DELIVERABLE 4.3

CircEUlar Data Collection Framework

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Executive Summary

This CircEUlar deliverable outlines the data collection framework for the investigation of circular consumption practices as part of the CircEUlar research project. Building on data outlined for collection in CircEUlar Deliverable 4.2 entitled *Guide for Circular Consumption Biographical Interviews* (Grealis & Rau 2023b), this document details the full list of potential variables from which a nationally representative survey will be conducted investigating promising Circular Consumption Practices primarily within the Focus Areas of Mobility, Buildings and Household Services, and Digitalisation, focusing on

(i)   past and current engagement in circular consumption practices,

(ii)   socio-economic, motivational and material factors that impact the adoption of circular consumption practices, and

(iii)   indicators concerning future engagement in circular consumption practices.

The list of variables can be divided into seven blocks. In Block 1, standardised social variables will be collected to facilitate statistical and segmentation analyses of socio-economic and demographic factors for both engagers and non-engagers in circular consumption practices. Focusing on the different elements of practice, Block 2 gathers information on material conditions while Block 3 collected information in the participant's self-reported skills and competences. Block 4 primarily focuses on surveying the actual level of engagement reported by participants for pre-selected high impact circular consumption practices while Block 5 attempts to capture the diverse meanings attached to different circular consumption practices. Block 6 explores the motivational and cultural factors influencing engagement while Block 7 specifically focuses on factors relating to circular citizenship.

Drawing on data from both the biographical consumption interviews and the nationally representative surveys, iterative content analysis combined with statistical and segmentation analyses will yield insights into the acceptance and adoption factors associated with circular consumption practices and potential consumer groups.
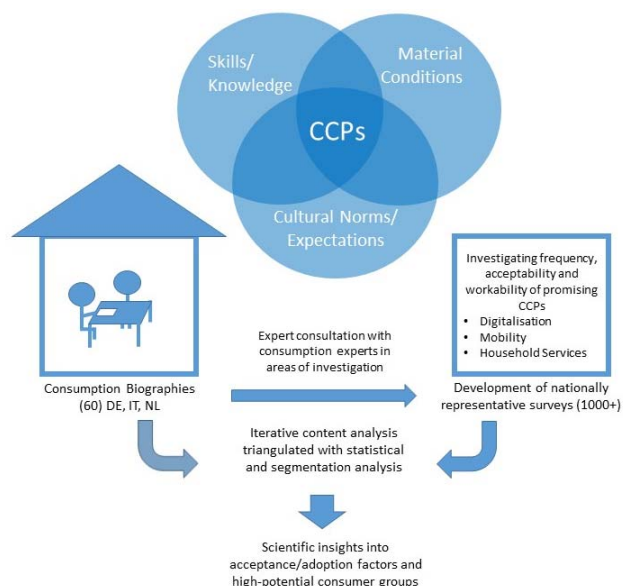

Figure 1: Circular Consumption Research Design (Grealis & Rau 2023a)

Keywords

circularity, circular consumption practices, digitalisation, mobility, buildings, household services, representative survey, attitudes, motivations, material conditions, skills, competences, meanings

Contents

Abbreviations

FAs	Focus Areas
CCPs	Circular Consumption Practices
CircEUlar	Developing circular pathways for a EU low-carbon transition
EU	European Union
IAM(s)	Integrated Assessment Model(s)
IIASA	International Institute for Applied Systems Analysis
PIK	The Potsdam Institute for Climate Impact Research
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
Varname	Variable name
Varnum	Variable number
VBN	Value-Belief-Norm
WP	Work Package

Definitions and Clarifications

Circular Consumption Practices

We understand and interpret Circular Consumption Practices (CCPs) to be practices, which on the balance of probability are likely and intended to contribute to greater levels of circularity such as reducing overall consumption, extending the useful life of products and avoiding waste. CircEUlar is primarily concerned with promising higher-impact consumption practices that are likely to make a substantial positive contribution to circularity (e.g. voluntary carlessness or 'car shedding') compared to lower impact resource intensive activities such as recycling. It is acknowledged in this and other CircEUlar publications that there may be specific circumstances and contexts in which a particular circular consumption practice may not contribute to increased circularity and/or which may in fact lead to adverse environmental outcomes e.g. where the energy inputs required to facilitate a particular circular consumption activity result in increased environmental degradation or where reduced consumption in one area results in increase in total consumption elsewhere due to backfire effects (Druckman et al. 2011).

