mean that participants cannot project their own meaning onto these objects, but rather that meaning remains inferred by the expert. For example, if a participant situated in a 'latte' product archetype recalibrated by stating '…I want a coffee that is stronger, give me an Americano', the preference for strength is only recalibrated to a broad opposing archetype. Whereas, if they were to invoke a particular point, such as '…I want a coffee that is stronger, give me participant 18's coffee', the preference for strength is narrowed to a particular point, thus providing a meaning (in)congruent or novel to the status quo.

I argue though that this evidences a useful application of PCA clusters (from the expert standpoint at least), in that meaning is at least broadly ascribed to components inductively, potentially augmenting the usual quantitative correlation of factors. Moreover, speculative interactions suggested that similar components in a novel valuescape might as well/ instead include the depiction of other sensemaking components, such as those denoting time and progression of preference as seen in Ramsey et al. [98].

6.6.3 Taxonomies

Central to the proposition of valuescapes' usefulness for the end-user was its handling of value-attributes for evaluation and recommendation as value-sets, or taxonomies. Interactions demonstrated how these sets could be affirmed, challenged, or added to through both ordering and recalibration of what was perceived to be recommended. This 'order' or 'recalibrate' fiction generally informed a range of different responses, from mundane repetition of product/service categories 'within' valuescape which generally aligned to ordering, to comparatively incisive elaborations on the meaning of value-attributes themselves. As such, participants – as well as the CoffeeWizard – become instrumental in asserting what should constitute those taxonomies.

Further, and aside from an 'order/recalibrate' delineation in the quality of response, there was some sense of an intrinsic/extrinsic divide in interactions. This revealed that while recalibrations of coffee product were more intuitively understood by the participant, there were few instances of novel suggestions for alternatives. This contrasted with personal experience, end-goal, and global objective suggestions, in which those participants who did elaborate, tended to bring new suggestions completely outside of the given fiction.

6.6.4 Emerging Archetypes and their Extrinsic Grounds

Extrinsic values were of central importance to building valuescape and the speculative grounds for 'real' personalization. Through scenarios of experience, end-goal, and global objective selection, participants offered substantiations of extrinsic value-attributes ranging from simple reflections on the given content, to more elaborate, conversational qualifications that furnished a more descriptive understanding of them. This enabled value qualification to take place 'outside of' the valuescape. Contrastingly, comparison of the archetype clusters kept interactions within the confines of the graph. Regardless, the main objects for interaction however – in terms of value substantiation – remained the labelled axis.

Just as archetypes such as 'latte', 'iced coffee', or 'Americano', are constructed from evaluations of intrinsic quality preferences, so archetypes of personal/collective experience were expected to emerge from participant evaluations extrinsic qualities. For the sake of the consumer fictions in valuescapes of product, experience, end-goal, and global objectives, CoffeeWizard suggested four archetypal groups that plausibly aligned to clusters shown. As stated in graph perceptions, these were used to inform choice to an extent, but as mentioned, the extent to which they were used comparatively was minimal.

Practically though, it was only in the fifth valuescape – in which there were no known attribute parameters – that participants began to suggest value-attributes that might make sense of these. Moreover, it took a deliberate fiction ('find your group') to provoke use of archetypes as a comparative tool for decision making.

6.6.5 Evaluation aggregation

Aggregation of value-set evaluations in the form of the valuescapes presented enables a provocative series of interactions that are predominantly substantive and practical in nature. These

correspond respectively to the perception of valuescape as either an artefact, or framework, or both, which to this point has been discussed in terms of its alignment to the proposed objectives of the study. Conversely, they also reveal shortcomings in the study design that do not adequately draw a line between the CoffeeWizard frame as depicted by the GUI, and the artefact/frame that valuescape itself should represent. This distinction will form an important basis for discussion limitations and future work, but also, for considering the usefulness of valuescape beyond this study.

6.6.6 VUI

Much of the challenge of building valuescape appears to come from eliciting elaboration from valuescape in the context of its deployment and interaction rather than the data artefact itself: To go from a static representation of personal and collective values to a tool for applied sensemaking, the producer of valuescape must present valuescape as a meaningful provocation to actual choice rather than a reflection of hypothetical preference, the consequent interaction intended to reinforce or challenging the validity of its content.

6.6.7 Valuescape as framework: Evocative and speculative use for the end-user

In the following sections I'll discuss interactions with valuescape when , with subsequent examples relating to practical values beyond efficiency, interaction frameworks, post-hoc rationalization, expertise, and creating shared value (CSV) to the participant. These draw on evocative and speculative interactions in addition to substantive and practical ones previously expanded on.

6.6.8 Multistakeholder recommendation

While valuescape and the CoffeeWizard framework are not presented in this study as recommender systems per se, they should similarly be sensitised to the overarching practical requirements of the end-user. This represented an obvious 'cold start problem', especially where participants found value-attributes or even value-sets (invariably, the extrinsic ones), not particularly relevant to their usual coffee consumption priorities.

It appears that extrinsic values are perceived as suitable grounds for interaction in coffee consumption scenarios when related to a practical purpose that immediately resonates with the individual. Having an

opinion on the correctness of the expert system is not necessarily sufficient, and as one participant put it, is preferable as 'background AI'.

6.6.9 Practical values beyond efficiency

It has been shown that cluster diagrams are effective in visually communicating how a particular alignment of values enables corporate practical value, 'efficiency' [21]. In many cases this is a shared value with end-users in the sense that interactions with the technology should both take up little time, cognitive effort, and effectively run in the background. However, efficiency may also be interpreted differently by end-users – to mean performance rather than maximising profit.

As well as managing priorities and personal assets as mentioned previously, a strong example of practical value appeared to be authenticity and trustworthiness. Where valuescape could demonstrate that recommendations were both transparent and aligned with the stated purpose – i.e. to recommend 'your' best product/service, this alleviated suspicions of 'surveillance' and 'upselling'.

When conceived as a framework, valuescape is therefore capable of revealing situated and practical interactions that themselves might be said to form a newly emergent value-set.

6.6.10 Interaction frameworks:

Valuescape is discussed as having the properties and functions of both a data artefact and a framework for eliciting data. We have already seen that the extent to which valuescape could be seen as a framework was somewhat obscured by the design, which often made CoffeeWizard the object of focus. This was most obvious across the other 'evocative' and 'speculative' instances of interaction. Nevertheless, these results might usefully be considered as informed suggestions of what valuescape should be used for, either in terms of context of application (dating apps, consumer loyalty apps, an app for maintaining/challenging cultural norms), or in terms of technical functionality (a hybrid map augmentation of physical retail space, a 'background AI' requiring little input, a time-sensitive visual).

6.6.11 Post-hoc rationalization

Interactions with valuescape took place in the context of post-hoc rationalization (relative to the initial survey), with the expectation that several practical benefits to would become of this for the expert, but particularly, the elicitation of 'real' values as opposed a priori, preferential values. It was more challenging to see how this was immediately useful to the end-user however, and in fact, it was found that conversation around task clarification and a desire for a more simplified interaction challenged this mode of interaction fundamentally. However, post-hoc rationalization might be considered most useful to the end-user during instances of cluster comparison (preferring to associate with a particular archetype over another) and questioning the product/service archetypes offered as aligned to those clusters. This leaves open the possibility of substantively qualifying the 'real' meaning of the value-attributes those clusters are composed of, albeit more indirectly.

6.6.12 Who is the expert and why?

It follows that expertise was an important underlying topic in all interactions with valuescape. The finding that certain extrinsic value-attributes were more provocative than their intrinsic counterparts – particularly global contribution attributes of 'no poverty' and 'clean water' – suggested that the end-user offers their situated expertise. In the case of participant 1, this was particularly evident in through the provocation of talk regarding the pay and working conditions of workers in the coffee supply chain itself.

Additionally – and perhaps more useful to the expert user of valuescape – participants offered suggestions of improvement to the functioning of valuescape in terms of how it elicits its input data before interaction. Again, participant 1 exemplified this well by suggesting a future system might elicit preferences on a continuum by means of a 'slider' tool on the GUI, as opposed to the discrete Likert scoring that was used. This will be discussed further in limitations and future works.

6.6.13 CSV, participatory design, and the value of co-creation

Notionally, valuescape has a shared appeal to expert and end-user alike in that its overarching purpose is to co-create products, services, experiences, and contributions of demonstrable shared value. This can be said to be evidenced both in terms of the participatory

nature of the research itself, and the orientation toward CSV objectives, manifest in extrinsic – and particularly the global objectives value-sets. However, there is a sense that without the intervention of the expert in the form of provocation to interact – especially through deliberate recalibration as opposed to routine ordering – participation is by default rather passive and devoid of content rich, qualitative elaboration. Moreover, these provocations to 'care' about participating in creating shared value appear to need to be disguised somewhat, or at least contrived to be integral to immediate and intrinsic experiences, such as the coffee product ordered or the ordering process. In other words, unless the valuescape itself is of immediate relevance, participant qualification of the value-attributes used can never really move beyond the evocative or speculative.

6.7 Conclusion

Building valuescape was a design fiction inspired by a common approach to multivariate data clustering and presented within the context of an app that recommends, provides and/or recalibrates coffee consumption preferences in plausible consumer scenarios. A three-part framework – CoffeeWizard – ensured that the fiction was maintained through key stages of consumer values survey, survey analysis and graphical visualization, and retrospective interview. Participant retrospections on 'their' personal valuescapes revealed practical, substantive, evocative, and speculative modes of interaction, in which the various objects comprising a valuescape were variably qualified, either 'within' the fiction or despite it. Substantiation of value-attributes and value-sets is therefore an inductive as well as deductive possibility furnished by CoffeeWizard as a framework of interaction. However, in terms of the end-user, the practical interactions reveal how valuescape 'ought' to work as an active data artefact – a framework in its own right – perhaps in the contexts evoked or speculated on during what was ultimately a design fiction.

Chapter 7: Discussion

The following discussion draws together the previous study chapters, ultimately answering the overarching thesis research questions outlined in the introductory chapter as a priority. Divided into 4 sections, the chapter comprises an introductory overview of the designed and emergent affordances of the studies and a summary of how thesis research questions are answered, a reconceptualization of the formative Valuescape framework as provided by Nöjd et al [42]; a characterisation of archetypal valuescapes as informed by theory and supported by the studies; and a critical summary of three tangible contributions of the research pertaining to mechanisms of values-orientated coffee personalization, agencies of values-orientated coffee personalization, and the implications that values-orientated coffee personalization has in terms of democratising corporate value agendas in the contemporary digital economy.

7.1 Introduction: Between designed and emergent affordances

Interactions with Valuescapes was a mixed-methods prototype study comprising three separate empirical projects. Two of these (S2, S3) developed and deployed CoffeeWizard as framework and technology probe, proposing valuescape interfaces as primary touchpoints for interaction. A further, interim study (S1) developed personal, conversational reflection as the primary mode of interactional and analytical focus. As an introduction to the discussion, it is useful to summarise the previous three empirical chapters in terms of the designed and emergent affordances of the CoffeeWizard frameworks and Valuescape artefacts; where designed affordances refer to the intended features and functions of a proposition and the emergent affordances to the thematic modes of interaction seen in their use. This dichotomous tension between the designs of the nascent expert system and its user was common to each study and has implications throughout this chapter, broadly informing how the original, overarching thesis research questions are answered in reference to both prospective providers and users of CoffeeWizard and Valuescape propositions.

7.1.1 Prototyping and probing: The designed and emergent affordances of CoffeeWizard and prototype valuescapes

In Interactions with CoffeeWizard (S1), the CoffeeWizard framework was instantiated via a values-orientated selection box, calibrated through initial preference survey, corroborated through continued and recorded choice, and made provocative through basic graphical depictions of personal value (in)congruencies. As the designed affordances of the study, these depictions were built on known value-sets of hedonic ('fresh', 'caffeinated') and eudaimonic ('organic', 'FairTrade') attributes, and elaborated through conversational retrospection. However, it was the emergent set of 'practical values' - provoked by nascent 'valuescapes' - which served as the 'real' affordances of the proposition [7].

Contingencies for Valued Interaction (S2) focussed more intently on the deliberate elicitation of practical values, this time from the collective reflections of business owners as they elaborated on maintaining service provision in cafes, bars and restaurants at key stages of a 'shared timeline' [207], [208]. As well as furnishing the resulting contingency themes, which served as practical value-sets detailing and corroborating the grounds of extra-sensory consumption values, the study raised the possibility of challenging the prevailing ontology and authority of an apparent values expert responsible for the original breaches to norms.

In the final study, Building Valuescapes (S3) re-imagined the CoffeeWizard interaction framework as enabling a voice-user interface (VUI) app augmenting everyday coffee consumption choice, affording users the ability to calibrate preferences, receive recommendations for products and services; and challenge those recommendations based as depicted through novel cluster diagrams. This was instrumental in envisioning a scalable tool for values-orientated coffee personalization that reverse engineers the cluster diagram such that it becomes a personal 'memento' enabling affirmation or challenge of personalization from within [54]. In terms of emergent affordances, four modes of interaction – the substantive, practical, evocative, and speculative – served as top-level value-sets, with respective applications for making sense of clusters and their components; the context of consumption, comparable situations, and user-led suggestions for system improvement.

7.1.2 Answering the original research questions

The thesis originally posed three questions; *What is the need for valuescape in everyday coffee personalization*?; *How is a valuescape made personally useful to the consumer end-user*?; and *How might a valuescape address the priorities of an expert system and end-users in everyday coffee consumption*?.

