Policy Report for Inclusive Digital Co-creation

Deliverable 1.4.1

BECODIGITAL

BRAIN-be 2.0, Belgian Research Action through Interdisciplinary Networks,
Phase 2 (2018 – 2023)

Contract number: B2/223/P3/BECODIGITAL

Work Package 1
KU Leuven

December 20, 2024

Issued by:
Public Governance Institute [PGI], Faculty of Social Sciences, KU Leuven, Parkstraat 45, 3000 Leuven, Belgium.

RESEARCH CONSORTIUM

COORDINATOR

Prof. dr. Anthony Simonofski (UNamur – Namur Digital Institute)

AUTHOR(S) OF THIS REPORT

Dr. Laurien Coenen (KU Leuven - Public Governance Institute) (WP 1 – 6)

SUPERVISORS AND CONTRIBUTORS TO THIS REPORT

Prof. dr. Ir. Joep Crompvoets (KU Leuven – Public Governance Institute)

Prof. dr. Monique Snoeck (KU Leuven – Research Centre for Management Informatics)

Prof. dr. Trui Steen (KU Leuven – Public Governance Institute)

Elena Tiukhova (KU Leuven – Research Centre for Management Informatics)

PRIMARY RESEARCHERS WITHIN THE CONSORTIUM

Dr. Nicolas Bono Rossello (UNamur – Namur Digital Institute) (WP 3 – 4 – 5 – 6)

Dr. Antoine Clarinval (UNamur – Namur Digital Institute) (WP 3 – 4 – 5 – 6)

Cato Janssen (UAntwerp – Politics & Public Governance) (WP 2 – 6)

Loes Reijnders (UAntwerp – Politics & Public Governance) (WP 2 – 6)

Dr. Marlies Saelaert (Sciensano)

PARTNERS

Prof. dr. Corentin Burnay (UNamur – Namur Digital Institute)

Prof. dr. Wafa Hammedi (UNamur – Namur Digital Institute)

Prof. dr. Benoît Vanderose (UNamur – Namur Digital Institute)

Prof. dr. Wouter Van Dooren (UAntwerp – Politics & Public Governance)

Prof. dr. Koen Verhoest (UAntwerp – Politics & Public Governance)

PROJECT WEBSITE: SOC.KULEUVEN.BE/IO/BECODIGITAL

TABLE OF CONTENTS

RESEARCH CONSORTIUM 1
COORDINATOR 1
AUTHOR(S) OF THIS REPORT 1
SUPERVISORS AND CONTRIBUTORS TO THIS REPORT 1
PRIMARY RESEARCHERS WITHIN THE CONSORTIUM 1
PARTNERS 1
PROJECT WEBSITE: SOC.KULEUVEN.BE/IO/BECODIGITAL 1
TABLE OF CONTENTS 2
EXECUTIVE SUMMARY OF THE POLICY REPORT FOR INCLUSIVE DIGITAL CO-CREATION 4
1. INTRODUCTION 5
1.1 DIGITAL CO-CREATION 5
1.2 RELEVANCY OF DIGITAL CO-CREATION RESEARCH 8
1.3 RESEARCH AIMS AND QUESTIONS 9
2. LITERATURE STUDY 11
2.1 CITIZEN PRE-CONDITIONS FOR CO-CREATION 11
2.1.1 Theory of planned behaviour 11
2.1.2 Behavioural intentions as a function of attitudes towards co-creation 12
2.1.3 Behavioural intentions as a function of subjective norm(s) 14
2.1.4 Behavioural intentions as a function of perceived behavioural control 14
2.1.5 Participation, equally evident to all? 15
2.2 CITIZEN PRE-CONDITIONS WITH PARTICULAR RELEVANCE TO DIGITAL CO-CREATION 16
2.2.1 Attitudes towards digital co-creation—the tool fit and twist in external efficacy 16
2.2.2 SUbjective norm—the case of social pressure in anonymous online settings 16
2.2.3 perceived behavioural control—the layeredness of internal efficacy 17
2.2.4 Participation, Equally evident to all?—Reflections on the 'digital divide' 17
2.3 INTERNAL PRE-CONDITIONS 19
3. RESEARCH METHODOLOGY 21
3.1 A GENERAL POPULATION VIDEO SURVEY EXPERIMENT TO EXPLORE CITIZENS' WILLINGNESS TO CO-CREATE (DIGITALLY) 21
3.1.1 Research context 21
3.1.2 Modular questionnaire build-up and the experimental video design 21
3.1.3 Data cleaning procedure 23
3.1.4 Participants 23
3.1.5 Operationalisation of the Dependent variable 24
3.1.6 Operationalisation of independent variables 24
3.1.7 Operationalisation of control variables 27
3.1.8 Data analysis procedure 27
3.2 A USE CASE SURVEY TO COMPARE WILLINGNESS TO ACTUAL BEHAVIOUR 30
3.2.1 Research context 30
3.2.2 Modular questionnaire build-up 30
3.2.3 Data cleaning procedure 30
3.2.4 Participants 31
3.2.5 Operationalisation of the variables 32
3.2.6 Data analysis procedure 34
3.3 A FOLLOW-UP COMMITTEE FOCUS GROUP TO EXPLORE INTERNAL PRE-CONDITIONS 34
3.3.1 Research context 34
3.3.2 Participants 35
3.3.3 Data analysis procedure 35
3.4 SUPPLEMENTARY USE CASE INTERVIEWS 36
3.4.1 Research context 36
3.4.2 Cases 36
3.4.3 Interview procedure and supplementary documents 36
3.4.4 Data analysis procedure 37
4. DATA ANALYSIS, PART 1 – CITIZEN PRE-CONDITIONS BASED ON THE GPS 38
4.1 EXPLORING WHEN DIGITAL CONFIGURATIONS MARK A DIFFERENCE IN CITIZENS' INTENTIONS TO CO-CREATE 38
4.2 EXAMINING CITIZEN PARTICIPATION PROFILES ACROSS CO-CREATION MODES 40

4.3 Examining citizen participation profiles across co-creation mode configurations 43
4.4 Examining the hierarchical nature of pre-conditions for digital co-creation through classification trees 49
4.4.1 Digital ideation 49
4.4.2 e-voting 51
4.4.3 Virtual deliberation 54
4.4.4 Digital co-delivery 55
4.4.5 Average tree level and information gain rank 57
4.5 Intermediary conclusion 57
5. DATA ANALYSIS, PART 2 – CITIZEN PRE-CONDITIONS BASED ON THE UCS 59
5.1 Case descriptions 59
5.1.1 Cartoweb.be and the topomapviewer 59
5.1.2 Corona consultations 61
5.1.3 amai! vlaanderen 63
5.1.4 Burgerbudget genk: maak da mee 66
5.2 Analysis 69
5.2.1 Descriptives 69
5.2.2 Thorough analysis – What motivates people to take this step? 71
5.2.3 A functional comparison between the UCS and GPS 73
6. DATA ANALYSIS, PART 3 – INTERNAL PRE-CONDITIONS 75
7. RECOMMENDATIONS FOR PRACTICE 80
8. CONCLUDING REMARKS 86
8.1 Conclusion 86
8.2 Limitations and avenues for future research 87
REFERENCES 88
ANNEX 95
Supplement 1 – Principal component analyses (PCA) and operationalisation of the dependent variables 95
Supplement 2 – OLS regressions with intent to participate in a given step as dependent variable 98
Supplement 3 – use case overview 111
Supplement 4 – interview topic list (English version) 113

EXECUTIVE SUMMARY OF THE POLICY REPORT FOR INCLUSIVE DIGITAL CO-CREATION

The BELSPO BRAIN-be 2.0 BECODIGITAL project (2022-2024) researched, over a two-year period, the **conditions and tools for effective and inclusive digital co-creation in a Belgian federal context** (covering co-creation initiatives at both national and sub-national policy levels). Presented in this **policy report** are the (a) **citizen and** (b) **internal (pre-)conditions** that affect participation appetite and behaviour. Given their critical importance to the success rate of digital co-creation initiatives, the policy report also formulates (c) **recommendations** on addressing influential conditions in practice.

In this policy report, we commence with a small **introduction** to the relevancy of the digital co-creation topic. We continue by elaborating **frameworks** to oversee the multitude of potential citizen and internal (pre-)conditions for the digital co-creation of public policy and services based on research antecedents. From this framework, we then take a **closer look at** those **conditions** that prove **truly important within a Belgian federal context**.

When it comes to the **citizen (pre-)conditions**, we start our exploration with a video survey experiment conducted among a representative outtake of 1,035 Belgians. The key question addressed through this experimental set-up was: what makes Belgian citizens willing to engage in different co-creation designs? Next, we cross-check the findings on participation intentions with actual participation or participatory behaviour. Do the same conditions ensure that people are willing to participate and that they do so indeed? To this end, we surveyed the characteristics, beliefs and perceptions of 75 Belgians who took part in four digital co-creation use cases at national (i.e., the Carto Map Viewer and Corona Consultations), regional (i.e., Amai! Vlaanderen) and local level (i.e., Burgerbudget Genk). When it comes to the **internal (pre-)conditions**, we started our search with a focus group discussion that took place in the frame of the second BECODIGITAL follow-up committee. Committee members reflected on past and current internal experiences with organising digital co-creation: what were the challenges and opportunities they encountered throughout the process? These insights are then supplemented with information from use case interviews.

Before the results are detailed, the reader will find a methodology section introducing the research design and clarifying how we operationalised variables, collected our data and conducted their analysis. After the results section, the reader will find a discussion section in which we try to connect all evidence and crystalise a set of organisational strategies or **do's and don'ts** for practitioners and future organisers.

Finally, we advise the reader not to view or read this document in isolation from the findings from the other work packages. Indeed, this report will show that design choices can majorly impact who participates in digital co-creation and how and to what outcomes. For both technological design choices and potential outcomes, we explicitly refer to the work within work packages 2 and 3, respectively, for more information. A summary of all this information in more practical terms can also be accessed through the **BECODIGITAL Roadmap** (D2.3.1). This validated instrument supports future co-creation initiatives using digital technologies or targeting public (e-)services.

1. INTRODUCTION

By way of introduction, in this section, we first revisit BECODIGITAL's conceptualisation of 'digital co-creation' as already outlined in the Baseline Measurement (D1.1.1). We do so to delineate what it is (not) and keep a clear view on its many aspects or appearances. In a second step, we elaborate on the reasons for researching digital co-creation. In a third step, those will translate into this policy report's aim and concomitant research questions.

1.1 DIGITAL CO-CREATION

We start by revisiting Torfing and colleagues' (2019, p. 802) definition of **co-creation** that informed BECODIGITAL's outlining of the research object 'digital co-creation':

> A process through which two or more public and private actors solve a shared problem, challenge or task through a constructive exchange of different kinds of knowledge, resources, competences and ideas that enhance the production of public value […] or services.

In the Baseline Measurement (D1.1.1), we decomposed this definition and modelled it into an analytical framework to visualise, describe and overview digital co-creation initiatives:

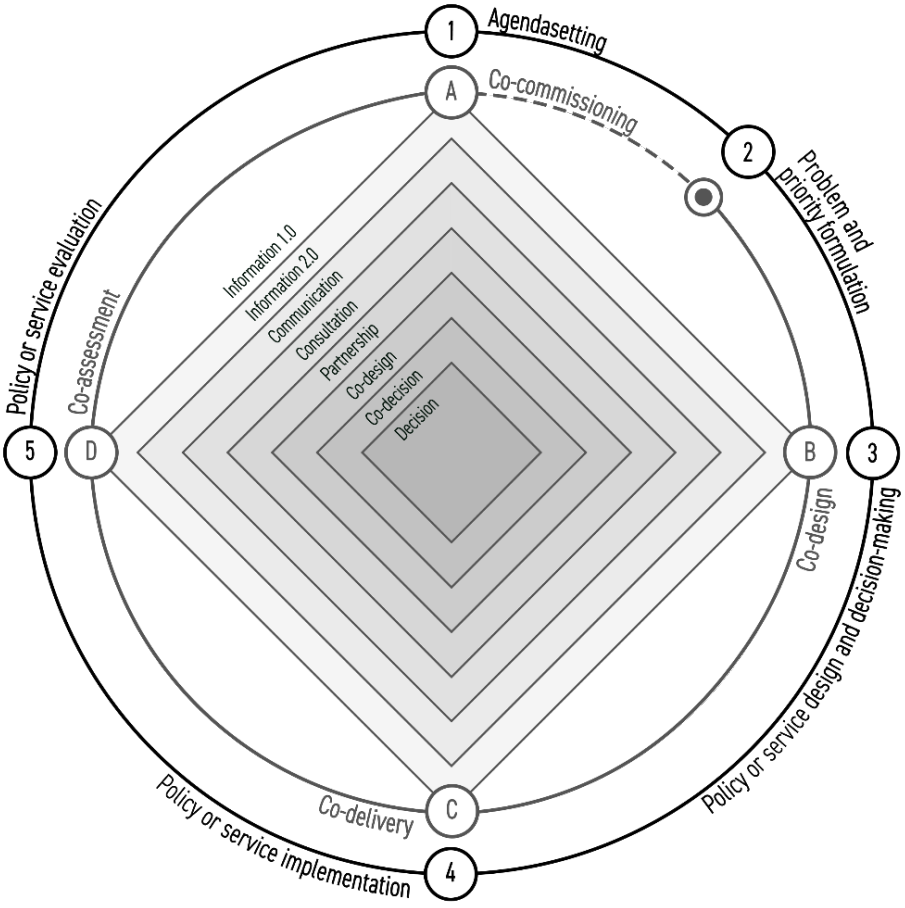


Figure 1. Visual summary of the analytical framework, part 1.

While the outer layer within Figure 1 represents the cyclicality in the three core functions of the public sector (i.e., public problem-solving, service provision and regulation) by combining the public policy cycle (see Howlett et al., 2020) and service delivery cycle (see Bovaird & Downe, 2008), the inner layer visualises the parallel modes of co-creation (Bovaird & Loeffler, 2013; Loeffler, 2021; Nabatchi et al., 2017). The **four modes** represent the following types of activities and objectives:

a) **Co-commissioning** refers to those activities in which public and private actors consult to highlight and demarcate shared problems, mutual challenges or common tasks; identify problem-solving or coping strategies (which might, for example, be directed at particular public services) and prioritise users and/or stakeholders, the needs to address, outcomes to achieve and resources to use.

b) **Co-design** evolves around *how* to address the common problem, challenge or task identified in the previous step so that the prioritised or desired outcomes are realised. Activities in this regard involve activating private actor resources (e.g., experiences and expertise or competencies, expectations and opinions) to create, plan and arrange public policies, services or regulations.

c) **Co-delivery** entails the activities between public and private actors to *co-implement, co-provide, co-manage, co-perform and co-improve* public policies, services and regulations. Hence, public and private actors jointly take action to achieve public outcomes and improve the delivery process along the way.

d) **Co-assessment** pertains to those activities in which public and private actors work together to monitor and evaluate the performance, quality and improvement areas of public policy, services or regulations.

Each co-creation mode can involve **a wide variety of stakeholders** (i.e., governmental actors, citizens, academia and research, private sector and non-profit actors) and deploy **different participation methods** (i.e., pertaining to the activities in which stakeholders are engaged), **sequencing arrangements** (i.e., pertaining to the steps or phases in which activities are organised), **logics about the level of involvement and decision-making power** (i.e., pertaining to stakeholders' allowed or allocated level of autonomy and power within the co-creation process) **and digital tools or technologies** (i.e., pertaining to the instrumental characteristics of a technology for which Aceto et al., 2018 discern sensing, communication, processing and actuation) to achieve its objectives. Using Douay's (2018) slightly altered version of Arnstein's (2019) ladder of citizen participation, we discerned eight distinguished layers of stakeholder involvement and decision-making power in digital co-creation, also presented in Figure 1:

- At the **information 1.0** layer, stakeholders are passive recipients of information. Public professionals inform them about decisions that have been made and why. The objective of this layer is to educate, empower or nudge. In itself, this layer can objectionably be described as co-creation. However, in some instances, it is neither an unthinkable nor undesirable stepping stone in the co-creation process.
- At the **information 2.0** layer, stakeholders are informed and can give feedback on the information received (e.g., by liking a policy update on a local government's social media channels), yet nothing is

done with this input. No direct communication between third-party actors and the organising public professional(s) exists.

- At the **communication** layer, a direct line of communication between third-party actors and the organising public professionals exists, yet nothing much is done with the input as it does not mark an end in itself. Third-party actors, for example, can ask questions about a particular e-service and be helped personally to understand and use it. However, the information from this direct interaction is not considered further in policymaking or service (re)design.
- At the **consultation** layer, enquiries are set up to purposefully gather information (e.g., about aspirations, expectations or needs) from third-party actors. They might, for example, be asked to complete a survey or participate in a meeting or discussion panel. In doing so, however, these actors do not possess any power to influence or affect change as the organising, collecting and processing public agent can freely decide if and how the information will be used.
- At the **partnership** layer, third-party actors advise and plan around the objectives set by the public professionals, who retain the right to judge the advice's quality, legitimacy and feasibility. Third-party actors are, therefore, allowed considerably more power to influence change: when their engagement remains within the confines of the co-creation initiative, they can be reasonably certain that the organising public entity or professionals will use their input. Although the decision-making power remains unilaterally with the public organising actor, they must justify why they disregard any recommendations, choices or preferences.
- At the **co-design** layer, third-party actors have slightly more to contribute as the objectives are formable, too. Only the ground rules, gridlines or confines for participation are fixed.
- At the **co-decision** layer, public and private actors share responsibility for planning, strategic decision-making and service delivery—both parties are accountable to each other and must agree.
- At the **decision** layer, the actor(s) that find themselves here have the final vote and, hence, the firmer power position. Justification for decisions might, yet does not need to be, provided.

Moreover, different digital tools or applications can be connected to each of these layers as they serve different objectives and allow distinct levels of stakeholder involvement in co-creation (Douay, 2018; Karlsson et al., 2012; Lago et al., 2019; Lember et al., 2019):

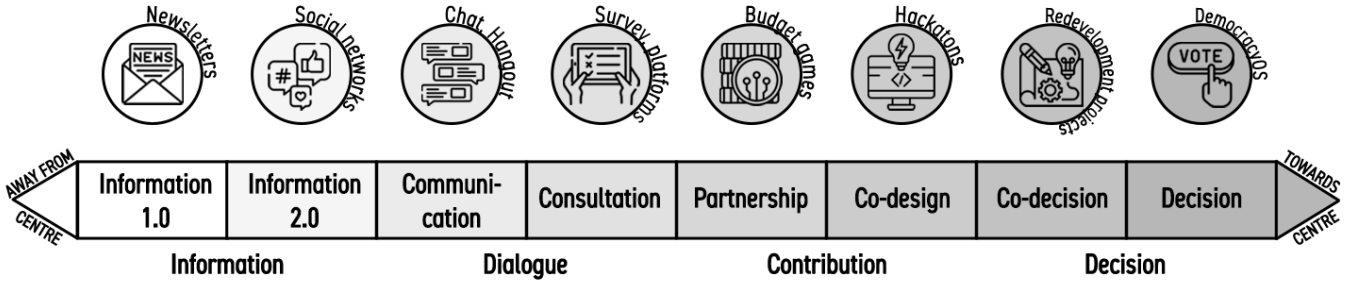


Figure 2. Visual summary of the analytical framework, part 2.

Finally, the twofold interpretation possibility of 'digital co-creation' requires mentioning. **Explicitly**, 'digital co-creation' can refer to all modes of co-creation as long as they deploy digital tools, technologies or applications to engage stakeholders in public problem-solving or service delivery. **Implicitly**, 'digital co-creation' can also be directed at the co-creation (either through analogue, hybrid or digital means) of e-services. Although we allowed both interpretations of 'digital co-creation' to guide our case selection for this policy report (see '3.4 Supplementary use case surveys'), almost all Belgian cases mentioned below fit the explicit interpretation.

Of course, the previous paragraphs are only an introductory summary of the **Baseline Measurement** deliverable to remind the reader of the operationalisation choices made and analytical framework(s) used within BECODIGITAL. Readers are referred to the original document for a more comprehensive overview of how we arrived at both.

1.2 RELEVANCY OF DIGITAL CO-CREATION RESEARCH

Digital technologies can alter how citizens interact with their government(s) and ease an active **engagement** in the policies they are subject to and the services they receive (Casula et al., 2022; Elstub & Escobar, 2019; Lember et al., 2019; Linders, 2012). Interacting with external stakeholders, such as citizens, and gathering their input for smarter decision-making and customised service delivery, for example, can now happen at an unprecedented scale, anywhere and at any time, through engaging interfaces with AI-enhanced support (e.g., Bono Rossello et al., 2024; Dugstad et al., 2019; Lember et al., 2019; Simonofski et al., 2019). That can prove particularly interesting to those who are unlikely, lack time to participate in more traditional, person-to-person co-creation, or require more tailored support (Elstub et al., 2021; Eseonu, 2022). **However**, despite 'civic tech optimism' (see Lember et al., 2019), the growing number of practical applications and slowly acceding body of research (Leino & Puumala, 2021; Rodriguez Müller, Casiano Flores, et al., 2021), **questions remain** as to what spurs external stakeholders to digital co-creation, how to guarantee inclusion on all ends of the initiative and deliver on desired output and outcomes in a viable way (e.g., Brandsen et al., 2018; Rodriguez Müller et al., 2024; Russon Gilman & Peixoto, 2019; Schelings et al., 2023).

An essential part of answering these questions includes **mapping stakeholder pre-conditions** for (sustained) participation as their expectations and opinions vis-à-vis oneself and the initiative are vital to (a) whether and (b) how co-production will occur and reach its full potential (e.g., Callens, 2023; Van Eijk & Gascó, 2018). In this respect, one needs to be mindful of the 'full potential' sought after, as the design choices made in its pursuit are by no means trivial (Best et al., 2019; Farr, 2016; Mukherjee & Mukherjee, 2018). In fact, **design choices** can greatly affect, amongst others, citizens' willingness and internal stakeholders' ability to co-create given the different expectations and challenges they impose (Brandsen & Honingh, 2016; Jo & Nabatchi, 2018; Linders, 2012; Russon Gilman & Peixoto, 2019; Schelings et al., 2023; Torfing et al., 2019). Participation methods (i.e., pertaining to how citizens are activated) mark the most obvious example in this regard, as activities such as voting place less demand on citizens' skills than deliberation and discursive expression or essay-based ideation. The latter might furthermore generate an information overload, complicating processing on the internal side (Lega et al., 2024). Another example are technological set-ups: some require active instead of passive involvement (e.g., communication vs. sensing tools as thoroughly described by Lember et al., 2019); synchronous rather than asynchronous interaction (e.g., discursive expression through real-time video-conferencing vs. time-independent ideation platforms); and guarantee anonymity instead of requiring identification to contribute (Elstub et al., 2021). Based on the interplay of all these configurational or design features, different segments of our targeted audience are likely to engage or refrain from doing so (Schelings et al., 2023). That puts different demands to the organisers' skills in activating them and processing their input. It has been shown, for example, that anonymity encourages particularly the seldom heard to participate (Baek et al., 2012) yet might affect the quality of interaction (Elstub et al., 2021).

1.3 RESEARCH AIMS AND QUESTIONS

This policy report demonstrates the complexity of citizen pre-conditions and the multi-faceted character of internal pre-conditions when deploying digital co-creation designs. It offers a framework of relevant concepts for studying both and formulates some points of attention and recommendations for future co-creation initiatives with Belgian citizens. To achieve these aims, the following **research questions** will be addressed throughout this policy report:

1) When (i.e., during which modes and concomitant participation methods) does a digital configuration make a difference in *citizens' intentions* to co-create?

2) Among which citizens does a digital configuration affect *co-creation intentions*?

    a. How do personal demographics (i.e., age, gender, educational attainment and occupational status) and evaluative beliefs (i.e., attitudes towards participation, subjective norm and perceived behavioural control) associate with Belgian citizens' intentions to co-create?

b. Do personal demographics (i.e., age, gender, educational attainment and occupational status) and evaluative beliefs (i.e., attitudes towards participation, subjective norm and perceived behavioural control) associate differently in co-creation stages organised digitally vs. in an analogue fashion?

c. Which points of attention regarding personal demographics (i.e., age, gender, educational attainment and occupational status) and evaluative beliefs (i.e., attitudes towards participation, subjective norm and perceived behavioural control) can be drawn for (semi-) governmental actors who wish to involve a diversified set of citizens in the digital co-creation of policies, services and/or regulations?

3) Which personal demographics (i.e., age, gender, educational attainment and occupational status) and evaluative beliefs (i.e., attitudes towards participation, subjective norm and perceived behavioural control) characterise *citizens who digitally co-create* with a Belgian federal, regional or local (semi-) governmental actor?

   a. Do these personal demographics (i.e., age, gender, educational attainment and occupational status) and evaluative beliefs (i.e., attitudes towards participation, subjective norm and perceived behavioural control) differ fundamentally between digital co-creation initiatives organised at the federal, regional and local level?

   b. How do the characteristics of Belgian citizens willing to participate compare to those who have already truly co-created with a Belgian federal, regional, and local (semi-)governmental actor through digital means?

   c. Which points of attention, based on the UCS dataset and interviews, can be drawn for (semi-) governmental actors who wish to involve Belgian citizens in the digital co-creation of policies, (e-)services and/or regulations in a meaningful way?

4) What common *challenges* do organisers of digital co-creation encounter *internally*?

   a. Where are these challenges situated in the production model of performant digital co-creation?

   b. Which points of attention regarding internal pre-conditions can be drawn for (semi-) governmental actors who wish to digitally co-create policies, services and/or regulations with external stakeholders?

5) Which overarching *recommendations* can be formulated regarding inclusive digital co-creation with citizens in a Belgian federal context?

Answering these questions will tell the reader more about *when* and *for whom* (i.e., both internally as well as externally) digital co-creation configurations impose (additional) barriers that necessitate thoughtful strategies on inclusion and organisation to ensure that desired outcomes and objectives are reached.

2. LITERATURE STUDY

In order to answer the research questions above, the reader is introduced to the literature on citizen and internal pre-conditions for willingness to co-create with respectively (semi-)governmental entities and other non-state actors. Whereas each time we will first delve into a more general overview of pre-conditions, we reflect on those with particular or peculiar relevance in specifically digital co-creation next. Moreover, we will reflect on how willingness to engage or participate can explain actual co-creating behaviour.

In sum, we will be deducing frameworks from the research evidence that will inform the data collection and operationalisation and, stepstone its analysis.

2.1 CITIZEN PRE-CONDITIONS FOR CO-CREATION

Various pre-conditions are believed to incite or keep citizens from engaging in co-creation with their government, (semi-)governmental actors or organisations (e.g., De Jong et al., 2019; Steen, 2021; Van Eijk & Gascó, 2018; Vicente & Novo, 2014). While some pre-conditions have repeatedly been confirmed by research, others rendered oscillating, context-bound results (Leino & Puumala, 2021; Parrado et al., 2013; Wijnhoven et al., 2015). In what follows, we provide an overview of frequently mentioned pre-conditions in citizen participation and co-creation literature and elaborate on these with particular importance in digital initiatives. This overviewing exercise brings us to the nexus between co-creation and technology acceptance. For overview purposes, the most common pre-conditions will be structured and discussed along Ajzen's (1991) **Theory of Planned Behaviour (TPB)**.

2.1.1 THEORY OF PLANNED BEHAVIOUR

Although **TPB** makes **only one of many models** that can be deployed to predict technology-related behaviour, as a general psychological theory, it proves most versatile for studying citizens' intentions to digitally co-create. Its core components—which this report describes below—allow a filling-out in line with this public sector field of study without profoundly altering their meaning. On the contrary, components within information system models such as Task-Technology Fit (TTF) (Goodhue & Thompson, 1995) or the (updated) Unified Theory of Acceptance and Use of Technology (UTAUT2) (Venkatesh et al., 2003, 2012, 2016), often prove less fitting, too narrow or even redundant, stemming from commercial and private sector applications. That goes without saying, however, that certain aspects or extensions (Tamilmani et al., 2021) of these models prove interesting regardless.

According to TPB, a person's **behavioural intentions herald** their **non-routine behaviour**, such as participation in a co-creation initiative through digital means. Behavioural **intentions** themselves are **shaped by three evaluative beliefs**: (a) attitudes towards the particular behaviour, which, in this case, involves a weighing-up of the pros and cons of participation; (b) subjective or perceived social norm, which refers to the pressure to participate a person perceives to emanate from one's social environment and; (c) the estimation of one's ability to actually portray the behaviour, also termed perceived behavioural control.

Each category of these evaluative beliefs will be thoroughly detailed below, linking them to the pre-conditions most commonly found to affect citizens' intention to engage in digital co-creation by research antecedents. Furthermore, we also describe how **personal features**, such as gender or one's employment status, can impact the behavioural intentions equation (Ajzen, 2011). Figure 3 visualises a preliminary TPB model applied to digital co-creation. This figure is gradually expanded throughout subsequent sections to form the comprehensive model presented in Figures 4 and 5 (cf. infra).

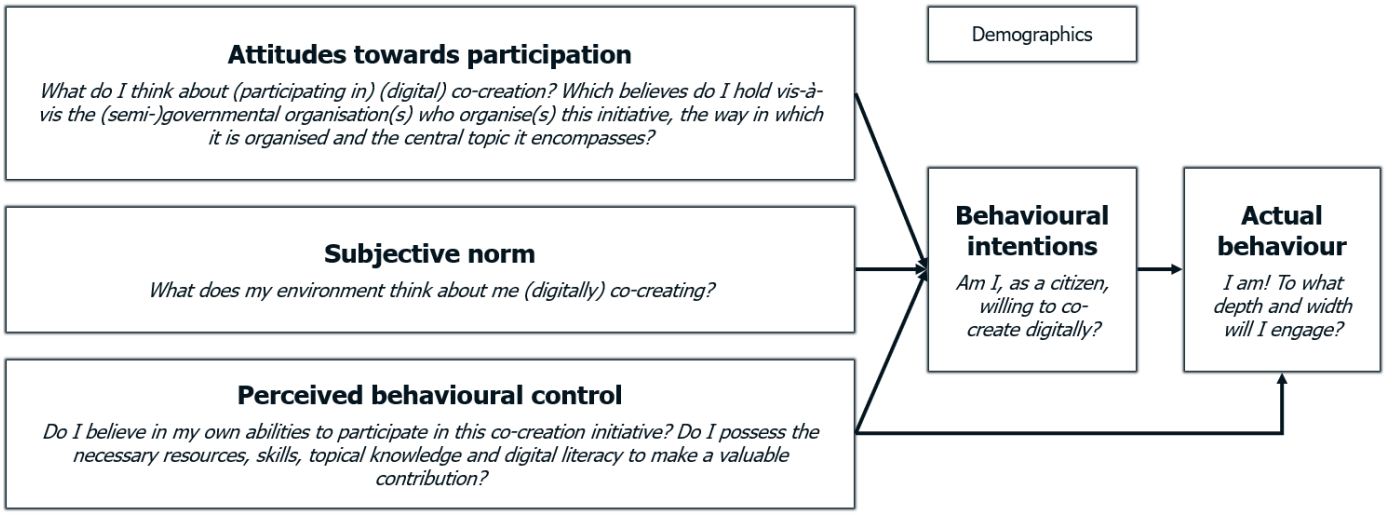


Figure 3. Visualisation of the preliminary TPB model applied to digital co-creation.

Before delving deeper into each of the three evaluative beliefs categories, the **direct pathway** between perceived behavioural control and actual behaviour requires further clarification. Indeed, sometimes, intentions are not nearly enough to get citizens to participate digitally (Abu-Tayeh et al., 2018; Cote et al., 1985). Our intentions might, for example, signal a desire to contribute in whatever way fits or is required, yet resource availability (such as a shortage of time or digital mediums) might logically prevent us from doing so. The most straightforward example is internet access: without it, submitting one's ideas to a digital platform will not be possible, regardless of how many intriguing suggestions we can formulate. Hence, certain aspects of perceived behavioural control, apart from their indirect effect through behavioural intentions, might also sort a direct, more pressing effect on actual behaviour.

2.1.2 BEHAVIOURAL INTENTIONS AS A FUNCTION OF ATTITUDES TOWARDS CO-CREATION

Upon formal invitation, a person's beliefs about (a) the (semi-)governmental organiser of the initiative, (b) the topic inviting co-creation and the way the process is organised, next to (c) the value of citizen participation more in general, will likely impact his or her attitude towards the requested behaviour (De Jong et al., 2019; Holgersson & Karlsson, 2014; Lee & Kim, 2018). In short, citizens should experience **external efficacy**—a basic confidence in the usefulness of investing valuable time and effort in digital co-creation. Usefulness, on the one hand, emanates from a firm belief that the (semi-)governmental actor that invites

digital co-creation (a) will be responsive to our demands and contributions (Craig et al., 1990), (b) has the means and sincere intention to involve us in a meaningful way (Bovaird et al., 2016) and (c) can be trusted to perform decently, deliver qualitative services and bring about change when required (A. Khan & Krishnan, 2021; Lowndes et al., 2001; Parrado et al., 2013; Van Eijk et al., 2017; Wijnhoven et al., 2015). On the other hand, usefulness also stems from the personal conviction that citizen participation is an activity worth pursuing and that we, as co-creators, can bring about change (De Jong et al., 2019). Assessing whether a public entity performs decently and whether its intentions can be trusted implies being familiar with its operations and taking a certain **interest in the political or policy level** at which it functions (De Jong et al., 2019; Vicente & Novo, 2014).

Apart from the (semi-)governmental organiser, the **topic or theme** over which co-creation happens, matters too. For example, crises might fuel communal interest and engagement but require swift action, complicating lengthy and reasoned co-creation processes (Elstub et al., 2021). And while politically sensitive or contested topics might do the same, they potentially entail gaps between stakeholders too deep to collaborate or learn from one another—a basic premise of co-creation, withal (Lember et al., 2019; Schelings et al., 2023). Does this imply that co-creation better restricts itself to low-risk public services or policy areas? Not necessarily, according to Torfing et al. (2019), yet some topics succeed better in engaging citizens simply because they perceive them as mattering more (Lowndes et al., 2001; Van Eijk & Gascó, 2018; Van Eijk & Steen, 2016). In that sense, **saliency** "concerns the sense of a project being needed, as the service provided affects co-creators themselves, their family or loved ones; but may also refer to the perception of citizens as to whether a serious problem is being tackled" (Steen, 2021, p. 510). Serious, in that sense, are those problems that appeal to personal interests and self-interest regardless of whether they are being addressed in an analogue or digital way.

Next, contemplating the usefulness of participation in (digital) co-creation also entails pondering whether it might deliver a sense of enjoyment, fun (Wijnhoven et al., 2015) or personal gratification (De Jong et al., 2019). With **hedonic motivation**, we delve into a concept often utilised in technology acceptance literature (e.g., Brown et al., 2010; Tamilmani et al., 2021; Venkatesh et al., 2003, 2012, 2016) to explain people's willingness to use a particular technology or product. Although perceived as the purest of motivations, corresponding to Deci and Ryan's (2000) intrinsic motivation, other types of motivation are also thinkable, such as external regulation (Ryan & Deci, 2000, 2020). For the latter, however, research antecedents showed how, amongst others, monetary rewards often hardly work within the frame of co-creation (Alford, 2002; Steen, 2021; Van Eijk et al., 2017; Vanleene et al., 2017).

Finally, and as already pointed out above, within any given co-creation initiative, specific **design** elements can affect citizens' willingness to co-create because of the unique expectations and challenges they impose (Brandsen & Honingh, 2016; Jo & Nabatchi, 2018; Linders, 2012; Russon Gilman & Peixoto, 2019; Schelings et al., 2023; Torfing et al., 2019). Citizens might not always consider the design choices made as adequate fits to the co-creation initiatives' ends and, thence, a justification of what is asked of them.

2.1.3 BEHAVIOURAL INTENTIONS AS A FUNCTION OF SUBJECTIVE NORM(S)

A second category of evaluative beliefs believed to affect a citizen's willingness to co-create is the **subjective norm**. Subjective norm refers to the implicit and explicit social cues we receive—or more precisely, perceive to receive—about the desired behaviour (Ajzen, 1991). Subconsciously, we pose ourselves the question of what our environment thinks about us co-creating (digitally). The answer is likely directly shaped by whether or not people close to us value participation in this or similar initiatives themselves. And whether they will likely motivate or even invite us to engage (Van Eijk & Steen, 2016). In more extreme instances, we may even experience (dis)approval and thus direct **pressure** (not) to participate. Indirectly, the answer can also be shaped by how **well-connected** we feel **to** our **neighbourhood or community** (Letki & Steen, 2021; Voorberg et al., 2015). When they co-create, we might be apt to do so too. Or, when co-creation affects them, we might feel inclined to contribute for their sake.

2.1.4 BEHAVIOURAL INTENTIONS AS A FUNCTION OF PERCEIVED BEHAVIOURAL CONTROL

A third category of evaluative beliefs refers to our estimation of our own abilities to truly co-create (digitally). Do we possess the necessary skills (e.g., civic ones when co-creation involves presenting, explaining or discussing one's ideas), topical knowledge and resources to make a valuable contribution (Alves & Wagner Mainardes, 2017; Hattke & Kalucza, 2019; Van Eijk & Steen, 2014)? Given that an exchange of information, knowledge or resources through interaction marks a core characteristic of co-creation (Torfing et al., 2019), citizens should feel sufficiently capable of doing so (digitally) (Lember et al., 2019). Because, building on Bandura's (1977) social-cognitive theory, it is expected that higher levels of self- or **internal efficacy** make people cope better with new demands posed to their knowledge and skills (Bandura, 1997). It makes us less likely to shy away from new or extra-challenging activities, such as participation in digital co-creation (Holgersson & Karlsson, 2014; Steen, 2021).

While a low or negative assessment of one's own ability can greatly limit intentions to participate, some facilitators are known to mediate this negative effect. For example, knowing that you lack topical knowledge might not prove an insurmountable problem when you trust that the organisers of the initiative are likely to provide you with the basic understanding needed to participate (Callens, 2023; Karlsson et al., 2012; Parrado et al., 2013; Viglia et al., 2018) or knowledge of where and who to turn to when problems, issues or concerns arise throughout your (digital) involvement. Moreover, co-creation initiatives ideally follow a universal design that makes them as accessible as possible to citizens, regardless of age, education level, disability or other factors (e.g., by using plain, explicit and simple language when inviting citizens and describing the objectives and set-up). We capture all these facilitators with the term **'facilitating conditions'**.