Elements of Practices

By their very nature, different CCPs require different (infra-)structures, skills and competences. Moreover, they have diverse meanings ascribed to them by those who continually maintain and reproduce them. As we investigate different CCPs across the three Focus Areas (FAs), differential weight is placed on investigating these elements of practice due to the differential weight of importance each element holds in the performance of those practices.

Unit of analysis

While broadly the unit of analysis for profiling engagement, acceptance and adoption of CCPs is the household, the individual participants will be asked about their attitudes to CCPs and the meaning they associate with performing them. Acquiring detailed information on all household members such as composition via the collection of the household grid (European Union, 2021) would consume a considerable amount of the time allocated to survey collection.

Enablers and barriers of circular practices

Enablers and barriers are factors that affect the attractiveness and feasibility of particular circular practices, including motivational factors (e.g., values, norms, perceptions), contextual factors (e.g., availability of products and services), and cultural factors (reflecting differences between countries and cultures).

Commoning

To assess the potential for high-impact CCPs in several instances, we have included questions that aim to capture the extent to which sharing/common practices and collaboration among residents form a regular part of participants' lives (Huber, 2022)

Quantitative Stock Measures

While we have included both stock and use variables to assess the individual resource and material requirements for certain CCPs, it is recognised that online survey participants across all countries may not be able to reliably quantify less tangible use variables at short notice (e.g. the number of online second-hand purchases per annum, or the annual number of non-work trips taken over 100km). Where possible, we have attempted to frame such questions in a simplified accessible manner both to aid recall and reduce the memory burden for respondents.

Material Conditions

Material conditions from a practice perspective includes the available infrastructure from which one is practically able to draw on.

Focus Area Colour Key

	Mobility
	Building & Household Services (Commoning)
	Digitalisation (2nd Hand Trading)

NB* Conditional questions which require a particular previous response have been italicised. Standard logic operators are used to indicate conditional questions including "!=" which means "is not equal to".

List of variables

The following list of variables reflects <u>a set of potential questions</u> that match the main data collection objectives of the quantitative part of WP4. However, some of these questions may not be asked across all countries that participate in the survey, depending on local priorities and/or relevance in a given socio-cultural context. In other cases, answer options will need to be modified to suit local conditions. For example, the nature and availability of what may be deemed basic and essential online services (e.g. tax declaration, TV/radio licence, registration of residence) may vary considerably between countries, requiring a different set of answer options.

Data Block 1: Socio-economic, demographic and location data

The first data block is designed to gather key socio-economic, demographic and location information about survey participants, which may later serve as explanatory variables for material conditions that affect people's capacity to engage in CCPs across the three FAs. The majority of the variables to be collected are drawn from the EU's guidelines for standardised key social variables (SKSV) (European Union, 2019, European Union, 2021). Some of these variables have been combined to reduce the burden on participants

Variable No.	Variable Name	Variable Type	Variable Description	Justification/ Use Case
01	gender	Categorical (male, female, divs, do not wish to say)	Self-identified gender category SKSV	Identification of potential impact of gender roles on adoption of CCPs
02	age	numerical	Age in completed years SKSV	Potential indicator of acquired skills, life stage, perceived agency.
03	partner	categorical	Is the participant living with a legal or de facto partner SKSV	Indication of impact of significant others on opportunities for CCP adoption
04	hhsize	numerical	Total number of household members (including participant) SKSV	Indication of impact of of significant others on opportunities for CCP adoption
05	hsetype	categorical	Household composition according to categories defined in EU's guidelines for SKSV	Indication of impact of of significant others on opportunities for CCP adoption

06	tenure	categorical	Tenure status of private household SKSV	Indication of impact of tenure status on availability and acceptability of specific CCPs
07	actvstat	categorical (single select)	Self-Reported Activity Status (a person's self-reported main activity status at the time of the survey. Covers labour market participation, but also categories of social status where employment is not the main activity e.g. care work, in education/training, retired, unable to work, in service etc. SKSV + combined options to assess permanency and working hours	Impact of activity status on engagement in CCPs
08	hhincome	categorical (single select)	Household Income 10 income bands (deciles above and below country-specific median) with option 'do not wish to say' SKSV	Impact of household income on current and potential future engagement in CCPs
09	educ	categorical (single select)	Describes highest educational honour attained. SKSV	Impact of education on uptake and acceptance of CCPs
10	child(n_m)	Numerical (multi-select drop down)	Number of children and other dependents in the household and their ages	Stage of life indicator