Answering these questions in reverse, this chapter firstly draws on study findings and the theoretical literature presented in chapter 2 to re-frame the model of Valuescape presented by Nöjd et al. [42], distinguishing Valuescape as social structure from valuescapes as the constructions of the social which can be mediated through tools such as CoffeeWizard. It is in this reappropriation of the original model that Valuescape is first established as operationalizable for both coffee provider and coffee consumer. Second and in respect of how a valuescape is made personally useful to its end-users, findings and implications of the studies are used to propose four archetypal valuescapes – the map, the 'hall of mirrors', the collaborator, and the 're-framer' – charactering constructions of the social and offering applications on par with the industrial imperative of the 'efficiency' [21]. Concluding the discussion three contributions are set out, and encompass the implications of using personal valuescapes and the CoffeeWizard framework for harnessing the practical value-set in respect of personalizing mechanisms; the implications of using personal valuescapes for making sense of and substantiating values for establishing value expertise and critical agency ; and the implication of democratising assertions of creating shared value (CSV) based on user understandings of otherwise institutional agendas such as social return on investment (SROI) and of course, the UNSDGs [22], [52], [70].

7.2 Distinguishing Valuescape from valuescapes

A fundamental implication of this work is that the terms Valuescape and valuescapes can and should be distinguished; the former referring to a singular structure and something which can be probed, while the latter referring to a plural series of constructions. This distinction is the first step toward moving beyond the theoretical and towards an operationalizable framework for values-orientated personalization, and directly addresses the contradiction of 'objective subjectivity': First set out in the literature and methodology chapters, it was reasoned that objective subjectivity is required for values-orientated coffee personalization, yet remains elusive due to extra-

sensory or 'social' value-attributes lacking the physical, replicable grounding of their sensory product counterparts. This section begins with a revision of a previously discussed model, situating observed interactions with valuescapes within a wider frame of universal Valuescape. Ultimately, this suggests that valuescapes address the practical priorities of an expert system and its end-users in everyday coffee consumption when operationalized as mediations of a broader, universal 'Valuescape' [TRQ3].

7.2.1 Valuescape as a framework for making the subjective objective

Of the three works initially reviewed for their definition of the term 'valuescape', Nöjd et al (2020) provided the most tangible worked example, presenting a model of 7 thematic components arranged across three clusters [42]. There was a clear delineation of human and non-human (technological) actors, which along with interactional context, informed 'guidelines on how to utilize digitization to leverage consumer experiences and…strengthen the attractiveness of physical retail spaces' [42]. Considering this work, the CoffeeWizard interaction framework in studies 1 and 3 acted as a service provider, while the valuescapes they produced served as key interactional touchpoints. However, there are also fundamental differences. Consequently, this thematic map can be applied to re-configure the original three clusters (service provider, digital technology, and customer), re-specify the thematic components based on modes of interaction (substantiation, practical application, evocation, and speculation), and most importantly, distinguish Valuescape (singular, structural) from valuescapes (plural, constructed).

It first is useful therefore to return to the Valuescape model as presented in the introduction (1.5.1), thinking in terms of its of the application of its components:

1. **VALUESCAPE (STRUCTURE):** The outermost 'social' frame;
    a. Valuescape encompasses the CoffeeWizard service provider, the Consumer End-user, and the valuescapes mediating interaction.
2. **CONSUMER END-USER:** preferences can be known and classified;
    a. 4 top-level modes describe substantive, practical, evocative, and speculative interaction.
3. **DIGITAL/PHYSICAL/HYBRID:** personalization is context specific
    a. E.g., Domestic, third place, and fictional design scenarios.
4. **VALUESCAPE<u>S</u>:** are perceived as having archetypal characteristics;

    a. Enabling navigating, manipulating, collaborating, and re-framing.
5. **COFFEEWIZARD (SERVICE PROVIDER):** has a 'remit' to offer values-orientated interaction for values-orientated personalization
    a. Role of CoffeeWizard is defined in relation to, but set apart from, the valuescapes it creates: It is a provocative value expert.
6. **VALUESCAPE (STRUCTURE):** is collectively and collaboratively defined and inductively grounded.
    a. The mediated Valuescape is affirmed or contested by individuals that comprise it, affording an enduring tension between its status as a social structure or a social construct.

An enduring imperative of the Valuescape concept was always its ability augment everyday consumption beyond a detached, grand theory of interaction in the digital economy [298], [299], [300]. This allows Valuescape to be operationalized in everyday coffee personalization as both 'a thing to describe' as well as 'a thing which to provoke and interact' [2], [156].

7.2.2 A framework for engaging 'original' and 'series' value-objects

Valuescape as a structural framework in which valuescapes can be constructed further offers a means of engaging with coffee values as the 'original' and 'series' objects set out in the literature chapter [18]. It was reasoned that archetypes of physical coffee product such as the 'latte' represent Baudrillard's concept of 'original' objects[18]; something which is widely understood and replicated, due to physical or sensate grounds such as 'milky', 'smooth', 'mellow' and so forth. In the revised framework the consumer end-user is afforded the opportunity to affirm or challenge original value-objects through substantive, practical, evocative, and speculative elaboration of their qualities, when provoked by a representation of the product archetype (S3), or of their (in)congruency to a predicted pattern of preferred choice given a prior calibration of value-attribute preference (S1). Moreover, when an original object is contested on the grounds of its contingent attributes – it ultimately becomes a 'series' object [18]. A series value-object is therefore rendered 'personalized' when it is made sense of on the terms of the end-user.

Implications for engaging original and series value-objects become more promising when considering the emergent archetypes of extra-sensory value preference seen in study 3. Contingent on the aggregated preferences, choices, and reflections on value-attributes

from taxonomies of aspirational values and global objectives for instance, original and series objects of personal end-goals and experiences in life, and of global sustainability objects are made possible through use of the framework [49], [52]. Thus, an archetype of the UNSDG goal 'ending poverty' may be affirmed through substantive, practical, evocative, or speculative interactions aligned to the existing contingent attributes of that goal. Conversely, the same archetype may be challenged through the same modes of interaction, thus revealing a 'series' object.

Distinguishing valuescape from valuescapes as a proposition for coffee personalization is ultimately useful for service provider and consumer alike, as it tangibly addresses the contradiction of objective, subjective values. Thus far, this distinction has drawn on modes of interaction to make a relatively general argument for the usefulness of the framework, particularly for answering TRQ3. In the following section, archetypes of valuescapes themselves are suggested together with specific use cases.

7.3 Valuescape: More than a speculation?

7.3.1 Revisiting original objectives

It is worth restating and reflecting on the stated objectives of this project as a means of setting up the discussion.

Objective 1: to understand the nature of personal coffee consumption explicitly in terms of values.

Objective 2: to understand the nature of interaction with 'valuescapes', as a novel proposition for values-orientated personalization in digital coffee futures.

The first objective sought to critically explore the speculative notion that personalized coffee consumption is best understood when grounded on values. Addressing this entailed a literal interpretation of values as has been demonstrated by contemporary scholars seeking to build expert systems that conceivably might be turned to delivering values-orientated coffee personalization [146], [168].

Objective 2 spoke to the need for deploying valuescape as a speculative artifact, implying a well-grounded methodology for working with values as the primary means by which users would interact.

It was suggested that virtual interaction with both the tangible and intangible factors of consumption are fulfilled in 3D (as opposed to 2D) visualizations of both the sensory and extra-sensory factors of consumption, and as such, this gives rise to new affordances [298].

7.3.2 Thesis research questions

All studies contribute to answering three thesis research questions, and in the following section are outlined both in terms of the tension between the designed and emergent affordances of each study, as well as the theoretical literature selected.

TRQ1: What is the need for valuescapes?

TRQ2: How are valuescapes made personally useful?

TRQ3: How might valuescapes address the practical priorities of expert system and end-user in everyday coffee consumption?

TRQ1 spoke to the overarching utility of valuescape and might be rephrased as 'what is the value of valuescape in everyday coffee consumption interactions?'. This was contrived to address the utility of the valuescape artefacts in their various forms to participants. A core rationale for the question is its deliberate emphasis on the needs of non-commercial stakeholders as a direct juxtaposition to the 'efficiency' driver seen in industry[21]. TRQ2 spoke to the interactional affordances of valuescapes as distinctly emergent from its contextual use. TRQ3 spoke to the proposition of shared value as an implicit necessity in personalizing technologies.

7.4 Mapping, Collaborating, Provoking, and Framing

In the methodology, it was reasoned that Valuescape can be referred to both in terms of its structural-constructed nature and the objective-subjective nature of its contents. The consideration of the intersectionality of these possibilities enabled speculation of potential Valuescape applications: It was stated that if valuescapes were fundamentally perceived as structural, then interaction with them would either be based on an (objective) depiction of reality or a (subjective) distortion of reality: A mediator of structural valuescapes such as CoffeeWizard was thus either an unbiased or biased expert. However, if valuescapes were fundamentally perceived as constructed, then interaction with them would either be based on the (objective) depiction of the mediating system's own taxonomies of values, or its

(subjective) distortion of those taxonomies. A mediator of constructed valuescapes was thus either a collaborative expert, or at best, a burgeoning expert.

	STRUCTURAL	CONSTRUCTED	NATURE OF VALUES
OBJECTIVE	THE MAP	THE CRL	VALUES ARE DISCRETE
SUBJECTIVE	THE HALL OF MIRRORS	THE RECURSIVE FRAME	VALUES ARE CONTINUOUS
NATURE OF INTERACTION	INTERACTION IS PROVOCATIVE	INTERACTION IS NEGOTIATED	-

Table 7:1 The nature of values and values-orientated interaction: Characterizing valuescapes

These characterizations of valuescape applications can be described as 'the map', 'the hall of mirrors', 'the collaborative reinforcement learner (CRL)', and 'the recursive frame' (Table 7:1)They are each supported by studies 1-3 to varying extents and have implications for how values and interaction were ultimately perceived and operationalized. Each is explained in turn.

7.4.1 'The map': Valuescape as objective and structural

In the objective, structural valuescape, sensory coffee values function as material facts, while extra-sensory coffee values function as social facts. The CoffeeWizard framework in this instance serves as an unbiased expert, mediating depictions of coffee preference and choice grounded. As such, it is best likened to a 'map', orientating the user among a landscape of value- structural objects. Of the four archetypes, this is the most aligned to theoretical conceptions of valuescape as a 'structure' of social phenomenon; something to harnessed and made sense of [53], [301], [302].

Implicitly, the map is used for navigating coffee preferences. Study 2 best demonstrated this when participants reflected on the practical value of personal value footprints in terms of its ability to adhere to standards of 'ethical consumption'; and in study 3, in the speculation that valuescapes align to physical locations in a public space. If CoffeeWizard presents valuescape as an objective view of social structure, the implication is one of it being an unbiased expert in the content it asserts..

It might be suggested that the primary user of the 'the map', other than the end-user, are established corporations seeking to enable navigation of everyday consumption space that is grounded in a fixed ontology of known value-sets, but that still allows for novel community and interaction to emerge. These could be large coffee shops or brands, who seek to improve extra-sensory offerings without compromising what substantively constitutes their own product portfolios, thus protecting established brands by making 'brand communities' a tangible, hybrid presence through a valuescape 'map' [36], [102].

7.4.2 'The Collaborative Reinforcement Learner (CRL)': Valuescape as objective and constructed

In the objective, constructed valuescape, hedonic and eudaimonic values are interacted with based on their heterogeneity, remaining categorically distinct. Practical value themes which emerge from user retrospections serve to elaborate their meaning in terms of the narrow, existing context of their use, and CoffeeWizard thus reinforces existing dimensions. Valuescape is therefore a tool for advancing the overarching value agenda of the system, key examples being those set out by CSR, ESG, and UNSDGs.

The objective constructed valuescape is best likened to a collaborative reinforcement learning (CRL) algorithm, useful for forming system-user agreement on value definition[303]. This was demonstrated in Interactions with CoffeeWizard when participants revealed the practical value of 'conversation' in terms of the need for ongoing (rather than 'one off') substantiation of value-attribute meaning (S1).

The implication of using valuescape as a tool for collaborative reinforcement learning is connected to substantiation or sensemaking of value meaning, where the user is in some way 'empowered' by being given a voice [156]. Such systems serve to affirm or challenge content presented based on the systems existing dimensions, but crucially, the dimensions remain fixed. Other than the everyday coffee consumer, it might be suggested that the primary user of the 'collaborative reinforcement learning tool' is a third-party organization interested in the critique of nature of values themselves. Most broadly this might be a global body such as the United Nations, but in terms of everyday application, this conception of valuescape is akin to the development of tools where the user would benefit from emancipatory empowerment through 'collaborative sensemaking' [156], [304].

7.4.3 'The Hall of Mirrors': Valuescape as subjective and structural

In the subjective, structural valuescape, hedonic values are perceived as factual in nature but bias in presentation. Consequently, extra-sensory values remain ungrounded, and CoffeeWizard is a biased expert. Valuescape in the subjective, structural sense is therefore a distortion, or 'not [really] my values' (S1).

The subjective structural valuescape is best likened to a 'hall of mirrors' and is used for deliberate provocation. This was demonstrated in Interactions with CoffeeWizard when participants articulated the novelty of an obscured and 'brandless' interaction with an artifact of provocation. In Contingences for Valued interaction, the subjective structural valuescape was best demonstrated when participants articulated corporate and anti-corporate contingencies; instances where . In terms of Building Valuescape, the subjective structural valuescape was best demonstrated when participants articulated its ability to evoke recollection consumer experiences.

The implication of using valuescape as a 'hall of mirrors' device is to treat hedonic and eudaimonic values as situated ontologies, and as ungrounded in nature. CoffeeWizard is thus a biased expert and valuescape a distortion of an underlying structural 'reality'. It might be suggested that the primary user of the hall of mirrors are any stakeholders interested in novel interaction and provocation of the status quo; manifesting through 'gamification', incentive based behaviour modification, and recreational pro-social applications, as seen in novel vending technologies or mobile apps with pro-social designs for networking or dating, for instance [173], [174], [175], [178], [296], [305].