Next, **prior experiences** can be a powerful breeding ground for future engagement—at least when these experiences are positive (Rodriguez Müller, Lerusse, et al., 2021; Van Eijk & Steen, 2016) regardless of

whether co-creation happens through analogue, digital or hybrid means. Finally, situational factors, such as **time availability**, can constrain our intentions to portray the requested behaviour (Cote et al., 1985).

2.1.5 PARTICIPATION, EQUALLY EVIDENT TO ALL?

Although not initially included or considered in the TPB (Ajzen, 1991, 2011), technology acceptance scholars added demographics as control variables to their partly TPB-inspired models (see, for example, Brown et al., 2010; Venkatesh et al., 2003, 2012, 2016). According to Tamilmani and colleagues' (2020) meta-analysis of studies investigating path relationship with UTAUT(2), particularly age and gender often serve as control or moderating variables. From a co-creation point of view, much theorising on personal characteristics affecting one's willingness to engage has been going on (Bovaird et al., 2015; De Jong et al., 2019; Steen, 2021; Van Eijk & Gascó, 2018). Overall, members who are part of wealthy communities (i.e., male, highly educated, in possession of sufficient means and a non-minority background) are believed more likely to engage in citizen participation simply because they find themselves in a better-equipped position to do so, possessing the required time, resources and know-how (Szesciło, 2018; Verschuere et al., 2012). However, empirical evidence shows these assumptions are less unambiguous as **demographics** frequently **render complex, mixed and inconsistent research findings**. This even leads Wijnhoven et al. (2015) to conclude that demographics do not matter at all.

Piercing the descriptions above together renders a first extended version of our digital co-creation framework, as presented in Figure 4.

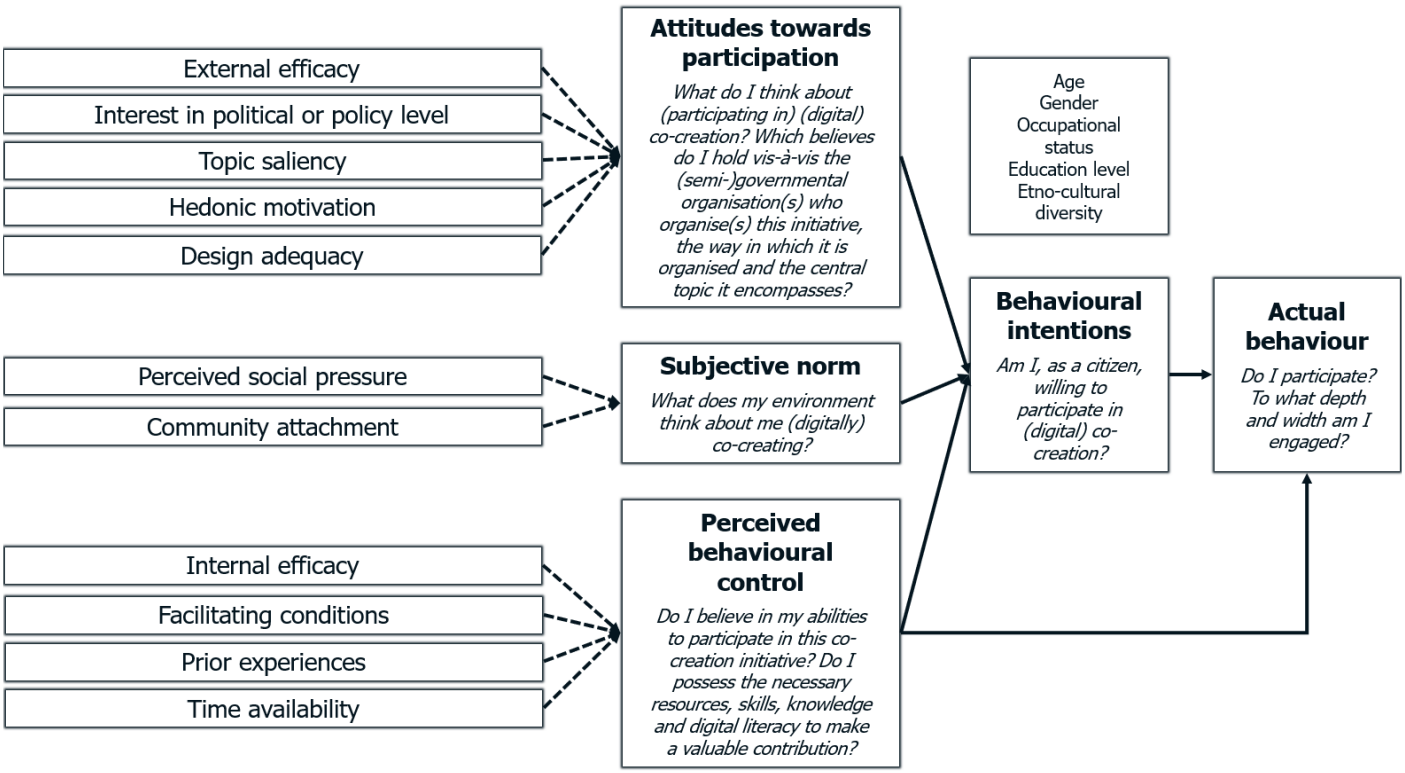


Figure 4. Visual summary of citizen pre-conditions to co-create public policy and services, inspired by TPB.

2.2 CITIZEN PRE-CONDITIONS WITH PARTICULAR RELEVANCE TO DIGITAL CO-CREATION

The attentive reader will notice, however, that many pre-conditions outlined in the above framework are likely to influence citizens' willingness to engage in analogue co-creation similar to digital co-creation (e.g., interest in the political or policy level, topic saliency or prior experiences). **Some** other **pre-conditions**, however, require a more thorough discussion because they **add a layer** (cf. infra' internal efficacy') **or** even **twist** (cf. infra 'external efficacy') **when using digital methods, tools or channels** to effectuate citizen co-creation. How exactly, we will zoom in on now. To this end, we follow the structure provided by the framework and first consider external efficacy and tool adequacy as part of the design choices. We then consider the phenomenon of social pressure in a digital environment, after which we divide the variable internal efficacy into two parts to account for self-efficacy beliefs specifically linked to the use of digital applications. We conclude by reflecting on how demographics can matter despite Wijnhoven et al.'s (2015) bold statement—they matter in their connection to a 'digital divide'.

2.2.1 ATTITUDES TOWARDS DIGITAL CO-CREATION—THE TOOL FIT AND TWIST IN EXTERNAL EFFICACY

Concerning particularly digital co-creation, one more specific **design** element might affect citizens' willingness to co-create: whether or not a person perceives the chosen **digital tools** and corresponding procedures as **adequate fits** to the project's ends and participation activities required. When invited to deliberate with fellow citizens, for example, one can easily perceive a video conferencing tool as a redundant and, above all, impoverishing alternative to face-to-face debate as it limits the possibility of interpersonal contact. After all, meeting (new) people can be one of citizens' motivations for participating (Van Eijk & Gascó, 2018; Van Eijk & Steen, 2016). Connecting design to external efficacy, moreover, Simonofski et al. (2021) identified visible government usage of submitted ideas as an important driver for citizens' willingness to engage. Organising qualitative feedback loops within the tools' design can motivate citizens to vote, discuss and submit ideas on particularly participation platforms. Nevertheless, we expect **external efficacy** to be more decisive in analogue participation as the cost of participation is higher. Furthermore, as co-creation sometimes "appears to depend in part on awareness of a shortfall in public performance on outcomes" (Parrado et al., 2013, p. 85), lower levels of external efficacy might even increase willingness to participate digitally as it offers a great venue to easily (and often anonymously) vent frustration (Elstub et al., 2021).

2.2.2 SUBJECTIVE NORM—THE CASE OF SOCIAL PRESSURE IN ANONYMOUS ONLINE SETTINGS

Despite the often-assumed positive association, in the study by De Jong et al. (2019) among Dutch citizens, **subjective norm** failed to significantly explain their willingness to hypothetically participate in the digital configurations of a provincial co-creation initiative. The study by Rodriguez Müller et al. (2024) also found **community attachment** to function in a way that contradicts prior research findings. Why this appears to be the case in two co-creation settings where digital tools are deployed still requires further clarification. A

possible explanation might lie in their **anonymity and remoteness**: as participation of yourself and others around you is much less visible, so are the pressure and reputation that flow from it.

2.2.3 PERCEIVED BEHAVIOURAL CONTROL—THE LAYEREDNESS OF INTERNAL EFFICACY

The **internal efficacy** described above **marks a** particularly interesting and **multi-layered concept** in digital co-creation settings where an additional set of competences (e.g., the ability to engage with an app or to find your way around a digital platform) is required (Brown et al., 2010; Wang et al., 2014). Hence, not only **civic efficacy** is likely at play but also **digital efficacy**—a basic confidence in one's skills to contribute digitally or to learn how to quickly when one does not yet possess the right skills (Vicente & Novo, 2014). In that sense, **facilitating conditions** should not only apply to the content-wise aspects of a co-creation initiative but also the digital side of things. Wolf et al. (2017), for example, showed that clear, intuitive and user-friendly designs increase willingness to use a particular technology.

Furthermore, an extended reflection on **time availability** or the assumption that the less free or spare time we perceive to have, the less likely we will be to co-create (Holgersson & Karlsson, 2014). A digital alternative to participation offers added value, allowing flexibility for citizens who lack the time (e.g., those with packed agendas, such as over-solicited citizens) to participate (Russon Gilman & Peixoto, 2019; Simonofski et al., 2019). However, we expect the effect size of these benefits to be greatest in those instances where the advantages of digital vis-à-vis analogue are most outspoken (such as in ideation and voting activities, which, unlike video conferencing, do not require a fixed time nor place to participate).

2.2.4 PARTICIPATION, EQUALLY EVIDENT TO ALL?—REFLECTIONS ON THE 'DIGITAL DIVIDE'

Despite the inconclusive results, we can assume that basic demographic characteristics such as **age** (Lee & Kim, 2018; Parrado et al., 2013; Rodriguez Müller et al., 2024; Rodriguez Müller, Lerusse, et al., 2021; Vicente & Novo, 2014), **gender** (Parrado et al., 2013; Rodriguez Müller et al., 2024; Rodriguez Müller, Lerusse, et al., 2021; Vicente & Novo, 2014), **educational attainment** (Lee & Kim, 2018; Schelings et al., 2023) and **occupational status** (Rodriguez Müller, Lerusse, et al., 2021; Vicente & Novo, 2014) exert an influence on our willingness to co-create digitally. Why this is the case can be brought back to the so-called **'digital divide'**. This concept pertains to the gap between citizens who have (a) the necessary resources (e.g., internet and device access), (b) knowhow (i.e., digital skills and self-efficacy) and (c) behavioural inclination (e.g., using new technologies for civic instead of entertainment purposes) to engage in activities such as digital co-creation and those who do not (Salem, 2016a, 2016b; Simonofski et al., 2019; Van Dijck, 2020). Overall, well-educated men are again deemed the 'usual suspects' to easily adopt digital co-creation opportunities, for they are most likely to possess the necessary resources and skills to use new technologies and to let their voices be heard (Russon Gilman & Peixoto, 2019; Salem, 2016b).

Exactly what shape the digital divide takes, in what circumstances, and how to deal with it **remains a subject for research** (Russon Gilman & Peixoto, 2019). This partly concerns observation difficulties as citizen co-creation through digital means often remains **anonymous**; hence, their characteristics are unknown to those inviting co-creation (Lember, 2018). Notwithstanding, research by Jalonen et al. (2021) shows how digital technologies, such as social media or discussion forums or platforms, can be used to approach and include vulnerable or hard-to-reach groups in co-creation initiatives geared at co-ideation or co-design.

Together, the reflections on additional layers and pre-condition complexity when including digital features in citizen co-creation **extend** our **framework** on citizen pre-conditions for co-creation. The results are presented in Figure 5.

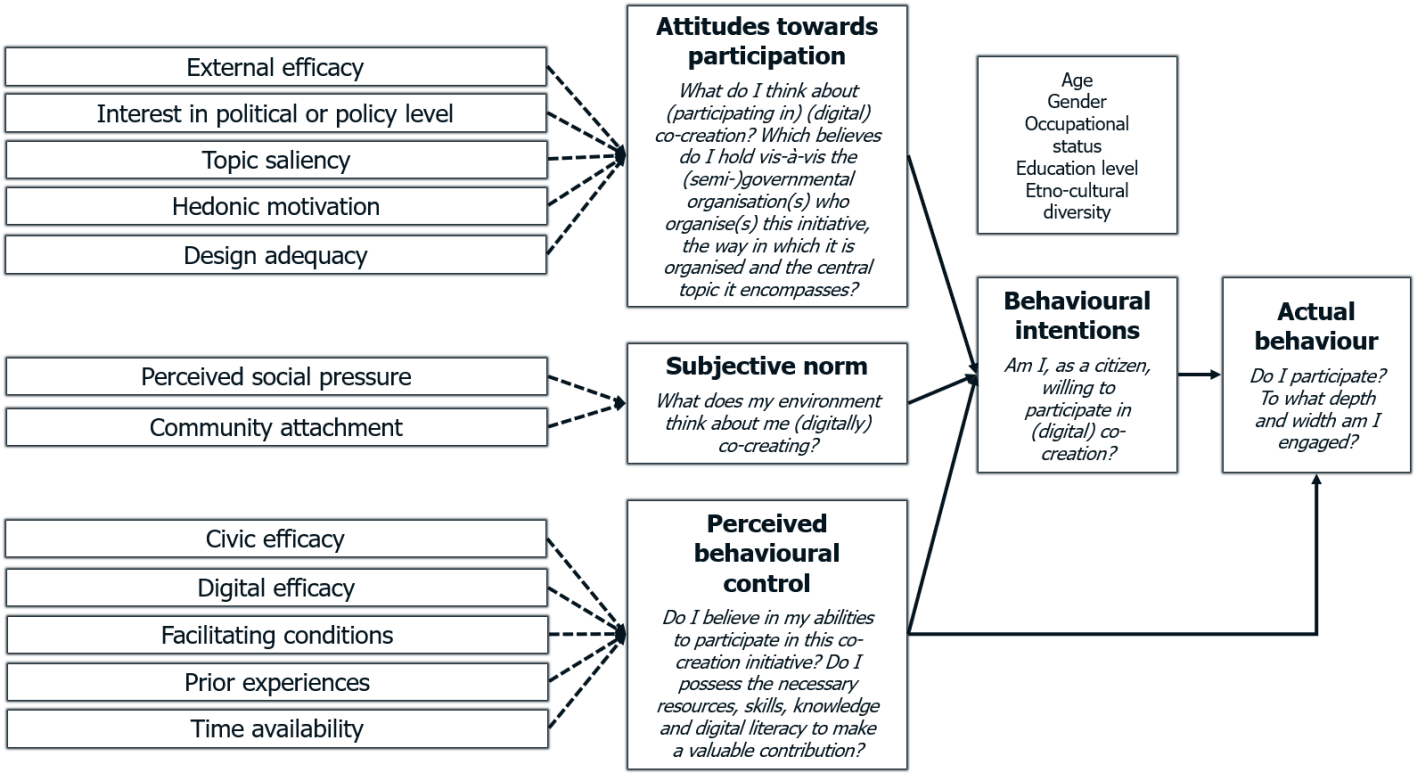


Figure 5. Visual summary of citizen pre-conditions to **digitally** co-create public policy and services, inspired by TPB.

This framework can serve as a utile instrument or **measurement tool to gauge citizens' willingness** to digitally co-create. After all, different groups of co-producers can be differently motivated, inspiring different expectations regarding their involvement (Van Eijk & Gascó, 2018). Knowing how specific groups of citizens are likely (not) motivated allows digital co-creation organisers and facilitators to develop tailor-made strategies to address these particular audiences (Rodriguez Müller et al., 2024; Schelings et al., 2023; Wolf et al., 2017). Only a targeted and value-conscious approach can answer **inclusivity concerns** (e.g., Brandsen, 2021; Glimmerveen et al., 2022).

2.3 INTERNAL PRE-CONDITIONS

The guiding question for this **internal pre-conditions** section reads: what difficulties or challenges—henceforth called 'barriers'—may arise internally before the co-creation initiative starts, throughout the initiative and in its aftermath? Barriers may be located at the level of individual (semi-)governmental co-workers involved in the digital co-creation initiative (e.g., a basic lack of time to take a moderation role on a citizen ideation platform). However, likewise at the level of intermediary processes within the initiative and/or (semi-)governmental organisation (e.g., distorted communication patterns between different co-workers or departments involved in the follow-up of the co-creation initiative's progress) or at the level of organisational and politico-administrative culture (e.g., "inviting citizen participation is not something we commonly do—why start now?") within which the initiative is framed. As the examples between brackets show, barriers can also be of varying nature (e.g., personal, social, cultural, economic, administrative or technological).

To add structure to the multiplicity of potential barriers, we rely on the **production model of public sector performance** as set out by Van Dooren et al. (2015). Performances are the outputs and outcomes (i.e., short-term or intermediate and long-term or final) or public values (e.g., efficiency and effectiveness) produced by a particular public policy, service, regulation or initiative (such as our co-creation ones). This production process does not situate itself in a vacuum but usually starts from a societal situation—a social or economic state in which policymakers perceive certain problems or opportunities and, thus, policy needs.

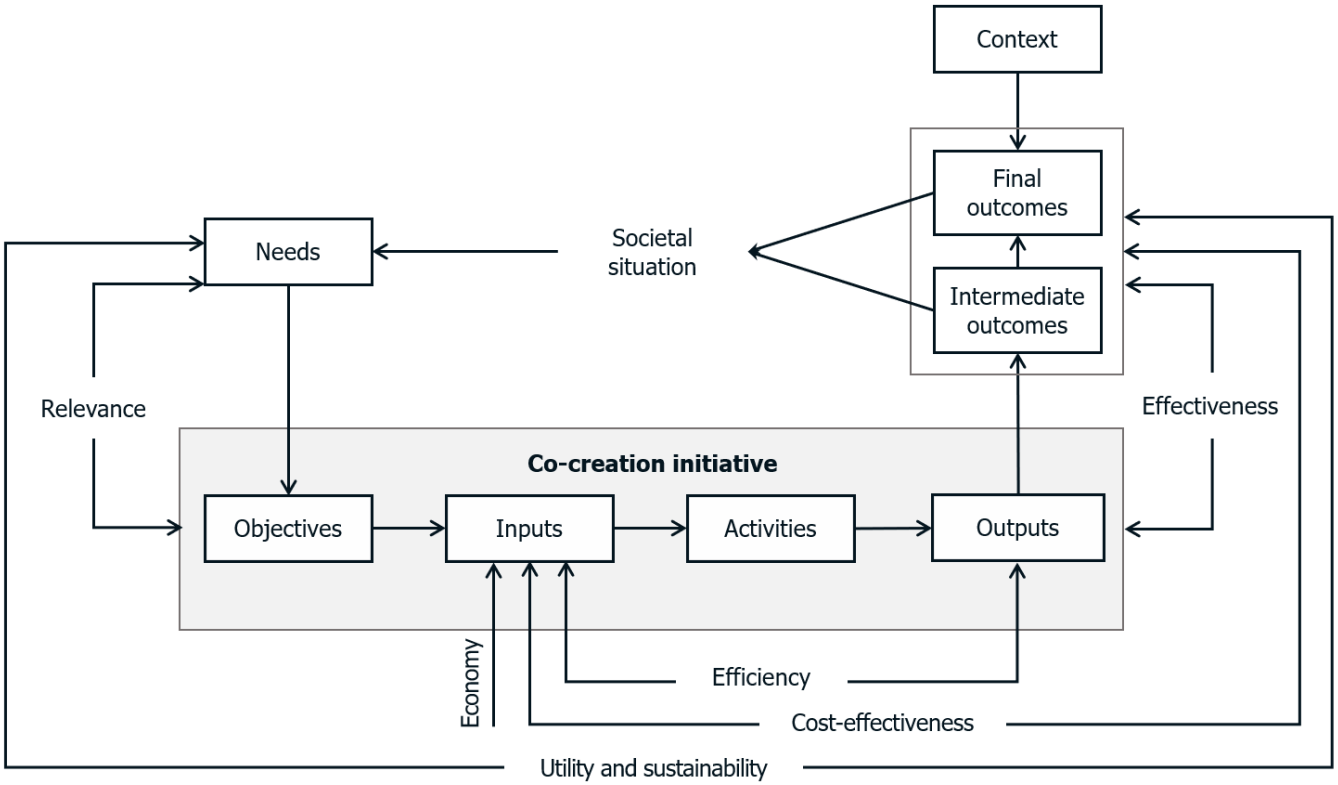


Figure 6. The production model of co-creation performance adopted from Van Dooren et al. (2015, p. 21).

Applied to, for example, a federal policy context, **situations** of budgetary tightness combined with path-dependency in policy-making (see Howlett et al., 2020) can result in already tried and tested recipes being used again and again, losing active support from the population, businesses, civil society and others. In such policy gridlock, the **need** may arise for new ideas and inspiration that transcend the paths already travelled and enjoy support from wider segments within the population (e.g., citizens, businesses, civil society and others) just because they could effectively contribute to it by thinking outside the usual confining boxes. With the aim of arriving at novel approaches to an existing policy issue (for example, redefining the Belgian political party funding), policymakers can proceed to work with digital discussion panels consisting of citizens, experts and primary stakeholders (i.e., representatives of the various political parties and their echelons) thoughtfully drawn from their respective populations. **Objectives** that meet perceived needs can be deemed **relevant**. For a co-creation initiative to achieve its objectives, **inputs** are required (e.g., human resources to guide the initiative, financial ones to advertise it and technological ones to develop and maintain the platform that will host the digital discussion tables). When choosing between inputs, trade-offs are logically made to ensure the best or lowest price for value—to **economise**. Through this resource allocation, co-creation **activities** both in the front (e.g., connected to the active participation at the discussion tables) as well as background (e.g., processing the multitude of information the tables provide), are staged, resulting in particular **outputs** (e.g., a report that synthesises the tables' conclusions) and **outcomes** (e.g., informing policy making in the short run and leading to an effective downsizing of party financing and, hence, budgetary burden in the long run). However, **contextual factors** (such as a party-wide reluctance to support such proposals in parliament) can facilitate or impede the translation or transformation of outputs into desired outcomes. In addition, certain co-creation processes can also generate unwanted side outcomes such as participant disenchantment over the initiative's output and what is done with it in practice (see, for example, Fung, 2015; Steen et al., 2018). However, when the outputs of our initiative result in the desired outcomes, we can speak of **effective** co-creation. When the inputs we had to deploy for this purpose are within acceptable limits, we can also deem it a **cost-effective** initiative. Finally, when the outcomes address the initiation needs we identified in the long run, we can term them **utile and sustainable**.

Hence, each block in the production model presented in Figure 6 builds on the next to produce outputs and outcomes and, hence, realises or keeps from realising particular public values. Unlike many policy evaluators (see McDavid et al., 2019), we will not utilise the model to assess digital co-creation initiatives' effectiveness *an sich* but deploy it to structure barriers that arise before, throughout and after such an initiative. At which building blocks of this production process do barriers mostly occur, hampering the digital co-creation initiative from being performant?

We deliberately leave the exact **content of outputs and outcomes** open, as this marks the **core focus of WP3**. At which outputs and outcomes can a digital co-creation process realistically aim? Which ones are often realised and how? How does this compare with any expectations and perceptions of citizens? Readers of this policy report are therefore invited to look at the WP3 documentation for more information.

3. RESEARCH METHODOLOGY

Description of the data collection, cleaning and analysis strategy used per subsection of this report or main research question formulated above. As such, this policy report commences by describing the methodological choices made in the General Population Survey (GPS) context. This online video survey experiment among Belgian citizens (n=1,035) aimed to determine which pre-conditions best explain citizens' willingness to participate in different steps of a (digital) co-creation initiative. Because willingness to co-create ultimately precedes actual co-creating behaviour yet does not coincide with it, the methodological section describes in second instance how GPS results are complemented with those of four Use Case Surveys (UCS) (n=75): questionnaires conducted among citizen co-creators at national (i.e., the Carto Map Viewer and Corona Consultations), regional (i.e., Amai! Vlaanderen) and local level (Burgerbudget Genk).

Thirdly, this methodological section talks about the focus group discussion among the BECODIGITAL follow-up committee members to discern internal stakeholder pre-conditions based on their rich practical experiences. Finally, we also clarify how the interviews conducted from the use cases as part of the Baseline Measurement (D.1.1.1) inform the recommendations formulated in section seven of this policy report.

3.1 A GENERAL POPULATION VIDEO SURVEY EXPERIMENT TO EXPLORE CITIZENS' WILLINGNESS TO CO-CREATE (DIGITALLY)

3.1.1 RESEARCH CONTEXT

An **online survey experiment** was designed to investigate (a) the effect of different co-creation configurations (i.e., organised in an analogue, digital or mixed fashion) on respondents' intent to participate in (different steps of) a local co-creation initiative and (b) the characteristics of those respondents for whom step design and configurations appear to make a difference.

The survey contained six modules (see 3.1.2 for an elaborate description). It was conducted using Qualtrics software among a sample of Belgian citizens between 18 and 89 years old, representative for gender, age, educational attainment and region (i.e., proxied by language spoken at home) between April 18 and May 16, 2024, with the Belgian panel service BPact.

3.1.2 MODULAR QUESTIONNAIRE BUILD-UP AND THE EXPERIMENTAL VIDEO DESIGN

Given the weight of audiovisual material in our experimental design, the survey commenced with an eight-second test video and follow-up question about its content to check whether the incorporated media worked properly on respondents' devices. The test comprised the **first module.**

The **second module** continued with a first set of more general questions about respondents' demographical characteristics (e.g., age, gender and language spoken at home), local community or neighbourhood attachment and opinions on their local governmental bodies and politics.

A first intermediary video (equating 57 seconds in Dutch and 68 seconds in French) started the **third module**, explaining the notion of co-creation to respondents. Respondents were made clear that engaging as a citizen can be done in various ways, as it can entail more than simply voicing an opinion or voting for a

preferred idea or solution. Moreover, citizens can get involved in many different topics. The video deliberately explained this without delving into particular examples, as those might prime respondents' answers in the subsequent experimental module of the questionnaire. After the video, respondents completed questions concerning their prior experiences with co-creation, their beliefs about the value of citizen participation and their estimation of their ability to contribute. Up to this point, the questionnaire went the same for all respondents.

After this second set of questions, **respondents** were **randomly assigned to one out of four video conditions**. In each condition, a one-minute video invited them to the same local co-production initiative comprising four distinct yet sequential steps. More specifically, respondents were invited by their local authority to (a) share an idea, suggestion or opinion for a municipal redevelopment project, (b) vote for those ideas, suggestions or opinions that looked most appealing, (c) discuss in-depth those ideas, suggestions or opinions that received the most votes with 40 fellow citizens and (d) help to materialise and deliver the ideas discussed. The conditions, however, differed from one another in the way they were configured. As can be seen in Table 1, some were organised in an analogue fashion (taking place in person at the municipal or city hall), whilst others invited respondents to participate digitally (i.e., through a participation platform, video-conferencing tool or app by the city or municipality).

Table 1. Overview of the step-wise configuration per experimental video condition.

	Condition	*n*	Step 1 Ideation	Step 2 Voting	Step 3 Deliberation	Step 4 Co-delivery
1	Analogue	262	Analogue	Analogue	Analogue	Analogue
2	Mixed 1	259	Digital	Digital	Analogue	Analogue
3	Mixed 2	258	Analogue	Analogue	Digital	Digital
4	Digital	256	Digital	Digital	Digital	Digital

In all **fourth modules**, respondents were asked to indicate **how likely** they were **to participate** in each step. Moreover, respondents who indicated a time insufficiency to engage in the previous module (i.e., approximately 30% of the sample) were offered small 'yes' or 'no' follow-up questions about whether they would or would not consider participation in each of the four steps if it were configured a different way (i.e., digital instead of analogue or vice versa).

For subsequent analysis purposes, we draw specific attention to the fact that the activities within steps 1 and 2 correspond mostly to the *co-commissioning* mode described in the Baseline Measurement (D1.1.1). Next, the reader will find step 3 most in line with *co-design,* while step 4 marks an example of *co-delivery*. As a mode, *co-assessment* was not operationalised in the video experiment for reasons of questionnaire conciseness—that is, not wanting to over-solicit respondents with too complex a local co-creation initiative.

Given that the **fifth and sixth modules** are connected to other objectives within BECODIGITAL's third work package, they are not elaborated on here. Nevertheless, the entire questionnaire took approximately 12 minutes to complete.

3.1.3 DATA CLEANING PROCEDURE

We received 1,120 sufficiently completed surveys (i.e., respondents clicking through the survey from the beginning until the fifth module). To conduct a complete case analysis, however, in the **first iteration**, this data was cleaned through a **case-wise deletion** of all respondents who showed **one or more missing values**. That rendered a dataset of 1,083 respondents.

In a **second iteration**, we checked the data quality of those cases left within the dataset by assessing respondents' **completion time**. Given the size of our questionnaire (which would take an average of 12 minutes or 720 seconds), 100 respondents who took less than 600 seconds to complete were flagged. As one question item within our digital self-efficacy scale (i.e., PBC8) was formulated in reverse (i.e., a negative instead of all priorly positive phrasing), we expected participants to answer opposite to their prior replies. If this was not the case, we checked the repetitive response nature of question items before and after this item. Based on this manual test, an additional 28 respondents were omitted from further analysis.

In the **third** and final **iteration**, we used the same question item (i.e., PBC8) to detect **repetitive response behaviour** among respondents not previously flagged as potential speeders. That yielded 29 respondents whose answer behaviour was checked compared to the previous and subsequent questions. Of those, an additional 20 respondents were removed from the dataset for taking their time to straight-line or answer repetitively without paying attention to the test question. This exercise rendered a dataset of 1,035 respondents.

3.1.4 PARTICIPANTS

The **descriptive statistics** of the retained **sample** can be found in Table 2 (cf. infra). This table also offers an overview of how each parameter approximates Belgian population distributions. Moreover, chi-square homogeneity tests indicated no outspoken differences between the conditions per parameter (category).[1]

[1] Chi-square results for the age groups respectively: $\chi^2 = .949$, $p = .814$; $\chi^2 = 4.714$, $p = .194$; $\chi^2 = 2.401$, $p = .493$; $\chi^2 = 3.350$, $p = .341$. Chi-square results for female respondents: $\chi^2 = 2.222$, $p = .528$. Chi-square results for the educational attainment groups respectively: $\chi^2 = 2.181$, $p = .536$; $\chi^2 = 4.359$, $p = .225$; $\chi^2 = 1.346$, $p = .718$. Chi-square results for the occupational status groups respectively: $\chi^2 = .275$, $p = .965$; $\chi^2 = 5.233$, $p = .155$; $\chi^2 = 2.903$, $p = .407$; $\chi^2 = 5.223$, $p = .155$. Chi-square results for Dutch speaking respondents: $\chi^2 = .789$, $p = .852$.

Table 2. Overview of respondent and population demographics.

Description	Condition 1 *n*=262	2 *n*=259	3 *n*=258	4 *n*=256	Total *n*=1,035	Population [a]
Age groups						
18 to 34 years	28%	27%	24%	26%	25%	26%
35 to 49 years	29%	21%	26%	26%	26%	25%
50 to 64 years	25%	28%	31%	27%	28%	25%
65 to 89 years	18%	24%	19%	21%	21%	24%
Female respondents	48%	46%	52%	48%	49%	51%
Educational attainment						
≤ Secondary education	51%	54%	56%	56%	55%	64%
= Higher education (short)	28%	21%	22%	23%	23%	19%
≥ Higher education (long)	21%	25%	22%	21%	22%	17%
Occupational status						
Inactive	19%	17%	19%	18%	18%	18%
Unemployed	4%	5%	5%	4%	5%	5%
Employed	55%	48%	52%	50%	51%	53%
Pensioned	22%	30%	24%	28%	26%	24%
Flemish (Dutch speaking)	58%	60%	57%	57%	58%	58%

Legend. Condition 1 = analogue; condition 2 = mixed 1; condition 3 = mixed 2; condition 4 = digital

Source. Belgian population statistics were derived from official data by the Belgian Statistical Office (Statbel).

Note (a). Belgian population statistics were calculated on the citizenry between 18 and 89 years old, approximating 9,232,200 residents.

3.1.5 OPERATIONALISATION OF THE DEPENDENT VARIABLE

Respondents' intention to engage in one or more steps of the co-creation initiative is the dependent variable throughout subsequent analyses. **Behavioural intention** was measured per step through the question, "How likely is it that you would participate in this step of the project?". Respondents could indicate their likelihood of engaging through an 11-point NPS scale with measurement points ranging from '0 = very unlikely' to '10 = very likely'.

3.1.6 OPERATIONALISATION OF INDEPENDENT VARIABLES

To answer the second research question, this paper considers how variables within three clusters of evaluative beliefs herald respondents' behavioural intentions to engage in (analogue vs. digital) co-creation upon formal invitation of a local public entity. Given that nearly all constructs within the clusters 'Attitudes towards the behaviour', 'Subjective norm' and 'Perceived behavioural control' as depicted in Figure 5 (cf. supra) are measured through multiple-item question batteries, composite variables were computed through

principal component factor analyses (PCA) (using Direct Oblimin)[2] in IBM SPSS statistics 29. To ensure easy interpretability of the newly constructed composites, we mean-scored the items that loaded sufficiently on the underlying component and proved internally consistent. Supplement 1 in the annexe provides an overview of question items and wording per construct and concomitant PCA and scale reliability results.

The eleven **independent** constructs or **variables** that we retained are:

- **External efficacy** was measured through six items. Each item tapped into respondents' trust in the sincere intentions of the public agent or entity that organises the initiative and their overall trust in the value of citizen participation and ability to ignite change. Examples of items to which respondents answered on a 7-point Likert scale ranging from 'totally disagree' to 'totally agree' are "I believe a city or municipality that organises [a citizen participation initiative] really wants to make use of residents' opinions" and "Citizen participation shows that citizens, like me, can effect change". Cronbach's alpha for this construct was 0.909.
- **Trust in the quality of services and solutions by the local governmental body** was measured with three items on an item-tailored 11-point NPS scale. An example of an item reads: "Does the city or municipality succeed in providing quality services to its residents?". Cronbach's alpha for this construct was 0.928.
- **Interest in local politics** was measured with four items for which respondents filled in a blank with a tailored 5-point answer option that best fitted their situation. Examples of items are "I will […] vote in the next local elections" and "I […] follow developments within the city or municipality (e.g., through the media)". Cronbach's alpha for this construct was 0.763.
- **Hedonic motivation** was measured with three items for which respondents filled in a blank with a tailored 6-point answer option that best fitted their situation. Examples of items are "I would consider my involvement […] interesting" and "I expect […] enjoyment from participation". Cronbach's alpha for this construct was 0.810.
- **Perceived social pressure** was measured with two items on a 7-point Likert scale. An example of an item is: "People I spend time with would encourage me to contribute to such a project". Cronbach's alpha for this construct was 0.807.
- **Community attachment** was measured with three items on a 7-point Likert scale. An item example reads: "People in my neighbourhood can be trusted". Cronbach's alpha for this construct was 0.819.
- **Civic efficacy** was measured through one item on a 7-point Likert scale: "I am capable of participating in a project as described in the video".

[2] An oblique rotation of the data using Direct Oblimin was chosen over orthogonal rotation options because the psychological nature of the constructs measured among fellow citizens. We have strong grounds to believe that these constructs are never truly independent from one another and neither should be the retained components. Through oblique rotation, we allow them to correlate (Field, 2013).

- **Digital efficacy** was measured with six items on a 7-point Likert scale. Examples of items are "I am able to engage in meetings digitally" and "Participating via digital means would require much effort on my part". Cronbach's alpha for this construct was 0.898.
- **Facilitating conditions** was measured through two items on the same 7-point Likert scale. An example of an item is "I trust that I will be provided with the necessary information to participate". Cronbach's alpha for this construct was 0.837.
- **Prior experience** was measured through the question: "Did you already partake in a similar initiative as the one showed in the video?", with answer options ranging from '0 = no, never' over '1 = yes, once' to '2 = yes, multiple times'. For analysis purposes, the variable is recoded binary (0 = 'No, never'; 1 = 'Yes, one or more times').
- **Time availability** was measured through one item: "I have sufficient time to participate in a project like this" on a 7-point Likert scale. For analysis purposes, the variable is recoded binary (0 = 'Sufficient time at hand'; 1 = 'Insufficient time at hand').

Table 3 provides the descriptive statistics of the retained dependent and independent variables expressed as mean scores or percentages.

Table 3. Descriptive statistics concerning the independent and dependent variables.

			Condition				
Variables	Min.	Max.	1	2	3	4	Total
Behavioural intentions							
Step 1 = ideation	0	10	6.0 (2.5)	6.7 (2.6)	5.8 (2.7)	6.6 (2.5)	6.3 (2.6)
Step 2 = voting	0	10	6.9 (2.4)	7.4 (2.4)	6.7 (2.6)	7.4 (2.3)	7.1 (2.5)
Step 3 = deliberation	0	10	5.5 (2.5)	5.9 (2.7)	5.4 (2.6)	5.7 (2.7)	5.6 (2.7)
Step 4 = co-delivery	0	10	5.4 (2.5)	5.4 (2.8)	5.4 (2.6)	5.5 (2.7)	5.4 (2.7)
Attitudes towards participation							
External efficacy	-3	3	1.1 (1.0)	1.1 (1.1)	1.2 (1.1)	1.0 (1.2)	1.1 (1.1)
Trust service and solution quality of the local governmental body	0	10	6.1 (1.8)	5.9 (2.0)	6.0 (1.8)	6.0 (2.0)	6.0 (1.9)
Interest in local politics	0	4	2.7 (0.8)	2.7 (0.7)	2.7 (0.8)	2.8 (0.8)	2.7 (0.8)
Hedonic motivation	-2	3	1.1 (0.8)	1.1 (0.9)	1.1 (0.8)	1.1 (0.8)	1.1 (1.1)
Subjective norm							
Perceived social pressure	-3	3	0.2 (1.0)	0.1 (1.3)	0.3 (1.0)	0.2 (1.2)	0.2 (1.1)
Community attachment	-3	3	0.9 (1.0)	1.1 (1.0)	1.0 (1.1)	1.0 (1.1)	1.0 (1.1)
Perceived behavioural control							
Civic efficacy	-3	3	1.2 (1.3)	1.1 (1.4)	1.1 (1.3)	1.1 (1.3)	1.1 (1.3)
Digital efficacy	-3	3	1.8 (1.0)	1.8 (1.1)	1.7 (1.2)	1.6 (1.2)	1.7 (1.1)
Facilitating conditions	-3	3	1.0 (1.0)	1.0 (1.2)	1.0 (1.3)	1.0 (1.2)	1.0 (1.2)
Prior experience (1=yes)	n/a	n/a	32%	31%	28%	30%	30%
Time insufficiency (1=yes)	n/a	n/a	28%	28%	31%	33%	30%

Legend. Condition 1 = analogue; condition 2 = mixed 1; condition 3 = mixed 2; condition 4 = digital. Min = minimal or lower boundary variable value; Max = maximal or top boundary variable value.