11	postcode	string	Data on the approximate location of each respondent is reported at an appropriate spatial scale.	Potential indicator of mobility and digital infrastructures and commoning opportunities
12	urbanity	categorical (single select 3 categories: Rural, Peri-Urban and Urban)	Self-reported level of urbanity of respondent's regular place of residence	Indicator of (infra-)structural conditions and commoning opportunities

Data Block 2: Opportunities for engagement

The second data block is designed to gather data relating to the existing opportunities for engagement in CCPs across the three FAs including the level of personal stocks and basic (infra-) structural access conditions for all participants.

Focus Area	Variable Name	Variable Type	Variable Description	Justification/ Use Case
	carnum	Categorical/ numerical drop down Non-electric, hybrid, electric	Number of cars owned by household + types of vehicles	Assessing mobility-related material stocks; type of car might affect willingness to go carless
	prknorm *(if carnum > 0*	*categorical* *single-select*	*Regular parking spot* *Where do you normally park your car when at home e.g. private space, shared space, on street etc.*	*Assessing material conditions and nature of infrastructure facilitating current mobility practices*
	share_avl_n	Categorical (Tick all that apply) -commercial -community -informal -none	Availability of Car Sharing Are any of the following car sharing options available in your local area? (include country specific examples where appropriate)	Assessing opportunities for car shedding/carlessness
	cycnum_n	nested drop down numerical	Number of functioning bicycles owned by household + type (standard, cargo, electric, other)	Assessing mobility-related material stocks: ownership of a functioning bicycle is a reasonable indicator of cycling intent.
	sqmetre	numerical	Self-reported estimated living space	Assessing dwelling-related material stocks

	sparerm	numerical	Describes the number of spare rooms that could be used as bedrooms available in the household	Indication of downsizing/sharing/commoning potential
	swpshare	Categorical (binary + string -Yes(with description) -No	Do you have a swap corner or other informal sharing system in your area?	Assessing existing structures
	shared_n	binary	Do you do have use of/have easy access to any of the following? -Shared workspace -Shared laundry room -Shared garden -Public Library	Assessing existing access and structures
	neighcom	categorical Multi-Select + String -neighbourhood watch -resident association -building management -gardening groups -other	Are there any formal or informal structures which facilitate sharing and collaboration with your neighbours	Indicator of existing localised social networks
	netaccq	ordinal (sliding scale) -No access -poor access, -good access, -very good access -excellent access	Self-reported quality of access to the internet at residence considering reliability and speed.	Indicating level of practical access for digitalisation

	mobage	categorical (Single Select Time scales)	How old is your smartphone (last option - I do not own a smartphone.	Level of digital engagement/access
	mbchnge *(if mobage != "I do not own"*	*categorical (Single Select Time scales)*	*After how many years do you normally replace your smart phone?*	*Level of digital engagement/access*
	onlinepay	categorical (binary)	Do you have a credit card or similar payment method that would enable you to pay for goods and services online?	Assessing existing level of digital engagement/access
	onplat(_n)	categorical (multi-select)	Are you familiar with (have you heard of) online second-hand trading platforms, including in your local area: (the most relevant sites to be listed for different countries.	Assessing existing level of awareness

Data Block 3: Competences

The third data block is designed to gather information about existing competences and skills for both current and potential future engagement in CCPs across the three FAs. This includes defined and recognised skills with entry conditions, existing levels of knowledge and the presence and availability of social networks and wider social competences and/or resources.