7.4.4 'The Recursive Frame': Valuescape as subjective and constructed

In the subjective, constructed valuescape, sensory and extra sensory values are interacted with based on their homogeneity as fundamental value-attributes, becoming categorically indistinct. Practical value themes which emerge from user retrospections serve to furnish details of the use context, and CoffeeWizard thus learns additional dimensions. Valuescape is therefore a tool for advancing the users' overarching value agenda, and potential tool for creating shared

value (CSV) where established boundaries and definitions might be pushed.

The implication of using valuescape as a recursive frame is connected to users' speculations and the desire to align products and services to real-time conceptions of 'personal preference'. It represents a conception of a personalized valuescape, in which CoffeeWizard is tasked with learning additional dimensions by allowing users to substantiate the parameters as well as the content that sits within the parameters.

It might be suggested that this represents the ultimate tool for creating shared value, as parameters that emerge through interaction reveal overarching user priorities the directly juxtapose with service provider values of, for instance, 'efficiency' or 'sustainability'. Industry and HCI practitioners alike should find this conception most appealing, as it aligns with the most fundamental conception of personalisation while also conceivably speaking to responsible research practice, in which the consumer end-user is an active participant in creating shared value (CSV) as a process as well as a final product.

7.5 Contributions of CoffeeWizard: Mechanisms for high dimensionality, affording critical engagement, and democratisation of value agendas

A final contradiction highlighted in the literature chapter was that of efficient coffee personalization. An enduring priority for the mass-market coffee industry and a technical challenge for HCI, this section discusses the contribution of the CoffeeWizard interaction framework in terms of engaging with the high-dimensionality of multiple value-sets, affording end-users critical engagement in efficient personalization processes, and enabling democratisation of extra-sensory value issues ultimately pertaining to personal preferences of the everyday coffee consumer.

7.5.1 CoffeeWizard is a mechanism for engaging the dimensionality of values

First, CoffeeWizard can be thought of as a mechanism for dimensionality reduction. Largely based on the design and findings of the third study – building valuescapes – this contribution of the work suggests a reimagining of the principal component analysis (PCA) and clustering approach, such that the end-result (the cluster diagram) is rendered intelligible and interactional to the end-user. For the user, this

offers a novel augmentation of everyday coffee consumption as it can be included in visual touchpoints of interaction such as a vending or mobile device screen. For the service provider, this offers the opportunity to explore a biproduct of research – currently applied narrowly to sensory product – in an entirely new way regarding extra-sensory qualities. The rationale for this contribution is akin to the 'reverse vending machine' – a technology probe that incentivised recycling by rewarding continued usage [176]; in that the PCA cluster diagram is reverse engineered as an inductive rather than deductive tool; provoking and corroborating its initial validity.

7.5.2 CoffeeWizard as an agent for Creating Shared Value (CSV)

Second, CoffeeWizard can be thought of as agent of Creating Shared Value (CSV). Depending on the extent to which the service provider allows the end-user substantive control over the content of the valuescapes produced, CoffeeWizard enables the affirmation or critique of asserted value-objects in a way that goes beyond existing 'top-down' CSV technologies [22], [73].

Most pertinently this speaks to contemporary work exploring the iterative nature of expertise between domain experts [4], [181]. While a conventional operationalization of value expertise would see domain experts such as coffee companies and other corporations as the obvious agencies for CSV, CoffeeWizard considers its users to be 'experts by experience' [306].

As has been shown, depending on the archetypal nature of valuescapes as maps, mirrors, CRLs or reframers; service providers and consumer end-users may each prioritise their own agency to varying extents. More specifically, the findings – particularly from study 3 – show that agency can be retained by the service provider over some value-sets, while being delegated over other value-sets. CSV is therefore enabled by CoffeeWizard as a form of 'agency delegation' [307], [308]. Most obviously, this reconciles the contradiction of efficient personalisation: it is conceivable that the corporation might retain its inferential models and practices for efficient coffee portfolio alignment to sensory preferences, while simultaneously enabling inductive substantiation of sensory and extra-sensory coffee qualities, including the practical qualities of interaction with valuescapes.

7.5.3 CoffeeWizard as an intervention in the global mass-market

Finally, CoffeeWizard can be thought of as an intervention in the global mass-market in terms of its ability to democratise the extra-sensory value-sets that are prevalent in guiding the corporate priorities of coffee suppliers. It was generally implied that the goals and objectives inspired by agendas such as environmental, social, and governance (ESG), corporate social responsibility (CSR), and the United Nation Sustainability Goals (UNSDGs) were originally conceived in the best interests of society [52], [78], [164]. However, it is evident that consensus and relevance always needs to be maintained: It was suggested that '…as multinationals are now effectively responsible for their own interpretations and outworking of CSR, it is important to consider new ways of maintaining accord between producing and importing entities, whether nation states, corporations, or individuals' [309]. Thus, what is meant by the value proposition, and what it is meant to evoke in the end-user in terms of sustainable, practical action, is in the interests of both consumer and corporation.

By operationalising the value-attributes comprising these global extra-sensory value-sets, CoffeeWizard enables their continued survey and calibration, ensuring that the personal interests of the end-user can not only be met my the service provider, but fed into a global understanding of 'Valuescape' as an objectionable domain in which to situated personalized interaction [18], [40], [53], [310].

Chapter 8: Limitations and future work

8.1 Limitations of the studies

8.1.1 Contingencies for Valued Interactions

In contingencies for valued interaction (S2), limitations include the representativeness of emergent themes in terms of their description of hospitality sector workers as a demographic beyond those surveyed, and the validity of the contingency themes as entirely dependent on discrete lockdown events.

In terms of the representativeness of the findings, a larger sample representative of the hospitality sector in Nottinghamshire would likely render findings generalizable to the local sector: I would ideally have a larger sample before asserting that contingency themes were representative of the hospitality sector in Nottinghamshire as a whole. A larger sample was initially sought, however, only the 8 participants in this study were able to commit to the remote interview.

In terms of the validity of the contingency themes themselves, the design of the lockdown timeline placed too much emphasis on framing the discrete events of each month between neat delineations of 'before' and 'after' norm breaches, resulting in these categories attracting the most elaboration in terms of conversation time. Assertions of correlation and implied causation of corporate responses to events could only function as illustrative, rather than descriptive, of a more quantifiable use of the reverse-timeline infographic as a prototypical valuescape.

In terms of the validity of the contingency themes themselves, the design of the lockdown timeline placed too much emphasis on framing the discrete events of each month between neat categories of 'before' and 'after', resulting in these categories attracting the most elaboration in terms of conversation time. Future works should firstly address the identified shortcomings by ideally identifying and recruiting a larger sample. Moreover, the strict adherence to the presentation of discrete lockdown events only, while risking a loss of general elaboration contextualising the time, might encourage participants to elaborate more on the discrete events themselves in greater detail.

8.1.2 Interactions with CoffeeWizard

In interactions with CoffeeWizard (S2), the emphasis was on deploying a full, three-part values-orientated interaction methodology via a framework and artefact. While considered a strength in terms of prototyping the methodology, this meant that the resulting technology probe was very much a 'minimum viable products' at every stage of the interaction framework. The presentation of the survey and coffee box and labelled product was clearly disruptive to normal routines of coffee consumption, and so emergent practical values were only valid in the sense that they described interaction with CoffeeWizard, rather than necessarily uncovering the day-to-day practical values that a more subtle technology probe might have achieved. Most specifically, the designation of valuescape (as opposed to CoffeeWizard) as the main user-facing interaction proposition was not explicitly defined in this original study.

As an analogue to a refined technology proposition, the design could be improved by addressing the survey in terms of its separation of habit and value data (the use of both was likely unnecessary to a focused probing of values alone); the presentation of data in terms of graph quality and novelty during the reflective interviews, and the interview themselves, again, in terms of focus on value (in)congruencies to the exclusion of other data 'footprints'. These limitations arose from a sense of needing to provide an analogue of many conceivable features of a values-orientated system offering augmentation in routine coffee consumption, where fewer and more focused use of coffee product and value-attributes descriptions/data visualizations would in future be preferable.

8.1.3 Building valuescapes

In building valuescape, limitations of the study pertain to the nature of the prototypical coffee ordering and recalibration 'app' as a mock-up, deployed in scenario based speculative enactments. To the extent that the mock-up could be achieved, its quantitative grounding is again illustrative rather than descriptive/conclusive about the grounds of the clusters generated from principal component analysis of preference data. Additionally, the presentation of the graphical user interface (GUI) as a touchpoint for voice user interaction (VUI) was largely speculative.

While the three-phase approach to building valuescape might be regarded as a strength in that it allowed development of all conceptual components of interaction, most of the limitations in this study can also be attributed to this rationale which effectively renders much of the study a 'prototype'. I'll discuss each phase in turn, focussing predominantly on the final stage, this being the chapter's main point of interest.

In the coffee values survey, 100 participants provided preferences for value-sets based on a standardised survey tool intended to produce PCA clusters. For the sake of simplicity, it was decided that Likert-style response items on a 1-5 scale were an appropriate means of eliciting those preferences. Conventionally, PCA is used to make sense of variables comprised of continuous data, and so a 0-100 slider widget would have been a preferable tool in hindsight. Moreover, the richness that this response conceivably captures would ideologically align with the stated benefits of a valuescape that similarly, aspires to fine-grain understanding of value-attributes.

In the analysis, while PCA analysis and k-means clustering visualization were performed as primary data analysis and a means of generating exemplary valuescapes for the interaction fiction, these were at best, data-driven sketches. They function well as provocations for perceptive interaction for the purpose of the main research questions, but sub questions of *'what emerged as principally valuable at population level for each of the value-sets?*'; and *'what emerged as principally valuable at population level for the combined value-set?'*; could not be answered with the limited attention given to this stage of the analysis.

In the final stage of the analysis, as has been mentioned in the discussion, the design and presentation of valuescape in a GUI representing a prototype 'valuescape recommender app' effectively 'frames' valuescape within a wider context of interaction. This proved problematic for analysis of interactions exclusively 'with' valuescape as opposed to 'about' valuescape, where the GUI became the main point of reference. This meant that only substantive and (the majority of) practical interactions could be discussed as emergent from the valuescape itself, while evocative and speculative interactions remained inferential.

8.2 Future iterations of the studies

Future work is considered based on the substantive, practical, evocative, and speculative requirements of the participants as documented in this work, in conjunction with the limitations of the designs identified. Before presenting a case for the redeployment of the studies and their artefacts and frameworks, this section outlines implications for other users beyond the consumer in terms of technological and corporate requirements particularly.

In terms of future work, the results from Chapters 4-6 confirm that extra-sensory values form a promising basis for personalization of everyday coffee interaction, that valuescapes are useful for the substantiation, practical provocation, evocation, and speculation of personalization, and that the CoffeeWizard mechanism is useful for enabling qualitative design research.

Future works are most interesting when considering the implications for moving away from design research however, and into the development and deployment of a more refined prototype. Again, the CoffeeWizard mechanism provides a blueprint for this, with the most developed study (study 3) grounded in an industry approach likely to have some impact potential in the mass-market.

8.2.1 Tools for 'pro-social' interaction in a post-Covid world

Re-deployment of the second study is less feasible directly, as time elapsed between Covid-19 lockdown events and the present is ever-increasing. However, the contingencies for valued-interaction may be taken forward as objective value touchpoints, to aid ideation of 'pro-social' interaction in a 'post-Covid' world; particularly in coffee shop and other third-place environments [195], [204], [311]. Whether deployed as ideation cards or reflexive infographics, the enduring validity of contingency themes may be tested through continued substantiation and practical application [199], [312], [313], [314].

8.2.2 CoffeeWizard: a system for keeping the consumer end-user accountable to their stated preferences

A future deployment of CoffeeWizard would likely address limitations associated with both the generalizability of the survey findings as well as the depth of the interaction themes, by focussing on one area of the

framework rather than the framework. For instance, surveying a larger cohort for evaluations of a greater number of values could enable the discovery of group as well as individual preferences, and support the creation of more engaging, multivariate visual provocations. Equally, focus on retrospection as the richest stage of design could shed light on the nature of practical values as distinct from intrinsic and extrinsic properties of coffee product and services.

Generally, any future work requires both upscaling and automation. In this sense, the CoffeeWizard framework can be retained while the selection box artefact might be better replaced with an app or other visual interface.

A redeployment of the first study should more explicitly state its overarching (practical) value proposition as keeping its end-users accountable to the preferences they state during calibration. Rather than reinvent a specialist product, this might involve the reappropriation and obfuscation of an existing product and product choices, such as a home coffee machine. As with similar technology probes exploring the affordances of provenance data such as the 'BitBarista', the probe should ideally be fully digital, fully automated, and fully situated in the context(s) of its use [173], [209], [296]. This would eliminate the need for hybrid interactions between researcher and participant that don't resemble authentic interaction in the wild, and moreover, move toward an instantiation of CoffeeWizard as a viable product for values-orientated personalization.

8.2.3 Valuescapes as novel PCA cluster diagrams:

Redeployment of the third study should priorities the development of valuescapes as full interactive, PCA driven cluster diagrams, situating the user among heterogeneous and homogeneous groups, and provoking substantive, practical, evocative, and speculative sensemaking. The existing dataset informing the prototype visualizations in study 3 should be further explored for a priori (known) and latent (unknown) groupings of participants by sensory and extra-sensory value preference [97], [264]. Moreover, the novel visualization of clusters should be explored for their potential as intuitive sensemaking touchpoints [268]. This would likely serve as a significant step toward the requisite induction of conversational data necessary to qualify the subjective meaning of clusters as emergent value-objects.

8.3 Future works inspired by the studies

Future directions for building valuescape might be divided into the academic and (industry) applied. In an academic sense, an improvement to this study if repeated would benefit from greater conceptual consistency between each phase, a quantitative 'proof' of collective values prior to retrospection, and a separation of artefact and framework if repeated with the above limitations considered.