Note. Descriptives presented as means and standard deviations (between brackets) or percentages.

Unlike the citizen pre-conditions for digital co-creation framework outlined above, topic saliency and design adequacy are missing from the table. **Topic saliency** was not enquired after given the experimental videos all deliberatively left the content of the municipal redevelopment project inviting co-creation open to the imagination of respondents. After all, we did not want to risk biasing respondents' answers by framing such an initiative in the light of particular objectives (e.g., climate, mobility or otherwise) as those might inadvertently cater to local sensitivities. **Design adequacy**, on the other hand, was not surveyed because we made it the exact object of the video experiment through the shifting configurations. Admittedly, whether or not a particular step or activity is organised in an analogue or digital fashion only makes one of many potential aspects of a design. There is sufficient research evidence to assume that additional design choices can affect citizens' appreciation of a co-creation initiative (see, for example, Simonofski et al., 2021 for an overview of citizen front-end requirements that participation platforms ideally meet). Again, for questionnaire conciseness, we limit ourselves to one aspect but emphasise that other aspects are better not forgotten.

3.1.7 OPERATIONALISATION OF CONTROL VARIABLES

We take into account the **personal characteristics** (a) age (continuous in the OLS regressions and categorically coded in the CART analysis following the quartiles of the distribution), (b) gender (dummy coded with non-female as reference category); (c) educational attainment (dummy coded with higher education of the long type as reference category) and (d) occupational status (effect coded with employed or professionally active as minus or hidden category) as control variables.

3.1.8 DATA ANALYSIS PROCEDURE

The data analysis section is **structured** and subdivided **per research question**. **Subsection one** (i.e., 4.1) explores respondents' intentions to engage in co-creation. It zooms in on whether intentions differ significantly based on the co-creation steps (ideation vs. voting, deliberation and co-delivery) and their configuration (analogue vs. digital). To this end, a **one-way repeated measures ANOVA** and multiple **t-tests** will be used. Furthermore, we reflect on the results of the small 'yes' or 'no' follow-up questions about whether respondents' would (still) take part in a particular step if it was organised differently (i.e., digitally instead of in-person and vice versa).

Subsection two (i.e., 4.2) presents the reader with **ordinary least square (OLS) linear regressions** to assess the association between respondent demographics and evaluative beliefs on the one hand and their intentions to engage in a four-step local co-creation initiative on the other. **Subsection three** (i.e., 4.3) then does the same yet deliberately compares the results of steps held in an analogue fashion to those organised digitally. Do we see different demographics or evaluative beliefs influencing respondents' intentions? All OLS regressions follow the same **modular build-up** through which respondent demographics are added and considered first. Attitudes towards participation are considered in a second step, followed by subjective norm

variables in a third one. The fourth and final model then adds perceived behavioural control to render full model results. Whereas this stepwise regression model build-up can be found in Supplement 2 of the annex, for conciseness' sake, the results section of this report will only disclose the full models' parameters.

Subsection four (i.e., 4.4) takes the regression analyses further by subjecting them to a **classification and regression tree analysis (CART).** This machine learning technique allows us to visualise the hierarchical importance of the pre-conditions (i.e., demographics or evaluative beliefs) and their interactions in predicting our dependent variable (i.e., respondents' intentions to co-create) (Breiman et al., 1984). Such hierarchical structures are more difficult to capture in the above one-dimensional OLS linear regressions. For easy understanding and to intuitively derive guidelines for practitioners, our dependent intentions variable will be recoded categorically into **'Unlikely'** (i.e., equalling intention scores between '0' and '3'), **'Doubtful'** (i.e., equalling scores between '4' and '6') **and 'Likely'** (i.e., equalling scores between '7' and '10'). Given the BECODIGITAL objectives for WP1, this section's CART analyses will zoom in on pre-conditions that best predict whether a respondent will be unlikely, doubtful, or likely to engage in particularly digital co-creation.

CART analysis searches for similarities between unknown subsets of our respondent population within the registered answer range or structure of our dependent variable through **recursive partitioning**. In this process, the entire sample (also called *root node*) is divided into smaller, homogeneous groups or subsets (also called *branch nodes*) based on the (a) optimum cut-off points (i.e., the lowest sum of squared residuals at each variable threshold) for independent scale variables (i.e., most of our evaluative belief variables) or (b) categories for categorical variables (i.e., most of our demographical variables) that are most relevant to predict the outcome of interest (i.e., whether a citizen's intentions to co-create digitally are unlikely, doubtful or likely) at each partition. In other words, to realise the least impurity (i.e., a measure of how mixed or disordered the data is within a node of our tree) at each split until the sample cannot be further divided into homogenous groups.[3]

A common risk in CART analysis is **overfitting** the data (Apté & Weiss, 1997; Gocheva-Ilieva et al., 2021). When overfitted, the tree might perform well in predicting the values (in case of a regression tree) or categories (in case of a classification tree) of an outcomes variable per respondent in our sample but generalise poorly to new or future data. Overfitting might, therefore, hamper the validity of the guidelines we derive. A potential way to limit the risk of overfitting is by 'pruning' our tree. Pruning can happen by either stopping the tree-building process early (i.e. also called pre-pruning) or cutting back (subbranches of) our tree (i.e. also called post-pruning). As a **pre-pruning** strategy, one can (a) define stopping rules (i.e., restricting the depth of tree growth to a particular number of layers) and (b) require a minimum number of respondents in each node (i.e., typically to avoid nodes becoming too small or niche to make meaningful generalisations). **Post-pruning**, on the other hand, involves the removal or cutting back of less important or

[3] If, let's say, between the three categories (i.e., unlikely, doubtful and likely) in my node, occurrence percentages are quite evenly dispersed (e.g., 33.3%; 33.3% and 33.3%), the node can be considered very impure. In that case, the split or node offers us little additional information to predict the respondent's actual category correctly—all categories appear equally (un)likely.

informative branches (i.e., typically to a level where the cross-validation error is within one standard error [SE] of the minimum error tree) (Lama et al., 2020).

We will present and discuss the content of four binary **classification trees**—one tree per digitally configured step. Our explanation will always depart at the top (*root node)* and work its way down the branches (*branch or parent node)* up to the leaves (*leave or child node)*. Given that our ultimate purpose is to arrive at a decision tree that allows a considerably better prediction accuracy of GPS respondents' intentions than one where we would base our prediction entirely on the majority category in the root node (i.e., most often the 'Likely' category), the **prediction accuracy** is displayed below each figure. Also displayed below each figure are the percentages of **false positives** within the **'Likely' category**—this is the relative number of respondents whose participation, in reality, is unlikely or doubtful yet who are wrongly classified or assumed likely digital co-creators. From a policy or organisational perspective, these false positives are the most troublesome: correctly predicting whether someone would be 'unlikely' or 'doubtful' to participate from our given set of pre-conditions (see Figure 3) allows us to formulate recommendations tailored to the relevant pre-conditions. After all, we are interested in those variables or pre-conditions that tip the balance from 'doubtful' to 'likely'. What strategies should we adopt to convince the doubters to participate in our digital co-creation project? Perhaps we also identify opportunities to persuade the unlikely to doubt and start considering participation despite reservations. Of a decision tree with a high ratio of false positives within the 'Likely' category, we may assume that it fails or has limited success in identifying those pre-conditions that cause citizens to doubt or discourage participation altogether. Conversely, false positives within the 'Unlikely' and 'Doutbful' categories are less problematic because these respondents would participate anyway. Including these groups of respondents in tailored recruiting or activation strategies may be redundant but does not hurt either.

The CART analyses were conducted using the **Gini Impurity** function in IBM SPSS Statistics 29. To avoid overfitting, each tree is pre-pruned by requiring at least 10% of respondents in the smallest dependent category (i.e., always the 'Unlikely' category) in a parent node and 5% in a child node. We did not deploy any stopping rules. However, SPSS restricts a CART analysis through the classification function to a depth of five layers by default. Moreover, post-pruning happened at 1 SE of the lowest cross-validated error rate.

In a **fifth and final subsection** (i.e., 4.5), we translate the prior section's results into guidelines on how to configure different co-creation steps and points of attention to involve a diversified set of citizens when doing so.

3.2 A USE CASE SURVEY TO COMPARE WILLINGNESS TO ACTUAL BEHAVIOUR

3.2.1 RESEARCH CONTEXT

An **online use case survey** (UCS) was designed to investigate the characteristics of citizens who moved beyond the point of behavioural intentions and truly participated in digital co-creation with a Belgian (semi-)governmental actor or entity. That way, the UCS supplements the GPS as it allows us to examine the **connection** between **behavioural intentions** on the one hand and **actual behaviour** on the other. Do the UCS respondents display the characteristics we would logically expect based on those that stood out in the four different steps and combined configurations of the GPS? Or do we witness noticeable differences? How can such differences be explained and used to inform the recommendations presented in '7. Discussion'?

Four distinct digital co-creation initiatives at the national (i.e., CartoWeb.be and the Corona Consultations), regional (i.e., Amai! Vlaanderen) and local level (Burgerbudget Genk) that partook in the Baseline Measurement interview set-up (see D.1.1.1), agreed to also lend a hand to the UCS. Through calls in their online newsletters, NGI/IGN, Sciensano, Scivil and Stad Genk invited and encouraged the participants in their digital co-creation initiatives to complete the UCS. Thanks to the organisers' valuable input, the questionnaire followed the same five-module build-up (detailed in section 3.2.2) each time yet tailored to the particular initiative.

3.2.2 MODULAR QUESTIONNAIRE BUILD-UP

The reader will notice that because the questionnaires were tailored to each case as much as possible, a one-on-one comparison with the pre-conditions in the GPS will not be possible. Depending on the use case's objectives or set-up, for example, some proved irrelevant or redundant (e.g., in the federal and regional initiatives, it made less sense to enquire about close—local—neighbourhood or community attachment). Moreover, our small sample sizes per case complicate a meaningful comparison with the GPS data. Instead of more conclusive and complex analyses, we will restrict our story to descriptive statistics, which can provide some interesting first insights into the connection between intentions and actual behaviour.

3.2.3 DATA CLEANING PROCEDURE

Qualtrics registered 88 individual questionnaire attempts, of which 75 entire completes (i.e., respondents clicking through the survey from the beginning until the end). As with the GPS, we checked the data quality of those cases by assessing respondents' **completion time**. Given the size of the respective questionnaires (which would take an average of 6 to 10 minutes or 360 to 600 seconds), nine respondents who took less than 240 or 480 seconds to complete the questionnaires were flagged. As one question item within our digital self-efficacy scale (i.e., PBC8) was formulated in reverse (i.e., a negative instead of all priorly positive phrasing), we expected participants to answer opposite to their prior replies. If this was not the case, we

checked the repetitive response nature of question items before and after this item. Based on this manual test, all nine priorly flagged respondents remained part of our sample. In the next step, we also checked how the other 66 respondents answered the PBC8 control question—without noteworthy abnormalities.

Unlike the GPS and because our already limited sample is used for merely descriptive analyses (detailed in section 3.2.6), we did not clear the dataset further using a **case-wise deletion** of all respondents who showed **one or more missings**. Hence, we continued with a 75-respondent dataset despite misses.

3.2.4 PARTICIPANTS

The **descriptive statistics** of the retained **sample** can be found in Table 4. This table also shows how the parameters deviate from Belgian population distributions.

Table 4. Overview of respondent and population demographics.

Description	Use cases					
	1 *n*=26	2 *n*=31	3 *n*=11	4 *n*=7	Total *n*=75	Population [a]
Age groups						
18 to 34 years	8%	0%	0%	14%	4%	26%
35 to 49 years	19%	13%	46%	0%	19%	25%
50 to 64 years	35%	42%	36%	43%	39%	25%
65 to 89 years	38%	45%	18%	43%	38%	24%
Female respondents	12%	65%	36%	57%	41%	51%
Educational attainment						
≤ Secondary education	15%	32%	64%	43%	32%	64%
= Higher education (short)	23%	36%	0%	29%	25%	19%
≥ Higher education (long)	62%	32%	36%	28%	43%	17%
Occupational status						
Inactive	0%	3%	0%	14%	3%	18%
Unemployed	0%	0%	0%	0%	0%	5%
Employed	62%	49%	73%	29%	54%	53%
Pensioned	38%	48%	27%	57%	43%	24%
Flemish (Dutch speaking)	35%	42%	100%	100%	53%	58%

Legend. 1 = CartoWeb.be; 2 = Corona Consultations; 3 = Amai! Vlaanderen; 4 = Burgerbudget Genk

Source. Belgian population statistics were derived from official data by the Belgian Statistical Office (Statbel).

Note (a). Belgian population statistics were calculated on the citizenry between 18 and 89 years old, approximating 9,232,200 residents.

3.2.5 OPERATIONALISATION OF THE VARIABLES

Each variable corresponding to the analytical framework of citizen pre-conditions for digital co-creation (cf. Figure 5) was **operationalised as** described **in section '3.1.6'**. At least insofar as these variables and their underlying questionnaire items were relevant to the use case. Table 5 provides a summative overview of all variables per case and over cases.

Table 5. Descriptive statistics concerning the independent and dependent variables.

			Case				
Variables	Min.	Max.	1	2	3	4	Total
Attitudes towards participation							
External efficacy	-3	3	2.0 (0.8)	0.5 (1.3)	2.2 (0.5)	1.7 (1.1)	1.4 (1.3)
Trust service and solution quality within policy domain	0	10	n/a	5.1 (2.2)	5.8 (2.0)	8.0 (1.3)	5.7 (2.2)
Trust in the organiser	0	10	n/a	5.7 (2.2)	7.9 (0.5)	7.8 (1.5)	6.5 (2.1)
Interest in local politics	0	4	2.8 (0.5)	2.9 (0.8)	3.0 (1.1)	3.6 (0.3)	2.9 (0.8)
Hedonic motivation	-2	3	1.8 (0.9)	1.9 (0.7)	2.3 (0.5)	2.1 (0.9)	2.0 (0.8)
Saliency project and topic	-3	3	2.5 (0.6)	1.9 (1.0)	2.3 (0.8)	2.1 (0.6)	2.2 (0.8)
Saliency organiser (1=new)	n/a	n/a	n/a	71%	73%	n/a	71%
Subjective norm							
Perceived social pressure	-3	3	-0.5 (1.4)	0.4 (1.9)	-0.8 (1.8)	0.2 (1.3)	-0.1 (1.7)
Community attachment	-3	3	n/a	n/a	n/a	1.5 (0.8)	1.5 (0.8)
Perceived behavioural control							
Civic efficacy	-3	3	2.4 (0.6)	1.5 (1.2)	1.2 (1.0)	2.1 (0.5)	1.8 (1.0)
Digital efficacy	-3	3	2.5 (0.7)	2.1 (1.1)	2.6 (0.5)	2.2 (0.5)	2.3 (0.9)
Facilitating conditions	-3	3	1.4 (0.9)	1.7 (1.1)	2.1 (0.8)	2.2 (0.6)	1.7 (1.0)
Prior experience (1=yes)	n/a	n/a	69%	45%	73%	29%	56%
Time insufficiency (1=yes)	n/a	n/a	15%	7%	0%	0%	8%

Legend. Case 1 = CartoWeb.be and the TopoMapViewer; case 2 = Corona Consultations; case 3 = Amai! Vlaanderen; case 4 = Burgerbudget Genk. Min = minimal or lower boundary variable value; Max = maximal or top boundary variable value.

Note. Descriptives are presented as means and standard deviations (between brackets) or percentages.

Additions to this table compared to Table 3 are the variables 'Saliency' (in terms of the project and topic as well as the organiser) and 'Trust in the organiser' (in terms of expertise on the topic on which it invites citizen co-creation as well as its operations):

- **Saliency of the project and its topic or theme** was measured through five items. Examples of items to which respondents answered on a 7-point Likert scale ranging from 'totally disagree' to 'totally agree' are "The [participatory citizen budget] deals with important problems or challenges" and "[Amai] dealt with a topic in which I take interest (i.e., climate, mobility, health and labour)".

- **Saliency of the organiser or organising entity** questioned after the perceived societal relevance of the organiser by asking: "Have you heard about [amai] and the work of [Scivil and the Knowledge Centre for Data & Society in collaboration with Department EWI] on [AI] before?" to which respondents could respond with 'No, this was new to me', 'Yes, one time' or 'Yes, many times'.
- **Trust in the know-how or expertise and acts of the organiser on the topic or theme it invited co-creation on** was measured with three items for which respondents indicated their trust levels on a tailored 11-point NPS scale. Examples of question items include "How much confidence did you have in [Sciensano's] knowledge and expertise in [epidemiology and vaccinology]" (with answer options ranging from '0 = No confidence at all' to '10 = Much confidence') or "According to you, does the Belgian government treat all of its citizens fairly?" (with answer options ranging from '0 = No, she does not at all' to '1 = Yes, she certainly does').[4]

The reasons for including these variables, as well as how they are expected to influence citizens' co-creation intentions and behaviour according to research antecedents, were already presented in the literature review above (see section '2.1.2') but were deliberately not included in the experimental GPS design (consult section '3.1.6' for a more detailed explanation).

Finally, we also asked each UCS respondent about their **reasons for participating** in the respective digital co-creation projects. For this, they could indicate several options from the following list:

- to learn something new;
- to contribute to improved services and neighbourhood facilities;
- to enjoy oneself;
- to give something back to one's neighbourhood or loved ones.
- to meet (new) people;
- to be able to express one's opinion or idea(s) for once;
- to acquire new skills;
- to be part of something bigger;
- another reason (for which we offered the possibility to provide a brief explanation).

Of course, as with other question wording, here, too, list options depended on or were tailored to a particular use case. The above list, therefore, constitutes the maximum list.

[4] On these examples, the reader will notice that for the Corona Consultations, the trust variables inquired about trust in knowledge and actions of two different entities: Sciensano (which managed the project) and the Belgian government (which implemented the Corona measures following decisions by the Minister for Public Health). However, this has to do with the particular design of the Corona Consultations (see the case description in section '5.1.2') and does not apply to every case.

3.2.6 DATA ANALYSIS PROCEDURE

Analysis of the UCS results proceeds in **four steps**. **First**, we provide a brief **case description** of the digital co-creation initiatives (i.e., CartoWeb.be and the TopoMapViewer; the Corona consultations; Amai! Vlaanderen and Burgerbudget Genk) that will help us to interpret the assembled survey data correctly. **Second**, we describe, discuss and compare the **descriptive statistics of each case**. **Third**, we then **compare** these **to** the pre-conditions that emerged prominently from the **GPS results** using **one-sample t-tests** (where normality assumptions allow) or non-parametric **Wilcoxon signed-rank tests** (where normality assumptions do not allow) for the scale variables and **chi-square goodness-of-fit tests** for our categorical variables (i.e., prior experience and time insufficiency). We will consider the value or percentage distribution we observed in the GPS in each of these tests as the hypothesised population value or distribution. Do the values or distributions of these variables rise to the same level or follow the same pattern when based on actual behaviour as when based on behavioural intentions? Do we find striking differences, or does our UCS data confirm the trends we have already observed in the GPS results? In other words, how well do behavioural intentions assist us in predicting eventual behaviour? **Finally**, we synthesise our findings into **tentative recommendations**.

3.3 A FOLLOW-UP COMMITTEE FOCUS GROUP TO EXPLORE INTERNAL PRE-CONDITIONS

3.3.1 RESEARCH CONTEXT

Within the frame of the third Follow-Up Committee meeting (March 25, 2024), a **focus group** discussion was held on internal pre-conditions. **Prior to the meeting**, committee members could fill out a small Qualtrics **survey** in Dutch, English or French containing the following questions:

- Question 1. What **internal barriers or difficulties** did you already encounter when setting up digital co-creation with citizens? *(These may be of all kinds and can, for example, range from personal barriers to political-administrative burdens or technical difficulties. Indeed, we are interested in frequently encountered barriers regardless of their nature)*
- Question 2. **How** can the internal barriers or problems you described above be **overcome**? In other words, what do you see as minimum internal conditions for organising digital co-creation with citizens?
- Question 3. What strategies are being used internally to make digital co-creation with citizens as inclusive a story as possible?
    - A. First, consider **strategies to include citizens**.
    - B. Second, consider **strategies to include co-workers internally**.

Their answers were preliminarily analysed and structured according to the 'Production model of Performance' by Van Dooren et al. (2015) and added to a shared **Miro board** to engage with interactively during the focus group discussion. The entire meeting was held in a hybrid fashion at BELSPO headquarters. For subsequent analysis, the focus group was video recorded using the MS Teams recording function so all committee members could see from the red light that their contribution was registered.

3.3.2 PARTICIPANTS

To gather as many relevant insights as possible, we also invited the federal, regional, and local use cases, which offered insight into their co-creation initiatives as part of the Baseline Measurement interviews, to this Follow-Up Committee Meeting. This call was enthusiastically answered by Burgerbudget Genk, Vorm 3010 by Stad Leuven, the Safer Cities project by Plan International and Amai! Vlaanderen by Scivil. In total, **14** Follow-up Committee **members** participated in the **focus group**, representing ten (semi-)governmental organisations at different policy levels in Belgium, one NGO and three facilitators of (citizen) participation.

3.3.3 DATA ANALYSIS PROCEDURE

Answers gathered before and during the focus group discussion are **linked** for ease of overview **to** the different **building blocks** from the **production process for co-creation performance** as set-out in Section 2.3, based on Figure 6 (cf. supra). All contributions will also be discussed in order of the barriers preceding the digital co-creation initiative (i.e., the societal situation and needs formulation), occurring as part of it (i.e., related to the translation of needs into objectives; decisions on the input required; the setting and following up on activities and translation or operationalisation into output), or in its wake (i.e., the outcomes). The different **barriers** will thereby be **colour-coded** according to their **nature**:

- Blue marks **cultural** barriers (such as politico-administrative or organisational convictions)
- Purple marks **communication, coordination and internal organisation** barriers (such as poor coordination, insufficient follow-up, knowledge exchange and support or leadership).
- Red marks **data and/or technological** barriers (such as a lack of relevant data to support the process or smart solutions to process vast amounts of stakeholder input).
- Orange marks **financial** barriers (such as budgetary tightness hampering an optimal use of inputs)
- Yellow marks **human capital** barriers (such as the availability of staff and their skills to co-create)
- Green marks **legal and administrative** barriers (such as law restrictions).
- Teal marks the **residual** barriers (such as a lack of infrastructure).

Insights from the **use cases supplement** input from the focus group members (see section 3.4 for a description of the **interview** procedure). Because we want to obtain a global overview of frequently recurring internal pre-conditions or barriers, we discuss the input from both sources (i.e., focus group and use cases) together.

3.4 SUPPLEMENTARY USE CASE INTERVIEWS

3.4.1 RESEARCH CONTEXT

Within the frame of the **Baseline Measurement**, **key stakeholder interviews** were organised to gain a coordinator perspective on Belgian digital co-creation initiatives (so-called 'use cases') at the federal, regional and local levels. More precisely, with these interviews we aspired to broaden our understanding of (a) the stakeholders (such as citizens) involved in digital co-creation or the co-creation of e-services, (b) strategies for (inclusive) engagement and (c) potential barriers encountered along the way.

3.4.2 CASES

Potentially interesting **use cases** were identified and **selected based on** the following **six criteria**:

- Initiatives organised at **central, regional or local level** …
- … **after March 2020** (the start of the covid-19 crisis counts as the caesura in our study to avoid retention bias among the coordinators) …
- … encompassing co-creation geared at the **co-commissioning, co-design, co-delivery or co-assessment** …
- … of **solutions**—in the form of visions, plans, policies, strategies, services, tools or regulatory frameworks—to a shared public problem, challenge or task …
- … by two or more **public and private actors (among which at least citizens) voluntarily** exchanging resources …
- … in an **analogue** (when co-creating e-services), **hybrid or digital way** (when co-creating all else) using a variety of activation methods and/or tools, techniques or applications.

Of an initial list of 22 potentially interesting use cases, 14 agreed to an interview. Given that some of our reference persons coordinated or were involved in more than one co-creation initiative, this resulted in 11 interviews. Supplement 3 provides an overview of these 14 use cases—eight at the central level, two at the regional and four at the local level.

3.4.3 INTERVIEW PROCEDURE AND SUPPLEMENTARY DOCUMENTS

All **11 interviews** took place between June 23, 2023 and November 28, 2023. They were held either online over MS Teams or at location, at the offices of the organising (public) entities. On average, an interview took 54 minutes to complete, rendering a total of 595 minutes of audiotaped data. Interviews always followed the **same question protocol** moving from smaller introductory questions to more in-depth ones on the

stakeholders involved and challenges encountered to guarantee their involvement. Supplement 4 encompasses a translated version of the topic list presented each time.

The interviews from the four use cases central to the analysis in Section 5 of this policy report were transcribed verbatim using Happy Scribe Online Software. All others were not textually analysed but annotated based on their audio file.

3.4.4 DATA ANALYSIS PROCEDURE

To answer research question four (i.e., 'What common challenges do organisers of digital co-creation encounter internally') and formulate overarching recommendations for the organisation of inclusive digital co-creation in line with research question 5, the **interviews** are **analysed** thematically **using a priori coding**. More specially, all pieces of information that connect to (a) internal barriers, (b) external barriers and (c) coping strategies or recommendations were classified in a first coding round. In a second coding round, the codes connecting to internal barriers were revisited and recoded according to the nature of the barrier.

4. DATA ANALYSIS, PART 1 – CITIZEN PRE-CONDITIONS BASED ON THE GPS

Quantitative data analysis in this section is structured and subdivided per research question. Subsection one explores respondents' intentions to engage in co-creation and whether intentions differ significantly based on the co-creation steps (ideation vs. voting, deliberation and co-delivery) and their configuration (analogue vs. digital). Subsection two presents OLS linear regressions to assess the association between respondent demographics and evaluative beliefs on the one hand and their intentions to engage in four-step local co-creation on the other. Subsection three then does the same yet deliberately compares the results of steps held in an analogue fashion to those organised digitally. Finally, subsection four takes the regression analyses further by subjecting them to CART analysis. Classification trees will aid our understanding of the hierarchical structure in pivotal citizen demographics and evaluative beliefs per step in digitally configured local co-creation and, hence, contribute to tailored activation strategies.

4.1 EXPLORING WHEN DIGITAL CONFIGURATIONS MARK A DIFFERENCE IN CITIZENS' INTENTIONS TO CO-CREATE

We start searching for relevant citizen pre-conditions *(for whom)* when co-creating digitally at its design phase *(when)*, considering (a) the four steps and concomitant participation methods (i.e., ideation vs. voting, deliberation or co-delivery) and (b) their configuration (i.e., organised in an analogue vs. digital fashion).

A pairwise comparison of within-subject intentions revealed a statistically **significant difference in** the **intention** of respondents **to participate in the four** different **steps** of the co-creation initiative.[5] Overall, respondents appeared most likely to lend their time to the voting in step 2 ($\overline{X}$ = 7.10; SD = .077) and the ideation exercise in step 1 ($\overline{X}$= 6.26; SD = .081). Although still considered rather likely (equating scores of more than 5 out of 10), the deliberation in step 3 ($\overline{X}$ = 5.64; SD = .083) and co-delivery in step 4 ($\overline{X}$= 5.42; SD = .082) met with remarkably less intent. Of course, these last two steps required entirely different skills from our respondents, which might explain the difference in their intentions (Elstub & Escobar, 2019).

Moreover, delving deeper into the steps individually, independent sample t-test results revealed yet another difference. As shown by Table 6 (cf. infra), intention to participate in each of the four steps also appeared **dependent on a** particular **step's configuration**. Particularly for the first two steps (i.e., ideation and voting), respondents estimated their likeliness to participate significantly higher when presented with the digital option to do so. In steps 3 and 4 (i.e., deliberation and co-delivery), this digital option fared no better than the analogue option inviting in-person contributions at the municipal hall.

Table 6. Independent sample t-test results per step between configurations (analogue vs. digital).

	Analogue		Digital					
	Mean	St. dev.	Mean	St. dev.	Mean difference	t	df	Sig.
Step 1 – Ideation	5.91	2.581	6.62	2.563	- .714	- 4.463	1033	< .001
Step 2 – Voting	6.80	2.532	7.41	2.350	- .614	- 4.039	1033	< .001
Step 3 – Deliberation	5.71	2.642	5.58	2.686	.129	.776	1033	.219
Step 4 – Co-delivery	5.37	2.672	5.46	2.624	- .087	- .527	1033	.299

[5] Greenhouse and Geisser test statistic of within-subjects effects rendered [F(2.357, 2437.114) = 240.587, p = < .001].

Note. For running these independent sample t-tests, the Levene's test for equality of variances indicated no significant variance differences between our analogue and digital groups per stage.

This immediately **raises the question of** whether these findings apply similarly to all respondents in our sample. Or whether it would be possible to discern a **digital inclusion and equity advantage** that extends beyond steps 1 and 2 for those who, for example, lack time to co-create (e.g., single parents, professionals with large career commitments or young adults with a wide variety of hobbies)? Despite the believed benefits of allowing a time and location unbound option to participate, the research base remains inconclusive about how much it can lower the threshold for co-creation. Wolf et al. (2017), for example, found no noteworthy difference in mobile shopping intentions between those with sufficient and insufficient time. That leads us to ponder whether allowing digital participation in combination with (a lack of) time availability can play a decisive role in respondents' willingness to co-create. And, if yes, does this prove generally applicable and, hence, step independent?

To this end, respondents in the video survey experiment contemplated their **time availability** to participate as citizens. Those respondents who perceived a time insufficiency (n = 310) received small 'yes' or 'no' follow-up questions about whether they would or would not consider participation in each of the four steps if it were configured a different way (i.e., digital instead of analogue or vice versa). The results of these small follow-up questions are presented as percentages in Table 7 and tell us more about whether a digital alternative matters to a particular subset of our sample: those lacking time.

Table 7. Percentage of respondents with insufficient time to engage in citizen participation (n = 310) indicating whether they would (still) be willing to engage if the stage would (not) have been organised digitally.

Configuration [a]	Question	Step 1 Ideation	Step 2 Voting	Step 3 Deliberation	Step 4 Co-delivery
Analogue	What percentage would participate if organised digitally while they would not participate analogously?	44%	56%	28%	22%
Digital	What percentage would not participate if organised analogously while they would participate digitally?	57%	52%	49%	36%
Combined [b]	For what percentage of our subset will 'going digital' have a positive effect?	52%	53%	38%	28%

Note (a). When presented with an analogue step, respondents with insufficient time, indicating an unwillingness to engage, were asked whether they would consider engagement if the step was organised digitally. On the contrary, when presented with a digital step, respondents with insufficient time, indicating a willingness to participate regardless, were presented with the alternative question of whether they would also be willing to engage if this particular step had been organised analogously.

Note (b). With 72, 73, 81 and 84 within each condition, respectively, respondents indicating time insufficiency to engage in citizen participation were approximately evenly distributed over the four experimental conditions.

Remarkably, the figures match the trend already presented in Table 6. Why **step three** (i.e., deliberation with 40 fellow citizens) fared seemingly worse than steps one and two might be explained by the fact that

the digital advantage partially disappears. In our experimental setup, the time unbound element no longer applies in the third step, given that video conferencing still requires a fixed time frame for people to join online. Admittedly, this assertion does not apply to the fourth step entailing co-delivery.

Although we can only speculate why, in steps one and two (i.e., ideation and voting), the digital alternative appears to make more of a difference than it does in steps three and four (i.e., deliberation and co-delivery) from an **inclusion** point of view, these findings are highly relevant. They carefully indicate that the **benefits** of a **digital configuration are not absolute** (i.e., applicable to all types of citizens, to the same extent and under all circumstances) given the deliberately highlighted 'time availability', of course, marks no isolated matter. As the above examples of single parents, young adults and career hunters suggest, time availability intertwines in a unique way with many other characteristics of a potential target audience (such as stage of life, the size of one's social network or occupational status). Each carries the capacity to affect views and abilities to contribute (digitally) in their own way by exposing one to distinct experiences (e.g., the digital native who uses digital tools on a daily job-related basis and the elderly digital savant who hardly ever does and professionally also never had to). In that, our findings also amplify warnings by Rodriguez Müller et al. (2024; 2021) and Schelings et al. (2023) that depending on the target audience, (semi-)governmental organisers of co-creation should be mindful of the (in)conveniences caused by the use online methods or tools in co-creation. Not all citizens are active, engaged, hyperconnected technophiles (Schelings et al., 2023), and some might require tailored strategies to engage (Rodriguez Müller et al., 2024). Who those citizens are exactly, we will delve deeper into now. For which citizens do what pre-conditions mark a tipping point in favour of digital co-creation while scaring away or inconveniencing others?

4.2 EXAMINING CITIZEN PARTICIPATION PROFILES ACROSS CO-CREATION MODES

Table 8 (cf. infra) provides four full model regression coefficients to examine the demographical characteristics and evaluative beliefs that make citizens likely co-creators in ideation, voting, deliberation and co-delivery. **Without differentiating between digital and analogue configurations**, we draw **four preliminary observations**: (a) demographics add only little to no explanatory power to the equations; (b) a digital configuration plays a decisive role in the first two co-creation steps, thereby confirming the findings from the previous section; (c) hedonic motivation and civic efficacy sort the most pronounced and lasting positive effect of all evaluative beliefs on willingness to engage whereas (d) facilitating conditions remain remarkably non-significant throughout most of our models. We will now take a closer look at each of these observations individually.

First, keeping all other variables constant, we find the **demographics** of **age and gender** non-decisive in stimulating or diminishing respondents' co-creation willingness. **Occupational status** then does add small explanatory power but only in the deliberation and co-delivery steps and with its categories functioning in different directions: while not being active on the labour market (e.g., a stay-at-home parent, chronically ill or permanently disabled) decreased one's co-creation willingness, being unemployed seemingly increased it.

Table 8. Full model summary of OLS linear regression results to explain citizens' intentions to participate in **co-creation (combined configurations)** using mean scored variables (n=1,035).

	Model Step 1		**Model Step 2**		**Model Step 3**		**Model Step 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.007 (.007)		-.012 (.007)		.016 (.007)	*	.010 (.007)	
Gender (ref=non-female)	-.142 (.141)		.056 (.133)		-.004 (.137)		.100 (.135)	
Educational attainment (ref=high)	.413 (.175)	*	.330 (.165)	*	.646 (.169)	***	.636 (.167)	***
Occupational status (effect=not yet active)	-.405 (.273)		-.277 (.257)		-.367 (.264)		.082 (.261)	
Occupational status (effect=not active)	-.010 (.197)		.039 (.186)		-.400 (.191)	*	-.515 (.189)	**
Occupational status (effect=unemployed)	.150 (.263)		.199 (.248)		.562 (.255)	*	.597 (.251)	*
Occupational status (effect=pensioned)	.226 (.217)		.181 (.205)		-.111 (.210)		-.495 (.207)	*
Configuration (ref=analogue)	.811 (.137)	***	.696 (.129)	***	-.086 (.132)		.114 (.131)	
Attitudes towards participation								
External efficacy	.324 (.083)	***	.364 (.078)	***	.142 (.080)		.220 (.079)	**
Trust service and solution quality	.024 (.042)		-.034 (.040)		-.031 (.041)		.095 (.040)	*
Interest in local politics	.527 (.102)	***	.483 (.096)	***	.441 (.099)	***	.117 (.097)	
Hedonic motivation	.623 (.113)	***	.757 (.107)	***	1.065 (.110)	***	1.134 (.108)	***
Subjective norm								
Perceived social pressure	.215 (.072)	**	.009 (.068)		.212 (.070)	**	.266 (.069)	***
Community attachment	-.248 (.075)	**	-.107 (.071)		-.197 (.073)	**	-.294 (.072)	***
Perceived behavioural control								
Civic efficacy	.213 (.067)	**	.158 (.063)	*	.217 (.065)	***	.267 (.064)	***
Digital efficacy	.249 (.071)	***	.303 (.067)	***	.331 (.069)	***	.063 (.068)	
Facilitating conditions	-.130 (.075)		-.016 (.071)		-.126 (.073)		-.137 (.072)	
Prior experience (ref=no prior experience)	.286 (.161)		.218 (.152)		.443 (.156)	**	.152 (.154)	
Time availability (ref=sufficient)	-.471 (.169)	**	-.160 (.159)		-.500 (.164)	**	-.942 (.162)	***
Constant	3.023 (.512)	***	4.146 (.484)	***	1.466 (.494)	**	2.137 (.488)	***
Adjusted R^2	.295	***	.302	***	.371	***	.380	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Step 1 = ideation; step 2 = voting; step 3 = deliberation; step 4 = co-delivery.

The fact that these two categories reached statistical significance in steps 3 and 4 is not entirely surprising, given the particular demands that both activities place on participants' skills. Deliberation, for example, requires one to be sufficiently well-versed in the processing of information (such as arguments and opinions) on the spot, to put to words one's personal opinion and structure it using logical and compelling argumentation, and have enough self-confidence to not only present it but also aptly pick up on the comments of other participants. These skills are often acquired and further developed through professional experience. Therein, non-active respondents de facto find themselves at a disadvantage. Conversely, those unemployed might perceive these types of co-creation as an opportunity to maintain these skills and continue to be useful to society during their temporary job loss. Finally, and contrarily to what is often assumed in the literature (e.g., Lee & Kim, 2018; Schelings et al., 2023; Szesciło, 2018; Verschuere et al., 2012), we witness how being **highly educated** (i.e., continuing education of the long or university type, including respondents holding Master's or equivalent degrees and PhDs) decreased instead of increased co-creation willingness levels. Within our sample, on average, simply not being highly educated increased one's willingness to participate by 0.330 to 0.636 points on a scale from 0 to 10.