Focus Area	Variable Name	Variable Type	Variable Description	Justification/ Use Case
	licence	categorical	Do you currently hold a driving licence?	Practice Entry condition
	licncyr	numeric (four digit)	Year licence acquired	Indicator of experience and identifier of those who have had a licence for a lengthy period but who no longer own a car.
	carprev (where carnum =0)	*categorical*	*Did you own a car previously*	*Previous experience & ownership profile of carless household*
	canbike	Categorical (Binary)	Can you physically cycle a bike without difficulty?	CCP entry condition
	multimod	categorical (Binary)	Do you regularly combine different modes of transport (e.g. such as park and ride systems, or combining active, micro and/or automobility?)	Indicates existing/current competences
	regjour (if carnum != 0)	*categorical (binary) -Yes -No*	*If you suddenly had to do your regular journeys without the use of a car, would you know how to do this? (i.e. through public transport, cycling, walking other modes, car sharing etc.)*	*Assessing existing/current competences*

	jourdiff *if regjour = "No"*	*categorical* *(single select)*	*If not, how difficult do you think that would be? (Likert. 4-point scale)*	*Assessing existing/current perceptions of ease of engagement*
	wyusecar *(if carnum != 0)*	*ordinal*	*Rank the primary reasons for doing your regular journeys with the use of a car.* *- Travel time* *- Weather* *- Convenience* *- Lack of alternative means (i.e. no public transport route)*	*Assessing relative importance of barriers to carlessness*
	knwneig	Categorical	How well do you know your (immediate?) next door neighbours (Likert 4-point scale)	Assessing existing social capital
	neigcon	categorical (multi-select)	How likely would you be to contact your neighbours for help under the following circumstances. (four-point Likert) -Mobility need due to car breakdown -Emergency care (e.g. of child) -Care of house while away (e.g. watering plants) -Security concerns	Assessing existing social structures for CCP potential
	neigbrw	categorical (multi-select)	How comfortable would you be asking your neighbour to borrow the following items (four-point Likert) -car -e-bike -tent -power tools e.g. saw -hand tools	Assessing existing social structures for CCP potential

	ontasks_n	categorical (multi-select)	Can you perform the following tasks online? (country specific options) -Tax declaration, -TV/Radio licence, -Registration of Residence, -Apply for Official Documents (e.g. Passport or Drivers licence), -Buy tickets online -Shopping	Assessing existing level of engagement in digitalisation
	dghlpgiv	ordinal (single-select) -very often -often -occasionally -seldom -never	Do people ask for your help when solving digital/IT problems? E.g. setting up and connecting networked devices, installing software, syncing or transferring data etc. (five-point Likert)	Proxy for digital literacy and skills and competencies related to digitalisation
	dghlpask	ordinal (single-select) -very often -often -occasionally -seldom -never	Do you often ask for help solving digital/IT problems? E.g. setting up and connecting networked devices, installing software, syncing or transferring data etc. (five-point Likert)	Proxy for digital literacy and skills and competencies related to digitalisation

Data Block 4: Current practices

This data block focuses on surveying the level of (non)engagement reported by participants for pre-selected high impact CCPs as well as gathering information on the self-identified primary drivers and quality of engagement.

Focus Area	Variable Name	Variable Type	Variable Description	Justification/ Use Case
	cycling *(if canbike = "yes")*	*Ordinal* *-Never* *-Rarely* *-Monthly* *-Weekly* *-Daily*	*How often do you cycle?*	*Assessing circular practice engagement*
	carfrquse *(where carnum >=1)*	Categorical -Less than once a week -once a week -2-3 trips pw -4-6 trips pw -daily	Frequency of Use of household car(s). Number of times per week	Assessing material impact of use for car owners and get an indication of relative car dependency
	caravdis *(where carnum >=1)*	*Numeric* -< one hr pw -1-2 hrs pw -3-4 hrs pw -5-6 hrs pw -4-6 trips pw -daily	*Estimated Average time spent per week in household car*	*Assessing material impact of use for car owners*
	carlntrip *(where carnum >=1)*	*Categorical* *-Less than once a month* *-Once a month*	*Do you regularly take longer trips by car (2hrs+) i.e. trips outside of normal commuting e.g. holiday, leisure activities, to visit*	*Assessing material impact of use for car owners*