In an applied sense, coffee product and other FMCG providers might test the framework, using their own value-sets and contriving a relevant end-user scenario for use in design fiction. Moreover, if developed as a functioning recommender app, real-world applications could replace the need for fiction altogether, with the elicitation of retrospection based on conversation, or perhaps another form of rich, reflective evaluations capture. Finally, and considering the tendency for perception of valuescape as a reflection of real-world terrain, the visualization of valuescape might consider a 3D rather than 2D approach and make use of emergent technologies amenable to probing hybrid environments – such as augmented reality (AR) or virtual reality (VR) wearables.

Conclusion

Interactions with Valuescapes was an interdisciplinary doctoral research project designed to investigate the challenges and opportunities of values-orientated personalization at the intersection of global coffee industry practices, structural sociology, and human computer interaction (HCI).

Over three studies explicitly asserting values and their attributes as objects for provocative retrospection, it was found that interactions with valuescapes may be thought of as enabling substantive, practical, evocative, and speculative modes of interaction during everyday practices of asserting coffee preferences, making real-time choices, and retrospectively re-evaluating the those as mediated by an expert system, such as CoffeeWizard. When critically evaluated at the intersections of structure and construction; object and subject, these modes of interaction revealed four 'archetypes' of valuescapes with significant but subtly different implications for mechanistic design, interactive agency, and real-world impact. In contrast to existing 'valuescapes' which serve as expert-orientated data visualizations enabling economic efficiency, personal valuescapes are no longer a biproduct of product preference research and analysis but offer the possibility of democratising values-orientated interaction such that the end-user becomes an empowered and critical participant co-designer of coffee product, experience and service.

In addition to the contributions of CoffeeWizard framework and valuescapes as personal data artefacts, implications for mechanism, agency, and the wider world can be summarised as retaining a model for sensory values while more holistically including their extra-sensory counterparts; a means for democratising the subjective meaning of expert asserted value status; and offering a model for conscientious and pro-social consumer interaction.

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Appendices

Chapter 3: Methodology

3.1 Guidelines for Speculative Enactments

Elsden's et al (2017) Guidelines [11]	**Interactions with CoffeeWizard (S1)**	**Building Valuescape(s) (S3)**
Designing the Enactment		
Identified speculation	Personal Value Footprints	Personal Valuescapes
'background research / design ethnography'	Value (In)Congruity & the digital/quantified self	Sensory precedents for expert Valuescapes
'… consequential for participants'	Consumption of real but obfuscated coffee product & being confronted by footprint.	The (in)congruent representation of the data subject as an integral part of the valuescape.
prototype / pilot	Orthogonal design; combining sensory/extra-sensory values	Use of Coffee Sensory Lexicon; Rokeach &UNSDG
Recruiting Participants		
Decide on who the best participants could be'	Coffee consumers	Coffee consumers
'Consider how to recruit'.	Opportunistic, small sample N = 12	Delegated, larger sample N=100
'Be up-front with potential participants'	'This study involves survey, probing, and re-evaluation of values' [see project info sheet]	'This study involves the ranking of value-attributes across categories, and interaction with a prototype interface' [see project info sheet'
'Use cultural probes'	CoffeeWizard Box	CoffeeWizard App
Conducting the Enactment		
'Find an appropriate setting'	Asynchronous home deployment	Online survey; individual face-to-face interview (Teams)
'Think about what you can record about the event and the qualitative data and analysis this can produce'	The active retrospection on active interaction and initial calibration.	The interaction is simultaneously the retrospection.
'be attentive so the social reality'.	The reality was disruption to norms, which revealed practical value (in)congruous to predicted and revealed choice.	The reality was the collaborative, critical interaction with a burgeoning 'expert system'.
Following the Enactment		
'Consider opportunities for post-hoc debriefing and reflection'	The speculation was informally discussed	Speculation more formally captured as a 'type' of interaction; distinct from other types
'Consider strategies for presenting the outcomes of the enactment to wider audiences'.	Results highlight 'practical values' as a category distinct from those used.	Results fundamentally distinguish 'valuescape' from 'valuescapes'

4.1 S1.ProjectInformation

PROJECT INFORMATION

Date: 23/03/2021

Project: Social & Digital Contingencies for valued interaction: independent coffee shop owner reflections on enabling consumption during the COVID crisis

School of Computer Science Ethics Reference: CS-2020-R50 Funded by: EPSRC Grant No. EP/L015463/1

Purpose of the research. To interview independent Nottingham coffee shops stakeholders with a view to answering the following broad question: 'which social and digital contingencies emerge as valuable to your perception of consumer interaction during reflective accounts of maintaining business activity over the past 12 months of COVID restrictions'. In lay terms, this simply means I'll be asking you questions related to the following:

- 'how did you react to the COVID-19 restrictions as a service provider',
- 'in what ways have your clientele interacted with you socially over the past year compared to before March 2020?'
- 'in what ways have you used technology differently over the past year compared to before March 2020?

As a stand-alone piece of research, your participation will contribute to practical and academic knowledge of social and technology-based responses to the challenges of COVID-19 as a local Nottingham SME. More broadly, this research is part of a wider PhD project seeking to explore the possibilities, challenges and benefits of data-driven consumption in the coffee industry and digital economy.

Nature of participation. On reading, signing and returning this and other forms (data privacy notice, participant consent form); we (participant & researcher) will agree a date and time for interview via MicrosoftTeams. Interviews are semi structured, meaning questions are majority open-ended and allow you to respond as you see fit. Interviews will last approximately 1 hour, with £30 Amazon vouchers offered as remuneration.

Participant engagement: You were initially contacted from publicly available business directories, and expression of interest email and/or telephone call. If you consent to take part in and schedule an interview, this will be audio recorded (for the purpose of transcription) and your responses to questions analysed to form a written report. 1 [School of Computer Science sample information sheet, last updated 2018-07-13] Benefits and risks of the research. Your participation will enable the building of a narrative of contingencies in response to conducting and managing your business during COVID. More broadly, you may consider that engagement in the research offers you a useful means of reflecting on the challenges and opportunities you currently face, a chance to speculate on future solutions, and in return, to receive feedback in the form of any analysis/write up of findings and publications as representative of your peer group. All efforts will be made to anonymise the working practices that you describe throughout the interview (such as the names of colleagues, place names, procedures, technologies etc).

Use of your data. Your personal data (e.g. name, contact details) will be used initially to facilitate interview; internally during discussion with PhD supervisors, and anonymised/redacted from any write-up, internal or external use at conferences, workshops, presentations and academic publications. Your response data (transcribed answers to questions from the interview) will be analysed and retained for future use, including publication. Again, these data are anonymised. If you are directly quoted in a subsequent publication, a pseudonym (e.g. 'participant 1') is used.

Future use of your data. Your anonymised data may be archived and reused in future for purposes that are in the public interest, or for historical, scientific or statistical purposes. Your data will be stored securely on University of Nottingham servers, remotely accessed securely via a university issue laptop.

Procedure for withdrawal from the research You may withdraw from the study at any time and do not have to give reasons for why you no longer want to take part. If you wish to withdraw please contact the researcher

who gathered the data. If you receive no response from the researcher please contact the School of Computer Science's Ethics Committee.

Contact details of the ethics committee. If you wish to file a complaint or exercise your rights you can contact the Ethics Committee at the following address: cs-ethicsadmin@cs.nott.ac.uk

4.2 S1.PrivacyNotice

PRIVACY NOTICE

The University of Nottingham is committed to protecting your personal data and informing you of your rights in relation to that data. The University will process your personal data in accordance with the General Data Protection Regulation (GDPR) and the Data Protection Act 2018 and this privacy notice is issued in accordance with GDPR Articles 13 and 14.

The University of Nottingham, University Park, Nottingham, NG7 2RD is registered as a Data Controller under the Data Protection Act 1998 (registration No. Z5654762, https://ico.org.uk/ESDWebPages/Entry/Z5654762).

The University has appointed a Data Protection Officer (DPO). The DPO's postal address is:

Data Protection Officer, Legal Services A5, Trent Building, University of Nottingham, University Park, Nottingham NG7 2RD The DPO can be emailed at dpo@nottingham.ac.uk

Why we collect your personal data. We collect personal data under the terms of the University's Royal Charter in our capacity as a teaching and research body to advance education and learning. Specific purposes for data collection on this occasion are fulfillment of the project entitled 'Social & Digital Contingencies for valued interaction: independent coffee shop owner reflections from the COVID crisis'; enabling interviews with participants and generation of written transcripts for analysis.

The legal basis for processing your personal data under GDPR. Under the General Data Protection Regulation, the University must establish a legal basis for processing your personal data and communicate this to you. The legal basis for processing your personal data on this occasion is Article 6(1e) processing is necessary for the performance of a task carried out in the public interest. Where the University receives your personal data from

- Personal data from publicly available sources e.g. via Google, Wikipedia, Twitter

Special category personal data

In addition to the legal basis for processing your personal data, the University must meet a further basis when processing any special category data, including: personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union 1 [School of Computer Science template privacy notice, last updated 2018-05-22] membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation.

The basis for processing your sensitive personal data on this occasion is Article 9(2e) processing relates to personal data which are manifestly made public by the data subject

How long we keep your data.

Your data will be stored until November 2022 and then deleted.

Who we share your data with

Your data may be shared with researchers from other collaborating institutions and organisations who are involved in the research. Extracts of your data may be disclosed in published works that are posted online for use by the scientific community. Your data may also be stored indefinitely by members of the researcher team and/or be stored on external data repositories (e.g., the UK Data Archive) and be further processed for archiving purposes in the public interest, or for historical, scientific or statistical purposes.

How we keep your data safe.

We keep your data securely and put measures in place to safeguard it. These safeguards include;

- Storage of your data on Microsoft 356 cloud storage

- Processing of your data on password protected, University of Nottingham laptops/desktop PCs

- Separation of your personal data from your response data during and after analysis (Anonymization)

Your rights as a data subject.

GDPR provides you, as a data subject, with a number of rights in relation to your personal data. Subject to some exemptions, you have the right to:

• withdraw your consent at any time where that is the legal basis of our processing, and in such circumstances you are not obliged to provide personal data for our research.

• object to automated decision-making, to contest the decision, and to obtain human intervention from the controller.

• access (i.e., receive a copy of) your personal data that we are processing together with information about the purposes of processing, the categories of personal data concerned, recipients/categories of recipient, retention periods, safeguards for any overseas transfers, and information about your rights.

• have inaccuracies in the personal data that we hold about you rectified and, depending on the purposes for which your data is processed, to have personal incomplete data completed

• be forgotten, i.e., to have your personal data erased where it is no longer needed, you withdraw consent and there is no other legal basis for processing your personal data, or you object to the processing and there is no overriding legitimate ground for that processing.

• in certain circumstances, request that the processing of your personal data be restricted, e.g., pending verification where you are contesting its accuracy, or you have objected to the processing.

• obtain a copy of your personal data which you have provided to the University in a structured, commonly used electronic form (portability), and to object to certain processing activities such as processing based on the University's or someone else's legitimate interests, processing in the public interest or for direct marketing purposes.

In the case of objections based on the latter, the University is obliged to cease processing.

• complain to the Information Commissioner's Office about the way we process your personal data. If you require advice on exercising any of the above rights, please contact the University's data protection team: data-protection@nottingham.ac.uk

CONSENT FORM

University of Nottingham
UK | CHINA | MALAYSIA

Date: 06/04/2021

Project: Social & Digital Contingencies for valued interaction: independent coffee shop owner reflections from the COVID crisis

School of Computer Science Ethics Reference: CS-2020-R50

Funded by: EPSRC Grant No. EP/L015463/1

Please tick the appropriate boxes

	Yes	No

1. Taking part in the study

a) I have read and understood the project information sheet dated [23/03/2021], or it has been read to me. I have been able to ask questions about the study and my questions have been answered satisfactorily. ☐ ☐

b) I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason. ☐ ☐

c) I understand that in taking part in the study there is a potential risk of being identified as a participant in this study despite anonymisation (separation of my personal data from my responses to questions) ☐ ☐

d) I understand that taking part in the study requires me to provide data and that this will involve providing contact details (name, email address/phone number), details of my company & working practices (e.g. descriptions of social and digital routines, descriptions of general clientele, patterns, trends etc.) I understand this will be obtained by from my responses to interview, which will be audio recorded on Microsoft Teams and transcribed. ☐ ☐

2. Use of my data in the study

a) I understand that data which can identify me will not be shared beyond the project team. ☐ ☐

b) I agree that anonymised data provided by me may be used for the following purposes:

- Presentation and discussion of the project and its results in research activities (e.g., in supervision sessions, project meetings, conferences). ☐ ☐
- Publications and reports describing the project and its results. ☐ ☐
- Dissemination of the project and its results, including publication of data on web pages and databases. ☐ ☐

c) I give permission for my words to be quoted for the purposes described above. ☐ ☐

3. Reuse of my data

a) I give permission for anonymised data that I provide to be reused for the sole purposes of future research and learning. ☐ ☐

b) I understand and agree that this may involve depositing my anonymised data in a data repository, which may be accessed by other researchers ☐ ☐

4. Security of my data

a) I understand that safeguards will be put in place to protect my identity and my anonymised data during the research, and if my data is kept for future use. ☐ ☐

b) I confirm that a written copy of these safeguards has been given to me in the University's privacy notice, and that they have been described to me and are acceptable to me. ☐ ☐

c) I understand that no computer system is completely secure and that there is a risk that a third party could obtain a copy of my data. ☐ ☐

5. Copyright

a) I give permission for anonymised data gathered during this project to be used, copied, excerpted, annotated, displayed and distributed for the purposes to which I have consented. ☐ ☐

b) I wish to be publicly identified as the creator of the following works [my audio recorded interview with Oliver Miles – interviewer/lead researcher] ☐ ☐

6. Signatures (sign as appropriate)

Name of participant (IN CAPITALS) _____ Signature _____ _____
Date

If applicable:

For participants unable to sign their name, mark the box instead of signing

I have witnessed the accurate reading of the consent form with the participant and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness (IN CAPITALS) Signature Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Name of researcher OLIVER MILES Signature Date

7. Researcher's contact details

Name: OLIVER MILES

Phone: ----------

Email: ----------

Provide the participant with a copy of the completed form either by email or hard copy as they prefer.