Second, a **digital configuration** plays an undeniable role in respondents' willingness to engage in ideation and voting (i.e., increasing willingness with 0.811 and 0.696 points, respectively, on a scale from 0 to 10) yet not deliberation and co-delivery. That confirms the findings of tables 6 and 7 (cf. supra) and adds to the caveat raised in their wake.

Recommendation 1

Actively evaluate the advantages and disadvantages of analogue, digital, hybrid and mixed co-creation designs in light of the (a) outset objectives, (b) necessary internal input(s) and/or resources, envisioned activities or activation methods, and (c) desirable output and outcomes, including how to measure them.

Third, **hedonic motivation and civic efficacy** are the only evaluative beliefs that exhibit a **pronounced and step-independent positive effect** on respondents' willingness to engage in co-creation. Expecting a certain sense of enjoyment, fun and inspiration from participation, as well as firmly believing in one's capacity to contribute meaningfully, can thus fuel co-creative engagement. These results cautiously demonstrate the importance of communicating what participants can gain from participation (for example: "It will be fun"), plus stipulating that every opinion counts and that truly everyone can (learn or will be supported to) contribute. Moreover, we find **interest in local politics** to follow closely after hedonic motivation and civic efficacy. Other evaluative beliefs show more fluctuating patterns, coinciding more strongly with particular steps.

Recommendation 2

Communicate clearly what participants can gain from engaging in co-creation (such as a sense of enjoyment, gratification, belonging, meaningfully contributing to their neighbourhood and surroundings, learning something news, or increasing the number of one's acquaintances).

Recommendation 3

Emphasise that every contribution matters and truly everyone can (learn how to) participate (meaningfully).

Fourth, facilitating conditions never reached statistical significance despite research evidence signalling the importance of sufficient information (e.g., so that all participants can comfortably engage in substantive thought and discussion without pre-existing knowledge imbalances resulting in or exacerbating participation inequalities) and tailored support to increase and maintain good participation levels (see, for example, Callens, 2023; Deligiaouri, 2013; Karlsson et al., 2012; Parrado et al., 2013; Viglia et al., 2018). However, we must be careful about drawing far-reaching conclusions. After all, we enquired about respondents' co-creation intentions for a fictitious initiative, which might have led them to undervalue additional information, good preparation and additional support schemes. Given the hypothetical nature of the situation and the fact that we left the object of co-creation up to respondents' imagination, they might have assumed they would not need it. Ideally, however, a facilitator and/or organiser of co-creation provides sufficient opportunity for the thorough preparation of all and the extra support for those who need it.

Recommendation 4

Avoid adverse knowledge and skill imbalances by adequately preparing participants and providing sufficient support throughout the co-creation initiative (on both digital and content-related aspects).

4.3 EXAMINING CITIZEN PARTICIPATION PROFILES ACROSS CO-CREATION MODE CONFIGURATIONS

Unlike in the previous section, we now differentiate between the analogue and digital configurations of the four-stepped co-creation initiative. In this regard, it is first of all interesting to note that Table 9, which presents the analogue configuration statistics, offers worse **explanatory power for steps 1** (i.e., R^2 = .253) **and 2** (i.e., R^2 = .248) than does Table 10, presenting the digital full models (i.e., R^2 = .357 and .389 for both steps respectively). In analogue configurations, explaining or pinpointing individual co-creation motives in relatively simple and short activities such as ideation and voting appears to be more challenging and, hence, uncertain. This complicates the formulation of customised activation strategies. Regarding steps 3 and 4, the regression models fare equally well.

First, zooming in on the **demographical variables** in tables 9 and 10 (i.e., labelled 'control variables'), we observe that **age and gender** sort no outspoken differences in the division between analogue and digital configurations, confirming the trend already presented in Table 8. Moreover, tables 9 and 10 clarify that the **education attainment** effect we witnessed in Table 8 situates itself predominantly in the analogue set-ups. Ceteris paribus did university-level education appear to lower one's willingness to co-create in analogue configurations between .760 to .925 points out of 10. We can only guess why we do not find this effect in the

digital configurations. Still, a reasonable explanation could lie in our digital alternative's time and location-independent character. This interpretation seems to be confirmed by the fact that in the digital configuration, in step three (i.e., deliberation), the same negative effect of education level looms (i.e., the more highly educated, the lower one's willingness to enter into discursive expression with 40 fellow citizens centred around a local redevelopment issue). As mentioned earlier, the time- and location-independent aspect is lost in this third step. Comparing the different **occupational status** categories between tables 9 and 10, we witness how not being active in the labour market coincides with decreased willingness intentions in analogue deliberation and digital co-delivery, whilst unemployment seems to spark enthusiasm for a digital co-delivery contribution, yet not an analogue one. Why these differences show among the non-active and unemployed in our sample requires further qualitative investigation.

Recommendation 1 *(continued)*

Actively evaluate the advantages and disadvantages of analogue, digital, hybrid and mixed co-creation designs in light of the targeted audience and their group and method-specific barriers to participation.

Recommendation 5

Specify the amount of time needed to contribute.

Second, a mere cost-benefit analysis to explain citizens' co-creation motivations does not hold. Despite expectations drawn from the literature review about the **attitudes towards participation**, we find **external efficacy** to play a more decisive role in digital co-creation steps than in its analogue counterparts. We did, however, expect that trust in a public entity organiser's sincere intentions and capacity to involve us meaningfully would play a more decisive role in analogue co-creation. After all, the operational cost of participation (in terms of travel expenses and time to commute to the city or municipal hall and back) in such instances is bigger than in most digital instances. Hence, if we were not to trust or believe that the organiser is genuinely interested in our contribution, we might assess the cost of participation as too high compared to the societal benefits or personal gains. Yet, our data contradicts this line of reasoning.

Moreover, our expectations about **trust in the service and solution quality** were only partly confirmed. Although we had expected that digital co-creation would be particularly interesting for the dissatisfied as it oftentimes offers an opportunity for unbridled and anonymous ventilation of frustrations and counter ideas, again our data did not lay bare such a pattern. Only in the digital voting step did less trust associate with more willingness to get engaged. Remarkably, neither does dissatisfaction associate in the opposite direction: significantly lowering co-creation willingness and causing citizens to refrain from participation. The variable simply does not associate, regardless of the direction.

Table 9. Full model summary of OLS linear regression results to explain citizens' intentions to participate in **co-creation (analogue configurations)** using mean scored variables (n=520 – 521).

	Model Step 1A		**Model Step 2A**		**Model Step 3A**		**Model Step 4A**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.017 (.011)		-.014 (.011)		.013 (.010)		.008 (.010)	
Gender (ref=non-female)	-.164 (.205)		.027 (.202)		.010 (.193)		.303 (.193)	
Educational attainment (ref=high)	.802 (.258)	**	.460 (.254)		.760 (.237)	**	.925 (.238)	***
Occupational status (effect=not yet active)	-.691 (.404)		-.365 (.397)		-.059 (.370)		.153 (.371)	
Occupational status (effect=not active)	.298 (.283)		.228 (.278)		-.554 (.271)	*	-.421 (.271)	
Occupational status (effect=unemployed)	-.077 (.378)		.233 (.372)		.305 (.362)		.244 (.363)	
Occupational status (effect=pensioned)	.499 (.314)		.162 (.309)		.040 (.300)		-.409 (.300)	
Attitudes towards participation								
External efficacy	.209 (.119)		.370 (.117)	**	.141 (.119)		.119 (.119)	
Trust service and solution quality	.104 (.065)		.072 (.064)		-.055 (.058)		.109 (.058)	
Interest in local politics	.479 (.150)	**	.481 (.147)	**	.438 (.143)	**	.045 (.143)	
Hedonic motivation	.823 (.167)	***	.763 (.164)	***	1.080 (.154)	***	1.178 (.155)	***
Subjective norm								
Perceived social pressure	.353 (.111)	**	.167 (.109)		.272 (.094)	**	.405 (.095)	***
Community attachment	-.200 (.111)		-.122 (.109)		-.060 (.105)		-.238 (.105)	*
Perceived behavioural control								
Civic efficacy	.131 (.100)		.148 (.098)		.324 (.088)	***	.366 (.088)	***
Digital efficacy	-.023 (.108)		-.025 (.107)		.203 (.101)	*	-.077 (.101)	
Facilitating conditions	-.013 (.110)		.104 (.108)		-.202 (.103)		-.198 (.104)	
Prior experience (ref=no prior experience)	.271 (.233)		.112 (.230)		.313 (.218)		.064 (.218)	
Time availability (ref=sufficient)	-.452 (.247)		-.207 (.243)		-.450 (.233)		-.855 (.233)	***
Constant	3.125 (.750)		4.088 (.739)	***	1.720 (.701)	*	2.165 (.702)	**
Adjusted R^2	.253	***	.248	***	.370	***	.380	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; beta=standardised regression coefficient; SE=standard error.

Note. Step 1 = ideation; step 2 = voting; step 3 = deliberation; step 4 = co-delivery.

Table 10. Full model summary of OLS linear regression results to explain citizens' intentions to participate in **co-creation (digital configurations)** using mean scored variables (n=514 – 515).

	Model Step 1D		**Model Step 2D**		**Model Step 3D**		**Model Step 4D**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	.006 (.010)		-.007 (.009)		.021 (.010)	*	.015 (.010)	
Gender (ref=non-female)	-.154 (.190)		.075 (.170)		-.031 (.196)		-.117 (.189)	
Educational attainment (ref=high)	-.002 (.231)		.148 (.206)		.494 (.246)	*	.299 (.238)	
Occupational status (effect=not yet active)	-.156 (.359)		-.228 (.321)		-.689 (.384)		.027 (.371)	
Occupational status (effect=not active)	-.147 (.271)		.014 (.242)		-.239 (.273)		-.591 (.264)	*
Occupational status (effect=unemployed)	.281 (.358)		.023 (.320)		.802 (.360)	*	.940 (.348)	**
Occupational status (effect=pensioned)	-.141 (.295)		.146 (.264)		-.280 (.297)		-.633 (.287)	*
Attitudes towards participation								
External efficacy	.463 (.112)	***	.375 (.100)	***	.159 (.110)		.321 (.106)	**
Trust service and solution quality	-.042 (.054)		-.117 (.048)	*	-.014 (.059)		.084 (.057)	
Interest in local politics	.611 (.136)	***	.500 (.121)	***	.419 (.139)	**	.176 (.135)	
Hedonic motivation	.375 (.150)	*	.685 (.134)	***	1.045 (.159)	***	1.101 (.154)	***
Subjective norm								
Perceived social pressure	.155 (.094)		-.069 (.084)		.146 (.106)		.094 (.103)	
Community attachment	-.296 (.101)	**	-.087 (.090)		-.333 (.103)	**	-.323 (.100)	**
Perceived behavioural control								
Civic efficacy	.332 (.089)	***	.217 (.080)	**	.071 (.098)		.146 (.095)	
Digital efficacy	.499 (.092)	***	.581 (.082)	***	.454 (.096)	***	.202 (.093)	*
Facilitating conditions	-.271 (.101)	**	-.141 (.090)		-.032 (.105)		-.082 (.101)	
Prior experience (ref=no prior experience)	.204 (.217)		.226 (.194)		.558 (.229)	*	.237 (.221)	
Time availability (ref=sufficient)	-.438 (.225)		-.088 (.201)		-.616 (.234)	**	-1.070 (.226)	***
Constant	3.521 (.672)	***	4.767 (.600)		1.282 (.709)		2.241 (.685)	**
Adjusted R^2	.357	***	.389	***	.374	***	.387	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; beta=standardised regression coefficient; SE=standard error.

Note. Step 1 = ideation; step 2 = voting; step 3 = deliberation; step 4 = co-delivery.

Despite the above findings, **interest in local politics** and **hedonic motivation** kept functioning according to the expectations. As described above, they continued to sort an outspoken positive effect on respondents' willingness to participate in nearly all analogue and digital co-creation steps. Still, we might wonder why interest in local politics seems to affect a willingness to co-produce or engage in the fourth co-delivery step less than all the other hypothetical initiative's steps. A possible explanation might be that citizens—knowingly or unknowingly—perceive the actual delivery of services as less of a political affair but more of an administrative one. Consequently, it taps into an interest in public affairs that is not captured by our variable.

Recommendation 6

Leverage the target audience's interest in (local) politics and elaborate on the link between politics, policymaking, service delivery, and their contribution.

Third, comparing the **subjective norm variables** between tables 9 and 10 reveals a reversed pattern in the perceived social pressure and community attachment variables. While **perceived social pressure** positively affects one's willingness to engage in analogue ideation, deliberation and co-delivery, it sorts no effect on digital occasions. This finding confirms the expectation that social pressure can play less of a role in situations where participants are asked to contribute digitally because of its remote and invisible character. On analogous occasions, however, the participation of significant others might be very apparent. Hiding oneself, for example, after being informally invited to contribute, becomes more difficult. Since participation is so visible, individual motivation grounds such as feeling seen and understood can also play a stronger role.

Community attachment, on the other hand, appears to negatively affect one's willingness to engage in ideation, deliberation and co-delivery in digital configurations, yet does no such thing in analogue ones—or only to a very limited extent, as is the case in analogue co-delivery. This observation could also be explained by a logic already presented above: citizens might assess digital participation as a poor alternative to in-person co-creation, where they can get to know new people, be seen and receive direct recognition for their contribution. After all, digitally, everything remains rather anonymous, not rendering the same direct gratitude. Furthermore, there is also the possibility that those who feel particularly connected to their local neighbourhood also estimate that they do not need to organise themselves online to make themselves valuable. They undoubtedly already have other channels to influence municipal decisions that affect their neighbourhood, or to arrange things among themselves when the municipality cannot meet their particular needs (e.g., young parents organising playdates for their children over WhatsApp groups when someone in the neighbourhood finds him, her or themselves in desperate need for a babysitter).

Recommendation 7

Make the contributions of individual participants in digital co-creation visible to fellow-citizens by removing anonymity while bearing in mind that this may imply an additional barrier for some groups.

In a **fourth** and final step, we consider the **perceived behavioural control variables** in Tables 9 and 10. As expected, we find **digital efficacy** only relevant in those instances that invited respondents to contribute to digital co-creation. Contrary to our expectations, however, civic efficacy only reached statistical significance in digital steps 1 and 2 and the analogue steps 3 and 4. This alternating pattern is remarkable and hard to interpret. Why a firm belief in one's capability to make a meaningful contribution appears more important in the last two analogue steps in comparison to the first two ones might still be explained by the fact that participation in those instances is very visible, for which feeling incapable of contributing can decrease chances of participation. Yet, we would have at least expected similar significance results between Tables 9 and 10 when it comes to the third co-creation step. After all, the same unique skillset is required in deliberation, whether in-person or not.

Time availability or the lack thereof affects respondents' willingness to participate in analogue co-creation in the same way as digital co-creation, yet digitally, the effects are more outspoken.

Similar to Table 8's findings, **facilitating conditions** again do not add significantly to the prediction of respondents' willingness to engage in different analogue or digital co-creation steps, apart from digital ideation. In the first digital step, the variable behaves contrary to all expectations, as the more one trusts that help or support will be provided during participation, the less willing one appears to participate. We have no explanation for this finding yet, but we would like to stress that we left the wording of the items residing under 'facilitating conditions' (see Table S1C in Supplement 1) quite vague. Hence, respondents could have interpreted them very broadly or very narrowly. Being provided with the necessary information to participate (i.e., item 1), for example, can range from a brief description of the expectations for participation and the course of the initiative up to a whole range of supportive measures that allow the content-wise preparation of participants through knowledge clips, background readings or the activation of tacit knowledge about the topic through inspiration and reflection exercises. Furthermore, being confident that you can turn to someone in case questions or concerns arise (i.e., item 2), can capture content-wise concerns, concerns related to the interaction with other participants (e.g., foul or abusive language not accurately filtered out on a platform), technological concerns (e.g., simply not knowing or finding how to) or maybe even a combination of all three. Therefore, interpretative freedom caused by the overly broad formulation of the variable items may lie at the root of these remarkable results. Section 5, which explores these variables among respondents who participated in real instances, might shed a different light on these findings.

Remarkably, engaging once does not guarantee participation at later points in life, as **prior experience** hardly ever seemed to reach statistical significance, apart from step three in the combined configurations presented in Table 8. This may have to do with the fact that we only presented respondents with a fictitious case. Again, Section 5, might shed a different light.

4.4 EXAMINING THE HIERARCHICAL NATURE OF PRE-CONDITIONS FOR DIGITAL CO-CREATION THROUGH CLASSIFICATION TREES

Finally, in this section, we elaborate on the order of recommendations for specifically digital co-creation by examining the results of four **classification tree** (CART) **analyses**. This technique adds a layer of meaning to the key variables that emerged from the linear regressions above, enabling us **to rank** these **variables and the recommendations derived from them** according to their importance at specific steps in the initiative. Or, more precisely, their importance in predicting the end results (i.e., a particular respondent's willingness to participate expressed as a score out of 10).

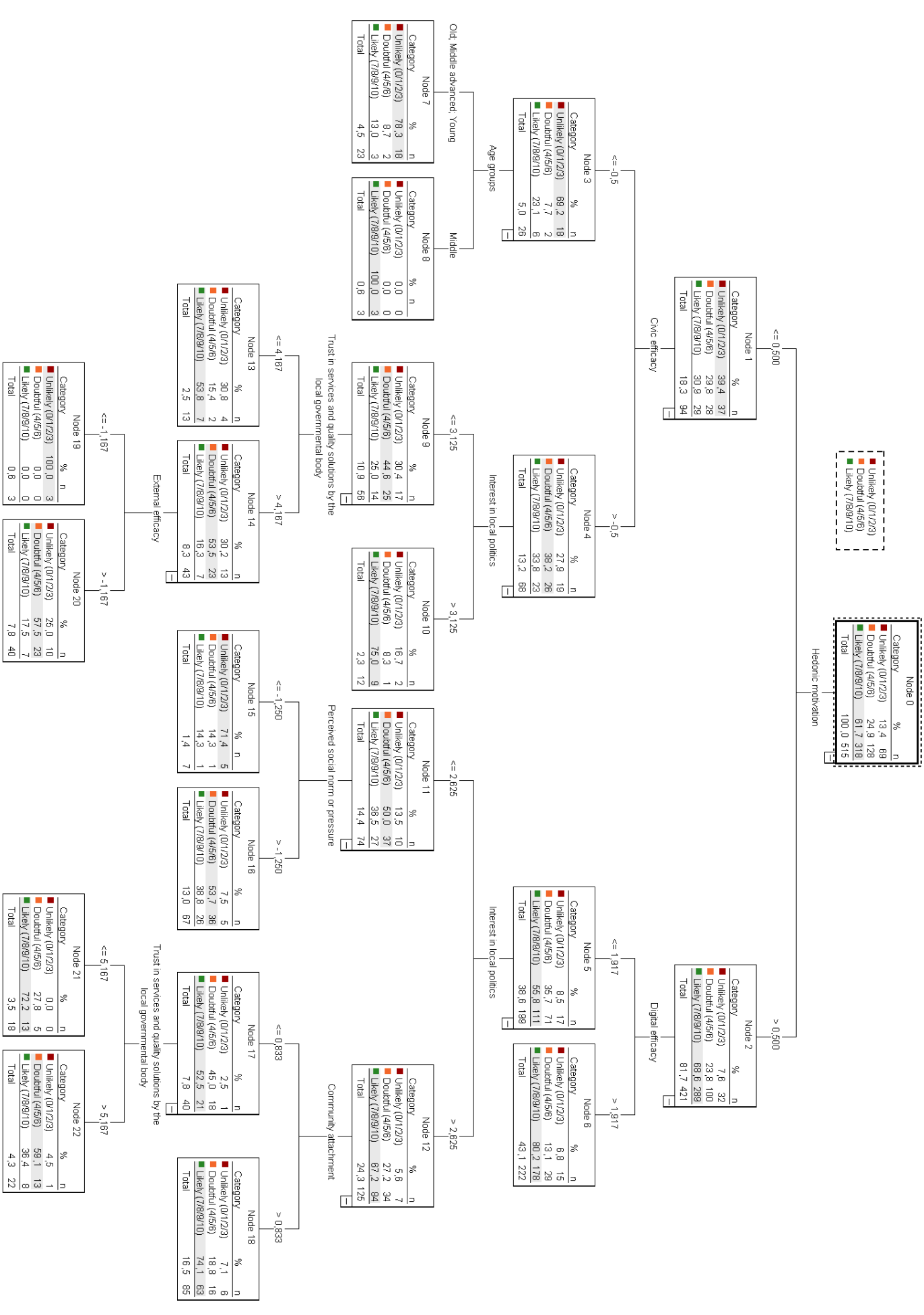
4.4.1 DIGITAL IDEATION

Among all respondents presented the digital ideation option (n=515), a clear majority of 61.7% expressed a willingness (i.e., equalling likeliness scores from seven to ten out of ten) to accept the fictional co-creation invitation by their local government. 13.4% indicated no intention too (i.e., equalling likeliness scores of null to three out of ten), whilst an additional 24.9% were classified 'doubtful' (i.e., equalling likeliness scores of four, five and six out of ten). Figure 7 shows that the **primary evaluative factor or demographic** influencing this intention score was **hedonic motivation**. When respondents did not believe that participation in digital ideation would be interesting or render them some sense of enjoyment and satisfaction (i.e., equalling motivation scores below 0.5), they most likely belonged to the segment of respondents indicating an unlikeliness to participate (i.e., a 39.4 per cent chance). On the contrary, expecting those things only to a small extent, already makes one a likely participant (i.e., a 68.6 per cent chance).

When we take a closer look at **the motivated group**, we see that having a high level of digital efficacy (i.e., scores above 1.9 on the scale from '-3' to '3') makes it particularly likely that they will intend to participate. A slightly lower efficacy level (i.e., all scores falling below 1,9), on the other hand, is more often associated with doubt. This is certainly the case when the political interest of that group falls below 2.6 (i.e., on a scale from '0' to '4'). When those scores are also accompanied by a complete lack of pressure or encouragement to participate (i.e., scores equal to or below -1.25 on a scale from '-3' to '3'), doubt can even turn into unlikeliness. Yet, in general, respondents on this side of the tree hold positive intentions to participate.

From a policy and activation strategy perspective, however, the **respondents** on the other side of the tree are more interesting. Following the branch from Node 1 downwards can potentially indicate salient variables that, when addressed smartly, might persuade those **who show little motivation or enthusiasm** for digital ideation to doubt. Some of the doubters might even be swayed to a likeliness score of seven or higher with the right activation strategies or supporting measures. So, which personal demographics and evaluative beliefs should we focus on? Following down the low hedonic motivation branch, we cross civic efficacy as the next influential factor at tree level 2. Overall, the subgroup with no or little confidence in their own capability of participating in digital ideation (i.e., civic efficacy equal to or below '-0.5' on a scale from '-3' to '3') proved unlikely participants in 70% of the cases.

Figure 7. Pruned classification tree for citizens' intentions to participate in digital ideation, subdivided by the categories ' Unlikely', ' Doubtful' and ' Likely'. Prediction accuracy of the tree model = 72,0%.
False positives = 14% (compared to 38% when basing the classification solely on the majority category).



Within the subgroup with civic efficacy scores above -0.5, cases were more evenly dispersed over all three willingness categories. This cautiously points to the importance of sufficient self-confidence in one's civic skills, as well as supportive measures to instil or stimulate these skills in potential participants. Because when citizens can also rely on very high levels of interest in local politics (i.e., equalling scores above '3.125'), they are particularly likely to participate. Compared to this subgroup, for those with somewhat lower levels of interest in local politics (i.e., scores equal to or below '3.125'), a distrust in the ability of their local governmental body to deliver quality services and solutions also seems to spur participation intentions. However, the number of respondents who reported such low trust scores at this point in our analysis was small.

Despite the 10% parent node and 5% child node rule utilised for pruning, it is worth mentioning that some nodes ended up being particularly small (such as nodes 8 and 19, which encompassed only three respondents each time). Such **small groups** are often considered less stable and, hence, their interpretation is less generalisable. For this reason, we like to stress the importance of treating them as **exploratory**. Despite that, the prediction accuracy of the tree model reached 72%, implying that the model correctly classified 371 of the observed responses into one of the three intention categories. Moreover, the confusion table confirmed that only an additional 14% of observed unlikely and doubtful cases were incorrectly classified as likely. This appears to be an interestingly low percentage of false positives or Type I errors compared to the approximately 38% we would have when we were to base our predictions or classification solely on the result of the majority category under Node 0.

4.4.2 E-VOTING

We can use the same logic to describe the results of the slightly narrower classification tree for e-voting. Once again, we see a clear majority group in the root node, namely the segment of likely participants, who account for no less than 75.7% of our sample or 390 out of 515 respondents. Which evaluative beliefs or demographics can tip the balance for the other 125 respondents in favour of participation?

Figure 8 (cf. infra) shows that again the **primary evaluative factor or demographic** influencing this intention score was **hedonic motivation** or expecting some sense of enjoyment and satisfaction over participation. We not only cross this variable at the tree level 1 but also at level 3. That is, on the right side of the tree and, therefore, within the likely to participate category of citizens. For citizens who feel slightly less digitally literate (but who are still in the positive segment of the scale), this positive expectation that it will simply be fun and satisfying does not seem insignificant.

From a policy perspective, of course, the left side of the tree provides us with most relevant information. On this side of the tree, after hedonic motivation scores that fall below 0.5, **external efficacy** emerges as the **second most important variable**. Where citizens believe in the added value of civic participation and the sincere intentions of their local government to involve them in a meaningful way (scores of 0.417 or higher on a scale of -3 to 3), there is a real inclination to participate, even if they may not really believe that it will be a particularly enjoyable, enriching or satisfying activity for them personally. It therefore seems important

to communicate and showcase success stories so that citizens can see what concrete results participation can lead to in their neighbourhood or municipality. Such examples can also illustrate that the local government is serious about citizen participation and allows it to me more than a so-called "park bench" problem or initiative of minor importance.

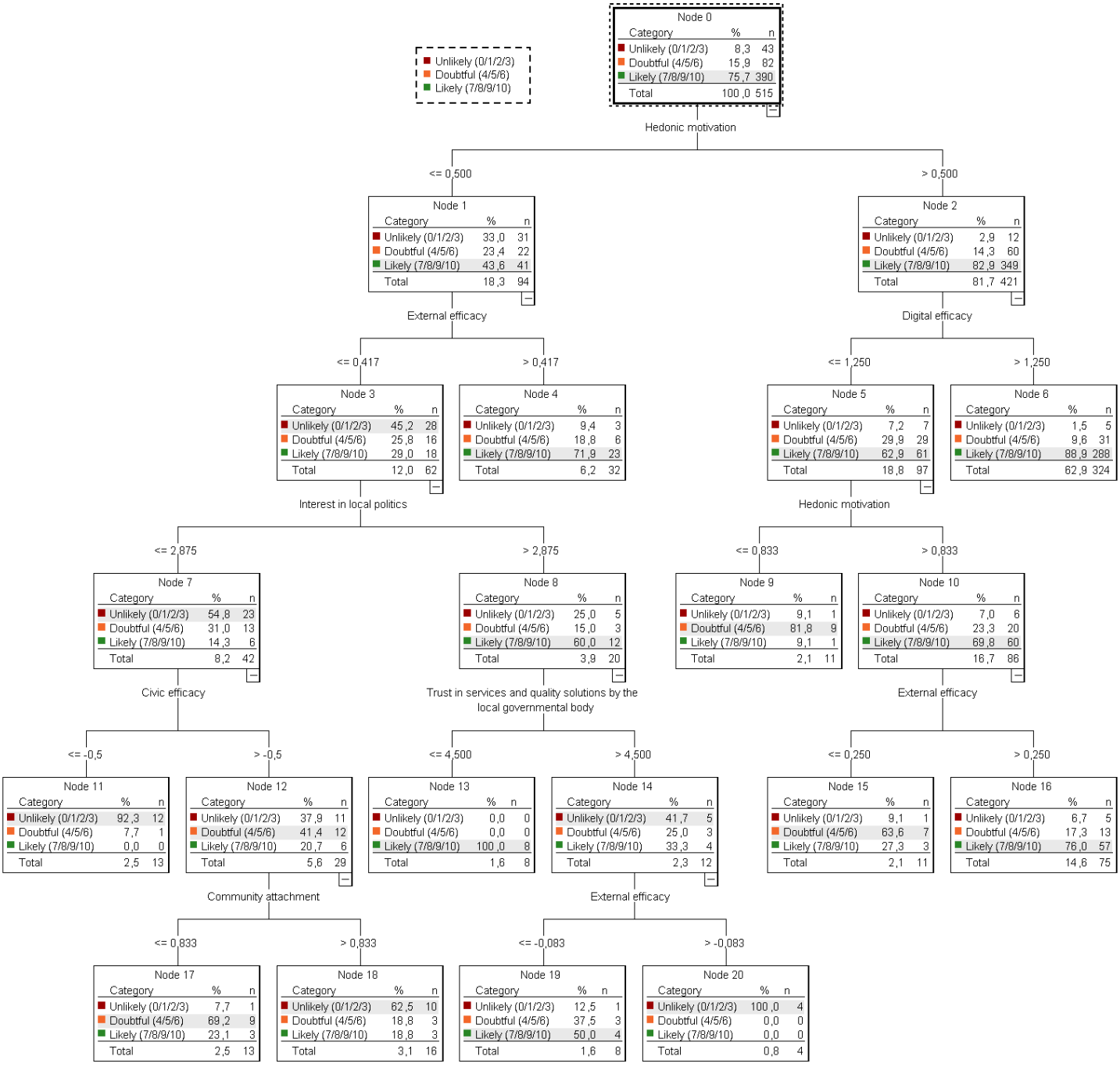


Figure 8. Pruned classification tree for citizens' intentions to participate in e-voting, subdivided by the categories 'Unlikely', 'Doubtful' and 'Likely'. Prediction accuracy of the tree model = 83,7%. False positives = 3% (compared to 24% when basing the classification solely on the majority category).

Recommendation 8

Showcase (digital) co-creation success stories or best practices.

This view of the public actor or entity as a reliable partner in initiating and organising citizen co-creation can be further reinforced by consistently **communicating transparently** about how citizens' contributions will be used and acting accordingly. For example, by providing citizens with interim feedback on their ideas or proposals, they understand that these are being read and thus have a chance to be considered. A two-way feedback loop, where both parties can engage in dialogue, can also increase the feeling of a human behind the digital tool and boost people's motivation (e.g., Gagliardi et al., 2017; Z. Khan et al., 2017; Schmidthuber et al., 2017). Additionally, it is highly recommended to avoid leaving citizens' questions or comments unanswered for too long—or, worse, completely unaddressed—and to publicly report on the final results. If, for any reason, contributions are not utilised or the results of a vote are not retained, explain why they are discarded.

Recommendation 9

Adopt a transparent and frequent communication regarding citizens' contributions.

A lack of external efficacy, however, does not need to be problematic, provided that the **political interest** of this group of citizens is high (i.e., scores above 2.875 out of 4). The group is what we could describe as 'citizens committed through frustration or disappointment'. Even though intrinsically, this group is very interested in what happens at the local political level, they are also **disenchanted** about the value of citizen participation, do not buy the sincere intentions of their local government and tend to assess the public services they receive and policy solutions that are taken rather badly (i.e., trust scores below 4.5 out of 10). Digitally, this group can easily, and often anonymously, vent (e.g., Elstub et al., 2021; Parrado et al., 2013). Whether this is also desirable, remains a point for discussion. Withal, organisers will do well to avoid that certain contributions impact other citizens' willingness to engage. Research by Moss and Coleman (2014) in a UK context, for example, shows how anonymous contributions made discussions on citizen platforms rapidly lapse into ridicule, verbal insults, and even racism. In a voting step like this one, however, everyone's opinion counts equally and chances of disrupting the initiative remain limited.

Finally, moving down node 7, we see that if people are not interested in local politics, their intentions to participate tend to remain low. That is, apart from a few doubters whose perceived self-efficacy to engage as citizens is not too bad (i.e., scores around the neutral null-point). Again, groups around this point in our tree are becoming smaller, making it harder to meaningfully generalise our interpretations. Overall, the tree model managed an 83% prediction accuracy, classifying 431 of the observed correctly. Only 3% of observed unlikely and doubtful cases were incorrectly classified as likely—which is a remarkably good percentage of false positives compared to the approximately 24% we would have when we were to base our predictions or classification solely on the result of the majority category under Node 0.

4.4.3 VIRTUAL DELIBERATION

Figure 9 presents the classification tree results for virtual deliberation. With 217 out of 514 respondents, or 42.2%, the likely category again marks the majority group presented in the root node.

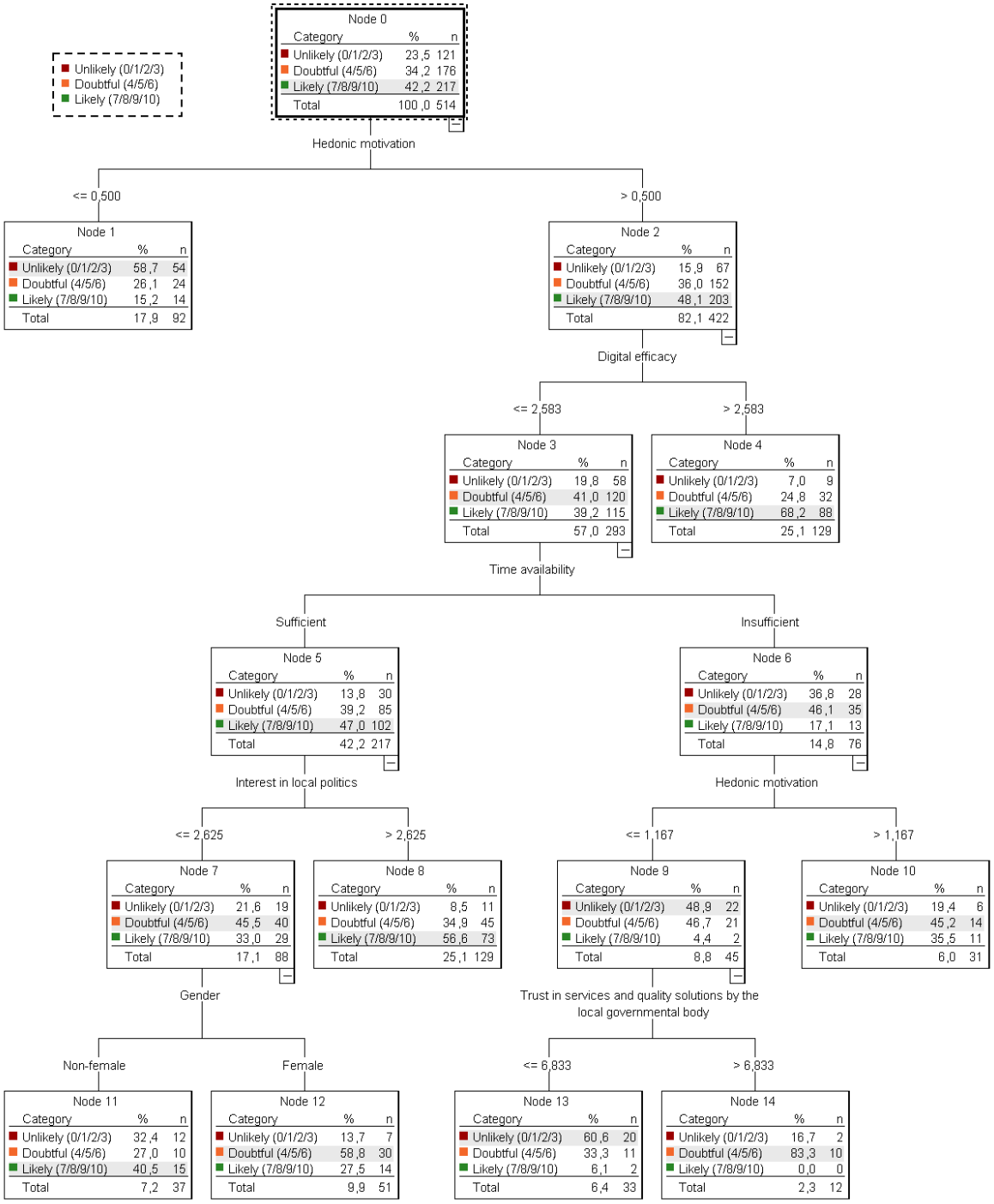


Figure 9. Pruned classification tree for citizens' intentions to participate in virtual deliberation, subdivided by the categories 'Unlikely', 'Doubtful' and 'Likely'. Prediction accuracy of the tree model = 59,1%. False positives = 19% (compared to 58% when basing the classification solely on the majority category).

Examining virtual deliberation intentions, **hedonic motivation** again emerges as a key factor influencing participation likelihood. For those scoring below 0.5, the model did not find a meaningful way to split the group further based on core evaluative beliefs or demographics. Generally, respondents in this category are unlikely to take part in the virtual deliberation with 40 fellow citizens. However, the outlook changes when considering respondents with motivation scores above 0.5 on the right-hand branch (node 2). Here, **digital efficacy** becomes the next significant explanatory variable. When this score exceeds 2.583, indicating very high digital self-confidence, respondents are more likely to intend to participate. Conversely, those with lower scores are more likely to be unlikely (19.8%) or doubtful (41%) about taking part. This underscores the importance of digital support, such as an integrated help feature, options to auto-connect to existing ideas or comments so citizens do not become overwhelmed by the volume of proposals, or an offline participation alternative, like a paper-based questionnaire or a physical suggestion box at the town hall or city hall.

Following the branch through node 3, we identify **time availability** as the next variable that could be detrimental. Within the group that believes they have enough time to engage in virtual discussion tables for a couple of hours, those with a strong interest in politics (i.e., more than 2.625 out of 4) are more likely to exhibit high participation intentions (i.e., in more than half of the cases). For the group with a slightly lower level of political interest, gender appears to influence participation, as men generally feel more comfortable contributing ideas in such virtual discussion settings than women (i.e., 40.5% are likely to participate versus only 27.5%). On the contrary, a perceived lack of time to contribute to virtual deliberation—such as through discussion tables or collaborative board workshops—makes individuals more hesitant about participating or might lead to them deciding not to join at all. The number of likely respondents in this group is notably low, with only 13 out of the remaining 76 respondents.