		-Every two weeks -Weekly	relatives/friends who do not live close by.	
	share_use *(If share_avl = 1)*	*Categorical* *(Tick all that apply)* *-Commerical* *-Community* *-Informal* *-I do not use car sharing*	*Do you regularly use any of the following car sharing options?*	*Assessing engagement in car sharing*
	shareif *(If share_avl = 0)*	*Ordinal* *-Very likely* *-Somewhat likely* *-Neither likely nor unlikely* *-Somewhat unlikely* *-Very unlikely*	*Would you be likely to use a car sharing option if one was to become available? (5-point likert)*	*Indication of willingness to share if car sharing was to become available.*
	shrnocar *(if carnum > 0 & share_avl = "0")*	*categorical* *(single-select)* *-very likely* *-somewhat likely* *-Somewhat unlikely* *-very unlikely*	*How likely would you be to choose to not own a car if adequate car sharing services were available to you?*	*Assessing willingness to engage in CCP under specific circumstances*
	share_for *(if share_use != 0)*	*Categorical + string (tick all that apply)* *-shopping* *-commuting* *-goods transport* *-family transport* *-visiting*	*What purposes do you typically use car-sharing for?*	*Assessing primary use*

		friends/family *-other*	
	share_wy *(if share_use != 0)*	*Ordinal (multi-select ranking + other string)* *-eco-friendly* *-lower costs* *-reduced burden of ownership* *-inc. availability* *-variety of cars available* *-other*	*Rank your primary reasons for engaging in car sharing*	*Assessing drivers of engagement in car-sharing for both Carless and non-carless households*
	flynum	categorical (single-select) Numerical drop down	How many times a year on average do you fly (i.e. how many return trips)? (1, 2, 3, 4, 5+, I don't fly)	*Assessing respondents use of highly resource intensive mobility*
	currshare	categorical (multi-select) + other string -Kitchen -bathroom -basement -garden -utility room -hallway -other	Do you share the following spaces with a tenant, housemate, neighbour, or other non-family member.	Assessing actual engagement
	borwtools	categorical (multi-select) + other string -car -e-bicycle	What tools or other occasional use items do you borrow from your neighbours?	Assessing actual engagement

		-bicycle -tent -power tools -hand tools -other		
	lendtools	categorical (multi-select) + other (string) -car -e-bicycle -bicycle -tent -power tools -hand tools -other	What tools or other occasional use items do you lend to your neighbours?	Assessing actual engagement
	rparself(_n)	categorical (multi-select) + other (string) -minor car repairs -bicycle -mobile phone -clothes mending -furniture -shoe repair -simple electronics -household appliances -other	Which of the following repair activities do you carry out? (List of common and less common repairs)	Assessing level of CCP engagement
	rparserv(_n)	categorical (multi-select) + other (string) -minor car repairs -bicycle -mobile phone -clothes mending -furniture -shoe repair -simple electronics -household	Which of the following repair activities do you purchase (List of common and less common repair services)	Assessing level of CCP service engagement

		appliances -other		
	sechand	categorical (single-select) -always -sometimes -seldomly, -never	I prefer to buy second hand rather than new. (Always, sometimes, seldomly, never)	Assessing level of willingness to engage in CCP
	buysec	categorical (single select) -very often -often -sometimes -seldomly -never	Do you buy second hand-goods online?	Assessing level of CCP engaged via digitalisation
	replace if buysec != "never"	categorical (single-select) -replaced item -additional item	Did your last second-hand purchase replace an existing item or was it simply bought as an additional item?	Assessing quality of CCP engagement
	sellsec(_n)	categorical (single select) -Yes often -Yes sometimes -yes rarely -never	Do you sell unwanted items online?	Assessing level of CCP engaged via digitalisation
	sellbcon If sellsec(_n) != "never"	categorical (single select) -Yes -No, would use other methods	Do you feel that you can resell more items instead of throwing them away because you can do so online, or would you use other methods such as flea markets etc.?	Assessing impact of digitalisation as a CCP enabler.

	noneed	Categorical (single select) -very often -sometimes -seldomly -never	How often do you buy things online you ultimately don't need? (4 point-likert)	Self-assessment of ultimate impact of CCP engagement

Data Block 5: Meanings and limits to engagement

This section of the survey gathers information on the motivations and meaning behind people's engagement in CCPs, focusing on their current perceptions of levels of difficulty and trust as well as limits to their willingness to engage in particular practices.