4.4 Reverse Timeline Infographic

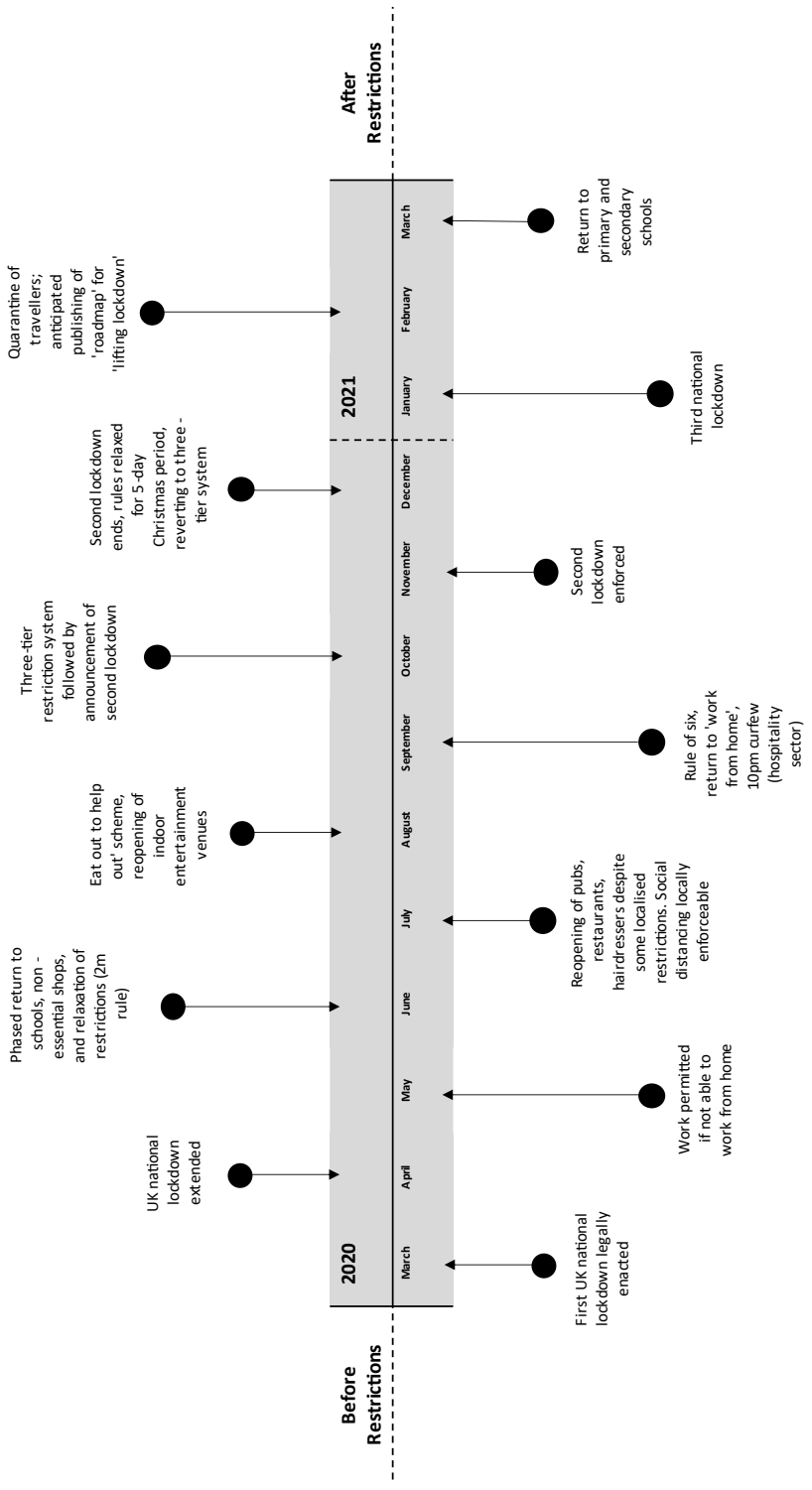
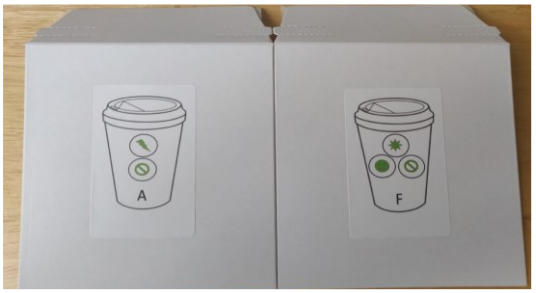


Figure 4-1 Lockdown event timeline (Study 2) based on IfG timeline [198]

Chapter 5: Interactions with CoffeeWizard (S1)

5.1 Coffee combinations & Personal Value Footprints (slides)



Let's start by talking about how coffee is presented and chosen:

You were asked to choose 1 of 2 sachets from a limited choice of 2, each time you wanted to consume a coffee:

How was this different to how you usually choose coffee?

How did it limit you?

How did it engage you?

Did you choose instinctively or employ a certain strategy?

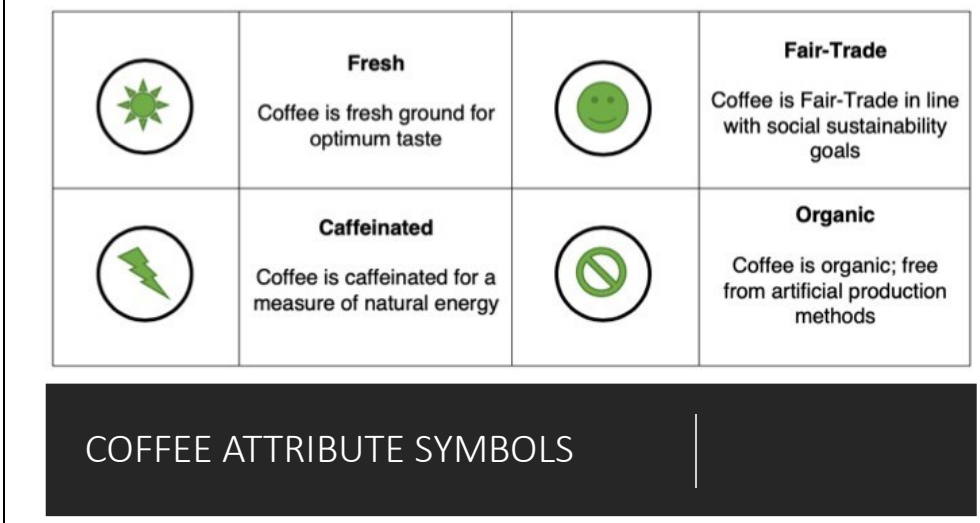
In terms of the descriptive icons, how were these helpful in making your decision?

Did you memorise their meaning as described, or did you have to keep referring to the sheet?

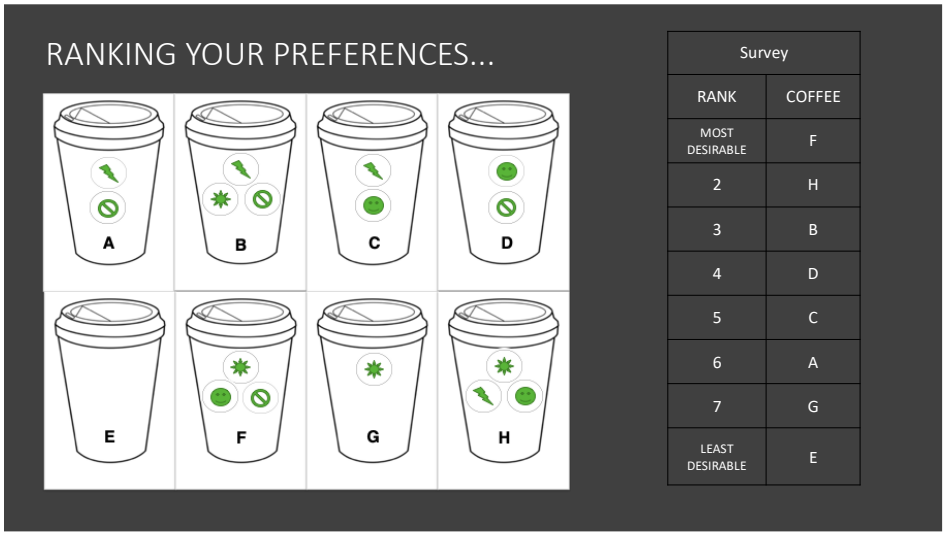
What is attractive to you about choosing coffee product based solely on attributes in this way?

What is problematic for you about choosing coffee product based solely on attributes in this way?

Did you drink any other coffee product over the 5-day study period? When/why?



Thinking back to the survey, you were presented with these same 4 symbols of attributes when asked about your hypothetical coffee preference. Coffee wizard has an idea of what these attributes mean, but it would like to know what you think of them.
Looking at the 4 attributes, do you agree or disagree with their definitions?
Which ones?
Why?



After introducing you to the symbols in the survey, you were shown 8 uniquely labelled coffees and asked to rank them from most to least appealing.

Talk me through your rationale – why this order?

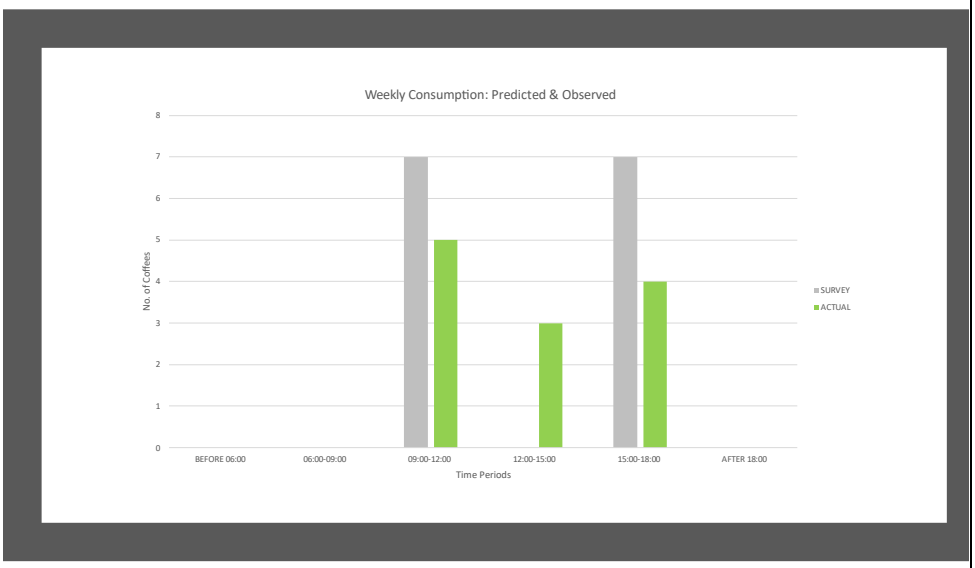
Why have you ranked 'Coffee E' in [ ] place?
If 'Coffee E' has no icons, what were you anticipating?
What are the attributes of 'Coffee E' if not any of the 4 described?

Value	Description	Your Ranking
TASTE	Anticipated flavour(s) of coffee when consumed	1
STRENGTH	Anticipated sensory impact of coffee when consumed	4
SOCIAL SUSTAINABILITY	Anticipated economic impact of coffee to societal good	2
ECOLOGY	Anticipated impact of coffee growth and harvesting on natural world	3

RANKING YOUR VALUES

Before asking your coffee preferences in the survey, coffee wizard asked you to rank 4 broad values from most to least important:

Why this order? Talk me through your rationale.



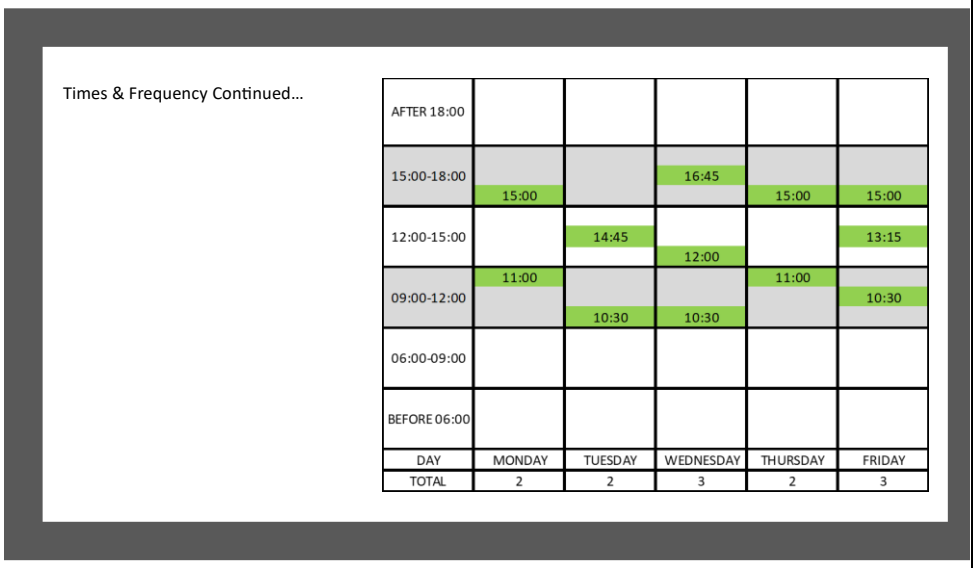
Thinking about the presentation of your values footprint, before asking about your values in the survey, coffee wizard wanted to know about the times and frequencies of your consumption.