However, it should be noted that, compared to the previous two models, this classification tree has a lower prediction accuracy, with only 59.1% of cases correctly classified by our model. The 19% false positives or Type I errors are, however, still notably better than the 58% that would result if we relied solely on the majority category for classification. These findings suggest that **estimating participation intentions for this activation method**, **as well as the next one**, digital co-production, is **more complex than what** our current **evaluative beliefs** variables **and demographics can capture**.

4.4.4 DIGITAL CO-DELIVERY

With only 58.4% prediction accuracy, Figure 10 shows the model for that digital activation method in which respondents' intentions are most difficult to predict: **digital co-delivery**. Compared to Figure 9, we also observe a sharp rise in the number of false positives.

However, there is also a lesson to be learnt from this model: **hedonic motivation** once again plays a prominent explanatory role. While scores below 0.5 usually suggest an unlikely participation intention and those above 1.833 typically indicate a higher probability, it is especially the category in between that is interesting for developing activation strategies.

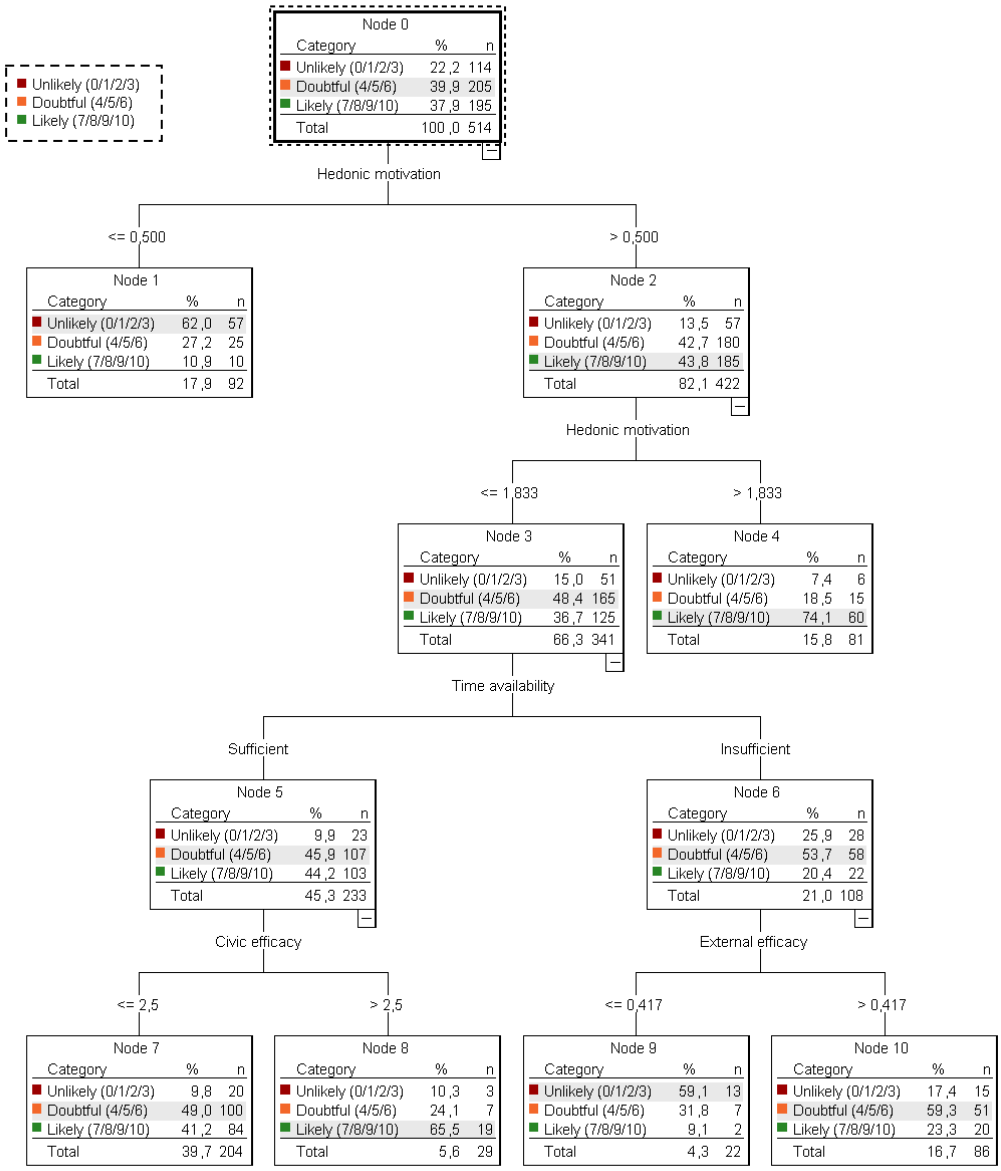


Figure 10. Pruned classification tree for citizens' intentions to participate in digital co-delivery, subdivided by the categories 'Unlikely', 'Doubtful' and 'Likely'. Prediction accuracy of the tree model = 58,4%. False positives = 59% (compared to ~ 100% when conducting the classification ad random as none of the three categories stands outs).

Here we observe once more that **time availability** marks the next decisive factor. While we can generally classify respondents with sufficient time as either doubtful (i.e., 49%) or likely (i.e., 41.2%) participants, those without time are best described as unlikely participants (i.e., 25.9%) or undecided (i.e., 53.7%) at most. In the former group, strongly trusting one's own ability to make a valuable contribution (i.e., **civic efficacy** scores above 2.5 on a scale ranging from '-3' to '3') appears to shift intentions from seemingly doubtful to likely, whereas in the latter group, **external efficacy** seems to have the opposite effect. The less one trusts in the sincere intentions and capacity of their local government to engage citizens meaningfully, the less likely they are to participate. Nevertheless, given the low prediction accuracy, these findings should be interpreted with caution.

4.4.5 AVERAGE TREE LEVEL AND INFORMATION GAIN RANK

In summary, Table 11 illustrates the relative importance of each independent variable in our explanatory model. It provides the reader with the average rank value across the four models based on their information gain—that is, the higher the rank or branching caused by a variable, the more informative it proved for splitting the sample and predicting the outcome variable—the three intention levels.

Table 11. Overview of independent variables according to their information gain ranking.

	Rank															
Independent variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Average Rank
Hedonic motivation	4															1.00
Civic efficacy		2	1	1												2.75
Digital efficacy		1	2				1									3.75
External efficacy		1		1	1					1						5.25
Interest in politics				1	1	1			1							6.00
Facilitating conditions					1	1	2									6.25
Perceived social pressure			1			1			1		1					7.25
Trust in service & solution quality								2	1	1						8.75
Time availability					1		1						1		1	10.00
Occupational status				1								2			1	10.75
Age										2		1			1	11.75
Community attachment						1		2			1				1	12.00
Prior experience									1					1	2	13.25
Gender											1		1		2	13.50
Educational attainment													1	1	2	14.25

4.5 INTERMEDIARY CONCLUSION

Based on Table 11, it is possible to distinguish between **two types of variables and**, consequently, two types of **recommendations** regarding activation strategies: (a) the **recurring and step-independent key variables** that organisers of co-creation ideally always focus on, such as hedonic or personal motivation and a sense of self-efficacy (either in civic or digital terms), and (b) the **occasional and step-dependent variables** that organisers can address later or when relevant, based on the activation methods chosen. Within the first group, we include the following recommendations:

- **Communicate clearly what participants can gain** from engaging in co-creation (such as a sense of enjoyment, gratification, belonging, meaningfully contributing to their neighbourhood and surroundings, learning something news, or increasing the number of one's acquaintances).
- **Emphasise** that every contribution matters and **truly everyone can** (learn how to) **participate** (meaningfully).
- **Empower** by adequately preparing **participants** and providing sufficient support throughout the initiative (in both digital and content-related aspects) to avoid adverse knowledge and skill imbalances.

Within the latter group, we include the following recommendations, which are more dependent on step or activation methods:

- **Specify** the **amount of time needed** to contribute.
- **Leverage** the **target audience's interest in local politics** and elaborate on the link between politics, policymaking, service delivery, and their contribution.
- **Make** the **contributions** of individual participants in digital co-creation **visible** to fellow citizens by removing anonymity, while bearing in mind that this may imply an additional barrier for some groups.
- **Showcase** (digital) co-creation **success stories** and best practices.
- **Adopt transparent and frequent communication** regarding citizens' contributions.

In ideal circumstances with unlimited financial resources, staffing and digital design capabilities, each of these variables is, of course, taken into account.

Finally, throughout the above section, we proposed a **recommendation that**, in essence, **precedes** consideration of **many of these variables** and, in a sense, is somewhat separate from them, but which can nonetheless influence their implementation:

- Actively **evaluate the advantages and disadvantages of analogue, digital, hybrid, and mixed co-creation designs** considering (a) the outset objectives, (b) necessary internal inputs and/or resources, (c) planned activities or activation methods in relation to the target audience and (d) desirable outputs and outcomes, including how to measure them.

In Chapter 5, we refine these recommendations based on four cases and respondents who actively engaged in digital co-creation and shared their experiences via a survey. Finally, in Chapter 6, these recommendations are considered in the context of real-world organisational challenges, struggles, and barriers. How likely are the recommendations to be adopted, and what side notes can be drawn considering the organisational challenges public organisers face when initiating and sustaining digital co-creation initiatives?

5. DATA ANALYSIS, PART 2 – CITIZEN PRE-CONDITIONS BASED ON THE UCS

Description of the second part of our data analysis, that is the analysis of the Use Case Survey results, to extend the General Population Survey's (GPS) results, conclusions and derived recommendations.

5.1 CASE DESCRIPTIONS

For the purpose of clarity in the four case descriptions below, the reader is reminded of the Baseline Measurement (Deliverable 1.1.1) colour and vector coding representing respectively stakeholder stakes and types of stakeholders. Refer to the original document for an elaborate description of their interpretation.

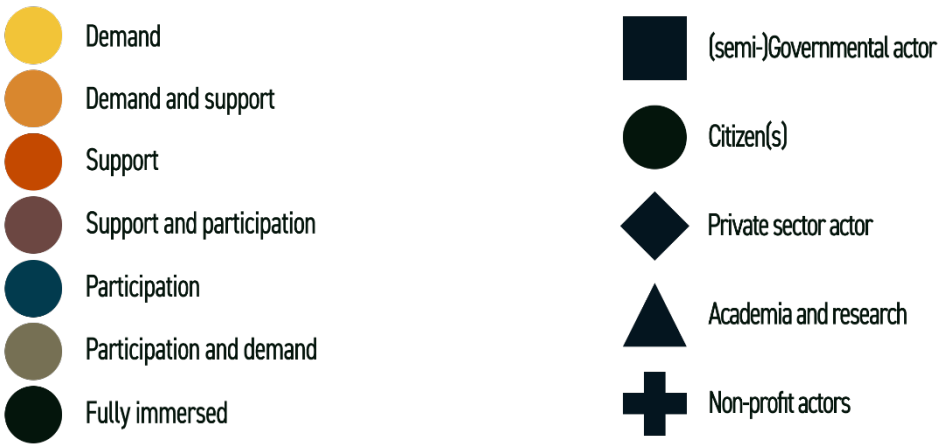


Figure 11. Visual summary of the colour coding regarding stakeholder stakes (panel on the left) and the vector coding regarding types of stakeholders (panel on the right).

5.1.1 CARTOWEB.BE AND THE TOPOMAPVIEWER

Our first federal digital co-creation case consists of a **co-assessment initiative** organised by the National Geographical Institute Belgium (NGI/IGN) (i.e., square 1) to keep their topographical base map(s) of Belgium as updated and high-quality as possible. After all, while the restitution of aerial photographs allows for the conversion of reality into accurate maps, it is not possible to permanently monitor the state of the entire Belgian territory. Hence, all those using the map through the web service (i.e., CartoWeb.be) or application (i.e., TopoMapViewer) can make a valuable contribution to its accuracy. To this end, since 2018, the TopoMapViewer has an incorporated functionality that allows every user to send a comment and report (a) issues with the application itself and (b) a discrepancy between the terrain in reality and what it should look like according to the map. Co-creation, in this case, proceeds in **two phases**.

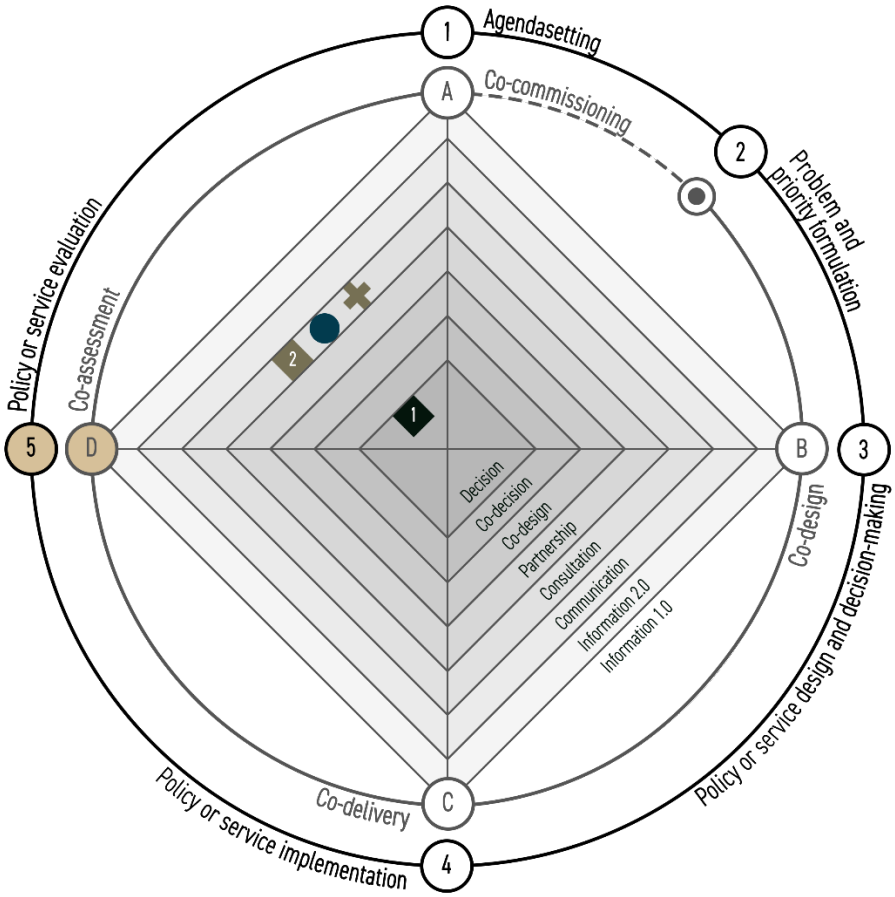


Figure 12. Visual summary of the TopoMapViewer co-assessment functionality – part 1.

In the first phase, individual actors (e.g., citizens, firemen, local civil servants, teachers, scouts, hiking club members, etc.) who come across an error or missing element in the map can report this. NGI purposefully collects all these reports in a database awaiting analyses to keep its maps updated. With a lead time of two months, NGI's *Production and Integration Department* validates each entry. The *Cartography Department* also registers approved changes in the printed maps revisions system.

In the second phase, the notifier of the map error or discrepancy is updated per email—at least, if (s)he indicated a desire to be kept in the loop—(s)he is informed about whether or not and how the change has been implemented based on his or her reporting.

While anyone can provide feedback on discrepancies between the reality on the terrain and those on the map, NGI observes that these mainly come from own staff or (semi-)governmental and non-profit professionals (i.e., square 2 and the cross), such as emergency services (fire brigades, police and the army), local government officials or civil servants and teachers on an excursion with their pupils. Whereas each of them individually is also a (Belgian) citizen, their stakes in this co-creation story differ substantially from those of ordinary citizens. For citizens, an updated and high-quality map constitutes a *nice to have* (e.g., when out and about exploring fields and forests). On the contrary, for (semi-)governmental and non-profit

professionals those maps imply a *must have* given the large amount of terrain information they require in the performance of their jobs. From that perspective, the demand for this initiative is two-fold. On the one hand, the feedback opportunity was installed at the request of the Belgian emergency services utilising the maps, as their service provision requires the most updated information on a particular terrain. On the other hand, NGI is perpetually in demand to continue offering the highest-quality maps possible.

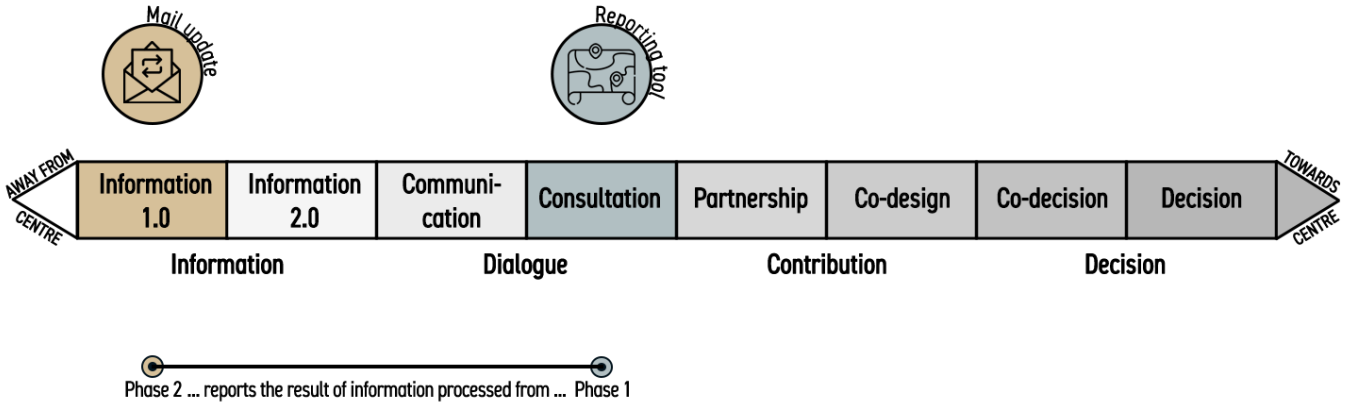


Figure 13. Visual summary of the TopoMapViewer co-assessment functionality – part 2.

This digital co-assessment tool results in approximately eight reports being received weekly and treated with an average turnaround time of two months. In addition to the notification option provided by the application, errors can still be reported by email or telephone.

5.1.2 CORONA CONSULTATIONS

The Corona Consultations implied a **three-phase co-commissioning initiative** carried out and coordinated by Sciensano (i.e., square 2) between November 2020 and January 2021 at the request of then Minister of Health and Social Affairs, Frank Vandenbroucke and his cabinet (i.e. square 1). The initial question was whether the organisation was interested and still had the capacity to organise citizen participation around COVID-19 vaccinations within the left-over margins of the Ministery allocated Cancerplan budget. The initiative's co-decided objective was to inform vaccination policy and lay out a vaccination strategy accepted and supported by the Belgian citizenry.

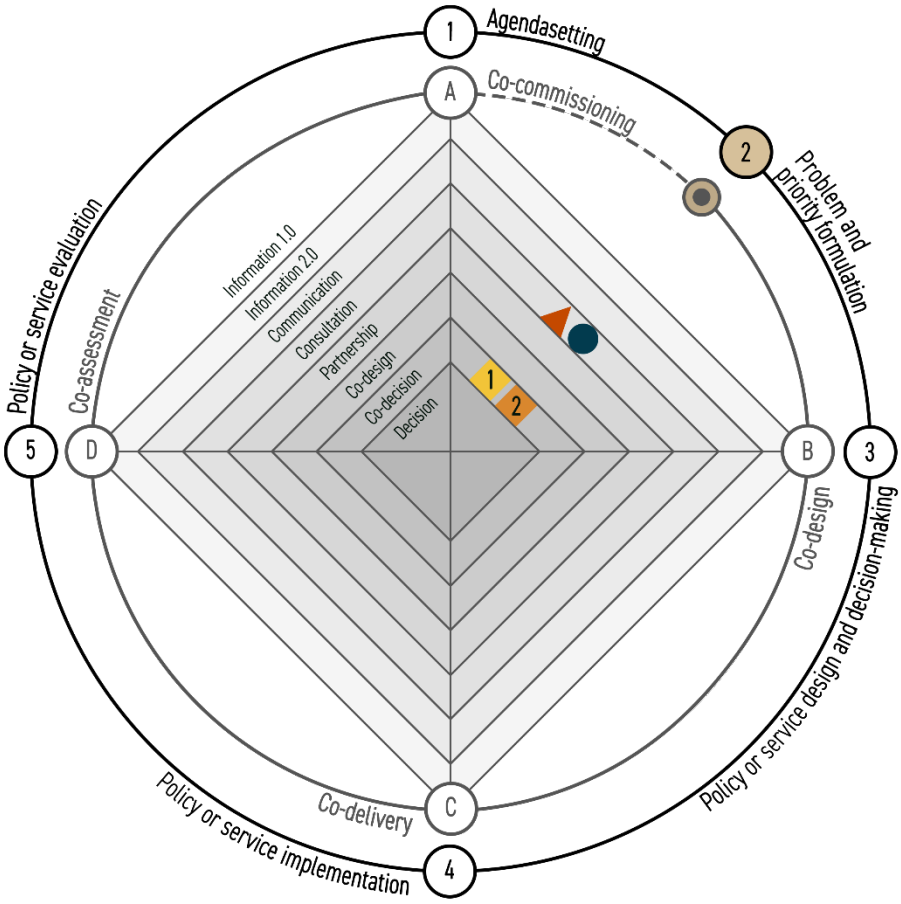


Figure 14. Visual summary of the Corona Consultations – part 1.

Ten debating moments (5 Dutch-speaking and 5 French-speaking of approx. two hours) about COVID-19 vaccination were organised on the same pattern. They included a deliberate outtake of citizens (i.e., circle) that were selected based on age, gender, language spoken at home, educational attainment and (un)willingness to get vaccinated in order to guarantee diverse opinions and capture a multitude of societal concerns. In total, 103 citizens were recruited from a sample of 5,802 citizens who had completed a COVID-19 Health questionnaire by Sciensano in the past and had indicated a willingness to debate COVID-19 policy.

In Phase 1, information and Q&A opportunities were provided by experts in pharmacology, immunology, medicine and virology (i.e., triangle) to prepare citizens for the debate in Phase 2. In Phase 2, and through moderation, citizens discussed the desirability of (a) mandatory vaccination and (b) the exclusion of citizens based on their vaccination status, using funnel and 'veil of ignorance' debating techniques (Saelaert et al., 2021). Although they did not partake as such, experts remained present throughout the debates as fact-checkers—a purely supportive function. The results of these discussions were briefly summarised and presented directly to the minister and his cabinet members in a third and final phase. Corona Consultation results were purely advisory and held no binding consequences. All phases were organised online and supported through Miro-boards.

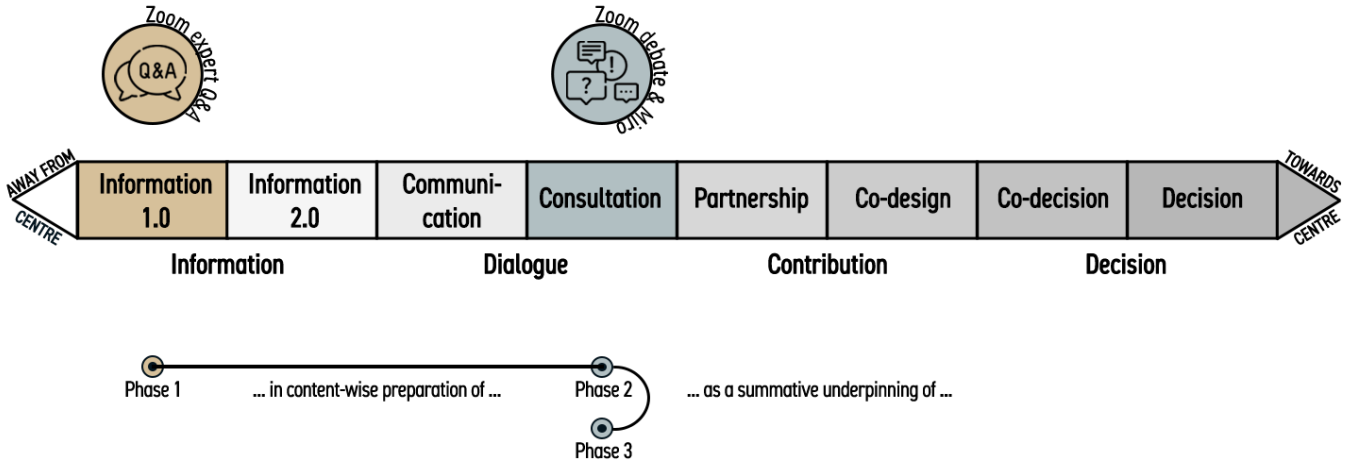


Figure 15. Visual summary of the Corona Consultations – part 2.

During the final presentation in phase 3, citizens could also ask pertinent questions directly to the minister. To do so, however, they first had to submit the questions using the chat function of the video conferencing tool. Other citizens could vote on the questions they found most relevant. Moreover, from the 5,802-headed recruitment sample, citizens who were not selected could submit a written answer to the two leading debate questions. However, as experts did not inform this group in a similar way, their responses were analysed separately. The deliberative part resulted in seven key messages for the minister and several concerns that citizens could express during their presentation (Saelaert et al., 2021).

5.1.3 AMAI! VLAANDEREN

Amai! marks the regional case in our sample. Led by the Knowledge Centre on Citizen Science (Scivil), in collaboration with the Knowledge Centre Data & Society (represented through triangle 1 in Figure 16), the project aims to (a) inform the public about AI and (b) involve citizens in innovation to address societal challenges through developing new AI applications in Flanders. It adopts a clear citizen science (CS) approach, rooted in the intention to democratise research by having experts engage with lay people, enabling them to contribute in diverse ways, such as submitting ideas, participating in data collection, or testing and training algorithms. Over **four project phases** spanning approximately a year, citizens (i.e., circle), policymakers (i.e., square), civil society (i.e., cross), and domain experts (in academia and industry, represented by triangle 2 and the rhombus) in climate, mobility, labour, and health or well-being collaborate and reinforce one another at multiple points. Beginning with **agenda setting**, they progress **to problem and priority formulation,** leading **to co-design** exercises that develop **implementable concepts that can be** citizen-**co-delivered**.

Amai! is funded by the Flemish Government's Department for Economy, Science, and Innovation within the Flemish AI Action Plan.

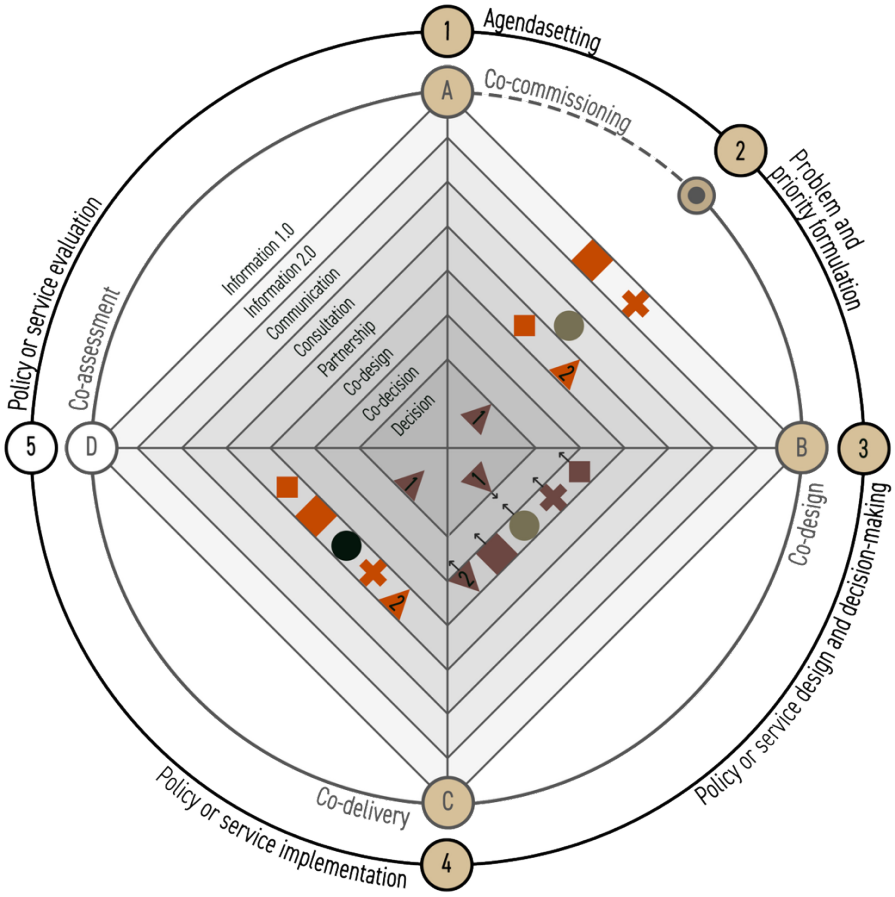


Figure 16. Visual summary of Amai! – part 1.

Although Amai! has been active since 2021 and has undergone small adjustments or innovations across its four editions, the four phases broadly include:

- **Phase 1 – the gathering of ideas**. Using a variety of offline and online ideation methods (from the ideation platform on the website to in-person AI information and brainstorming sessions, data walks, and interactive walls at science fairs), ideas are crowdsourced within the themes of climate, mobility, work, and health. The key question for citizens to consider both offline and online is: "What do they still need to invent? What do I think is missing that could have a substantial positive impact on everyday life?" Contributions can range from minor issues to major societal challenges, for which citizens are eager to find innovative, preferably AI-based, solutions. Amai!'s role in this phase is one of support and demand, establishing the contours of participation and steering the initiative accordingly by, among other things, providing extensive background material to assist citizens and expand their understanding of AI (such as educational resources available on the website for primary and secondary school teachers to use in their classrooms). The roles of other stakeholders, especially civil society and policymakers, are supportive, as they promote the call for ideas within their networks.

For experts (from industry and academia), support extends further, as they can offer feedback on the social desirability and feasibility of proposals.

- **Phase 2 – from research idea to concept**. The ideas submitted in the previous phase "are clustered per societal theme using keyword tags. These clusters guide the co-creation sessions in which citizens, civil society organisations (CSOs), AI professionals, and policymakers co-define the scope of research projects with potential AI solutions" (Duerinckx et al., 2024, p. 4). A co-creation session in each Flemish provincial capital results in the interaction and engagement of approximately 25 stakeholders each time. These can be citizens as well as policymakers or actors from civil society, academia, or industry. While citizens are characterised by a purely participatory role, in which they are allowed to actively contribute thoughts about the precise objectives of new projects within the margins of these sessions, our other stakeholders also play a supporting role. They can utilise their unique expertise to assist citizens and other stakeholders in the co-creation process. After all, the sessions are open to all as no prior knowledge is required.

- **Phase 3 – the open call for funding**. "After the scoping of potential research projects with AI solutions, an open call for funding is launched, inviting consortia to submit proposals to turn the crowdsourced ideas into reality. Winning proposals receive funding of up to 125,000 euros. The call requires projects to (i) build on one or more of the crowdsourced research ideas; (ii) provide societal and innovative value through AI; (iii) engage citizens through CS activities (e.g., collecting or analysing data, reporting, co-creating the methodology); and (iv) involve at least two partners, one with AI expertise and one in the societal domain. Proposals are evaluated by a jury of experts in AI, CS, and science communication" (Duerinckx et al., 2024, p. 4). The jury makes a pre-selection based on, among other things, the envisaged workplan, budget, and CS approach. Citizens are permitted the final decision on which project receives funding through a public vote on the shortlisted proposals.

- **Phase 4 – the implementation** of the citizen-driven research projects. "Finally, the funded projects start addressing the research questions and developing the AI solutions, together with relevant stakeholders. Consortia receive methodological support from the programme through workshops on CS and ethics in AI. Projects also receive assistance in the development of a communication strategy for citizen recruitment and media outreach" (Duerinckx et al., 2024, p. 5).

Across the four phases, citizens were engaged through both online and offline activation methods. This strategy aimed not only to appeal to a diverse audience but also to reduce barriers to participation and to "go where the people are (e.g., science festivals)" rather than requiring individuals "to make an active decision" to visit the ideation platform (Duerinckx et al., 2024, p. 6).

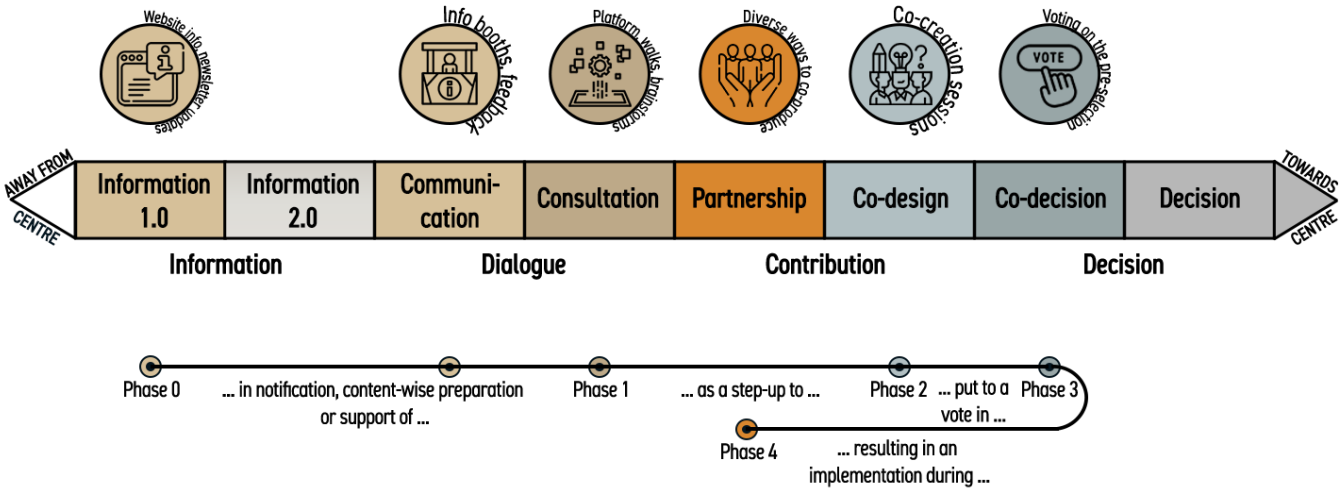


Figure 17. Visual summary of Amai! – part 2.

Over its past four editions (from 2021 to 2024), Amai! gathered 988 ideas concerning minor and major barriers, challenges, or issues faced by citizens across the four main domains of climate, mobility, work, and health. Most of these could be grouped into 37 large clusters, such as waste, litter, and pollution within the climate domain. In 14 of these clusters, an AI project had already been realised with the involvement of citizens (for example, Waste Watchers, in which participants, guided by VITO and River Cleanup, used drones to capture images for AI-based litter detection). At the time of writing, the project was preparing its fifth edition.

5.1.4 BURGERBUDGET GENK: MAAK DA MEE

Burgerbudget Genk presents the final case in this policy report—and the only local one. Led by the city administration of Genk, the project invited citizens to submit project proposals within the three central themes from the multi-year budget and policy plan: (a) climate and sustainability, (b) poverty, and (c) talent development. The dual aim of the citizen budget was, firstly, to reduce the gap between citizens and the administration by involving them more actively in policymaking, and secondly, to raise their awareness of these three themes within the municipal borders. Over five project phases, citizens participated in **submitting** project **ideas** (i.e., co-commissioning), **refining** these ideas **into tangible proposals** with support from municipal coaches (i.e., co-design), which could then be put to a vote and, if successful, implemented by the group of applicants.

At the time of data collection, the participatory or citizen budget had just completed its second edition, in which 29 projects (out of 46 contenders) were nominated and awarded funding. Five of those had already made a promising start.

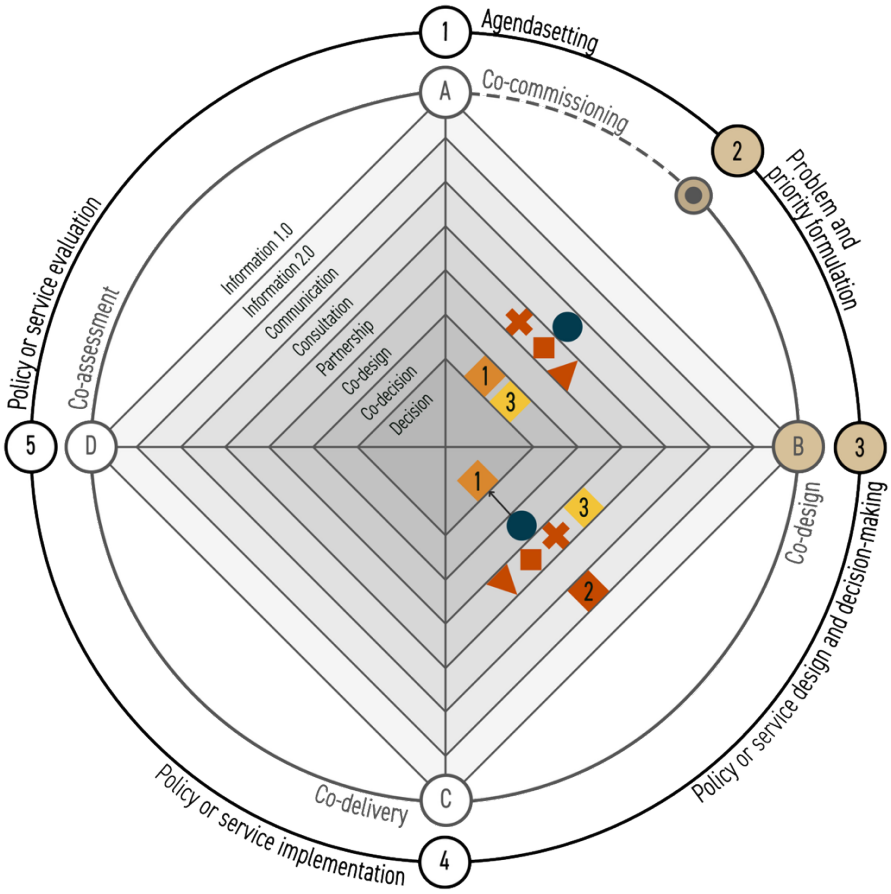


Figure 18. Visual summary of Burgerbudget Genk – part 1.

The five phases of the citizen budget broadly included:

- **Phase 1 – the gathering of ideas**. In this phase, citizens (i.e., circle) submit their project ideas for Genk or a neighbourhood within it on the digital participation platform. They briefly describe their idea in about half a page. Although this step is entirely digital (i.e., ideas can only be submitted through the platform), the administration (i.e., square 1) does offer in-person support for citizens who have difficulty using the platform or articulating their ideas in a short text.