Focus Area	Variable Name	Variable Type	Variable Description	Justification/ Use Case
	carwnrnk *if carnum != 0)*	*ordinal + String* *-reliability* *-comfort* *-security* *-option value* *-capacity*	*Ranking of most important factors for ownership*	*Profiling of non-engagement drivers*
	carnornk *if carnum = 0)*	*ordinal + String* *-cost* *-safety* *-environ. concerns* *-*	*Ranking of most important factors for non-ownership*	*Profiling of engagement drivers*
	wuduspt_n	Ordinal Likert Rating of the following -reliability -frequency -accessibility -affordability -comfort -safety -functionality	How would you rate your current public transport provision in the following categories (4-point likert)	Profiling participants' current perception of public transport offering
	carfutr *(where carnum =0)*	*ordinal + string* *-relocating* *-starting a family* *-becomes affordable* *-other*	*Most likely reasons to own a car in the future*	*Ranking most likely reasons for not owning a car in the future*

		Most likely reasons to not own a car in the future	
nocarfut *(where carnum =1)*	*ordinal + string* *-cost* *-no longer able to drive* *-children grown up* *-other*		*Ranking most likely reasons for not owning a car in the future*
wudlnd(_n)	categorical (multi-select) -yes -maybe but only if they are a trusted friend -no -n/a	Where applicable, would you lend your neighbour the following items -car -e-bicycle -bicycle -tent -power tools -hand tools	Indicates differentiated willingness to engage regarding certain items while also providing more information on material stocks
wudntlnd(_n) *(if wudlnd(_n) = 0)*	categorical (multi-select + string) ranked	*If not, why not?* *-Insufficient levels of trust,* *-unacceptable level of risk,* *-lack of sufficient relationship* *-temporary loss of item use* *-risk of item not being returned* *-other,*	Assesses factors affecting willingness to share/lend differentiated by item category
wudshare	categorical (multi-select) -Kitchen -bathroom -basement -garden -utility room -hallway	Where applicable, would you share the following spaces with a tenant, housemate, neighbour, or other non-family member	Indicates differentiated willingness to share certain spaces
wudmove	categorical -with great reluctance -with some reluctance -somewhat	To what extent would you be happy to live in a smaller home?	Attitudes towards downsizing

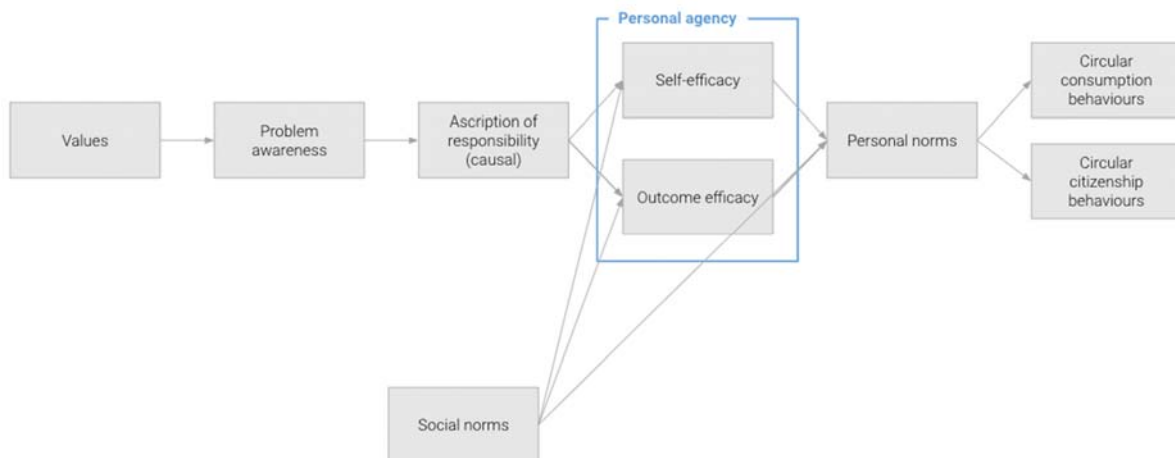|			
		happy -very happy	
	wudmvbe (if wudmv = "Somewhat happy or very happy")	*categorical + String (other)* *(single-select)*	*If happy to move, please select the most important determining factors if applicable.* *-lower running costs* *-ease of moving* *-likely to be able to stay in neighbourhood* *-don't need the space* *-lower cleaning burden*	*Ranking of reasons to downsize*
	wudmvif (if wudmv = "Not at all, with reluctance)	*Ordinal + String (other) (single-select)*	*If not, please select the most important determining factor?* *-cost/expense* *-inconvenience of moving* *-unlikely to be able to stay in neighbourhood* *-don't want to lose space* *-emotional attachment*	*Ranking of barriers to downsizing*
	digitrust	categorical (single-select) -Very good -good -fair -poor -very poor	How would you describe your ability to assess the security of your data when using digital services (five-point Likert)	Assessing participants' perception of their ability to assess risk
	digicons_n	categorical (single-select) -largely increased -slightly increased -no change -slightly decreased	In the last 10 years how do you feel has digitalisation affected your consumption of: (five-point Likert) -electricity -fuel -media -household goods and services	Assessing participants' perception of the impact of digitalisation on their consumption of certain goods and services