*You said that you typically drink **[ ]** coffees per day, and that these are typically at **[ ]** times.*

*Based on this information, coffee wizard thought you would consume about **[ ]** per week, during the times you stated, on average.*

*Based on your actual consumption, you consumed **[ ]** during these times.*

Before going into these in more detail, why do you think you consumed more/less coffee than you stated in the survey?

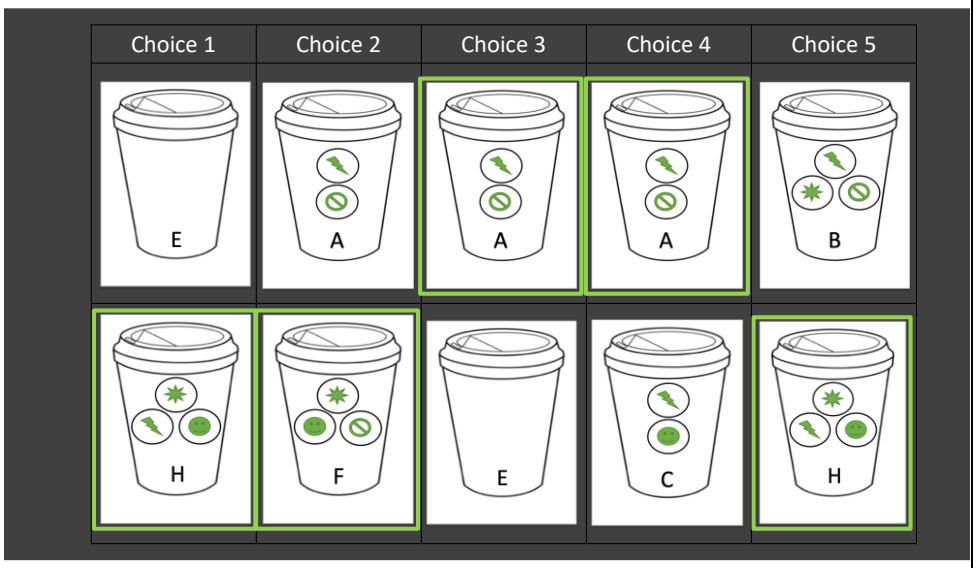


Here are your consumption times and frequencies across the week in more detail.

Firstly, does this chart make sense to you?

What was special about [ ] – why do you think you consumed [ ] here?

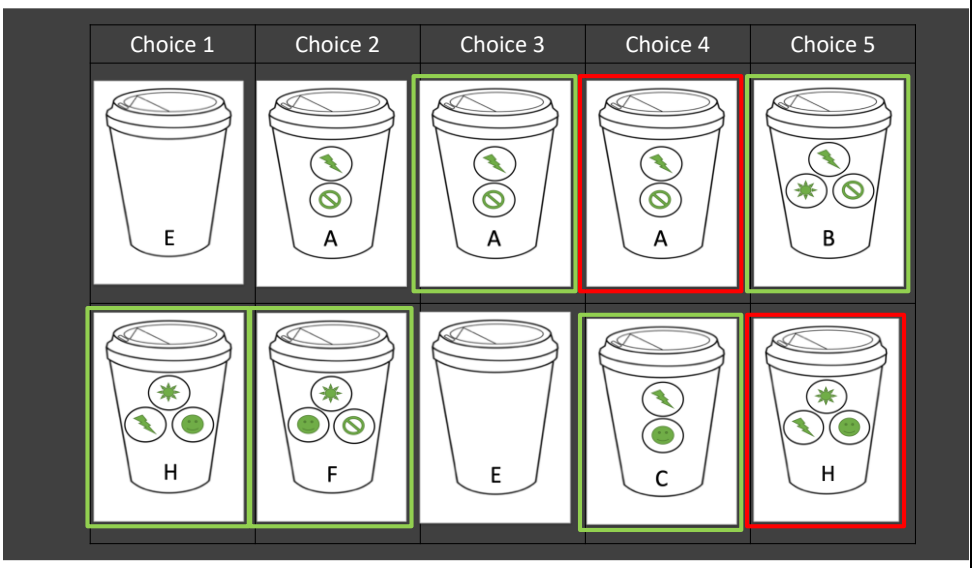
What additional information do you think coffee wizard could use here, to help you account for your consumption?



Based on the survey, coffee wizard predicted you would make the choices highlighted in green. Before seeing whether or not you did;

How do you feel about a technology that could predict your coffee consumption choices based on the values you explicitly pre-define?

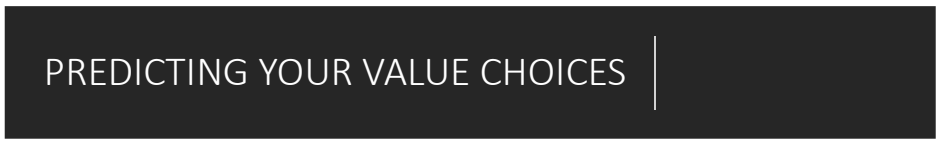
In what was might such a functionality benefit you?



In terms of your actual choices over the week, coffee wizard correctly predicted …% of the first 5 choices.

Coffee Wizard is interested in choice [ ]. In the survey you rank coffee [ ] higher/lower than coffee [] – why do you think you chose coffee [ ] on this occasion?

Value	Description	Your Ranking
TASTE	Anticipated flavour(s) of coffee when consumed	2=
STRENGTH	Anticipated sensory impact of coffee when consumed	1
SOCIAL SUSTAINABILITY	Anticipated economic impact of coffee to societal good	2=
ECOLOGY	Anticipated impact of coffee growth and harvesting on natural world	2=



After the interaction, coffee wizard has re-evaluated your values based on your actual choices and has given you the following ranking:

How do you feel about being told by coffee wizard that your value preferences differ in any way from your own rankings in the survey?

How might knowing adherence to your values benefit you?

How might knowing deviation from your values benefit you?

Do you think that coffee wizard should be in charge of defining values in the way presented to you in this study?

Why/why not?

Do you think that you should have more of a role in defining values?

Why/why not?

YOUR FEEDBACK…

To finish, I'm interested in any broader feedback about the study you may have:

What other values would you be interested in seeing coffee wizard probe?

Specifically related to coffee as a consumable product?

Related to wider society/social/economic/political/cultural issues?

Practically, coffee wizard was delivered as a basic 'selection box': How would you like to see it develop as a technology?

PROJECT INFORMATION

Date: 22/05/20

Project: Coffee Wizard' – values-orientated interaction surveying using the WoZ paradigm: Towards a mutually valued technology

Full Study

School of Computer Science Ethics Reference: CS-2019-R53

Funded by: EPSRC

Purpose of the research: 'Coffee Wizard' is a formative technology of speculated mutual value to coffee drinkers, coffee suppliers and researchers of human-computer-interaction/digital sociology. The purpose of this research is to profile your coffee consumption habits and values via survey; observe your coffee consumption choices at home via a 'selection box' and choice upload exercise, and reflect on prototype visualisations of your consumer footprint. As an early step in initial ideation, your participation is highly valued.

Nature of participation:

There are three stages of participation. First, you will be asked to complete a very brief online survey. Second, a coffee consumption recording exercise over a period of a week. Third, a final 1hr semi-structured interview at a time convenient to you after this exercise. Results of both the survey and interaction exercise will be analysed and responses presented in the interview conducted in a follow up Microsoft Teams video call.

Survey

- You will be sent a link to an online survey on receipt of your signed consent form
- In the survey you will be asked for some personal details (name, age, sex, email contact confirmation), some questions on your coffee drinking habits,

values & preferences relating to coffee product. This should take less than 10 minutes.

Interaction

In the exercise your will be sent a coffee selection box, a record keeping card to fill in, and a summary of instructions to your home address. (This is collected separately and stored securely on a Microsoft Forms doc; deleted after use and not used in analysis).

- You will be sent a coffee selection box in the post to your home address, containing envelopes of coffee. Each envelope contains two coffee sachets to choose from, each with a descriptive logo.
- Over a defined period of 1 week (5 days), you will be asked to make a choice from these envelopes in the order they appear, each time you want to make and consume a coffee.
- A record card – also contained – asks you to note your choice along with the time you make/consume your coffee.
- A reminder of the instructions and descriptions of the coffee are contained in the box.
- You are asked to keep this box secure and at hand where you would normally keep your coffee product at home, and out of the reach of children/pets.
- You are asked to open the choice-envelopes in the order presented; moving the opened envelopes containing the coffee NOT selected the back of the box (see box instructions).
- A link to an upload form for your record card is provided.
- IMPORTANT: Re. COVID-19 & food hygiene. No coffee product has been handled directly by the researcher and has been kept in original sachets throughout before repackaging into sachets, choice envelopes, and the selection box itself. This has been done on a disinfected worksurface after washing hands and wearing a face-mask.The box has been sent via Royal Mail in a secure plastic bag, which you should dispose of immediately after receiving delivery. In accordance with government guidelines you should wash your hands for 20 seconds with warm water and soap after this, and each time before making, consuming a coffee from the box.

Interview

- On the final day of the study (after submitting your record of choices document electronically), you will be invited to participate in a semi-structured interview over Microsoft Teams with the lead researcher.
- This should last no more than 1 hour, and will ask you to account for your consumer choices based on visual pictures of data-analysis generated from your choice record.
- The lead researcher will liaise arrange a convenient time closer to this date

Participant engagement: Survey: 10-12 mins, Interaction: min 1 hr - 2 hours total over 1 week (5days), Interview: 1 hour.

Total. c. 2 – 3 hrs.

Benefits and risks of the research: You will receive a £40 Amazon voucher on completion of the interview, and you may keep any coffee you don't consume in the course of the practical exercise. By agreeing to participate you are contributing to interdisciplinary doctoral work aimed at contributing to methodological advance in digital, quantitative sociology, Human Computer Interaction (HCI) and novel coffee technology ideation. You have the opportunity to articulate various values important to you and your field more broadly, influencing the direction of this project. Risks associated with the research involve reidentification via personal data, mitigation of which is outlined below. Additionally, you MUST NOT participate in this research if you are allergic to caffeinated/decaffeinated coffee product. You also MUST NOT participate if you are self-isolating as a result of COVID-19 and/or are 'vulnerable/ shielding' as defined by the UK government.

Use of your data: The data gathered during this study will be used for research purposes, and personal data anonymised before analysis (survey). Responses will be paraphrased or directly quoted, but you may remain anonymous and a pseudonym used instead if you prefer. Results of this research could potentially be shared internally and /or disseminated via conference workshops, presentations and publications. Response data will be stored securely online and on University of Nottingham personal devices (laptops).

Future use of your data: Response data may be archived and reused in future for purposes that are in the public interest, or for historical, scientific or statistical purposes. Anonymised data may also be shared with 3rd party industrial partners. Any such data will be stored anonymously on University of Nottingham servers and/or encrypted hard drives that are not connected to a computer network.

Procedure for withdrawal from the research: You may withdraw from the study at any time before or during the study, and do not have to give a reason for why you no longer want to take part. If you wish to withdraw please inform the researcher before or during the experiment. Once you have completed the study, your response data will be held anonymously, and so it will not be possible to identify and delete it.

Contact details of the ethics committee: If you wish to file a complaint or exercise your rights you can contact the Ethics Committee at the following address: cs-ethicsadmin@cs.nott.ac.uk

5.3 S2.Privacy Notice

PRIVACY NOTICE

The University of Nottingham is committed to protecting your personal data and informing you of your rights in relation to that data. The University will process your personal data in accordance with the General Data Protection Regulation (GDPR) and the Data Protection Act 2018 and this privacy notice is issued in accordance with GDPR Articles 13 and 14.

The University of Nottingham, University Park, Nottingham, NG7 2RD is registered as a Data Controller under the Data Protection Act 1998 (registration No. **Z5654762,** https://ico.org.uk/ESDWebPages/Entry/Z5654762**).**

The University has appointed a Data Protection Officer (DPO). The DPO's postal address is:

Data Protection Officer,
Legal Services
A5, Trent Building,
University of Nottingham,
University Park,
Nottingham
NG7 2RD

The DPO can be emailed at dpo@nottingham.ac.uk

Why we collect your personal data. We collect personal data under the terms of the University's Royal Charter in our capacity as a teaching and research body to advance education and learning. Specific purposes for data collection on this occasion are the understanding of your habits and attitudes toward a consumer product/experience – coffee -, your use of a proposed data-driven technology, and your experiential feedback after interacting with its prototyping and development.

The legal basis for processing your personal data under GDPR. Under the General Data Protection Regulation, the University must establish a legal basis for processing your personal data and communicate this to you. The legal basis for processing your personal data on this occasion is Article 6(1e) processing is necessary for the performance of a task carried out in the public interest.

Automated decision-making

Your data will be subject to automated processing or profiling, which operates according to the following logic. Pre-written algorithms are used to sort your responses into demographic, habitual and rank-ordered value categories. The significance of automated processing or profiling is that it enables the identification of consumer preference change and comparative analysis over the duration of the study. The intended consequence of the automated processing or profiling is to produce data-driven visualizations of your valued-interaction, enabling qualitative discussion and speculation on a. the veracity (truthfulness) of the description the visualization paints of your values, b. the type/context and usefulness of a technology able to deliver value driven coffee consumption; and c. other types of data you would like to see included in future versions. At all times your responses to these questions are analyzed and published separately from any personal details that could identify you.

How long we keep your data. The University may store your data for up to 25 years and for a period of no less than 7 years after the research project finishes. The researchers who gathered or processed the data may also store the data indefinitely and reuse it in future research.

Who we share your data with Your data may be shared with researchers from other collaborating institutions and organisations who are involved in the research. Extracts of your data may be disclosed in published works that are posted online for use by the scientific community. Your data may also be stored indefinitely by members of the researcher team and/or be stored on external data repositories (e.g., the UK Data Archive) and be further processed for archiving purposes in the public interest, or for historical, scientific or statistical purposes.