- **Phase 2 – evaluation of the project ideas.** A diverse sounding board group, composed of stakeholders familiar with Genk society and rooted there (e.g., academics, local entrepreneurs, engineers, or representatives of the social sector represented by the cross, rhombus, and triangle in Figure 18), assesses the project ideas based on (a) the participatory budgeting rulebook and (b) their connection with the three central themes. Although almost all ideas pass this phase, many are assigned homework as they receive feedback on what should be considered in further developing their proposal (for example, to prevent the proposal in this second edition of the participatory budget from being too similar to the one that already received funding in the first edition, an innovative

element must be included). Therefore, citizens are not actively involved at this stage, but they do receive vital information for the next steps.

- **Phase 3 – Development of project ideas**. Citizens who (jointly) submitted a project proposal now have three months to turn their project idea summary into a detailed proposal, including a management plan and budget estimates. Each proposal (about 60 to 70 at this stage) is assigned a dedicated project coach from the city administration (i.e., square 2). Without taking over the writing and thinking work of the proposers, these coaches guide these citizens in further developing their ideas (e.g., by directing them internally to the right colleagues for more substantive information or assisting them in uploading all necessary information to the platform). Additionally, extensive support is provided through in-person information sessions and workshops (e.g., on project planning, the Business Model Canvas, administrative management, or budget drafting). This phase is therefore characterised, on the one hand, by communication, through which citizens can access substantial information and feedback, and, on the other, by co-design, in which they are free to decide within the guidelines set by the city administration's citizen budget rulebook.

- **Phase 4 – the municipal vote**. As a brief preparation for this voting stage, the sounding board group reassesses all proposals—this time considering more detailed dossiers. If the proposals (i.e., approximately 60-70%) are deemed sufficiently realistic, contain no missing information, and do not overlap excessively with projects from previous rounds, they will be retained and put to a public vote. Each project will then receive a standard package of promotional materials designed to encourage fellow citizens to vote for their project during two voting weeks. Voting is open after ID registration for residents of the municipality aged 14 or older. Eligible voters will receive three votes, one per proposal category (i.e., category 1 for proposals with a projected budget of between 5,000 and 15,000 euros; category 2 for proposals between 15,001 and 50,000 euros; and category 3 for proposals between 50,001 and 100,000 euros). In addition to the 1.3 million euro project budget—allocated among the different categories—the city provides a small residual budget for wildcards. The College of Mayor and Aldermen (i.e., square 3) fully respects the results of the public vote (which are presented to them solely for information), but they may select additional proposals that narrowly missed selection. In practice, this process is carried out transparently as they rewarded the runner-up in each category.

- **Phase 5 – the implementation.** Citizens begin to implement their projects.

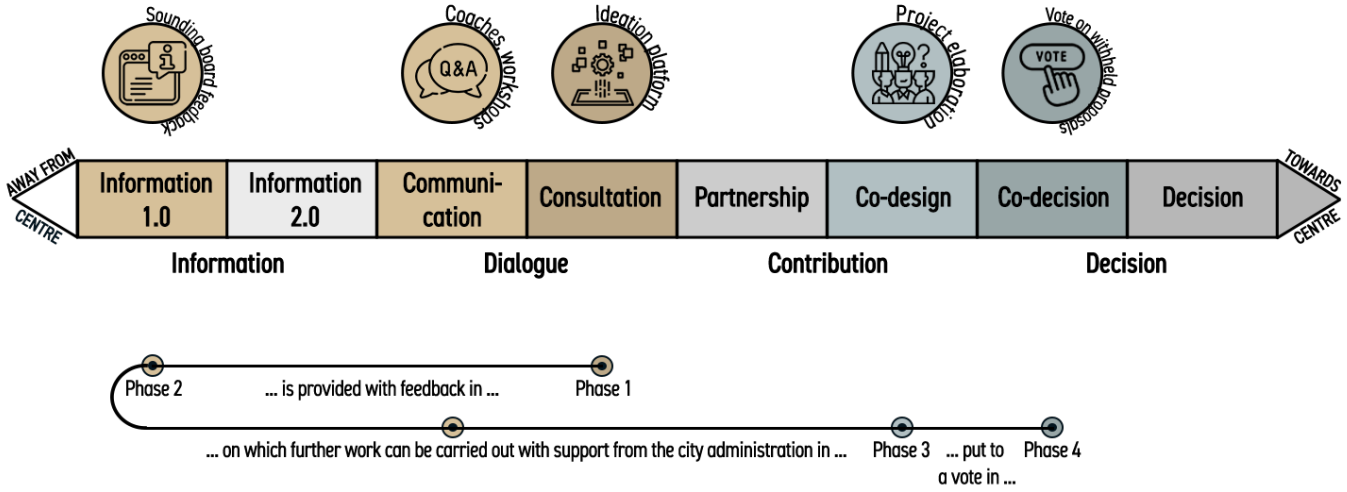


Figure 19. Visual summary of Burgerbudget Genk – part 2.

As with our previous case, we observe that there was also **frequent switching between online and offline activation strategies** or support to reach the most diverse audience possible and generate enthusiasm for the initiative. Although the project process was entirely digital or platform-based (i.e., project proposals and votes could only be submitted or cast online), the city administration provided ample offline information and support (e.g., info sessions, workshops, and coaching) to reduce digital literacy barriers.

5.2 ANALYSIS

5.2.1 DESCRIPTIVES

When we look at the figures per case again, presented below in Table 12, a couple of points stand out. First, **external efficacy**, defined as confidence that citizen participation is useful and that a public organisation has sincere intentions and the capacity to involve us in a meaningful way, appears to be high among all participants. Participants at the Corona Consultations seem the only exception to this rule, with a score of 'only' 0.5 on a scale ranging from -3 to 3. This can partly be explained by the fact that the recommendations formulated as conclusions to this initiative were superseded by the actual policy measures that followed (where COVID-19 vaccination was not made compulsory, but access to public life was severely restricted based on vaccination status). This may have led to scepticism among respondents.

Second, the highest levels of **trust** were recorded among participants in the local case. Because policy is close to citizens, it is also highly visible, which may help them better appreciate the quality of specific decisions, services and amenities. Alternatively, they may become more aware of this through participation in an initiative such as the Genk Citizens' Budget. Regardless of the direction of this association, the local policy level therefore seems an ideal place to establish citizen participation and encourage public engagement. This is also evident in the fact that **interest in politics** at this level is highest across all four of our cases. Linked

to evaluative beliefs of a social nature (i.e., social pressure and community attachment), which are also slightly higher in this case, this may indicate an interesting activation strategy: when people with a keen interest in local politics are willing to engage in citizen participation, local authorities can use them as ambassadors for the participation initiative within their own networks. In other words, it forms an interesting entry point for recruitment, one that is less available at a higher policy level, where individual citizen contributions remain somewhat less visible.

This less visible character is also evident in the figures presented in Table 12, where **social norm**, as in our GPS sample, averages remarkably low (i.e., below the neutral 0 point). Digital participation is simply less visible, which means that phenomena such as social pressure, for better or worse, play a lesser role. This reinforces our earlier recommendation to make participation more visible, while also adding offline alternatives or complementary elements to the digital set-up to allow people to connect with each other and give a face to an otherwise particularly anonymous project. **Community attachment**, by contrast, does not function as observed earlier in the GPS data. Here, the variable is much more in line with expectations from the literature, whereby a strong attachment to your local community does seem to encourage co-creation at the local level.

Table 12. Descriptive statistics concerning the independent and dependent variables measured in the use cases.

			Case				
Variables	Min.	Max.	1	2	3	4	Total
Attitudes towards participation							
External efficacy	-3	3	2.0 (0.8)	0.5 (1.3)	2.2 (0.5)	1.7 (1.1)	1.4 (1.3)
Trust service and solution quality within policy domain	0	10	n/a	5.1 (2.2)	5.8 (2.0)	8.0 (1.3)	5.7 (2.2)
Trust in the organiser	0	10	n/a	7.4 (1.8)	7.9 (0.5)	7.9 (1.5)	7.6 (1.5)
Interest in local politics	0	4	2.8 (0.5)	2.9 (0.8)	3.0 (1.1)	3.6 (0.3)	2.9 (0.8)
Hedonic motivation	-2	3	1.8 (0.9)	1.9 (0.7)	2.3 (0.5)	2.1 (0.9)	2.0 (0.8)
Saliency project and topic	-3	3	2.5 (0.6)	1.9 (1.0)	2.3 (0.8)	2.1 (0.6)	2.2 (0.8)
Saliency organiser (1=new)	n/a	n/a	n/a	71%	73%	n/a	71%
Subjective norm							
Perceived social pressure	-3	3	-0.5 (1.4)	0.4 (1.9)	-0.8 (1.8)	0.2 (1.3)	-0.1 (1.7)
Community attachment	-3	3	n/a	n/a	n/a	1.5 (0.8)	1.5 (0.8)
Perceived behavioural control							
Civic efficacy	-3	3	2.4 (0.6)	1.5 (1.2)	1.2 (1.0)	2.1 (0.5)	1.8 (1.0)
Digital efficacy	-3	3	2.5 (0.7)	2.1 (1.1)	2.6 (0.5)	2.2 (0.5)	2.3 (0.9)
Facilitating conditions	-3	3	1.4 (0.9)	1.7 (1.1)	2.1 (0.8)	2.2 (0.6)	1.7 (1.0)
Prior experience (1=yes)	n/a	n/a	69%	45%	73%	29%	56%
Time insufficiency (1=yes)	n/a	n/a	15%	7%	0%	0%	8%

Legend. Case 1 = CartoWeb.be and the TopoMapViewer; case 2 = Corona Consultations; case 3 = Amai! Vlaanderen; case 4 = Burgerbudget Genk.

Note. Descriptives are presented as means and standard deviations (between brackets) or percentages. Min = minimal or lower boundary variable value; Max = maximal or top boundary variable value.

Third, there is consistently a strong level of **trust in the public organiser's expertise** in the topic for which they facilitate co-creation with citizens (e.g., AI expertise in Scivil and the Knowledge Centre for Data and Society organising Amai!). Still, we cannot make any definitive statements about the direction of this association. Do individuals with high confidence in these organisations seek out these initiatives, or does participation in these co-creation initiatives enable them to become more familiar with and place greater value on the organisation's expertise? It is possible that a combination of both factors is at play here, as we see further down the table that for initiatives at a higher policy level, namely the federal Corona Consultations and the regional Amai!, most participants (i.e., 71 to 73%) had never heard of either organisation before participating.

Four, with scores well above the neutral 0 point, the **civic efficacy** levels of respondents across cases can be considered high. These findings provide important support for our previously formulated recommendations to empower citizens to participate and to make them feel that every contribution counts and will be appreciated. Without this, citizens seem less likely to participate. It is, therefore, not entirely surprising that, in comparison with the GPS data, **facilitating conditions** are noticed and appreciated more. A combination of answers to the questions "I trusted that I would be provided with the necessary information to participate" and "I was confident that I would have somewhere to turn to with questions or concerns" yielded only scores above the 'rather agree' point of 1.

Finally, the UCS sample comprises respondents who estimate their **available time** for co-creation to be quite high, yet do not necessarily have much **experience** with it, especially when it is organised at the local level (i.e., only 29% had prior experience of this kind). This again underscores that the local level is a particularly interesting place to involve citizens in policymaking and service delivery. It should be noted, however, that the Genk city administration devoted significant time and resources to reaching a diverse sample of citizens, ranging from on-site information sessions in various neighbourhoods and boroughs to individual guidance from process coaches to remove participation barriers. Amai! also employed such a differentiated approach, actively reaching out and going to citizens to gather ideas in a non-digital way. Nevertheless, the eventual participants, at least in our sample, appear to be the usual suspects with prior participation experience (i.e., in 73% of responses).

5.2.2 THOROUGH ANALYSIS – WHAT MOTIVATES PEOPLE TO TAKE THIS STEP?

In one of the recommendations above (cf. the intermediary conclusion in section 4.5), we emphasise the importance of always thinking from the perspective of the target group and considering the question: "What exactly motivates them to engage in co-creation?" Figure 20 (cf. infra) clearly shows that this is not a trivial question, as motivations for participation can be multifaceted, as can the strategies for addressing them.

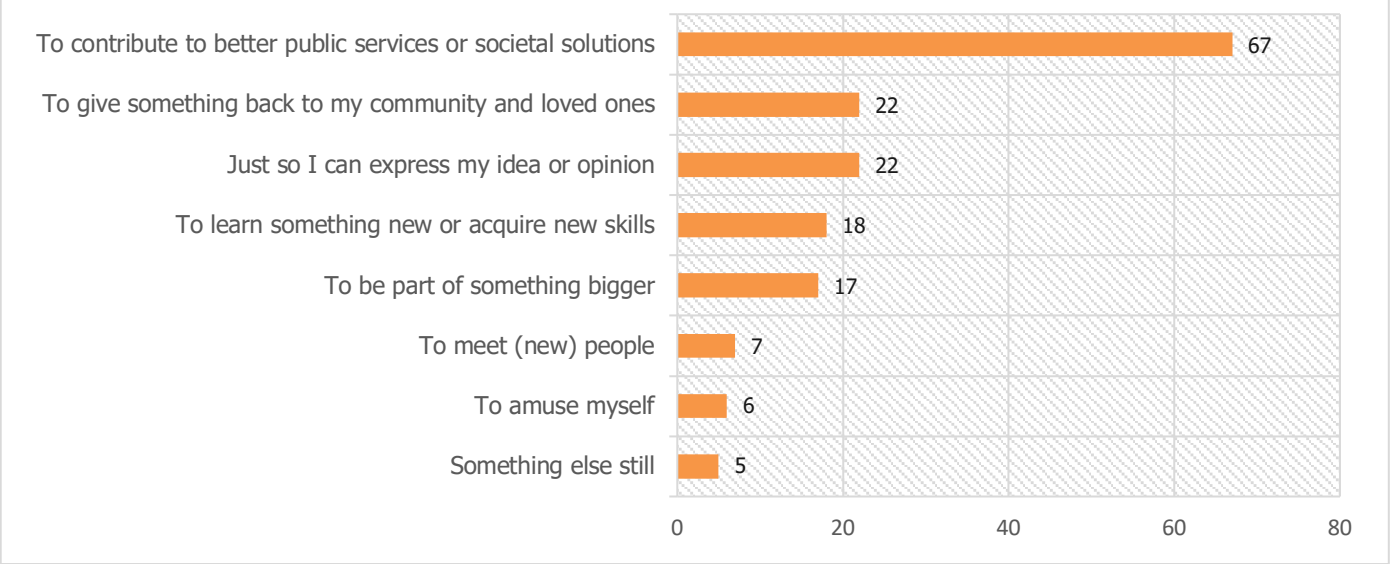


Figure 20. Number of times a particular type of motivation was mentioned across cases (n=75).[6]

Given that participants share a clear motivation **to contribute to better public services, amenities and solutions to social issues** when co-creating (with 67 out of 75 respondents checking this box), it seems important to showcase achievements. In this way, organisers can reassure participants that their contribution was useful and effectively led to the positive results they sought. Furthermore, when a co-creation initiative takes place over multiple editions or iterations, showcasing good examples may also encourage others to participate. After all, they can see that it can add value to the environment in which they live. In this way, it increases external efficacy—not unimportant, as Table 12 (cf. supra) already showed.

With respondents who mainly **contribute for the sake of others**, such as loved ones, one should be wary of crowding out their motivation. Rewarding this group for their contribution, for example, may conflict with the selfless nature of their actions. This may also apply to respondents who ticked **'to be part of something bigger'**, although the latter group may well want to be recognised for their contribution to the greater good. This can, for example, be achieved by lifting anonymous participation.

Respondents who selected the third motivation option primarily viewed co-creation as **an opportunity to express their opinions or to share ideas** they had been mulling over for a long time. For this group, it seems particularly important to acknowledge their contributions, to show that they are valued and that their input will be acted on, for example, by providing them with feedback. Respondents **keen to learn something new or acquire a new skill** may also benefit from this feedback and background material to browse through. Since people engage with content and learn in different ways, it is important to provide a range of supplementary materials so that everyone can find something to their liking. Amai! offers a good

[6] Within the 'something else' category, we mainly found topic-specific motivations like ensuring that cultural heritage is maintained or a will to transfer and/or exchange one's skills and knowledge about the topic with fellow citizens.

example of this by providing a range of materials on both its website and at physical events, including quizzes and educational materials that teachers can use in the classroom.

For those who want **to meet (new) people**, offline participation opportunities seem most suitable—this can be in addition or as an alternative to what is already happening digitally. By contrast, for those who simply want **to be entertained or amuse themselves**, digital co-creation offers plenty of interesting and engaging options by incorporating **gamification elements** such as collaboration, competition, personalisation, rewards, or storytelling. By integrating these features into a co-creation design, developers and/or organisers might increase participants' enjoyment and, consequently, their motivation to take part. However, some authors critique gamification for crowding out citizens' sense of civic duty. According to Fuller (2023, p. 161), democracy should not be conceived as fun nor a game, because "the only way democracy could be fun is if nothing truly important rested on the outcome—and in that case, it wouldn't be democracy". In such cases, co-creation is unlikely to be anything more than tokenism (see Chapter 2). Although these points of critique should not be dismissed, we do not want to go so far as to completely disregard the potential of gamification. After all, a sense of enjoyment and intrinsic motivation have consistently been identified as key variables explaining user engagement with digital tools, such as citizen participation apps or platforms, in the literature (e.g., Brown et al., 2010; Tamilmani et al., 2021; Venkatesh et al., 2003, 2012, 2016) and in our GPS and UCS data. What is true, however, is that certain gamification elements have consistently been shown not to work, such as monetary rewards (e.g., Alford, 2002; Steen, 2021; Van Eijk et al., 2017; Vanleene et al., 2017). Of course, rewards are just one among many gamification options (see Simonofski et al., 2022 for more practical examples), and few can hardly object to methods such as storytelling, through which citizen participation initiatives are organised as coherent stories to engage and retain participants. What we advocate here, therefore, is the scientifically grounded use of gamification elements. One should be aware that not every gamification feature is suitable for each type of citizen, nor for every task or requirement (White et al., 2023). Requirement analyses and the development of citizen personas can support design processes (e.g., Schelings et al., 2020, 2023; Simonofski et al., 2022).

Of course, these are just a few examples of how to address specific motivations, but ideally the aim is to achieve a good mix of activation strategies—within organisational and budgetary constraints, of course. Cases such as Amai! and Burgerbudget Genk demonstrate that a differentiated approach, involving various recruitment strategies and activation methods (both online and offline), is certainly effective yet resource intensive.

5.2.3 A FUNCTIONAL COMPARISON BETWEEN THE UCS AND GPS

Finally, we would like to find out whether there are any significant differences between the UCS and GPS samples, and, if so, whether these differences reaffirm the findings in section 4. Are the variables that appear to increase the intention to participate in co-creation also present in the group that ultimately participates in co-creation? In other words, can we conclude that what contributes to high intentions may also be a good

predictor of ultimate behaviour, and that the recommendations we have derived from this are, therefore, relevant? The answer appears to be 'yes'.

Table 13. One sample t-test results considering the GPS data as general population estimate or test value.

	GPS (n=1,035)	UCS (n=75)					
	Mean	Mean	St. dev.	Mean difference	t	df	Sig.
External efficacy	1.09	1.36	1.269	.274	1.874	74	.032
Trust service and solution quality	6.01	6.48	2.117	.473	1.564	48	.062
Interest in politics	2.70	2.94	.747	.237	2.745	74	.004
Hedonic motivation	1.09	1.95	.778	.863	9.536	73	<.001
Perceived social pressure	0.20	-.09	1.697	-.289	-1.435	70	.078
Community attachment	1.02	1.52	.766	.504	1.739	6	.066
Civic efficacy	1.13	1.80	1.03	.674	5.613	73	<.001
Digital efficacy	1.72	2.29	.849	.571	5.663	70	<.001
Facilitating conditions	1.00	1.70	.986	.696	6.074	73	<.001

Note (a). The reported significance levels are always one-sided, as we assume the UCS to be located on the outer left side of the population curve and, hence, the variables to take more pronounced positive proportions.

Note (b). Assumptions for running a one-sample t-test were checked prior to each analysis. For the hedonic motivation and social pressure comparisons, one outlier was removed from the analysis each time.

Based on Table 13, we can conclude that citizens who participate effectively in co-creation differ significantly from their average fellow citizens in several areas (i.e., evaluative beliefs). Not only do they trust more that participation will be enjoyable, but they also show higher levels of external, civic and digital efficacy, greater interest in politics, and greater trust in the supportive value of facilitating conditions provided by the organiser. This fully confirms our findings from the GPS analysis, summarised in Table 11 (cf. supra). Therefore, continuing to work on the variables and associated recommendations formulated throughout Section 4 seems to be a sound strategy. Even the recommendation regarding citizen empowerment (the so-called facilitating conditions), for which we never found evidence in the GPS data despite recommendations in the academic literature, is supported by the UCS data. Therefore, we will use Section 6 of this policy report to elaborate further on the nine recommendations already formulated.

6. DATA ANALYSIS, PART 3 – INTERNAL PRE-CONDITIONS

Description of the findings as to internal pre-conditions as derived from a triangulation of (a) the follow-up committee focus group discussion with (b) the interviews with head coordinators or practical organisers of the use cases.

During one of the Follow-Up Committee meetings, a **focus group** discussion was held on internal pre-conditions. **Prior to the meeting**, committee members reflected on the **internal barriers or difficulties** they had already encountered when setting up digital co-creation with citizens. Their responses were preliminarily analysed and structured using the 'Production model of Performance' by Van Dooren et al. (2015), then added to a shared **Miro board** to be used interactively during the focus group discussion. Insights from this deliberative exercise were supplemented by those from the use case interviews. Figure 21 shows the results of the integration.

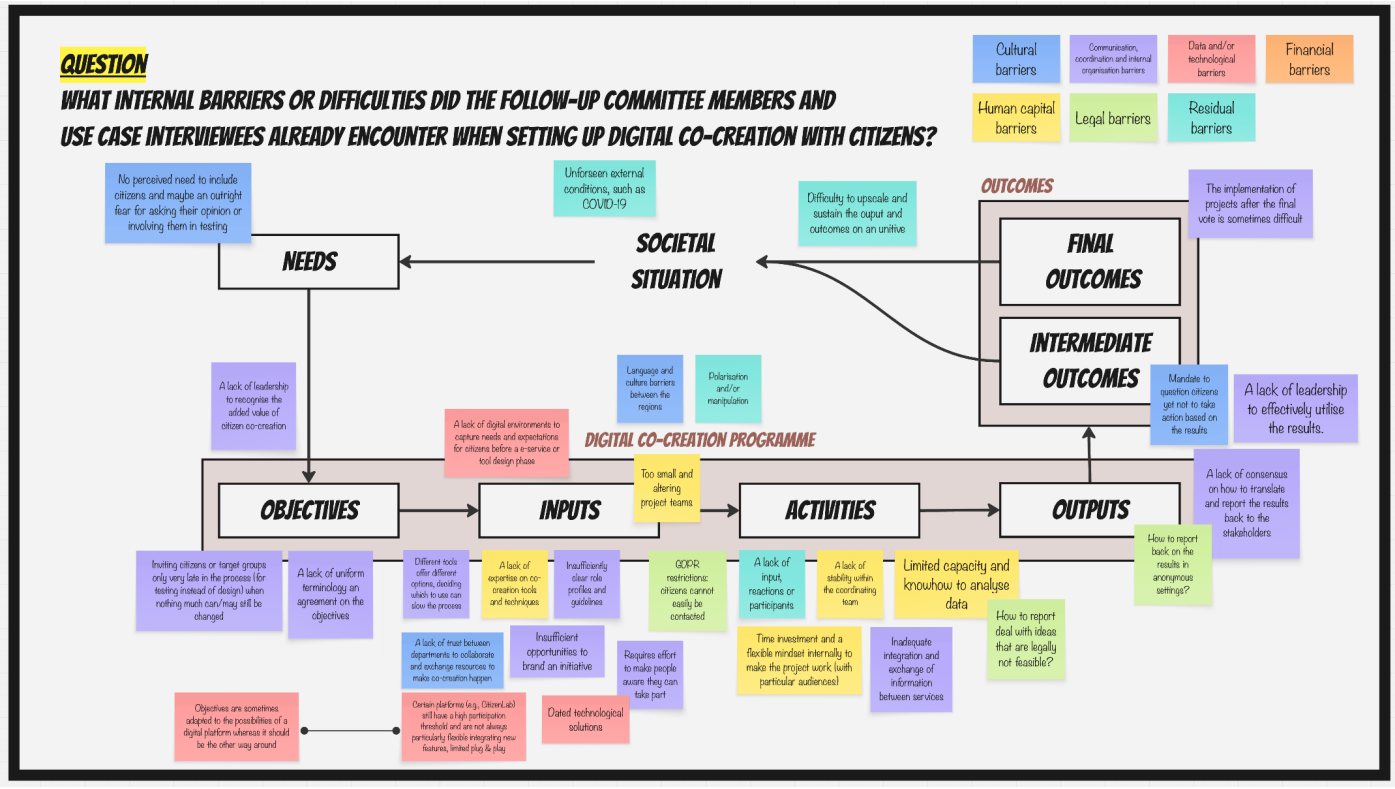


Figure 21. Miro board summary of the internal barriers and challenges encountered by focus group members (n=14) and use case interviewees (n=11).

The different Post-it note colours thereby reflect the following types of challenges or encountered barriers:

- Blue marks **cultural** barriers (such as politico-administrative or organisational convictions)
- Purple marks **communication, coordination and internal organisation** barriers (such as poor coordination, insufficient follow-up, knowledge exchange and support or leadership).
- Red marks **data and/or technological** barriers (such as a lack of relevant data to support the process or smart solutions to process vast amounts of stakeholder input).

- Orange marks **financial** barriers (such as budgetary tightness hampering an optimal use of inputs)
- Yellow marks **human capital** barriers (such as the availability of staff and their skills to co-create)
- Green marks **legal and administrative** barriers (such as law restrictions).
- Teal marks the **residual** barriers (such as a lack of infrastructure).

Because some Post-its may be difficult to read and their descriptions may be uninformative, Table 14 provides a more detailed description of the barriers mentioned within each category. Visually, we can nevertheless cautiously state that quite a few challenges or barriers are of a communicative, coordination or organisational nature—whether internal or external. Many of the challenges also appear to lie on the input and throughput side of digital co-creation initiatives. This largely confirms the earlier recommendation to allow for thorough preparation of digital co-creation initiatives—a recommendation that is further elaborated in the following section (cf. Section 7).

Table 14. Overview of barriers and/or challenges encountered or expected in digital citizen co-creation, presented in order of frequency of mentioning per category throughout the focus group and use case interviews.

Category	Barriers and/or challenges
Culture	• Although the first steps are often taken, there remains a certain **reluctance to involve citizens more strongly or give them greater responsibility**. However, the experience of both the focus group and the case studies shows that when citizen participation feels real, with more at stake, it becomes easier to engage people and encourage them to contribute. After all, they can make a real difference (e.g. by not only choosing items within an allocated budget but also helping to prioritise between budgets). However, this presupposes a cultural change for which politics is responsible. Relinquishing decision-making power as a mandate holder proves particularly difficult (focus group and three use cases). • **Routine can** sometimes **stand in the way of co-creative innovation**. When developing new technological applications and, consequently, public services, there can be a temptation to rely on in-house routines, which raises the question of why citizens should be involved at all. After all, "we have always done this internally, haven't we? Moreover, we are citizens ourselves, so we are perfectly capable of asking our colleagues about their expectations, aren't we?" In some cases, this stems not only from routine but also from **a fear of** working with citizens and thus **stepping outside our comfort zones** (focus group and one use case). • In Belgium, **language barriers often also imply cultural or mental barriers** that, although often enriching, make it more cumbersome to align expectations and enable both groups to interact (focus group). • **A lack of trust between departments** can also hinder co-creative innovation, especially when data exchange or collaboration is required to run such an initiative. When other departments do not trust that the final product will be sufficiently valuable and of adequate quality for their purposes, they are unlikely to overcome that distrust (one use case).

- **External communication aimed at reaching as diverse an audience as possible** is often **particularly difficult** and requires a great deal of effort, especially when the topic of co-creation is somewhat removed from citizens' daily lives. This is definitely true when you want to reach beyond the usual suspects and target other language speakers, single mothers, young people, senior citizens, or people living in poverty, for example (focus group and eight use cases).
- Furthermore, citizens are not always aware that they can participate, even though options exist (for example, in a specific digital application where they can report problems). This requires sustained **external communication via various channels and with differentiated messages** (focus group and three use cases).
- **Integrated workflows and the exchange of information between services or departments**. Integrating information is sometimes necessary to move a project forward (e.g., when citizens submit their preferences and needs for a design, which must be tested against knowledge from various actors, or, on a smaller scale, when different parties need to provide content for the newsletter and communication to citizens). This requires coordination and harmonisation to ensure all data is exchanged in a timely manner (focus group and three use cases).
- **A lack of uniform terminology** about what co-creation can and cannot be, **and a clear internal view of the objectives and distribution of responsibilities**, complicates processes. This raises questions such as which stakeholders to involve, how, and, above all, why. Who exactly takes on which responsibilities and by when. If this is not clear from the outset, you run the risk that, over time, everyone will start doing whatever they like, coordination will be lost, and results not achieved (four use cases).
- **Missing role profiles and guidelines or standards to help people fulfil their role expectations**. Because co-creation can place a considerable burden on the staff team or specific individuals within it (e.g. community workers who remain responsible for communication, feedback and guidance for specific target groups throughout the entire project), it seems important to clarify for them exactly what the expectations are and how they can fulfil their role (e.g. as a project coach) (two use cases). Citizens also want to be aware of everything that is involved (e.g. once their project has been selected, what administrative burden and time investment are required to manage the resources it receives from the administration). The exact expectations must also be clearly communicated to them (three use cases).
- **A lack of leadership and commitment from hierarchical superiors**. For the credibility of a co-creation initiative, it is particularly important that clear agreements exist with politicians (for example, a sounding board group's decision should be honoured within the project, and the project should be granted the responsibility to make decisions). If the political level approved the initiative, they must also show sufficient leadership by committing to the decisions taken by the sounding board group and any subsequent steps, such as a public vote (two use cases).
- **Clear agreements with external parties**, such as experts, about their supporting role. During an information session, for example, some experts may overwhelm or intimidate people with their domain-specific knowledge. This can scare off certain target groups, which is why it is vital to establish clear agreements with these external parties in advance (one use case).

Communication, coordination and internal organisation (continued)	• The **implementation of co-creation initiative outputs and outcomes** is sometimes difficult, of low quality, or not sustainable over time (e.g., Who will be responsible for maintaining a co-produced amenity after five or ten years, when the initial group of citizens who supported it may no longer be there). What coordination, agreements and planning are required to ensure this? (one use case) • **Insufficient opportunities to develop a distinctive identity**. Co-creation initiatives are often forced to blend in with the broader communication style of the city, municipality or department, which means that many people do not notice them. Sometimes it can be beneficial to develop a distinctive style to make a new co-creation initiative stand out (one use case).
Data and technology	• The **objectives of digital co-creation** are **still too often adapted to the capabilities of the technology** because of legacy solutions, rather than the other way around. If you want something special or customised, you often have to pay extra (e.g. an ID login module for certain parts of your initiative, but not all, in order to keep the initiative accessible initially and also allow input from outside). There is still too little plug & play functionality, whereby modules can be adapted more flexibly to the needs, expectations and characteristics of a particular organisation (focus group and two use cases). • **Difficulty providing feedback and reporting back results** in a digital environment where much of the interaction is **anonymous** (focus group). • How to **encourage people** on a platform **to contribute rather than just lurk** (two use cases)? • **Limited capacity to address misinformation and harmful contributions** swiftly and adequately (focus group). • **Outdated and user-unfriendly technological applications**, for example, where voting (such as via ID login) or uploading ideas is difficult and requires a lot of offline support for citizens (one use case) • A **lack of interoperable data** to feed the participation platform or initiative (one use case).
Financial	• None.
Human capital	• **Resources, capacity and time for analysis are often limited**. When citizen input is extensive (e.g., Land voor de Toekomst with around 10,000 individual contributions), clear procedures and possibly AI support are needed to identify major themes and trends in the data (focus group and five use cases). • A **project team that lacks the skills or training** to make complex themes accessible to a wide audience, to set up co-creation creatively, and to supervise these processes. Moreover, **specific profiles are missing** to deal with certain target groups and to differentiate the project's activities (focus group and five use cases). • A **project team** that is **too small** to achieve all objectives within a short time frame, thereby increasing the **risk of overload**. In addition, some teams are characterised by **high staff turnover and fragmentation** due to different levels of appointment (focus group and three use cases).

Legal or administrative	• The **GDPR severely restricts** how citizens can be involved, which future contacts are permitted, and how. In this regard, a specific example was raised that participants who were previously actively involved cannot simply be contacted again in person to participate in new editions, which seriously jeopardises the added value of building a solid foundation for future engagement (focus group). • Sometimes deliberation exercises (e.g., designing a digital application via UX design) produce **outputs that cannot be implemented for security reasons or due to legal restrictions** (including the AI Act, NIS2, privacy and data protection). In such cases, solutions must be sought (one use case).
Residual	• **External factors** (e.g. COVID-19) **can completely derail a well-thought-out plan on paper**. Take this into account when planning an initiative and provide alternatives for participation (e.g. a switch to digital) so that the essential characteristics can be retained (e.g. if you are suddenly unable to hold physical meetings but attach great importance to connecting participants during coffee breaks, provide small breakout rooms to allow this to happen) (three use cases). • Sometimes it is not easy to avoid **distorting results in citizen participation processes**, such as in a vote where fellow citizens do not choose the proposal that is most relevant to society (which is what you would want), but rather the proposal that has been backed by the strongest lobbying campaign and might lead to less favourable outcomes for society. A difficult imbalance to deal with (two use cases). • **Scaling up citizen participation remains a difficult task and often meets resistance or an inability to expand**. For example, it is not easy to move from ideation or co-design to co-delivery, where citizens are given the opportunity to help implement what they have decided or would like to see, and thus are structurally involved in the entire policymaking and/or service delivery cycle. This can conflict with other expectations from the administration about how resources are used (e.g. only providing people and resources for that first step, and avoiding having to venture into the second) (one use case).

Although Table 14 provides only an overview of the most frequently mentioned or implied **barriers and/or challenges**, the focus group and use case interviews also provided substantial information on **how to address or avert them**. In the **following section**, we integrate these insights into the recommendations we have already formulated in the previous two sections (i.e., sections 4 and 5). In total, this yields a list of ten tangible recommendations.

7. RECOMMENDATIONS FOR PRACTICE

Findings from subsections 4, 5, and 6 are translated into recommendations for organisers of future digital co-creation initiatives to ensure a rich diversity of citizens is involved and to maintain their engagement.

When we link the insights from the individual sections and translate them into **practical recommendations** that organisers of future digital co-creation initiatives can use, we recommend the following course of action to attract and retain a rich diversity of citizens:

1) **Ensure thorough preparation** of the co-creation initiative, considering the following elements:
    a. **Formulate SMART objectives** in which the 'R' of relevance is paramount. In this way, it makes no sense to involve citizens digitally solely for the sake of digital possibilities or to choose a topic for participation (e.g. AI) solely for the sake of that topic. Instead, ensure that the chosen objectives have societal relevance that stakeholders, such as citizens, can relate to. After all, giving them the feeling that they can contribute to something beneficial or innovative for society seems to increase individual motivation. This also implies that citizen participation should ideally not be a hollow gesture, merely for appearances' sake—also known as 'tokenism' (Arnstein, 2019). When citizens feel that they are only involved in minor issues, the so-called 'park bench problems' (see Fung, 2015, p. 521), this will greatly reduce their willingness to sacrifice valuable time to co-create. In sum, when co-creating with citizens, it seems essential to adopt a serious approach and to ensure that their participation is both meaningful and relevant.

    b. **Ensure internal consensus and unanimity on** these **objectives**, as well as clear agreements and **monitoring strategies** to track their progress and ultimately evaluate them, so that periodic adjustments can be made in a timely manner where necessary.

    c. In light of the objectives, **consider** exactly **which external stakeholders you need, in what role** (e.g., a supporting one) **and when or at which stages** of your co-creation initiative. After all, it is perfectly plausible that certain groups of citizens (e.g., those with limited ability to express themselves or articulate their ideas due to language barriers) would benefit from being involved later in the process, when ideas have somewhat crystallised and they can give their opinion on the more tangible proposals they can actually see in model designs. Indeed, their opinions are no less valuable than those of their fellow citizens, but reasoning from abstract assumptions may be such a barrier that they do not participate at all. This should be avoided, and external stakeholders can offer significant added value in this regard. Not only can they provide substantive support to such participants (for example, doctoral students working on AI who also enjoy helping citizens with their substantive questions and clarifying their ideas, as this allows them to step away from theory for a moment and look at what is happening in the real world), but they can also help with outreach to these target groups. This is certainly the case when their network can be used to further disseminate the call or invitation to participate

or to communicate in a more targeted manner. For this very reason, it is best to identify these stakeholders before the project starts.

d. **Allocate sufficient internal support, financial resources and personnel** to guide a co-creation initiative from start to finish, to assist or steer where needed, and to maintain or deepen contacts with the many stakeholders (as mentioned above). Reaching certain groups can be a long-term endeavour; ideally, this should not be left to a fragmented and changing workforce. Furthermore, not everyone within the organisation has the necessary skills to take part in this. It is therefore essential that **motivated staff are encouraged to (re-)skill themselves** in this area and are assigned to those parts of the initiative where their strengths can be best utilised (e.g. community workers who are involved in certain phases of a co-creation initiative precisely because they have such a good relationship or connection with certain target groups and are therefore also familiar with any issues that may arise).

e. **Allow sufficient time to complete the process** you genuinely want to run and believe is necessary to achieve the outset objectives. There is no point in rushing through a co-creation project and skipping vital steps (even if they are time- and resource-intensive), as this will not benefit the final products. However, this is a common pitfall in many projects, especially at higher policy levels, where tight deadlines lead to cutbacks in citizen involvement (e.g., by dropping certain UX design exercises), resulting in fewer useful insights to inform the development of new technology.

f. Therefore, **provide a clear plan, including time estimates and standards or guidelines** for fulfilling your individual role within the initiative (from a co-worker perspective). In many cases, this clarity was precisely what made colleagues willing to join the initiative and shape their role so they could provide optimal support to citizens and other stakeholders. After all, having to decide on an ad hoc basis what to do, combined with easily changing plans and expectations, was found to undermine contacts with citizens.

g. **Periodically discuss concerns, address frustrations, and exchange best practices or valuable experiences internally**. This again enables timely adjustments in areas requiring improvement and helps consolidate what is working well, whilst increasing the organisation's learning potential. A strong internal learning culture can also help to reduce resistance to involving external parties in policymaking, service delivery, or the development of new applications. By sharing brief success stories with colleagues, they learn that there is nothing intimidating about involving citizens and that the specialised knowledge or skills required for this can be readily acquired. Moreover, it leads to better products and may reduce the 'cost of failure' by tailoring them more closely to end users' expectations.

h. To enhance your organisation's learning potential, also **seek opportunities to learn from external parties' experiences and expertise**. In many cases, there is no need to reinvent the wheel, as external parties may hold best practices, experience, or resources that can be transferred to your co-creation initiative.