		-largely decreased		
	dgenable	categorical (single-select) -much harder, -slightly harder, -the same, -slightly easier, -much easier	In your view, in the last 10 years has it become harder or easier to perform the following basic functions online (5 point likert) -banking -shopping -searching for information -finding local services -basic communication (e-mail, video/voice calling etc.	Assessing participants' perception of the impact of increasing digitalisation on their ability to perform basic functions.
	Circular citizenship behaviours Example item: Signing a petition on the local, national, or international level that promotes circularity	12 items 6-point Likert scale ranging from (1) Never to (6) Frequently	Behaviours that are aimed at creating systemic change towards a CE by influencing other actors, e.g. governments, businesses, and other citizens	Behaviours that are essential for the CE transition; understanding prevalence of behaviours & of factors influencing them needed Behaviours also relate to reducing barriers for individual circular consumption, making it more attractive and feasible

Data Block 6: Motivational & cultural factors (barriers and enablers) influencing engagement in circular consumption behaviors

To understand motivational and cultural factors influencing the acceptability and adoption of circular consumption practices, this block focuses on factors such as people's values, beliefs, norms that can inhibit or promote engagement in circular consumption behaviours. As interventions are more effective, when aimed at determinants of behaviour, understanding these determinants is crucial (van Valkengoed et al., 2022). The proposed variables are based on Value-Belief-Norm (VBN) theory of which factors might influence engagement in circular consumption behaviours. These factors have previously been shown to relate to many different sustainable behaviours, and should therefore, also be highly relevant to circular consumption behaviours. Indeed, our pilot study indicates significant relations between the variables proposed in the model, such as between personal norms and i) the willingness to be carless, ii) using car sharing instead of owning a car, iii) living in a smaller living space, or iv) the willingness to share living spaces. Below the theoretical model is shown.

Proposed theoretical model

Variable Name	Variable Type	Variable Description	Justification/ Use Case
Values: **Biospheric values** Example item: Unity with nature: fitting into nature **Altruistic values** Example item: Equality: equal opportunity for all **Hedonic values** Example item: Self-indulgent: doing pleasant things	Scale for each value made up of 3-5 items; Answers for each item on a scale from (-1) opposed, (0) not important at all, to (7) supreme importance as a guiding principle in my life	Scale for assessing extent to which people endorse different values as guiding principles in their life	Values influence many different variables, such as more behaviour-specific motivating factors and actual behaviours, incl. various sustainable behaviours