How we keep your data safe. We keep your data securely and put measures in place to safeguard it. These safeguards include separating your identifiable personal data (name, email address, home address, telephone number) from your response data before analysis, storing all data in password protected folders in university drives, and use of pseudonyms (e.g. 'Participant A') in internal/external documents and publication.

Transfers of your data outside Europe

N/A - All data is stored/ processed in UK data centers

Your rights as a data subject. GDPR provides you, as a data subject, with a number of rights in relation to your personal data. Subject to some exemptions, you have the right to:

- withdraw your consent at any time where that is the legal basis of our processing, and in such circumstances you are not obliged to provide personal data for our research.

- object to automated decision-making, to contest the decision, and to obtain human intervention from the controller.
- access (i.e., receive a copy of) your personal data that we are processing together with information about the purposes of processing, the categories of personal data concerned, recipients/categories of recipient, retention periods, safeguards for any overseas transfers, and information about your rights.
- have inaccuracies in the personal data that we hold about you rectified and, depending on the purposes for which your data is processed, to have personal incomplete data completed
- be forgotten, i.e., to have your personal data erased where it is no longer needed, you withdraw consent and there is no other legal basis for processing your personal data, or you object to the processing and there is no overriding legitimate ground for that processing.
- in certain circumstances, request that the processing of your personal data be restricted, e.g., pending verification where you are contesting its accuracy or you have objected to the processing.
- obtain a copy of your personal data which you have provided to the University in a structured, commonly used electronic form (portability), and to object to certain processing activities such as processing based on the University's or someone else's legitimate interests, processing in the public interest or for direct marketing purposes. In the case of objections based on the latter, the University is obliged to cease processing.
- complain to the Information Commissioner's Office about the way we process your personal data.

If you require advice on exercising any of the above rights, please contact the University's data protection team: data-protection@nottingham.ac.uk

CONSENT FORM

University of Nottingham
UK | CHINA | MALAYSIA

Date: 28/05/20

Project: CoffeeWizard

School of Computer Science Ethics Reference: CS-2019-R53

Funded by: EPSRC/ UKRI

Please tick the appropriate boxes

Yes **No**

1. Taking part in the study

a) I have read and understood the project information sheet dated 22/05/20 ☐ ☐

or it has been read to me. I have been able to ask questions about the study and my questions have been answered satisfactorily.

b) I consent voluntarily to be a participant in this study and understand that I can ☐ ☐

refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.

d) I understand that taking part in the study requires me to provide data and that this ☐ ☐

will involve completing a short online survey about my coffee consumption habits and preferences, a follow-up week-long consumption study selecting and consuming coffee, and participating in a recorded follow-up interview on Microsoft Teams lasting approximately 1 hour to talk about the survey and give my own insight & experience.

e) I understand that taking part in the study requires me to consume coffee product, and confirm that I have no allergies to fresh/instant, caffeinated or decaffeinated high-street coffee products

☐ ☐

f) I understand that I should WITHDRAW NOW from this study if I am in the vulnerable & shielding categories as defined by the UK government and/or am currently self-isolating due to COVID-19

☐ ☐

2. Use of my data in the study

a) I understand that data which can identify me will not be shared beyond the project team.

☐ ☐

b) I agree that the data provided by me may be used for the following purposes:

- Presentation and discussion of the project and its results in research activities (e.g., in supervision sessions, project meetings, conferences).

  ☐ ☐

- Publications and reports describing the project and its results.

  ☐ ☐

- Dissemination of the project and its results, including publication of data on web pages and databases.

  ☐ ☐

c) I give permission for my words to be quoted for the purposes described above.

☐ ☐

d) I give permission for my visual image contained in photos or video gathered during the research to be used for the purposes described above. (This may form part of the data collection if your camera is switched on, but will not be published in any internal or external documents).

☐ ☐

3. Reuse of my data

a) I give permission for the data that I provide to be reused for the sole purposes of future research and learning.

☐ ☐

b) I understand and agree that this may involve depositing my data in a data repository, which may be accessed by other researchers

☐ ☐

4. Security of my data

a) I understand that safeguards will be put in place to protect my identity and my data during the research, and if my data is kept for future use.

☐ ☐

b) I confirm that a written copy of these safeguards has been given to me in the University's privacy notice, and that they have been described to me and are acceptable to me.

☐ ☐

c) I understand that no computer system is completely secure and that there is a risk that a third party could obtain a copy of my data.

☐ ☐

5. Copyright

a) I give permission for data gathered during this project to be used, copied, excerpted, annotated, displayed and distributed for the purposes to which I have consented.

☐ ☐

b) I wish to be publicly identified as the creator of the following works: feedback, opinions and suggestions for future ideation (direct quotations)?

☐ ☐

6. Signatures (sign as appropriate)

Name of participant (IN CAPITALS)	Signature	Date
Name of researcher Oliver Miles	Signature	Date

7. Researcher's contact details

Name: Oliver Miles

Phone | Email

Provide the participant with a copy of the completed form either by email or hard copy as they prefer.

6.1 S3.ProjectInformation

PROJECT INFORMATION

University of Nottingham
UK | CHINA | MALAYSIA

Date: 04/04/2022

Project: From collective preferences to individual reflections: Social values as grounds for novel coffee consumption personalization

School of Computer Science Ethics Reference: [Number]

Funded by: EPSRC Grant No. EP/L015463/1

Purpose of the research.

- To explore coffee product and consumer experience preference in terms of explicitly valued items, contributing to a PhD thesis on values-orientated interaction in everyday contexts of consumption.
- Specifically, your participation will:
    - Enable the analysis of different human values as they relate to consumption scenarios
    - Enable the visualisation of those values graphically
    - Enable an understanding of value-preference within and across the research participant population you are a part of.

Nature of participation.

- This research investigates your preferences for different types of personal, social, and product attributes linked to coffee consumption using a simple preference survey.
- You are asked to give preference scores to various items as they appear alongside descriptions of context and consumer scenarios.
- Participation in this research is voluntary, with all data provided by you, the participant, during the survey exercise.
- There are two stages to the research: the questionnaire, and (potentially) a follow up interview.

- If you want to be considered for the interview, **please check the 'opt in to interview' box** when prompted

Participant engagement

- The questionnaire should take no more than 15 minutes to complete on an electronic device using a mouse, tracker pad or touchscreen (you may find a larger screen more user friendly). Please follow instructions on screen and read each question carefully. As a summary, you will be asked for some introductory questions 'about you'; before being asked to rank various items in terms of their relative importance.
- The questionnaire is delivered via SurveyHero, and collects three types of data:
    - Data 'About you' (age, gender, coffee preferences,)
    - Your ranking/scoring of given values (calibrating your preferences)
    - Your ranking/scoring of given values (against a specific consumer scenario).
- If have opted in to be considered for interview, you may be contacted by email to arrange a time and date.
- Interviews will take place on Microsoft Teams, with conversation between you and the lead researcher recorded.
- You will be asked to comment on various infographics devised from analysis of your questionnaire data.

Benefits and risks of the research.

- Benefits include contributing to research with multidisciplinary objectives in 3 areas; furthering academic knowledge of hard-to-define human/social values and how they are understood/represented/measured; developing technology for personally relevant and meaningful consumption in the digital economy, and repurposing global, 'big business' methods of data analysis for the advancement of pro-social and mutually beneficial values.
- Risks may include re-identification as a participant despite best efforts to anonymize your data.

Remuneration.

- For completion of questionnaire, you will be entered into a prize draw for £50 online shopping voucher
- If selected, on completion of interview, you will receive £20 shopping voucher,

Use of your data.

- All data is captured, stored and used in compliance with GDPR, with personal identifying data separated from your responses, before being allocated a pseudonym (e.g. 'participant 1').
- Statistical analysis of your responses is performed using University of Nottingham approved software and stored on a secure University of Nottingham drive.

- Responses are seen by the lead researcher, two doctoral supervisors and two assistant analysts, with findings presented to internal/external audiences being fully anonymised.

Future use of your data. Your data may be archived and reused in future for purposes that are in the public interest, or for historical, scientific or statistical purposes. Explain the benefits of archiving and reuse to participants. State where the data will be stored, e.g., on the UK Data Service or University of Nottingham servers or on an encrypted hard drive that is not connected to a computer network, etc.

- In the immediate future, we will use this data to explore various statistical/graphical methods of analysing your responses (survey); and/or ways of categorising your responses if you participate in stage 2 (interview)

Procedure for withdrawal from the research You may withdraw from the study at any time and do not have to give reasons for why you no longer want to take part. If you wish to withdraw, please contact the researcher who gathered the data. If you receive no response from the researcher, please contact the School of Computer Science's Ethics Committee.

Contact details of the ethics committee. If you wish to file a complaint or exercise your rights you can contact the Ethics Committee at the following address: cs-ethicsadmin@cs.nott.ac.uk

PART 2: Interview Stage

Date: 06/05/2022

Project: From collective preferences to individual reflections: Social values as grounds for novel coffee consumption personalization

School of Computer Science Ethics Reference: CS-2021-R38

Funded by: EPSRC Grant No. EP/L015463/1

Purpose of the research.

Previously you took part in the 'Social values as grounds for novel personalization in coffee consumption' survey and gave your contact details to be considered for a follow up interview shortlist.

The overall objective of this project is to build a collective picture of social values in contexts of coffee consumption. The specific objective in this second phase is to take data visualizations generated from your survey results and reflect on their personal meaning and utility to you through interview.

Nature of participation.

After having been selected from shortlist, you are now invited to participate in an interactive interview over Microsoft Teams, lasting approximately 1-hour.

Participant engagement

From analysis of the survey, visualizations combining individual and population-level value priorities have been made.

You will now be shown these as graphical depictions of your responses, as part of an audio-recorded conversation with the lead researcher.

Through a series of semi-structured questions, you will be asked to reflect on these in terms of for example, their representation of your choices in the survey and the usefulness of the graph in 'personalizing' your consumer activity.

Benefits and risks of the research.

Benefits include contributing to research with multidisciplinary objectives in 3 areas; furthering academic knowledge of hard-to-define human/social values and how they are understood/represented/measured; developing technology for personally relevant and meaningful consumption in the digital economy, and repurposing global, 'big business' methods of data analysis for the advancement of pro-social and mutually beneficial values.

Risks may include re-identification as a participant despite best efforts to anonymize your data

Remuneration

You will receive a £20 online shopping voucher on completion of the interview

Use of your data.

All data is captured, stored and used in compliance with GDPR, with personal identifying data separated from your responses, before being allocated a pseudonym (e.g. 'participant 1').

Statistical analysis of your responses is performed using University of Nottingham approved software and stored on a secure University of Nottingham drive.

Responses are seen by the lead researcher, two doctoral supervisors and two assistant analysts, with findings presented to internal/external audiences being fully anonymised.

Future use of your data.

Your data may be archived and reused in future for purposes that are in the public interest, or for historical, scientific, or statistical purposes. In the immediate future, we will use this data to continue to explore various statistical/graphical methods of analysing your responses and ways of categorising/operationalising your interview reflections more efficiently.

Procedure for withdrawal from the research

You may withdraw from the study at any time and do not have to give reasons for why you no longer want to take part. If you wish to withdraw please contact the researcher who

gathered the data. If you receive no response from the researcher please contact the School of Computer Science's Ethics Committee.

Contact details of the ethics committee. If you wish to file a complaint or exercise your rights you can contact the Ethics Committee at the following address: cs-ethicsadmin@cs.nott.ac.uk

6.2 S3.PrivacyNotice

PRIVACY NOTICE

The University of Nottingham is committed to protecting your personal data and informing you of your rights in relation to that data. The University will process your personal data in accordance with the General Data Protection Regulation (GDPR) and the Data Protection Act 2018 and this privacy notice is issued in accordance with GDPR Articles 13 and 14.

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The University has appointed a Data Protection Officer (DPO). The DPO's postal address is:

Data Protection Officer,
Legal Services
A5, Trent Building,
University of Nottingham,
University Park,
Nottingham
NG7 2RD

The DPO can be emailed at dpo@nottingham.ac.uk

Why we collect your personal data. We collect personal data under the terms of the University's Royal Charter in our capacity as a teaching and research body to advance education and learning. Specific purposes for data collection on this occasion are completion of a research project investigating the role of your value preferences in relation to everyday consumption activities.

The legal basis for processing your personal data under GDPR. Under the General Data Protection Regulation, the University must establish a legal basis for processing your personal data and communicate this to you. The legal basis for processing your personal data on this occasion is Article 6(1e) processing is necessary for the performance of a task carried out in the public interest.

Where the University receives your personal data from.

- In addition to your questionnaire response and interview responses (if invited to interview);
    - Meta data from Microsoft Forms including completion time and date

Special category personal data In addition to the legal basis for processing your personal data, the University must meet a further basis when processing any special category data, including: personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation. The basis for processing your sensitive personal data on this occasion is Article 9(2j) processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long we keep your data. The University may store your data for up to 25 years and for a period of no less than 7 years after the research project finishes. The researchers who gathered or processed the data may also store the data indefinitely and reuse it in future research.

Who we share your data with Your data may be shared with researchers from other collaborating institutions and organisations who are involved in the research. Extracts of your data may be disclosed in published works that are posted online for use by the scientific community. Your data may also be stored indefinitely by members of the researcher team and/or be stored on external data repositories (e.g., the UK Data Archive) and be further processed for archiving purposes in the public interest, or for historical, scientific or statistical purposes.

How we keep your data safe. We keep your data securely and put measures in place to safeguard it. These safeguards include separation of your personal data from your substantive responses (anonymization) and allocation of a participant number 'Participant 1, 2, etc' (pseudonymization); storage of all data on secure University of Nottingham drives and approved external repositories, 'Research Fish', 'Juliet' and 'SHERPA'.