2) Actively **evaluate the advantages and disadvantages of analogue, digital, hybrid, and mixed co-creation designs,** considering (a) the outset objectives, (b) the necessary internal inputs and/or resources, (c) the planned activities or activation methods in relation to the target audience, and (d) the desirable outputs and outcomes, including how to measure them.

   a. **Be aware that digital participation methods have limitations**. Online participants are more easily distracted and quicker to drop out of activities. One-to-one conversations are difficult to facilitate online, and online interaction tends to build less trust, making it harder for participants to overcome insecurities, particularly at higher policy levels that often address more complex topics, such as expectations for a Belgian justice system that provides services through digital technologies.

   b. **Consider offering offline alternatives** to digital steps in your co-creation process to lower barriers to participation (e.g., a citizen survey that can also be completed on paper, with ideas added to the platform by a staff member for analysis; a datawalk, workshop or focus group using storyboards and future scenarios to collect ideas). In other words, consider how to obtain the same input from the same target group using alternative methods.

   c. **Complement** digital steps **with offline activation methods** to attract other participants and gain different insights and ideas. Various cases have shown that it is more effective not to wait for participants to come to your participation platform, but to approach these groups in person and thus actively reach out to them. This not only lowers the (digital) threshold to participation, but it also allows you to link your initiative to their daily lives. Why is it relevant to participate, and how does the topic relate to their lives, interests and ideas? That is slightly easier to explain in a one-to-one conversation. For example, JustNew approached citizens during breaks or after court hearings to gather information about their expectations of digital justice. Citizens are there, after all, and do not have to overcome barriers by logging in to an anonymous platform to submit their ideas once they get home. Moreover, a direct, in-person question-and-answer format can help participants articulate their ideas or opinions.

3) **Make it clear that citizens can participate and that there is** always **something to gain from co-creation**.
    a. **Ensure people are aware they can participate**. Do not assume that a single communication or advertisement will be sufficient, nor that people will have seen it. Communication requires sustained effort, the use of various channels (e.g., website, social media, radio, television, newspaper ads), creativity (e.g., asking an influencer with roots in a particular community to help you advertise) and a tailored approach to the target group (e.g., organising information sessions on location in particular neighbourhood centres).
    b. In this communication, also **emphasise what participation can yield for citizens**. In doing so, focus in particular on intangible rewards (such as enjoyment, gratification, belonging, meaningful contribution to their neighbourhood and surroundings, learning something new, or increasing the number of one's acquaintances), as material rewards are repeatedly cited in the literature as undesirable and potentially crowding out intrinsic motivation.

4) **Emphasise** that every contribution matters and **truly everyone can** (learn how to) **participate** (meaningfully). Stress the accessibility of the initiative and any supporting measures available to citizens.

5) **Empower** by adequately preparing **participants** and providing sufficient support throughout the initiative (in both digital and content-related aspects) to avoid adverse knowledge and skill imbalances.
    a. **Make participation digestible** by breaking it down into small, easily achievable steps. Within each step, carefully consider which information and support citizens need first and which they will require later. For example, it makes no sense to ask citizens to submit proposals for AI solutions when they (a) do not know exactly what AI entails, nor (b) the social problems it is supposed to solve. Similarly, when submitting project proposals, requiring citizens to submit a detailed portfolio of several pages immediately sets an unattainable threshold.
    b. **Differentiate learning materials**. Provide background information that appeals to different learning needs or preferences (e.g., texts, videos, quizzes etc.) and that adhere to these three standards: (a) accessible and, hence, requiring no prior knowledge to digest; (b) connecting to citizens' daily lives and, hence, recognisable; (c) containing fun and engaging elements to spark enthusiasm. Gamification techniques can also be used for the latter purpose.
    c. **Provide digital support where needed** (e.g., a help function or physical locations where people can seek assistance or borrow equipment, such as headphones for an online meeting).
    d. **Provide participation support where needed**. Consider using coaches or other personal points of contact for this purpose. These can provide in-depth or content-related guidance (e.g., by referring citizens internally to the right people within the organisation for more information) and

surface-level guidance (e.g., by helping citizens put their ideas into words or meet the formal requirements of a proposal). Although this recommendation is resource-intensive, it has been cited in various cases as highly valuable for keeping citizens motivated.

6) Adopt a **clear, transparent line of communication** about the project, its objectives, progress, and expectations for all stakeholders to avoid false or conflicting expectations. Repeat regularly so everyone stays on the same page.
    a. **Specify** the **amount of time required** to contribute. Never ask stakeholders for more.
    b. **Clarify what knowledge and skills are required** for more complex forms of participation (e.g., those involving coordination and management, where groups of citizens jointly submit a project proposal and are permitted to begin implementation), and what guidance is available in this regard. This should prevent them from becoming overwhelmed.
    c. **Explain how the results will be analysed** and ensure the analysis covers the subject matter and is as accessible as possible to all.

7) **Provide frequent, timely and two-way feedback** on citizens' contributions. When citizens can submit preliminary ideas, knowing they can be further developed and strengthened through feedback, this removes a barrier to participation. Moreover, this type of feedback can reinforce the feeling that someone is reading their contributions and that they are not merely anonymous or obscure additions to a platform. In other words, it gives people the feeling that what they are doing or contributing is meaningful and is being read by at least one person.

8) **Leverage** the **target audience's interest in (local) politics, what matters to them in daily life, and their connections** to specific communities or networks.
    a. **Elaborate on the link between politics, policymaking, service delivery, and their contributions**. When citizens believe civic participation is meaningful and trust that the organising public entity will act on their input, it can boost their motivation to participate.
    b. **Inspire citizens by showing how this connects with their everyday lives and by challenging their views**. To do this, consider reaching out to citizens in environments that appeal to them or are connected to the theme, such as libraries, where people go to gather knowledge and meet others. Hence, an ideal location to gather innovative and diverse ideas.
    c. **Build on** the **well-established networks** some participants already have to gain access to the subgroups they belong to. This is particularly interesting at the local level, where it is often possible to build on strong social structures, such as voluntary work (associations) or a thriving community life and civil society.

9) **Make** individual **participants' contributions** in digital co-creation **visible** to fellow citizens by removing anonymity, while recognising that this may create an additional barrier for some groups. This also supports recommendation 10, as it is difficult to provide feedback on anonymous contributions.

10) **Showcase** (digital) co-creation **success stories** and best practices both **externally and internally**. By keeping all stakeholders informed of the final results, you build a connection with the project, which can help sustain stakeholder involvement in the future or generate excitement for a new edition of the project. Furthermore, if citizens see what is possible through previous achievements, they will be more inclined to participate. Withal, these examples conclusively demonstrate that co-creation is not merely a hollow concept. For longer-duration co-creation initiatives, it may also be beneficial to highlight interim results or progress to maintain motivation, both externally and internally. Internally, showcasing good examples and small achievements can also initiate cultural change, as colleagues now have concrete evidence that citizen participation can yield promising results.

The set of recommendations outlined above is extensive and largely addresses 'obvious' issues. However, case interviews show that the most obvious issues are often the ones most easily overlooked, with thorough planning and preparation being the best example. Of course, the list includes recommendations that may not be equally relevant to every project. It is therefore advisable to assess the specific requirements of each planned initiative and target group, and to adapt activation strategies accordingly.

8. CONCLUDING REMARKS

A revisit of the central research questions and suggestions for future research.

8.1 CONCLUSION

This policy report concludes by synthesising the research conducted within **BECODIGITAL's WP1** to establish the necessary conditions for **inclusive digital co-creation** in the Belgian federal context. To answer the research questions, a **multi-methodological approach** was employed: a General Population Video Survey Experiment (GPS) involving 1,035 representative Belgians explored participation intentions; a Use Case Survey (UCS) of 75 participants in four real-world initiatives examined actual behaviour; and focus group discussions and interviews with organisers identified internal barriers. By triangulating these sources, the research shed light on the complex interplay between design choices, citizen characteristics, and organisational constraints.

The investigation into **when digital configurations make a difference (RQ1)** revealed that digital options significantly increase citizens' intentions to participate in lower-threshold activities such as ideation and voting. However, for more intensive tasks such as deliberation and co-delivery, digital configurations showed no significant advantage over analogue methods, as the 'digital advantage'—such as time flexibility—partly disappears. These findings align with Rodriguez Müller et al. (2023; 2021) and Schelings et al. (2023), who argue that, depending on the objectives and design choices for citizen involvement, one should be mindful of potential pitfalls and inconveniences caused by digital participation features compared with analogue ones. Despite their increasing popularity (Elstub et al., 2021; Gilman & Peixoto, 2019), the desirability of confining participation to digital options alone should, therefore, always be questioned.

Regarding **who is affected by these configurations (RQ2)**, our analysis found that demographic factors such as age and gender are generally non-decisive. Instead, evaluative beliefs—specifically hedonic motivation (the expectation of enjoyment) and civic efficacy (belief in one's ability to contribute)—emerged as the most powerful and consistent predictors of participation intent. The comparison between intentions and actual behaviour (RQ3) further showed that real-world digital co-creators have significantly higher levels of trust, civic efficacy, and political interest than the general population. These participants are often motivated by a desire to contribute to better public services or societal solutions. However, our research also cautioned that even in successful cases, participants frequently remain 'the usual suspects' with prior experience, necessitating tailored activation strategies to reach less engaged groups.

Internally, **organisational challenges (RQ4)** are predominantly situated within the input and throughput phases of a co-creation project. Communication, coordination and internal organisational difficulties most frequently arise, for example from poor inter-departmental coordination, a lack of consensus on project objectives and role expectations, and difficulties in identifying external communication strategies that are effective with the target groups. However, challenges relating to organisational culture and the availability of human capital should also not be underestimated (e.g., the lack of certain expertise within the organisation

to successfully manage a co-creation initiative). These are sometimes exacerbated by technological 'legacy' issues, where outdated, inflexible software dictates project outcomes, forcing organisers to adapt their objectives to the technology's limitations rather than using tools that serve the project's specific needs.

To address these findings, **ten overarching recommendations (RQ5)** were formulated to support future initiatives. These advise practitioners, among others, to ensure thorough preparation with relevant objectives, actively evaluate design trade-offs between digital and analogue means, and communicate intangible rewards such as personal gratification and community contribution. Organisers must empower participants by breaking tasks into digestible steps and providing both content-related and digital support to prevent knowledge imbalances. Finally, fostering a transparent feedback loop and showcasing success stories are vital for maintaining both internal momentum and external citizen trust.

In essence, successful digital co-creation is less about the technology itself and more about the preparation and human support that surround it. It is akin to hosting a grand community dinner: while a digital platform may serve as the 'table', the success of the evening depends entirely on the host's preparation, the clarity of the menu, and the continuous, warm interaction that ensures every guest—regardless of their background—feels able to contribute to the conversation.

8.2 LIMITATIONS AND AVENUES FOR FUTURE RESEARCH

Despite our findings and recommendations, there remains **considerable scope for further research into the effectiveness of inclusion measures in digital co-creation**. While we touched on this theme at various points throughout the report, it does not lend itself to definitive solutions or universal answers; rather, it is best understood as a both/and story that is highly context dependent. This makes continued investigation important. After all, inclusion measures and tailored strategies are vital because when certain groups choose not to engage or participate, the legitimacy and effectiveness of co-creation processes may be undermined: results can become biased (Rodriguez Müller et al., 2024), some voices or opinions may be over-represented (Elstub et al., 2021), and the needs and expectations of hard-to-reach groups may remain invisible (Eseonu, 2022; Jalonen et al., 2021). As a result, "[...] public service producers should pay attention to users' [characteristics] to configure effective and inclusive public services" (Rodriguez Müller, Lerusse, et al., 2021, p. 7).

Finally, we would like to devote a brief note to **'hybrid'** participation initiatives, tools or solutions, as this design type was undermentioned throughout this policy report, despite many use cases showing that they often combine offline and online activation methods. Designs can range from ***light hybrid*** (i.e., allowing citizens to choose between an analogue and a digital equivalent) to ***full hybrid*** (i.e., inviting citizens to co-create both analogue and digital simultaneously). However, the specific impact of these combinations on participants' experiences warrants further investigation. In line with Karlsson et al. (2012, p. 166), who caution: "None of the user participation approaches is a silver bullet […], and each approach has its challenges", hybrid co-creation or citizen participation requires just as much thoughtful consideration of who it might advantage whilst inconveniencing others, and hence how to balance hybrid design choices.

REFERENCES

Abu-Tayeh, G., Neumann, O., & Stuermer, M. (2018). Exploring the Motives of Citizen Reporting Engagement: Self-Concern and Other-Orientation. *Business & Information Systems Engineering*, *60*(3), 215–226. https://doi.org/10.1007/s12599-018-0530-8

Aceto, G., Persico, V., & Pescapé, A. (2018). The role of Information and Communication Technologies in healthcare: Taxonomies, perspectives, and challenges. *Journal of Network and Computer Applications*, *107*, 125–154. https://doi.org/10.1016/j.jnca.2018.02.008

Ajzen, I. (1991). The Theory of Planned Behaviour. *Organizational Behavior and Human Decision Processes*, *50*, 179–211.

Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, *26*(9), 1113–1127. https://doi.org/10.1080/08870446.2011.613995

Alford, J. (2002). Why Do Public-Sector Clients Coproduce? Toward a Contingency Theory. *Administration & Society*, *34*(1), 32–56. https://doi.org/10.1177/0095399702034001004

Alves, H., & Wagner Mainardes, E. (2017). Self-efficacy, trust, and perceived benefits in the co-creation of value by consumers. *International Journal of Retail & Distribution Management*, *45*(11), 1159–1180. https://doi.org/10.1108/IJRDM-05-2016-0071

Apté, C., & Weiss, S. (1997). Data mining with decision trees and decision rules. *Future Generation Computer Systems*, *13*(2–3), 197–210. https://doi.org/10.1016/S0167-739X(97)00021-6

Arnstein, S. R. (2019). A Ladder of Citizen Participation. *Journal of the American Planning Association*, *85*(1), 24–34. https://doi.org/10.1080/01944363.2018.1559388

Baek, Y. M., Wojcieszak, M., & Delli Carpini, M. X. (2012). Online versus face-to-face deliberation: Who? Why? What? With what effects? *New Media & Society*, *14*(3), 363–383. https://doi.org/10.1177/1461444811413191

Bandura, A. (1977). Self-efficacy: Toward a Unifying Theory of Behavioral Change. *Psychological Review*, *84*(2), 191–215.

Bandura, A. (1997). *Self efficacy: The exercise of control*. W. H. Freeman.

Best, B., Moffett, S., & McAdam, R. (2019). Stakeholder salience in public sector value co-creation. *Public Management Review*, *21*(11), 1707–1732. https://doi.org/10.1080/14719037.2019.1619809

Bono Rossello, N., Simonofski, A., Clarinval, A., & Castiaux, A. (2024). A Typology for AI-enhanced Online Ideation: Application to Digital Participation Platforms. *Proceedings of the 57th Hawaii International Conference on System Sciences*, 1850–1859. https://doi.org/10.24251/HICSS.2024.233

Bovaird, T., & Downe, J. (2008). *Innovation In Public Engagement And Co-Production Of Services* [White Paper]. Cardiff Business School. https://doi.org/10.13140/2.1.2391.5845

Bovaird, T., & Loeffler, E. (2013). We're all in this together: Harnessing user and community co-production of public outcomes. In *Making Sense of the Future: Do We Need a New Model of Public Services?* (pp. 1–13). Institute of Local Government Studies, University of Birmingham.

Bovaird, T., Stoker, G., Jones, T., Loeffler, E., & Pinilla Roncancio, M. (2016). Activating collective co-production of public services: Influencing citizens to participate in complex governance mechanisms in the UK. *International Review of Administrative Sciences*, *82*(1), 47–68. https://doi.org/10.1177/0020852314566009

Bovaird, T., Van Ryzin, G. G., Loeffler, E., & Parrado, S. (2015). Activating Citizens to Participate in Collective Co-Production of Public Services. *Journal of Social Policy*, *44*(1), 1–23. https://doi.org/10.1017/S0047279414000567

Brandsen, T. (2021). Vulnerable Citizens: Will Co-production Make a Difference? In E. Loeffler & T. Bovaird (Eds), *The Palgrave Handbook of Co-Production of Public Services and Outcomes* (pp. 527–539). Springer International Publishing. https://doi.org/10.1007/978-3-030-53705-0_27

Brandsen, T., & Honingh, M. (2016). Distinguishing Different Types of Coproduction: A Conceptual Analysis Based on the Classical Definitions. *Public Administration Review*, *76*(3), 427–435. https://doi.org/10.1111/puar.12465

Brandsen, T., Steen, T., & Verschuere, B. (2018). Co-Creation and Co-Production in Public Services: Urgent issues in practice and research. In T. Brandsen, T. Steen, & B. Verschuere (Eds), *Co-Production and Co-Creation* (1st edn, pp. 3–8). Routledge. https://doi.org/10.4324/9781315204956-1

Breiman, L., Friedman, J. H., Olshen, R. A., & Stone, C. J. (1984). *Classification and regression trees*. Chapman & Hall/CRC. https://doi.org/10.1201/9781315139470

Brown, S. A., Dennis, A. R., & Venkatesh, V. (2010). Predicting Collaboration Technology Use: Integrating Technology Adoption and Collaboration Research. *Journal of Management Information Systems*, *27*(2), 9–54. https://doi.org/10.2753/MIS0742-1222270201

Callens, C. (2023). User Involvement as a Catalyst for Collaborative Public Service Innovation. *Journal of Public Administration Research and Theory*, *33*(2), 329–341. https://doi.org/10.1093/jopart/muac030

Casula, M., Leonardi, C., & Zancanaro, M. (2022). How does digital technology impact on the co-production of local services? Evidence from a childcare experience. *Public Money & Management*, *42*(2), 87–97. https://doi.org/10.1080/09540962.2020.1728066

Cote, J. A., McCullough, J., & Reilly, M. (1985). Effects of Unexpected Situations on Behavior-Intention Differences: A Garbology Analysis. *Journal of Consumer Research*, *12*(2), 188. https://doi.org/10.1086/208507

Craig, S. C., Niemi, R. G., & Silver, G. E. (1990). Political efficacy and trust: A report on the NES pilot study items. *Political Behavior*, *12*(3), 289–314. https://doi.org/10.1007/BF00992337

De Jong, M. D. T., Neulen, S., & Jansma, S. R. (2019). Citizens' intentions to participate in governmental co-creation initiatives: Comparing three co-creation configurations. *Government Information Quarterly*, *36*(3), 490–500. https://doi.org/10.1016/j.giq.2019.04.003

Deci, E. L., & Ryan, R. M. (2000). The 'What' and 'Why' of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Deligiaouri, A. (2013). Open Governance and E-Rulemaking: Online Deliberation and Policy-Making in Contemporary Greek Politics. *Journal of Information Technology & Politics*, *10*(1), 104–124. https://doi.org/10.1080/19331681.2012.746109

Douay, N. (2018). *Urban Planning in the Digital Age*. Wiley.

Duerinckx, A., Veeckman, C., Verstraelen, K., Singh, N., Van Laer, J., Vaes, M., Vandooren, C., & Duysburgh, P. (2024). Co-creating Artificial Intelligence: Designing and Enhancing Democratic AI Solutions Through Citizen Science. *Citizen Science: Theory and Practice*, *9*(1), 43. https://doi.org/10.5334/cstp.732

Dugstad, J., Eide, T., Nilsen, E. R., & Eide, H. (2019). Towards successful digital transformation through co-creation: A longitudinal study of a four-year implementation of digital monitoring technology in residential care for persons with dementia. *BMC Health Services Research*, *19*(1), 366. https://doi.org/10.1186/s12913-019-4191-1

Elstub, S., & Escobar, O. (2019). Defining and typologising democratic innovations. In S. Elstub & O. Escobar (Eds), *Handbook of Democratic Innovation and Governance* (pp. 11–31). Edward Elgar Publishing.

Elstub, S., Thompson, R., Escobar, O., Hollinghurst, J., Grimes, D., Aitken, M., McKeon, A., Jones, K. H., Waud, A., & Sethi, N. (2021). The Resilience of Pandemic Digital Deliberation: An Analysis of Online Synchronous Forums. *Javnost - The Public*, *28*(3), 237–255. https://doi.org/10.1080/13183222.2021.1969616

Eseonu, T. (2022). Co-creation as social innovation: Including 'hard-to-reach' groups in public service delivery. *Public Money & Management*, *42*(5), 306–313. https://doi.org/10.1080/09540962.2021.1981057

Farr, M. (2016). Co-Production and Value Co-Creation in Outcome-Based Contracting in Public Services. *Public Management Review*, *18*(5), 654–672. https://doi.org/10.1080/14719037.2015.1111661

Field, A. (2013). *Discovering statistics using IBM SPSS statistics: And sex and drugs and rock 'n' roll* (4th edition). Sage.

Fuller, R. (2023). *Principles of Digital Democracy: Theory and Case Studies. Democracy in Times of Upheavel.* De Gruyter. https://doi.org/10.1515/9783110794465

Fung, A. (2015). Putting the Public Back into Governance: The Challenges of Citizen Participation and Its Future. *Public Administration Review*, *75*(4), 513–522. https://doi.org/10.1111/puar.12361

Gagliardi, D., Schina, L., Sarcinella, M. L., Mangialardi, G., Niglia, F., & Corallo, A. (2017). Information and communication technologies and public participation: Interactive maps and value added for citizens. *Government Information Quarterly*, *34*(1), 153–166. https://doi.org/10.1016/j.giq.2016.09.002

Glimmerveen, L., Ybema, S., & Nies, H. (2022). Who Participates in Public Participation? The Exclusionary Effects of Inclusionary Efforts. *Administration & Society*, *54*(4), 543–574. https://doi.org/10.1177/00953997211034137

Gocheva-Ilieva, S., Kulina, H., & Ivanov, A. (2021). Assessment of Students' Achievements and Competencies in Mathematics Using CART and CART Ensembles and Bagging with Combined Model Improvement by MARS. In *Statistical Data Modeling and Machine Learning with Applications* (pp. 5–22). MDPI. https://doi.org/10.3390/books978-3-0365-2693-5

Goodhue, D. L., & Thompson, R. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly*, *19*(2), 213. https://doi.org/10.2307/249689

Hattke, F., & Kalucza, J. (2019). What influences the willingness of citizens to coproduce public services? Results from a vignette experiment. *Journal of Behavioral Public Administration*, *2*(1). https://doi.org/10.30636/jbpa.21.60

Holgersson, J., & Karlsson, F. (2014). Public e-service development: Understanding citizens' conditions for participation. *Government Information Quarterly*, *31*(3), 396–410. https://doi.org/10.1016/j.giq.2014.02.006

Howlett, M., Ramesh, M., & Perl, A. (2020). *Studying Public Policy: Principles and Processes* (4th edn). Oxford University Press.

Jalonen, H., Kokkola, J., Laihonen, H., Kirjavainen, H., Kaartemo, V., & Vähämaa, M. (2021). Reaching hard-to-reach people through digital means – Citizens as initiators of co-creation in public services. *International Journal of Public Sector Management*, *34*(7), 799–816. https://doi.org/10.1108/IJPSM-01-2021-0008

Jo, S., & Nabatchi, T. (2018). Co-Production, Co-Creation, and Citizen Empowerment. In T. Brandsen, T. Steen, & B. Verschuere (Eds), *Co-Production and Co-Creation* (1st edn, pp. 231–239). Routledge. https://doi.org/10.4324/9781315204956-36

Karlsson, F., Holgersson, J., Söderström, E., & Hedström, K. (2012). Exploring user participation approaches in public e-service development. *Government Information Quarterly*, *29*(2), 158–168. https://doi.org/10.1016/j.giq.2011.07.009

Khan, A., & Krishnan, S. (2021). Citizen engagement in co-creation of e-government services: A process theory view from a meta-synthesis approach. *Internet Research*, *31*(4), 1318–1375. https://doi.org/10.1108/INTR-03-2020-0116

Khan, Z., Dambruch, J., Peters-Anders, J., Sackl, A., Strasser, A., Fröhlich, P., Templer, S., & Soomro, K. (2017). Developing Knowledge-Based Citizen Participation Platform to Support Smart City Decision Making: The Smarticipate Case Study. *Information*, *8*(2), 47. https://doi.org/10.3390/info8020047

Lago, N., Durieux, M., Pouleur, J.-A., Scoubeau, C., Elsen, C., & Schelings, C. (2019). Citizen Participation through Digital Platforms: The Challenging Question of Data Processing for Cities. *SMART 2019: The Eighth International Conference on Smart Cities, Systems, Devices and Technologies*, 19–25.

Lama, Y., Hancock, G. R., Freimuth, V. S., Jamison, A. M., & Quinn, S. C. (2020). Using classification and regression tree analysis to explore parental influenza vaccine decisions. *Vaccine*, *38*(5), 1032–1039. https://doi.org/10.1016/j.vaccine.2019.11.039

Lee, J., & Kim, S. (2018). Citizens' e-participation on agenda setting in local governance: Do individual social capital and e-participation management matter? *Public Management Review*, *20*(6), 873–895. https://doi.org/10.1080/14719037.2017.1340507

Lega, M., Giunta, B., Pirnay, L., Simonofski, A., & Burnay, C. (2024). Reducing information overload in e-participation: A data-driven prioritization framework for policy-makers. *International Journal of Information Management Data Insights*, *4*(2), 1–12. https://doi.org/10.1016/j.jjimei.2024.100264

Leino, H., & Puumala, E. (2021). What can co-creation do for the citizens? Applying co-creation for the promotion of participation in cities. *Environment and Planning C: Politics and Space*, *39*(4), 781–799. https://doi.org/10.1177/2399654420957337

Lember, V. (2018). The Increasing Role of Digital Technologies in Co-Production and Co-Creation. In T. Brandsen, T. Steen, & B. Verschuere (Eds), *Co-Production and Co-Creation* (1st edn, pp. 115–127). Routledge. https://doi.org/10.4324/9781315204956-16

Lember, V., Brandsen, T., & Tõnurist, P. (2019). The potential impacts of digital technologies on co-production and co-creation. *Public Management Review*, *21*(11), 1665–1686. https://doi.org/10.1080/14719037.2019.1619807

Letki, N., & Steen, T. (2021). Social-Psychological Context Moderates Incentives to Co-produce: Evidence from a Large-Scale Survey Experiment on Park Upkeep in an Urban Setting. *Public Administration Review*, *81*(5), 935–950. https://doi.org/10.1111/puar.13340

Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government Information Quarterly*, *29*(4), 446–454. https://doi.org/10.1016/j.giq.2012.06.003

Loeffler, E. (2021). The Four Co's: Co-commissioning, Co-design, Co-delivery and Co-assessment of Public Services and Outcomes Through Traditional and Digital Mechanisms. In *Co-Production of Public Services and Outcomes* (pp. 75–176). Springer International Publishing. https://link.springer.com/chapter/10.1007/978-3-030-55509-2_3

Lowndes, V., Pratchett, L., & Stoker, G. (2001). Trends in Public Participation: Part 2 – Citizens' Perspectives. *Public Administration*, *79*(2), 445–455. https://doi.org/10.1111/1467-9299.00264

McDavid, J. C., Huse, I., & Hawthorn, L. R. L. (2019). *Program evaluation and performance measurement: An introduction to practice* (Third edition). SAGE.

Moss, G., & Coleman, S. (2014). Deliberative Manoeuvres in the Digital Darkness: E-Democracy Policy in the UK. *The British Journal of Politics and International Relations*, *16*(3), 410–427. https://doi.org/10.1111/1467-856X.12004

Mukherjee, I., & Mukherjee, N. (2018). Designing for sustainable outcomes: Espousing behavioural change into co-production programmes. *Policy and Society*, *37*(3), 326–346. https://doi.org/10.1080/14494035.2018.1383032

Nabatchi, T., Sancino, A., & Sicilia, M. (2017). Varieties of Participation in Public Services: The Who, When, and What of Coproduction. *Public Administration Review*, *77*(5), 766–776. https://doi.org/10.1111/puar.12765

Parrado, S., Van Ryzin, G. G., Bovaird, T., & Löffler, E. (2013). Correlates of Co-production: Evidence From a Five-Nation Survey of Citizens. *International Public Management Journal*, *16*(1), 85–112. https://doi.org/10.1080/10967494.2013.796260

Rodriguez Müller, A. P., Casiano Flores, C., Albrecht, V., Steen, T., & Crompvoets, J. (2021). A Scoping Review of Empirical Evidence on (Digital) Public Services Co-Creation. *Administrative Sciences*, *11*(4), 1–21. https://doi.org/10.3390/admsci11040130

Rodriguez Müller, A. P., Lerusse, A., Steen, T., & Van De Walle, S. (2021). Understanding channel choice in users' reporting behavior: Evidence from a smart mobility case. *Government Information Quarterly*, *38*(1), 1–11. https://doi.org/10.1016/j.giq.2020.101540

Rodriguez Müller, A. P., Lerusse, A., Steen, T., & Van De Walle, S. (2024). What motivates users to report service-related issues? A study on coproduction in a smart public service. *Public Administration*, *102*(2), 691–714. https://doi.org/10.1111/padm.12946

Russon Gilman, H., & Peixoto, T. C. (2019). Digital Participation. In S. Elstub & O. Escobar (Eds), *Handbook of Democratic Innovation and Governance* (pp. 105–118). Edward Elgar Publishing.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, *25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Saelaert, M., Mayeur, C., & Van Hoof, W. (2021). *Coronaconsultaties. Burgerparticipatie in het Belgisch Vaccinatiebeleid* (Rapport No. D/2021/14.440/1; p. 11). Sciensano.

Salem, F. (2016a). Brainstorming the Nation through Social Media: Emerging Open Governance in Closed Contexts? *Proceedings of the 9th International Conference on Theory and Practice of Electronic Governance*, 390–391. https://doi.org/10.1145/2910019.2910065

Salem, F. (2016b). Open Governance in Authoritarian States: A Framework for Assessing Digital Participation in the Age of Mass Surveillance. In E. Tambouris, P. Panagiotopoulos, Ø. Sæbø, M. A. Wimmer, T. A. Pardo, Y. Charalabidis, D. Sá Soares, & T. Janowski (Eds), *Electronic Participation* (pp. 94–105). Springer International Publishing. https://doi.org/10.1007/978-3-319-45074-2_8

Schelings, C., Calixte, X., & Elsen, C. (2020). Advocating for Participation in Design: Designers' and Non-designers' New Roles and Responsibilities. *The International Journal of Design Management and Professional Practice*, *14*(3), 9–27.

Schelings, C., Defays, A., & Elsen, C. (2023). Profiling Citizens in the Smart City: A Quantitative Study in Wallonia. *Smart Cities*, *6*(4), 2125–2149. https://doi.org/10.3390/smartcities6040098

Schmidthuber, L., Hilgers, D., Gegenhuber, T., & Etzelstorfer, S. (2017). The emergence of local open government: Determinants of citizen participation in online service reporting. *Government Information Quarterly*, *34*(3), 457–469. https://doi.org/10.1016/j.giq.2017.07.001

Simonofski, A., Hertoghe, E., Steegmans, M., Snoeck, M., & Wautelet, Y. (2021). Engaging citizens in the smart city through participation platforms: A framework for public servants and developers. *Computers in Human Behavior*, *124*, 1–11. https://doi.org/10.1016/j.chb.2021.106901

Simonofski, A., Snoeck, M., & Vanderose, B. (2019). Co-creating e-Government Services: An Empirical Analysis of Participation Methods in Belgium. In M. P. Rodriguez Bolivar (Ed.), *Setting Foundations for the Creation of Public Value in Smart Cities* (Vol. 35, pp. 225–245). Springer International Publishing. https://doi.org/10.1007/978-3-319-98953-2_9

Simonofski, A., Zuiderwijk, A., Clarinval, A., & Hammedi, W. (2022). Tailoring open government data portals for lay citizens: A gamification theory approach. *International Journal of Information Management*, *65*, 102511. https://doi.org/10.1016/j.ijinfomgt.2022.102511

Steen, T. (2021). Citizens' Motivations for Co-production: Willingness, Ability and Opportunity at Play. In E. Loeffler & T. Bovaird (Eds), *The Palgrave Handbook of Co-Production of Public Services and Outcomes* (pp. 507–525). Springer International Publishing. https://doi.org/10.1007/978-3-030-53705-0_26

Steen, T., Brandsen, T., & Verschuere, B. (2018). The Dark Side of Co-Creation and Co-Production. In T. Brandsen, T. Steen, & B. Verschuere (Eds), *Co-Production and Co-Creation* (1st edn, pp. 284–293). Routledge. https://doi.org/10.4324/9781315204956-45

Szesciło, D. (2018). Legal Dilemmas of Co-Production and Co-Creation. In T. Brandsen, T. Steen, & B. Verschuere (Eds), *Co-Production and Co-Creation: Engaging Citizens in Public Services* (pp. 137–144). Routledge.

Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2021). Consumer Acceptance and Use of Information Technology: A Meta-Analytic Evaluation of UTAUT2. *Information Systems Frontiers*, *23*(4), 987–1005. https://doi.org/10.1007/s10796-020-10007-6

Torfing, J., Sørensen, E., & Røiseland, A. (2019). Transforming the Public Sector Into an Arena for Co-Creation: Barriers, Drivers, Benefits, and Ways Forward. *Administration & Society*, *51*(5), 795–825. https://doi.org/10.1177/0095399716680057

Van Dijck, J. (2020). Solutions to Mitigate the Digital Divide. In J. Van Dijck, *The Digital Divide* (pp. 132–158). Polity Press.

Van Dooren, W., Bouckaert, G., & Halligan, J. (2015). *Performance Management in the Public Sector* (Second edition). Routledge. https://doi.org/10.4324/9781315817590

Van Eijk, C., & Gascó, M. (2018). Unravelling the Co-Producers: Who are they and What Motivations do They Have? In T. Brandsen, T. Steen, & B. Verschuere (Eds), *Co-Production and Co-Creation: Engaging Citizens in Public Services* (1st edn, pp. 63–76). Routledge. https://doi.org/10.4324/9781315204956

Van Eijk, C., & Steen, T. (2014). Why People Co-Produce: Analysing citizens' perceptions on co-planning engagement in health care services. *Public Management Review*, *16*(3), 358–382. https://doi.org/10.1080/14719037.2013.841458

Van Eijk, C., & Steen, T. (2016). Why engage in co-production of public services? Mixing theory and empirical evidence. *International Review of Administrative Sciences*, *82*(1), 28–46. https://doi.org/10.1177/0020852314566007

Van Eijk, C., Steen, T., & Verschuere, B. (2017). Co-producing safety in the local community: A Q-methodology study on the incentives of Belgian and Dutch members of neighbourhood watch schemes. *Local Government Studies*, *43*(3), 323–343. https://doi.org/10.1080/03003930.2017.1281803

Vanleene, D., Voets, J., & Verschuere, B. (2017). Co-Producing a Nicer Neighbourhood: Why do People Participate in Local Community Development Projects? *Lex Localis - Journal of Local Self-Government*, *15*(1), 111–132. https://doi.org/10.4335/15.1.111-132(2017)

Venkatesh, Morris, Davis, & Davis. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27*(3), 425. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, *36*(1), 157–178. https://doi.org/10.2307/41410412

Venkatesh, V., Thong, J., & Xu, X. (2016). Unified Theory of Acceptance and Use of Technology: A Synthesis and the Road Ahead. *Journal of the Association for Information Systems*, *17*(5), 328–376. https://doi.org/10.17705/1jais.00428

Verschuere, B., Brandsen, T., & Pestoff, V. (2012). Co-production: The State of the Art in Research and the Future Agenda. *Voluntas*, *23*(4), 1083–1101. https://doi.org/10.1007/s11266-012-9307-8

Vicente, M. R., & Novo, A. (2014). An empirical analysis of e-participation. The role of social networks and e-government over citizens' online engagement. *Government Information Quarterly*, *31*(3), 379–387. https://doi.org/10.1016/j.giq.2013.12.006

Viglia, G., Pera, R., & Bigné, E. (2018). The determinants of stakeholder engagement in digital platforms. *Journal of Business Research*, *89*, 404–410. https://doi.org/10.1016/j.jbusres.2017.12.029

Voorberg, W. H., Bekkers, V. J. J. M., & Tummers, L. G. (2015). A Systematic Review of Co-Creation and Co-Production: Embarking on the social innovation journey. *Public Management Review*, *17*(9), 1333–1357. https://doi.org/10.1080/14719037.2014.930505

Wang, T., Jung, C.-H., Kang, M.-H., & Chung, Y.-S. (2014). Exploring determinants of adoption intentions towards Enterprise 2.0 applications: An empirical study. *Behaviour & Information Technology*, *33*(10), 1048–1064. https://doi.org/10.1080/0144929X.2013.781221

White, B. K., Martin, A., & White, J. (2023). Gamification and older adults: Opportunities for gamification to support health promotion initiatives for older adults in the context of COVID-19. *The Lancet Regional Health - Western Pacific*, *35*, 1–7. https://doi.org/10.1016/j.lanwpc.2022.100528

Wijnhoven, F., Ehrenhard, M., & Kuhn, J. (2015). Open government objectives and participation motivations. *Government Information Quarterly*, *32*(1), 30–42. https://doi.org/10.1016/j.giq.2014.10.002

Wolf, L., Bick, M., & Kummer, T.-F. (2017). The Influence of Situation-Dependent Factors on Mobile Shopping Usage. *Proceedings of the 50th Hawaii International Conference on System Sciences*. Hawaii International Conference on System Sciences (HICCS). https://doi.org/10.24251/HICSS.2017.504

ANNEX

SUPPLEMENT 1 – PRINCIPAL COMPONENT ANALYSES (PCA) AND OPERATIONALISATION OF THE DEPENDENT VARIABLES

Table S1A. Operationalisation of constructs within 'Attitudes towards participation' and concomitant PCA results (Direct Oblimin rotation).