Egoistic values, example item social power: control over others, dominance			
Problem awareness Example item: The current linear economy and corresponding consumption behaviours cause important environmental problems, such as climate change, loss of biodiversity, waste, and pollution	3 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Problem awareness captures the extent to which people are aware that environmental problems arise from the current linear economy and consumption behaviours	Problem awareness is necessary to understand the need for engaging in circular consumption behaviours
Ascription of causal responsibility Example item: I feel partly responsible for environmental problems that arise from the current linear economy and consumption behaviours	3 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Extent to which people feel that they are (partly) responsible for environmental problems arising from the economy and consumption	Ascription of responsibility is necessary so that people feel a need to act
Self-efficacy Example item: I feel capable of engaging in circular consumption behaviours	3 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Perception of how much people feel they are able to engage in a certain behaviour, i.e. circular consumption behaviour	Self-efficacy acts as a perception of contextual barriers on the engagement in circular consumption behaviours. Self-efficacy is likely influenced by the opportunity for engagement and competences; perceptions matter more than actual context
Outcome efficacy Example item: If I engage in circular consumption behaviours, I reduce environmental problems that arise from the current linear economy and consumption behaviours	3 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	The extent to which people believe that engaging in circular consumption behaviours is effective in reaching a goal, e.g. reducing env. problems	If people do not feel like their actions matter, they are a lot less likely to engage in them as they will not see the need or value to do so.
Personal norms Example item: It is my moral ideal to engage in circular consumption behaviours	5 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Feeling of moral obligation to engage in circular consumption behaviours	If people do not feel morally obliged to engage in circular consumption, they are a lot less likely to do so. People are motivated to act in line with their personal norms as they are motivated to be consistent, and as doing so elicits positive feelings (eg proud) and not doing so negative feelings (eg guilt)
Descriptive norms Example item: Most people close to me engage in circular consumption behaviours	3-5 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Perception of how many people close to one, engage in circular consumption behaviours	People's behaviours are influenced by their social surroundings; they think that when many people act in a certain way, it is probably sensible and normative to do the same
Dynamic norms Example item: More and more people close to me engage in	3-5 items 7-point Likert scale ranging	Perception of the increase in engagement	Besides being influenced by how many people engage in a behaviour (absolute number),

circular consumption behaviours	from (1) fully disagree to (7) fully agree	in circular consumption behaviours	people are also influenced by the "trend", so whether they perceive that more and more people are engaging in a behaviour, for the same reason as descriptive norms. Dynamic norms are particularly influential when the behaviour is not common yet (which is likely the case with many circular behaviours)

Data Block 7: Motivational & cultural factors influencing engagement in circular citizenship behaviors

Additionally, to engaging in circular consumption behaviours, which are focused on individual change, people can also engage in behaviours to target more structural barriers of a CE transition. We call these behaviours circular citizenship behaviours that can be targeted at influencing governments, e.g. through protesting or signing petitions, businesses, e.g. by advocating for more circularity of the organisation one works for, or other citizens, e.g. by spreading knowledge and awareness about circularity and circular behaviours to them. Circular citizenship behaviour is important as these can change the opportunities for engagement and competences that are likely to inhibit circular consumption.

We hypothesize that similar factors influence whether people engage in circular consumption and citizenship behaviours. As indicated above, values, problem awareness, and ascription of responsibility do not focus on a specific type of behaviour and are likely to affect both circular consumption and citizenship behaviour. Yet, the efficacy beliefs and norms we listed above focus on circular consumption specifically, so if we want to test the full model for circular citizenship behaviour, and therefore, how individuals can target systemic change towards a CE as well, we would need to add similar items, this time focusing on citizenship behaviours.

Variable Name	Variable Type	Variable Description	Justification/ Use Case
Self-efficacy Example item: I feel capable of engaging in circular citizenship behaviours	3 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Perception of how much people feel they are able to engage in a certain behaviour, i.e. circular citizenship behaviours	Self-efficacy acts as a proxy for contextual barriers on the engagement in circular citizenship behaviours
Outcome efficacy Example item: If I engage in circular citizenship behaviours, I reduce environmental problems that arise from the current linear economy and consumption behaviours	3 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	The extent to which people believe that engaging in circular citizenship behaviours is effective in reaching a goal, e.g. reducing env. problems	If people do not feel like their actions matter, they are a lot less likely to engage in them.
Personal norm, Example item: It is my moral ideal to engage in circular citizenship behaviours	5 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Feeling of moral obligation to engage in circular citizenship behaviours	If people do not feel morally obliged to engage in circular citizenship behaviours, they are a lot less likely to do so
Descriptive norms Example item: Most people close to me engage in circular citizenship behaviours	3-5 items 7-point Likert scale ranging from (1) fully disagree to (7) fully agree	Perception of how many people close to one, engage in circular consumption behaviours	People's behaviours are strongly influenced by their social surroundings
Dynamic norms Example item: More and more people	3-5 items	Perception of the increase of engagement	Besides being influencing how many people engage in a behaviour

close to me engage in circular consumption behaviours	7-point Likert scale ranging from (1) fully disagree to (7) fully agree	in circular consumption behaviours	(absolute number), people are also influenced by the "trend", so whether they perceive that more and more people are engaging in a behaviour

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