Your rights as a data subject. GDPR provides you, as a data subject, with a number of rights in relation to your personal data. Subject to some exemptions, you have the right to:

- withdraw your consent at any time where that is the legal basis of our processing, and in such circumstances you are not obliged to provide personal data for our research.

- object to automated decision-making, to contest the decision, and to obtain human intervention from the controller.
- access (i.e., receive a copy of) your personal data that we are processing together with information about the purposes of processing, the categories of personal data concerned, recipients/categories of recipient, retention periods, safeguards for any overseas transfers, and information about your rights.
- have inaccuracies in the personal data that we hold about you rectified and, depending on the purposes for which your data is processed, to have personal incomplete data completed
- be forgotten, i.e., to have your personal data erased where it is no longer needed, you withdraw consent and there is no other legal basis for processing your personal data, or you object to the processing and there is no overriding legitimate ground for that processing.
- in certain circumstances, request that the processing of your personal data be restricted, e.g., pending verification where you are contesting its accuracy or you have objected to the processing.
- obtain a copy of your personal data which you have provided to the University in a structured, commonly used electronic form (portability), and to object to certain processing activities such as processing based on the University's or someone else's legitimate interests, processing in the public interest or for direct marketing purposes. In the case of objections based on the latter, the University is obliged to cease processing.
- complain to the Information Commissioner's Office about the way we process your personal data.

If you require advice on exercising any of the above rights, please contact the University's data protection team: data-protection@nottingham.ac.uk

6.3 S3.ConsentForm

CONSENT

University of Nottingham
UK | CHINA | MALAYSIA

FORM

Date: 04/04/2022

Project: From collective preferences to individual reflections: Social values as grounds for a novel consumer personalization.

School of Computer Science Ethics Reference: [Insert ref number]

Funded by: EPSRC Grant No. EP/L015463/1

Please tick the appropriate boxes

Yes **No**

1. Taking part in the study

a) I have read and understood the project information sheet dated 04/004/2022 ☐ ☐

or it has been read to me. I have been able to ask questions about the study and

my questions have been answered satisfactorily.

b) I consent voluntarily to be a participant in this study and understand that I can ☐ ☐

refuse to answer questions and I can withdraw from the study at any time, without

having to give a reason.

c) I understand that in taking part in the study there is a potential risk of reidentification

despite best efforts to anonymize my identity ☐ ☐

d) I understand that taking part in the study requires me to provide data and that this ☐ ☐

will involve giving personal details (name, age, gender, email address); hypothetical

preferences regarding consumer and social values, and (if invited to take part in a follow up

interview) my reflections on the analysis of my consumer preferences compared to those

of the wider research population, audio recorded for transcription.

2. Use of my data in the study

a) I understand that data which can identify me will not be shared beyond the ☐ ☐

project team.

b) I agree that the data provided by me may be used for the following purposes:

- Presentation and discussion of the project and its results in research ☐ ☐ activities (e.g., in supervision sessions, project meetings, conferences).
- Publications and reports describing the project and its results. ☐ ☐
- Dissemination of the project and its results, including publication of data ☐ ☐ on web pages and databases.

c) I give permission for my words to be quoted for the purposes described above. ☐ ☐

3. Reuse of my data

a) I give permission for the data that I provide to be reused for the sole purposes of ☐ ☐

future research and learning.

b) I understand and agree that this may involve depositing my data in a data ☐ ☐

repository, which may be accessed by other researchers

4. Security of my data

a) I understand that safeguards will be put in place to protect my identity and my data ☐ ☐

during the research, and if my data is kept for future use.

b) I confirm that a written copy of these safeguards has been given to me in the ☐ ☐

University's privacy notice, and that they have been described to me and are acceptable to me.

c) I understand that no computer system is completely secure and that there is a risk ☐ ☐

that a third party could obtain a copy of my data.

5. Copyright

a) I give permission for data gathered during this project to be used, copied, excerpted, ☐ ☐

annotated, displayed and distributed for the purposes to which I have consented.

6. Signatures (sign as appropriate)

Name of participant (IN CAPITALS) Signature

Date

If applicable:

For participants unable to sign their name, mark the box instead of signing ☐

I have witnessed the accurate reading of the consent form with the participant and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness (IN CAPITALS) Signature

Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Name of researcher OLIVER MILES Signature

Date

7. Researcher's contact details

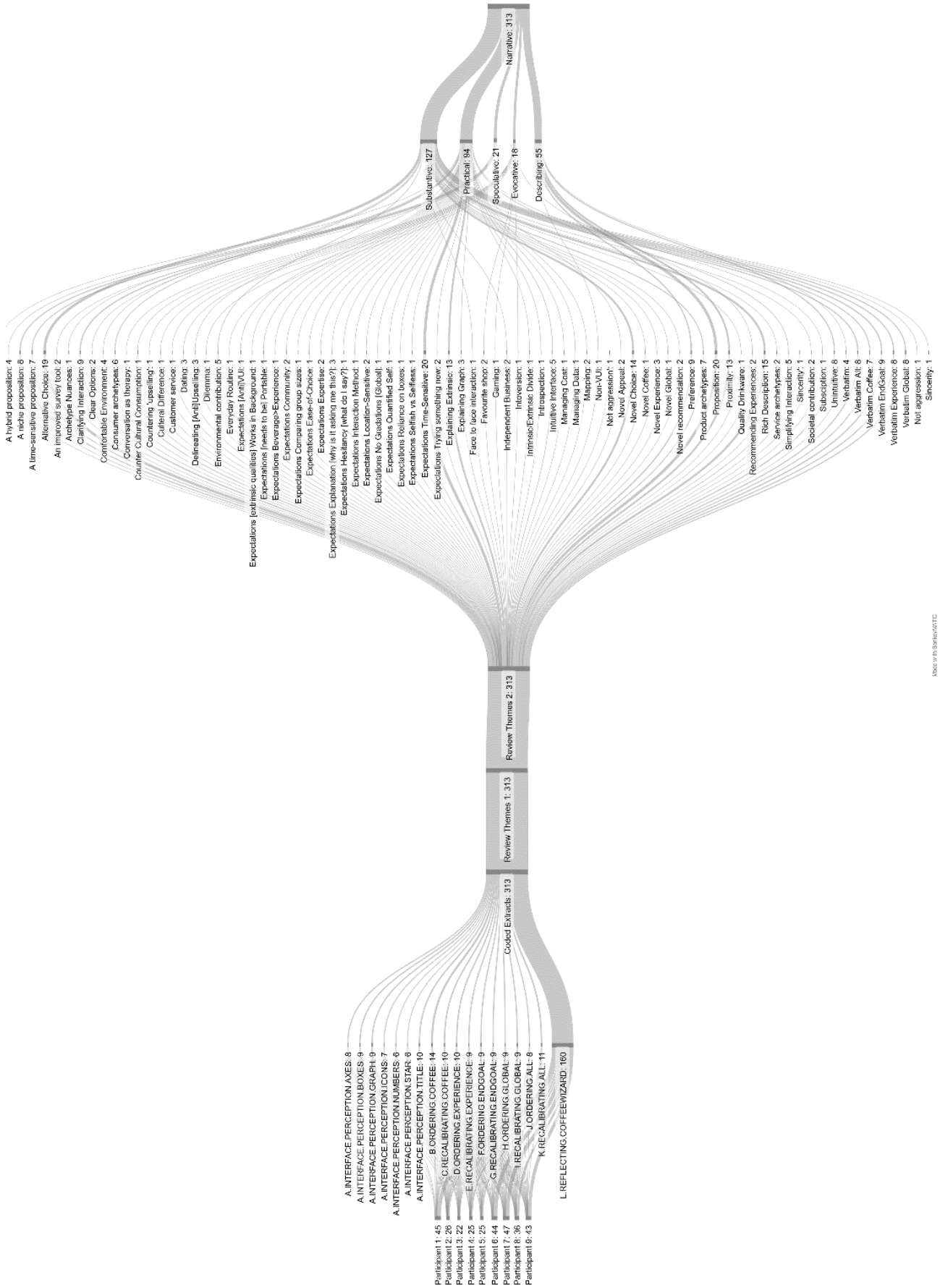
Name: Oliver Miles

Email: -----

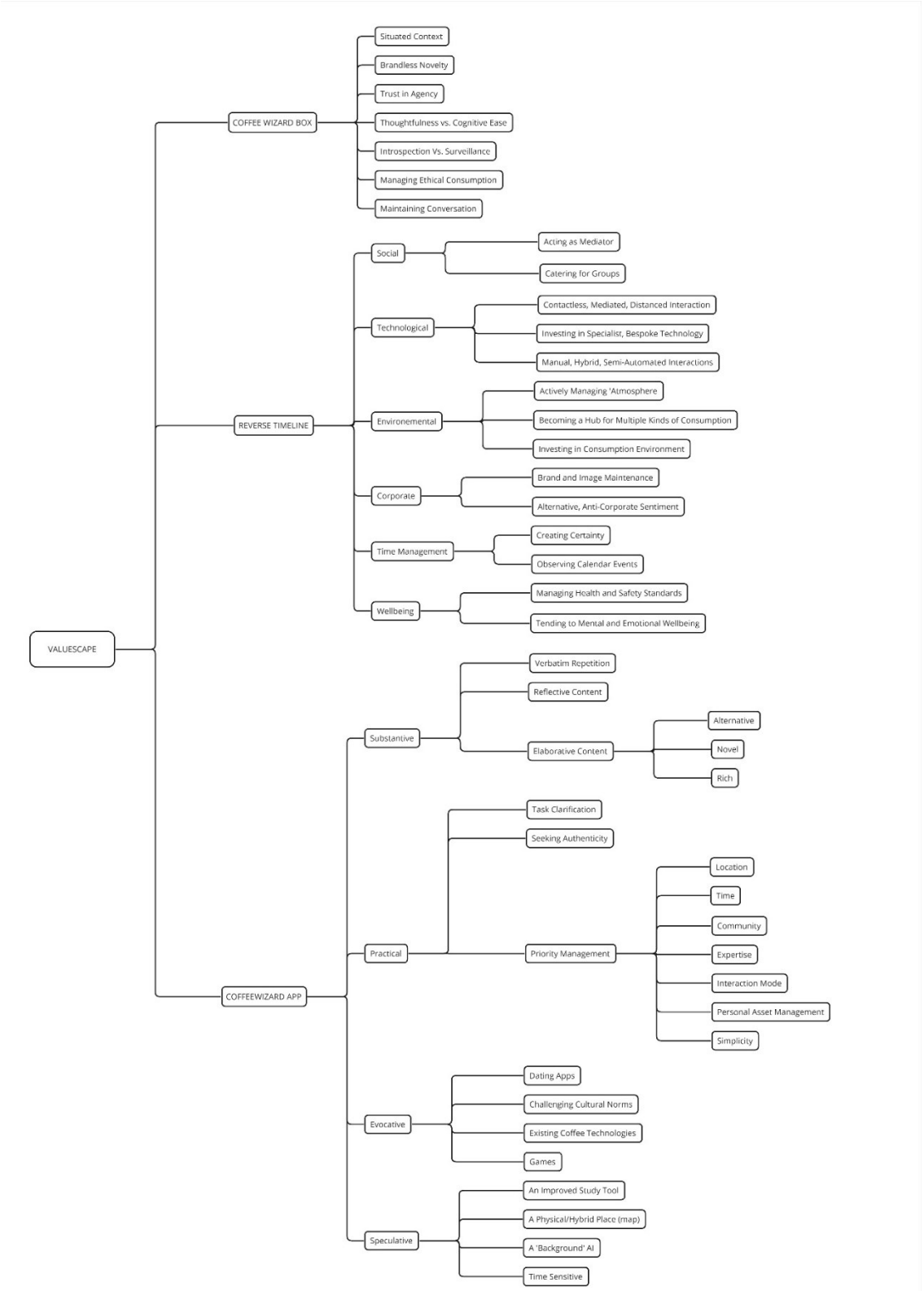
Provide the participant with a copy of the completed form either by email or hard copy as they prefer.

6.4 Thematic analysis: From value-sets to practical values

Chapter 7: Discussion



7.1 Synthesising Results



QQ

7.2 Differentiating Valuescape from valuescapes: Applying the thematic map

Nöjd et als Valuescape[42]	Valuescape and valuescapes
Consumer motivation to interaction in the digital economy can be conceptually modelled	
Valuescape comprises service provider, drivers ('goal fulfilment, relationships, experiences), arenas (milieu and physical venue), and enabling technology.	Valuescape comprises service provider (CoffeeWizard), modes of interaction (substantive, practical, …), interaction contexts (digital, physical, hybrid), and enabling technologies.
Consumer **driver** categories characterise the motivations to interaction	
Three top-level drivers for customers: Goal fulfilment, relationships, experiences).	4 top-level drivers for consumer end-users – substantiating, practical, evocative, speculative.
Interaction context (**'milieu'**) represents places of service provider control.	
Physical venues are well defined and controlled but situated in a 'milieu' or 'constellation' of other actors.	Digital, physical, and hybrid venues are controlled by CoffeeWizard, but situated in a wider interaction context.
Digital technology ('valuescapes') can enable creation of top-level 'shared value' themes	
Moderation of value between consumer and service provider	Archetypes of 'valuescapes'
Value Themes emerging from interaction with the technology itself, can appear to contradict	
"Intrusiveness" vs "Practical usability"	Navigate, Collaborate, Manipulate, (Re)frame
Service provider (CoffeeWizard) 'remit' is consequently established	
Role of service provider is defined in relation to other elements of the map.	Role of CoffeeWizard is defined in relation to, but set apart from, the valuescapes it creates: It is a provocative value expert.
Valuescape is defined and harnessed	
Valuescape is primarily 'customer-centred' such that 'value is co-created, experienced, and enhanced'. It is centred on an agent (customer or service provider), with a view achieving value co-creation.	Personal valuescapes are constructions of Valuescape (social structure). They are personal to the value expert (user or service provider), with alignment contingent on valuations of specific value-attributes.

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