ID	Constructs and corresponding survey items	Component loadings	Communality	α if item deleted	α
	External efficacy [a]				.909
TSI1	I believe a city or municipality that organises this really wants to make use of residents' opinions.	.840	.721	.893	
TSI2	Through a citizen participation project like this, a city or municipality shows that it is interested in residents' opinions.	.902	.819	.881	
TSI3	A citizen participation project like this shows me that the organising city or municipality is willing to give residents a say.	.901	.810	.884	
TCP1	Participating as citizens leads to better solutions to problems.	.712	.610	.907	
TCP2	Citizen participation leads to solutions that people support.	.773	.648	.900	
TCP3	Citizen participation shows that citizens, like me, can effect change.	.761	.713	.892	
	Trust in services and quality solutions by the local governmental body [b]				.928
TQSS1	How do you think the city or municipality is governed?	.921	.870	.889	
TQSS2	Does your city or municipal council succeed in providing appropriate responses to challenges or problems in the area?	.917	.878	.880	
TQSS3	Does the city or municipality succeed in providing quality services to residents?	.901	.831	.918	
	Interest in local politics [c]				.763
IP1	Local politics […] interest me.	.848	.752	.625	
IP2	I will […] vote in the next local elections.	.535	.313	.822	
IP3	I […] follow developments within the city or municipality (e.g. through the media).	.867	.762	.634	
IP4	I […] know what the services and tasks of city or municipal council are.	.785	.613	.711	
	Hedonic motivation [d]				.810
HM1	Participating would give me a [...] feeling.	-.789	.728	.727	
HM2	I would consider my involvement [...] interesting.	-.824	.784	.687	
HM3	I expect […] enjoyment from participation.	-.844	.684	.801	

Legend. α = Cronbach's alpha.

Note (a). Question items were inspired by De Jong, et al. (2019). Respondents indicated on a 7-point Likert scale the extent to which they agreed with each question item (-3 =' totally disagree'; -2 = 'disagree'; -1=' rather disagree'; 0 = 'nor agree, nor disagree'; 1 = 'rather agree'; 2 = 'agree'; 3 = 'totally agree').

Note (b). Question items of own design. Respondents indicated their satisfaction over each item on a 11-point NPS scale. For each item, the ends of the scale corresponded to the item wording (e.g., 0 = 'very badly' to 10 = 'very well' for TSQS1 or 0 = 'no, not at all' to 10 = 'Yes, very well' for TSQS2).

Note (c). Question items were inspired by De Jong, et al. (2019). Respondents indicated on a 5-point scale which item-adapted description best fitted the blank between square brackets (e.g., 0 = 'doesn't', 1 = 'seldom', 2 = 'sometimes', 3 = 'often' and 4 = 'always' for IP1).

Note (d). Question items were inspired by De Jong, et al. (2019) and Venkatesh et al. (2012). Respondents indicated on a 6-point scale which item-adapted description best fitted the blank between square brackets (e.g., -2 = 'very dissatisfied', -1 = 'dissatisfied', 0 = 'rather dissatisfied', 1 = 'rather satisfied', 2 = 'satisfied' and 3 = 'very satisfied' for HM1).

Table S1B. Operationalisation of constructs within 'Subjective norm' and concomitant PCA results (Direct Oblimin rotation).

ID	Constructs and corresponding survey items	Component loadings	Communality	α if item deleted	α
	Perceived social pressure [a]				.807
SN1	People I spend time with would consider it important for themselves to participate.	.918	.840	n/a	
SN2	People I spend time with would encourage me to contribute to such a project.	.914	.839	n/a	
	Community attachment [b]				.819
CA1	I live in a nice neighbourhood.	.882	.720	.770	
CA2	People in my neighbourhood can be trusted.	.857	.774	.714	
CA3	People from around here are willing to help each other.	.832	.713	.769	

Legend. α = Cronbach's alpha.

Note (a). Question items were inspired by De Jong, et al. (2019). Respondents indicated on a 7-point Likert scale the extent to which they agreed with each question item (-3 =' totally disagree'; -2 = 'disagree'; -1=' rather disagree'; 0 = 'nor agree, nor disagree'; 1 = 'rather agree'; 2 = 'agree'; 3 = 'totally agree').

Note (b). Question items were derived from Letki & Steen (2021). Respondents indicated on a 7-point Likert scale the extent to which they agreed with each question item (-3 =' totally disagree'; -2 = 'disagree'; -1=' rather disagree'; 0 = 'nor agree, nor disagree'; 1 = 'rather agree'; 2 = 'agree'; 3 = 'totally agree').

Table S1C. Operationalisation of constructs within 'perceived behavioural control' and concomitant PCA results (Direct Oblimin rotation).

ID	Constructs and corresponding survey items	Component loadings	Communality	α if item deleted	α
	Digital efficacy [a]				.898
PBC6	I have the necessary equipment (e.g., laptop, tablet or smartphone; internet) to participate digitally.	.808	.675	.883	
PBC7A	I am able to express an opinion or propose an idea via digital means.	.882	.795	.870	
PBC7B	I am able to vote on an idea or proposal via digital means.	.865	.766	.875	
PBC7C	I am able to engage in meetings digitally.	.822	.694	.876	
PBC7D	I am able to share or provide relevant information via an app.	.833	.686	.875	
PBC8	Participating via digital means would require much effort on my part	-.737	.517	.900	
	Facilitating conditions [b]				.837
PBC2	I trust that I will be provided with the necessary information to participate.	.923	.856	n/a	
PBC3	I am confident I would have somewhere to turn with questions or concerns.	.926	.858	n/a	
	Internal efficacy [c]				
PBC1	I am capable of participating in a project as described in the video.	n/a	n/a	n/a	
	Time availability [c]				
PBC4	I have sufficient time to participate in a project like this.	n/a	n/a	n/a	

Legend. α = Cronbach's alpha.

Note (a). Question items were inspired by Venkatesh et al. (2012) and Brown et al. (2010). Respondents indicated on a 7-point Likert scale the extent to which they agreed with each question item (-3 =' totally disagree'; -2 = 'disagree'; -1=' rather disagree'; 0 = 'nor agree, nor disagree'; 1 = 'rather agree'; 2 = 'agree'; 3 = 'totally agree').

Note (b). Question items of own design. Respondents indicated on a 7-point Likert scale the extent to which they agreed with each question item (-3 =' totally disagree'; -2 = 'disagree'; -1=' rather disagree'; 0 = 'nor agree, nor disagree'; 1 = 'rather agree'; 2 = 'agree'; 3 = 'totally agree').

Note (c). Question items concerning internal efficacy and time availability were both inspired by the study of De Jong et al. (2019). Respondents indicated on a 7-point Likert scale the extent to which they agreed with each question item (-3 =' totally disagree'; -2 = 'disagree'; -1=' rather disagree'; 0 = 'nor agree, nor disagree'; 1 = 'rather agree'; 2 = 'agree'; 3 = 'totally agree'). As both constructs are measured through a single item, they were not included in the PCA run on the Ease of use and digital efficacy items. After all, we did not wish to reduce the number of items for these two constructs further. Hence, PBC1 and PBC4 will be treated as constructs in themselves within further analyses, albeit PBC4 in a dichotomised way.

SUPPLEMENT 2 – OLS REGRESSIONS WITH INTENT TO PARTICIPATE IN A GIVEN STEP AS DEPENDENT VARIABLE

Table S2A. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 1 (= ideation; combined configurations**) using mean scored variables (n=1,035).

	Model S1C 1		**Model S1C 2**		**Model S1C 3**		**Model S1C 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.012 (.008)		-.014 (.007)		-.014 (.007)		-.007 (.007)	
Gender (ref=non-female)	-.347 (.162)	*	-.248 (.144)		-.257 (.143)		-.142 (.141)	
Educational attainment (ref=high)	.024 (.200)		.328 (.178)		.307 (.176)		.413 (.175)	*
Occupational status (effect=not yet active)	-.530 (.318)		-.478 (.279)		-.528 (.277)		-.405 (.273)	
Occupational status (effect=not active)	-.085 (.230)		-.056 (.202)		-.023 (.200)		-.010 (.197)	
Occupational status (effect=unemployed)	.184 (.307)		.169 (.269)		.188 (.267)		.150 (.263)	
Occupational status (effect=pensioned)	.390 (.254)		.255 (.223)		.281 (.221)		.226 (.217)	
Configuration (ref=analogue)	.697 (.160)	***	.753 (.140)	***	.785 (.139)	***	.811 (.137)	***
Attitudes towards participation								
External efficacy			.372 (.080)	***	.332 (.081)	***	.324 (.083)	***
Trust service and solution quality			-.062 (.039)		-.019 (.042)		.024 (.042)	
Interest in local politics			.677 (.100)	***	.654 (.101)	***	.527 (.102)	***
Hedonic motivation			.919 (.106)	***	.830 (.109)	***	.623 (.113)	***
Subjective norm								
Perceived social pressure					.265 (.073)	***	.215 (.072)	**
Community attachment					-.234 (.076)	**	-.248 (.075)	**
Perceived behavioural control								
Civic efficacy							.213 (.067)	**
Digital efficacy							.249 (.071)	***
Facilitating conditions							-.130 (.075)	
Prior experience (ref=no prior experience)							.286 (.161)	
Time availability (ref=sufficient)							-.471 (.169)	**
Constant	6.571 (.415)	***	3.522 (.470)	***	3.627 (.479)	***	3.023 (.512)	***
Adjusted R^2	0.020	**	.252	***	.264	***	.295	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, six outliers were identified. The avoid faulty conclusions, we cross-checked the significance levels and the direction of regression estimates in a re-run of the linear models without the concomitant outliers. In none of the models did this fundamentally alter our results. Hence, as we are working with natural data, in which respondents were allowed to answer in line with how they felt and thought at the moment, the models presented above are those including the outliers.

Table S2B. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 2 (= voting; combined configurations**) using mean scored variables (n=1,035).

	Model S2C 1		**Model S2C 2**		**Model S2C 3**		**Model S2C 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.020 (.008)	*	-.020 (.007)	**	-.020 (.007)	**	-.012 (.007)	
Gender (ref=non-female)	-.129 (.154)		-.050 (.134)		-.050 (.134)		.056 (.133)	
Educational attainment (ref=high)	-.075 (.190)		.208 (.166)		.200 (.166)		.330 (.165)	*
Occupational status (effect=not yet active)	-.407 (.302)		-.342 (.261)		-.350 (.261)		-.277 (.257)	
Occupational status (effect=not active)	-.087 (.218)		.045 (.188)		.031 (.188)		.039 (.186)	
Occupational status (effect=unemployed)	.199 (.292)		.183 (.251)		.183 (.251)		.199 (.248)	
Occupational status (effect=pensioned)	.370 (.241)		.227 (.208)		.235 (.208)		.181 (.205)	
Configuration (ref=analogue)	.607 (.152)	***	.669 (.131)	***	.680 (.131)	***	.696 (.129)	***
Attitudes towards participation								
External efficacy			.412 (.074)	***	.409 (.076)	***	.364 (.078)	***
Trust service and solution quality			-.071 (.036)		-.056 (.039)		-.034 (.040)	
Interest in local politics			.602 (.093)	***	.604 (.095)	***	.483 (.096)	***
Hedonic motivation			.932 (.098)	***	.919 (.102)	***	.757 (.107)	***
Subjective norm								
Perceived social pressure					.046 (.069)		.009 (.068)	
Community attachment					-.080 (.072)		-.107 (.071)	
Perceived behavioural control								
Civic efficacy							.158 (.063)	*
Digital efficacy							.303 (.067)	***
Facilitating conditions							-.016 (.071)	
Prior experience (ref=no prior experience)							.218 (.152)	
Time availability (ref=sufficient)							-.160 (.159)	
Constant	7.854 (.394)	***	4.957 (.438)	***	4.938 (.450)	***	4.146 (.484)	***
Adjusted R^2	.017	**	.276	***	.276	***	.302	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, twelve outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2C. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 3 (= deliberation; combined configurations**) using mean scored variables (n=1,035).

	Model S3C 1		**Model S3C 2**		**Model S3C 3**		**Model S3C 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	.009 (.008)		.008 (.007)		.008 (.007)		.016 (.007)	*
Gender (ref=non-female)	-.274 (.167)		-.128 (.141)		-.139 (.140)		-.004 (.137)	
Educational attainment (ref=high)	.185 (.206)		.525 (.174)	**	.512 (.173)	**	.646 (.169)	***
Occupational status (effect=not yet active)	-.569 (.327)		-.457 (.274)		-.509 (.272)		-.367 (.264)	
Occupational status (effect=not active)	-.494 (.236)	*	-.343 (.197)		-.366 (.196)		-.400 (.191)	*
Occupational status (effect=unemployed)	.677 (.316)	*	.584 (.264)	*	.609 (.262)	*	.562 (.255)	*
Occupational status (effect=pensioned)	.058 (.261)		-.077 (.218)		-.054 (.217)		-.111 (.210)	
Configuration (ref=analogue)	-.124 (.164)		-.153 (.137)		-.176 (.136)		-.086 (.132)	
Attitudes towards participation								
External efficacy			.203 (.078)	**	.156 (.079)	*	.142 (.080)	
Trust service and solution quality			-.108 (.038)	**	-.077 (.041)		-.031 (.041)	
Interest in local politics			.635 (.098)	***	.603 (.099)	***	.441 (.099)	***
Hedonic motivation			1.402 (.104)	***	1.306 (.107)	***	1.065 (.110)	***
Subjective norm								
Perceived social pressure					.274 (.072)	***	.212 (.070)	**
Community attachment					-.179 (.075)	*	-.197 (.073)	**
Perceived behavioural control								
Civic efficacy							.217 (.065)	***
Digital efficacy							.331 (.069)	***
Facilitating conditions							-.126 (.073)	
Prior experience (ref=no prior experience)							.443 (.156)	**
Time availability (ref=sufficient)							-.500 (.164)	**
Constant	5.121 (.423)	***	2.067 (.458)	***	2.260 (.466)	***	1.466 (.494)	**
Adjusted R^2	.017	**	.317	***	.328	***	.371	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, five outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2D. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 4 (= co-delivery; combined configurations**) using mean scored variables (n=1,035).

	Model S4C 1		**Model S4C 2**		**Model S4C 3**		**Model S4C 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	.005 (.008)		.008 (.007)		.008 (.007)		.010 (.007)	
Gender (ref=non-female)	-.037 (.166)		.014 (.140)		.003 (.138)		.100 (.135)	
Educational attainment (ref=high)	.314 (.205)		.628 (.173)	***	.603 (.171)	***	.636 (.167)	***
Occupational status (effect=not yet active)	-.104 (.326)		-.034 (.272)		-.097 (.268)		.082 (.261)	
Occupational status (effect=not active)	-.515 (.236)	*	-.366 (.196)		-.408 (.194)	*	-.515 (.189)	**
Occupational status (effect=unemployed)	.779 (.315)	*	.670 (.262)	*	.694 (.258)	**	.597 (.251)	*
Occupational status (effect=pensioned)	-.386 (.261)		-.480 (.217)	*	-.446 (.214)	*	-.495 (.207)	*
Configuration (ref=analogue)	.083 (.164)		.078 (.136)		.050 (.134)		.114 (.131)	
Attitudes towards participation								
External efficacy			.263 (.078)	***	.211 (.078)	**	.220 (.079)	**
Trust service and solution quality			-.006 (.038)		.046 (.040)		.095 (.040)	*
Interest in local politics			.256 (.097)	**	.229 (.098)	*	.117 (.097)	
Hedonic motivation			1.501 (.103)	***	1.389 (.105)	***	1.134 (.108)	***
Subjective norm								
Perceived social pressure					.334 (.071)	***	.266 (.069)	***
Community attachment					-.289 (.074)	***	-.294 (.072)	***
Perceived behavioural control								
Civic efficacy							.267 (.064)	***
Digital efficacy							.063 (.068)	
Facilitating conditions							-.137 (.072)	
Prior experience (ref=no prior experience)							.152 (.154)	
Time availability (ref=sufficient)							-.942 (.162)	***
Constant	4.892 (.422)	***	1.937 (.454)	***	2.109 (.460)	***	2.137 (.488)	***
Adjusted R^2	.008	*	.319	***	.338	***	.380	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, six outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2E. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 1 (= ideation; analogue configurations**) using mean scored variables (n=520).

	Model S1A 1		**Model S1A 2**		**Model S1A 3**		**Model S1A 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.012 (.012)		-.018 (.011)		-.018 (.010)		-.017 (.011)	
Gender (ref=non-female)	-.255 (.230)		-.209 (.204)		-.220 (.202)		-.164 (.205)	
Educational attainment (ref=high)	.329 (.287)		.780 (.256)	**	.786 (.254)	**	.802 (.258)	**
Occupational status (effect=not yet active)	-.583 (.460)		-.723 (.406)		-.821 (.401)	*	-.691 (.404)	
Occupational status (effect=not active)	.009 (.320)		.372 (.284)		.402 (.281)		.298 (.283)	
Occupational status (effect=unemployed)	.026 (.432)		-.076 (.380)		-.037 (.377)		-.077 (.378)	
Occupational status (effect=pensioned)	.653 (.360)		.541 (.318)		.547 (.315)		.499 (.314)	
Attitudes towards participation								
External efficacy			.263 (.115)	*	.208 (.115)		.209 (.119)	
Trust service and solution quality			.053 (.060)		.082 (.063)		.104 (.065)	
Interest in local politics			.591 (.144)	***	.554 (.145)	***	.479 (.150)	**
Hedonic motivation			.263 (.115)	***	.976 (.156)	***	.823 (.167)	***
Subjective norm								
Perceived social pressure					.404 (.109)	***	.353 (.111)	**
Community attachment					-.197 (.109)		-.200 (.111)	
Perceived behavioural control								
Civic efficacy							.131 (.100)	
Digital efficacy							-.023 (.108)	
Facilitating conditions							-.013 (.110)	
Prior experience (ref=no prior experience)							.271 (.233)	
Time availability (ref=sufficient)							-.452 (.247)	
Constant	6.298 (.591)	***	2.809 (.681)	***	3.012 (.689)	***	3.125 (.750)	***
Adjusted R^2	.000		.228	***	.247	***	.253	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, two outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2F. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 2 (= voting; analogue configurations**) using mean scored variables (n=520).

	Model S2A 1		**Model S2A 2**		**Model S2A 3**		**Model S2A 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.012 (.012)		-.017 (.010)		-.017 (.010)		-.014 (.011)	
Gender (ref=non-female)	-.040 (.227)		-.024 (.198)		-.031 (.198)		.027 (.202)	
Educational attainment (ref=high)	-.018 (.283)		.415 (.249)		.420 (.249)		.460 (.254)	
Occupational status (effect=not yet active)	-.245 (.453)		-.378 (.394)		-.427 (.394)		-.365 (.397)	
Occupational status (effect=not active)	-.066 (.315)		.287 (.276)		.303 (.276)		.228 (.278)	
Occupational status (effect=unemployed)	.262 (.425)		.190 (.370)		.213 (.370)		.233 (.372)	
Occupational status (effect=pensioned)	.324 (.355)		.190 (.309)		.191 (.309)		.162 (.309)	
Attitudes towards participation								
External efficacy			.430 (.111)	***	.401 (.112)	***	.370 (.117)	**
Trust service and solution quality			.055 (.058)		.068 (.062)		.072 (.064)	
Interest in local politics			.574 (.140)	***	.552 (.143)	***	.481 (.147)	**
Hedonic motivation			.966 (.150)	***	.905 (.154)	***	.763 (.164)	***
Subjective norm								
Perceived social pressure					.211 (.107)	*	.167 (.109)	
Community attachment					-.092 (.393)		-.122 (.109)	
Perceived behavioural control								
Civic efficacy							.148 (.098)	
Digital efficacy							-.025 (.107)	
Facilitating conditions							.104 (.108)	
Prior experience (ref=no prior experience)							.112 (.230)	
Time availability (ref=sufficient)							-.207 (.243)	
Constant	7.504 (.582)	***	3.955 (.662)	***	4.072 (.677)	***	4.088 (.739)	***
Adjusted R^2	.000		.243	***	.246	***	.248	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, six outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2G. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 3 (= deliberation; analogue configurations**) using mean scored variables (n=521).

	Model S3A 1		**Model S3A 2**		**Model S3A 3**		**Model S3A 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	.004 (.012)		.003 (.010)		.003 (.010)		.013 (.010)	
Gender (ref=non-female)	-.255 (.234)		-.107 (.198)		-.128 (.196)		.010 (.193)	
Educational attainment (ref=high)	.326 (.286)		.623 (.241)	*	.611 (.239)	*	.760 (.237)	**
Occupational status (effect=not yet active)	-.425 (.453)		-.211 (.382)		-.225 (.378)		-.059 (.370)	
Occupational status (effect=not active)	-.660 (.333)	*	-.464 (.278)		-.459 (.276)		-.554 (.271)	*
Occupational status (effect=unemployed)	.565 (.448)		.305 (.373)		.330 (.369)		.305 (.362)	
Occupational status (effect=pensioned)	.350 (.370)		.171 (.309)		.155 (.307)		.040 (.300)	
Attitudes towards participation								
External efficacy			.191 (.116)		.116 (.117)		.141 (.119)	
Trust service and solution quality			-.125 (.053)	*	-.122 (.057)	*	-.055 (.058)	
Interest in local politics			.612 (.141)	***	.541 (.143)	***	.438 (.143)	**
Hedonic motivation			1.461 (.146)	***	1.333 (.149)	***	1.080 (.154)	***
Subjective norm								
Perceived social pressure					.332 (.096)	***	.272 (.094)	**
Community attachment					-.003 (.107)		-.060 (.105)	
Perceived behavioural control								
Civic efficacy							.324 (.088)	***
Digital efficacy							.203 (.101)	*
Facilitating conditions							-.202 (.103)	
Prior experience (ref=no prior experience)							.313 (.218)	
Time availability (ref=sufficient)							-.450 (.233)	
Constant	5.286 (.593)	***	2.324 (.636)	***	2.688 (.643)	***	1.720 (.701)	*
Adjusted R^2	.011		.319	***	.332	***	.370	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, three outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2H. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 4 (= co-delivery; analogue configurations**) using mean scored variables (n=521).

	Model S4A 1		**Model S4A 2**		**Model S4A 3**		**Model S4A 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	.004 (.012)		.004 (.010)		.005 (.010)		.008 (.010)	
Gender (ref=non-female)	.214 (.238)		.253 (.201)		.224 (.197)		.303 (.193)	
Educational attainment (ref=high)	.689 (.290)	*	.944 (.245)	***	.903 (.240)	***	.925 (.238)	***
Occupational status (effect=not yet active)	-.136 (.459)		-.012 (.388)		-.036 (.380)		.153 (.371)	
Occupational status (effect=not active)	-.432 (.337)		-.237 (.282)		-.269 (.277)		-.421 (.271)	
Occupational status (effect=unemployed)	.585 (.454)		.314 (.379)		.343 (.371)		.244 (.363)	
Occupational status (effect=pensioned)	-.252 (.375)		-.351 (.314)		-.345 (.308)		-.409 (.300)	
Attitudes towards participation								
External efficacy			.166 (.118)		.079 (.118)		.119 (.119)	
Trust service and solution quality			.000 (.054)		.040 (.057)		.109 (.058)	
Interest in local politics			.155 (.143)		.103 (.144)		.045 (.143)	
Hedonic motivation			1.623 (.149)	***	1.448 (.150)	***	1.178 (.155)	***
Subjective norm								
Perceived social pressure					.465 (.097)	***	.405 (.095)	***
Community attachment					-.193 (.108)		-.238 (.105)	*
Perceived behavioural control								
Civic efficacy							.366 (.088)	***
Digital efficacy							-.077 (.101)	
Facilitating conditions							-.198 (.104)	
Prior experience (ref=no prior experience)							.064 (.218)	
Time availability (ref=sufficient)							-.855 (.233)	***
Constant	4.542 (.601)	***	1.890 (.646)	**	2.236 (.646)	***	2.165 (.702)	**
Adjusted R^2	.005		.313	***	.341	***	.380	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, one outlier was identified. We proceed similarly (see S2A), including it regardless.

Table S2I. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 1 (= ideation; digital configurations**) using mean scored variables (n=515).

	Model S1D 1		**Model S1D 2**		**Model S1D 3**		**Model S1D 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.012 (.012)		-.008 (.010)		-.008 (.010)		.006 (.010)	
Gender (ref=non-female)	-.469 (.228)	*	-.319 (.201)		-.338 (.200)		-.154 (.190)	
Educational attainment (ref=high)	-.273 (.278)		-.094 (.245)		-.118 (.243)		-.002 (.231)	
Occupational status (effect=not yet active)	-.480 (.440)		-.220 (.382)		-.209 (.381)		-.156 (.359)	
Occupational status (effect=not active)	-.195 (.331)		-.223 (.285)		-.309 (.285)		-.147 (.271)	
Occupational status (effect=unemployed)	.308 (.440)		.365 (.381)		.386 (.379)		.281 (.358)	
Occupational status (effect=pensioned)	.169 (.361)		-.074 (.314)		-.061 (.312)		-.141 (.295)	
Attitudes towards participation								
External efficacy			.494 (.110)	***	.478 (.113)	***	.463 (.112)	***
Trust service and solution quality			-.157 (.051)	**	-.100 (.055)		-.042 (.054)	
Interest in local politics			.770 (.138)	***	.758 (.140)	***	.611 (.136)	***
Hedonic motivation			.746 (.144)	***	.692 (.150)	***	.375 (.150)	*
Subjective norm								
Perceived social pressure					.165 (.099)		.155 (.094)	
Community attachment					-.282 (.107)	**	-.296 (.101)	**
Perceived behavioural control								
Civic efficacy							.332 (.089)	***
Digital efficacy							.499 (.092)	***
Facilitating conditions							-.271 (.101)	**
Prior experience (ref=no prior experience)							.204 (.217)	
Time availability (ref=sufficient)							-.438 (.225)	
Constant	7.549 (.559)	***	4.735 (.635)	***	4.771 (.649)	***	3.521 (.672)	***
Adjusted R^2	.009		.265	***	.274	***	.357	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, five outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2J. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 2 (= voting; digital configurations**) using mean scored variables (n=515).

	Model S2D 1		**Model S2D 2**		**Model S2D 3**		**Model S2D 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	-.028 (.011)	**	-.023 (.009)	*	-.023 (.009)	*	-.007 (.009)	
Gender (ref=non-female)	-.221 (.209)		-.075 (.179)		-.074 (.179)		.075 (.170)	
Educational attainment (ref=high)	-.139 (.255)		.007 (.218)		.002 (.218)		.148 (.206)	
Occupational status (effect=not yet active)	-.577 (.402)		-.292 (.341)		-.260 (.342)		-.228 (.321)	
Occupational status (effect=not active)	-.123 (.302)		-.161 (.254)		-.181 (.256)		.014 (.242)	
Occupational status (effect=unemployed)	.069 (.402)		.068 (.340)		.063 (.340)		.023 (.320)	
Occupational status (effect=pensioned)	.480 (.330)		.272 (.280)		.259 (.280)		.146 (.264)	
Attitudes towards participation								
External efficacy			.405 (.098)	***	.433 (.101)	***	.375 (.100)	***
Trust service and solution quality			-.169 (.046)	***	-.154 (.050)	**	-.117 (.048)	*
Interest in local politics			.617 (.123)	***	.642 (.125)	***	.500 (.121)	***
Hedonic motivation			.900 (.129)	***	.936 (.135)	***	.685 (.134)	***
Subjective norm								
Perceived social pressure					-.069 (.089)		-.069 (.084)	
Community attachment					-.070 (.096)		-.087 (.090)	
Perceived behavioural control								
Civic efficacy							.217 (.080)	**
Digital efficacy							.581 (.082)	***
Facilitating conditions							-.141 (.090)	
Prior experience (ref=no prior experience)							.226 (.194)	
Time availability (ref=sufficient)							-.088 (.201)	
Constant	8.853 (.511)	***	6.415 (.566)	***	6.264 (.583)	***	4.767 (.600)	
Adjusted R^2	.014		.305	***	.304	***	.389	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, four outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2K. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 3 (= deliberation; digital configurations**) using mean scored variables (n=514).

	Model S3D 1		**Model S3D 2**		**Model S3D 3**		**Model S3D 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	.014 (.012)		.013 (.010)		.014 (.010)		.021 (.010)	*
Gender (ref=non-female)	-.287 (.239)		-.166 (.204)		-.159 (.202)		-.031 (.196)	
Educational attainment (ref=high)	.036 (.297)		.419 (.254)		.399 (.252)		.494 (.246)	*
Occupational status (effect=not yet active)	-.736 (.473)		-.724 (.399)		-.780 (.397)		-.689 (.384)	
Occupational status (effect=not active)	-.341 (.337)		-.221 (.284)		-.268 (.282)		-.239 (.273)	
Occupational status (effect=unemployed)	.798 (.446)		.861 (.376)	*	.857 (.373)	*	.802 (.360)	*
Occupational status (effect=pensioned)	-.211 (.370)		-.307 (.311)		-.276 (.308)		-.280 (.297)	
Attitudes towards participation								
External efficacy			.231 (.108)	*	.212 (.109)		.159 (.110)	
Trust service and solution quality			-.096 (.056)		-.031 (.060)		-.014 (.059)	
Interest in local politics			.658 (.138)	***	.637 (.139)	***	.419 (.139)	**
Hedonic motivation			1.325 (.149)	***	1.286 (.154)	***	1.045 (.159)	***
Subjective norm								
Perceived social pressure					.201 (.109)		.146 (.106)	
Community attachment					-.347 (.105)	**	-.333 (.103)	**
Perceived behavioural control								
Civic efficacy							.071 (.098)	
Digital efficacy							.454 (.096)	***
Facilitating conditions							-.032 (.105)	
Prior experience (ref=no prior experience)							.558 (.229)	*
Time availability (ref=sufficient)							-.616 (.234)	**
Constant	4.867 (.589)	***	1.716 (.665)	*	1.679 (.681)	*	1.282 (.709)	
Adjusted R^2	.019	*	.310	***	.325	***	.374	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, five outliers were identified. We proceed similarly (see S2A), including them regardless.

Table S2L. OLS linear regression results with a step-wise model build-up to explain intentions to participate in **step 4 (= co-delivery; digital configurations**) using mean scored variables (n=514).

	Model S4D 1		**Model S4D 2**		**Model S4D 3**		**Model S4D 4**	
Variables	b (SE)		b (SE)		b (SE)		b (SE)	
Control variables								
Age	.009 (.012)		.012 (.010)		.013 (.010)		.015 (.010)	
Gender (ref=non-female)	-.256 (.234)		-.234 (.197)		-.225 (.195)		-.117 (.189)	
Educational attainment (ref=high)	-.063 (.292)		.311 (.245)		.286 (.243)		.299 (.238)	
Occupational status (effect=not yet active)	-.025 (.464)		-.069 (.385)		-.108 (.383)		.027 (.371)	
Occupational status (effect=not active)	-.627 (.331)		-.486 (.274)		-.538 (.272)	*	-.591 (.264)	*
Occupational status (effect=unemployed)	.978 (.438)	*	1.041 (.362)	**	1.027 (.359)	**	.940 (.348)	**
Occupational status (effect=pensioned)	-.559 (.363)		-.631 (.300)	*	-.604 (.297)	*	-.633 (.287)	*
Attitudes towards participation								
External efficacy			.351 (.104)	***	.342 (.105)	**	.321 (.106)	**
Trust service and solution quality			-.008 (.054)		.060 (.058)		.084 (.057)	
Interest in local politics			.356 (.133)	**	.345 (.134)	*	.176 (.135)	
Hedonic motivation			1.374 (.144)	***	1.352 (.149)	***	1.101 (.154)	***
Subjective norm								
Perceived social pressure					.162 (.105)		.094 (.103)	
Community attachment					-.354 (.101)	***	-.323 (.100)	**
Perceived behavioural control								
Civic efficacy							.146 (.095)	
Digital efficacy							.202 (.093)	*
Facilitating conditions							-.082 (.101)	
Prior experience (ref=no prior experience)							.237 (.221)	
Time availability (ref=sufficient)							-1.070 (.226)	***
Constant	5.227 (.578)	***	2.037 (.641)	**	1.936 (.656)	**	2.241 (.685)	**
Adjusted R^2	.011		.327	***	.342	***	.387	***

Legend. Significance levels: *p< .05, **p< .01, ***p< .001; b=unstandardised regression coefficient; SE=standard error.

Note. Upon checking the outlier assumption for running OLS regressions, four outliers were identified. We proceed similarly (see S2A), including them regardless.

SUPPLEMENT 3 – USE CASE OVERVIEW

Table S3. Use case overview.

Case ID	Political or administrative level	Organising (public) entity	Project name	Type of co-creation	Digital co-creation or co-creation of e-services (analogue, digital or hybrid)	Timeframe
1	Central	Sciensano	My Healthy Data	Co-commissioning	Digital co-creation	December 2021 – April 2023
2	Central	Sciensano	Corona Consultations	Co-commissioning	Digital co-creation	November 2020 – January 2021
3	Central	Sigedis	My Pension	Co-design	Co-creation of an e-service (unspecified)	December 2021 – December 2023
4	Central	NGI	CartoWeb.be TopoMapViewer	Co-assessment	Co-creation of an e-service (digital)	Permanent
5	Central	CGVS	Asylum.be	Co-design	Co-creation of an e-service (analogue)	
6	Central	FOD BOSA	Belgian (ID) Wallet	Co-design	Co-creation of an e-service (unspecified)	
7	Central	FOD BOSA	Een land voor de toekomst	Co-commissioning	Digital co-creation	
8	Central	FOD BOSA	JustNew	Co-design	Co-creation of an e-service (unspecified)	
9	Regional—Flanders	Scivil Kenniscentrum Data & Maatschappij	Amai! Vlaanderen	Co-commissioning Co-design Co-delivery	Digital co-creation	Maart 2024 – January 2025 (3rd and latest round)

10	Regional—Flanders	Agentschap voor Binnenlands Bestuur & Plan International	SaferCities	Co-commissioning	Digital co-creation	March 2023 – January 2024
11	Local—Flanders	Genk	Maak da mee	Co-commissioning Co-design Co-delivery	Digital co-creation	November 2022 – June 2023
12	Local—Flanders	Beringen	SaferCities	Co-commissioning	Digital co-creation	March 2023 – January 2024
13	Local—Flanders	Leuven	Vorm3010	Co-commissioning Co-design	Digital co-creation	February 2021 – June 2022
14	Local—Flanders	Kortrijk	Burgerbudget	Co-commissioning Co-design Co-delivery	Digital co-creation	May 2023 – March 2024

SUPPLEMENT 4 – INTERVIEW TOPIC LIST (ENGLISH VERSION)

We start with a couple of introductory questions:

1) Can you briefly **describe** the (digital) **co-creation project** [name]?
    a. Does this project constitute **an organisation initiative,** or is it part of a task commissioned by a higher authority?
    b. Based on which **objective(s)** did the project commence?
    c. What main **components** or phases did this project entail?
    d. Through which **digital tools** were each of those realised? [7]
    e. How would you describe **your role** in this co-creation project?

In what follows, we zoom in on stakeholders and third-party actors directly involved in the co-creation project:

2) Can you list the **different stakeholders** (groups) **involved** in this (digital) co-creation project? [8]
3) **How did each** of these stakeholders **enter** the (digital) co-creation project? [9]
    a. [In case they were selected or recruited] How did this process work? Were specific selection criteria deployed? Or strategies to pick up on hard to reach target audiences?
    b. [In case they were selected or recruited] Why was/is there inclusion preferable?
    c. [In case they presented themselves for participation] Based on what considerations do these present themselves?
4) How were these **in contact** with one another? How did they relate?
5) **How** are each of the stakeholders **encouraged to engage actively and long-term**? What challenges, if any, do you encounter there? How do you deal with those?
6) Did the project also aim at including **hard to reach target audiences**?
    a. [If yes] Which ones? And, what strategies were used to involve them and keep them involved?

[7] Of course, this question will probably not apply to all cases as some do not encompass digital co-creation but are directed at a person-to-person co-creation of e-services instead.

[8] These can possibly be broken down or described by project phase if that promotes clarity and facilitates answering the subsequent question (e.g., sometimes contacts and relationships may change according to the project phase).

[9] Did they (a) have to be statutorily involved, (b) were they selected or recruited or, (c) did they present themselves?

Afterwards, we discuss the different roles several stakeholders can assume:

7) Each of the stakeholders or stakeholder groups we have already discussed can assume different and unique **roles** throughout the co-creation process. How would you describe the role of each in the process?

8) Was the **assignment or assuming** of roles a **deliberate decision** based on the project's objectives, or did they grow organically?
    a. [When a deliberate choice] How were these roles determined? Who had a say in this?
    b. [When a non-deliberate choice] How did the organic growth process, including the spontaneous assumption of roles, work?

9) In what way was the **input** of the different **stakeholders** taken into account in the project? How much **freedom** did the different stakeholders enjoy in providing input?
    a. Was this fixed by predetermined rules or procedures?
    b. If yes, which ones and did they apply equally to each group of actors?

10) Did you ever notice **a discrepancy** between the roles assigned and the expectations held by the stakeholders?
    a. [If yes] Wherein did this discrepancy reside? Where did they diverge? Where did they correspond?
    b. [If yes] (How) was this situation remedied?

Finally, to summarise and wrap up:

11) Did you perceive a **difference** between 'the co-creation **plan on paper**' and 'its **progression in practice**'? If so, in what way(s)? Are there things you would approach differently now?

In the frame of the BECODIGITAL objectives, both the General Population Survey described above, and the video on which our experimental conditions were based, were developed in collaboration with the project partner, the University of Antwerp. We thank *Ziehoe* for the graphic design of the video visuals as well as Romina Cucchiara (Dutch-spoken version) and project leader Anthony Simonofski (French-spoken version) who lend their voice to them. Finally, we also wish to devote a word of appreciation to colleague Elena Tiukhova (KU Leuven – LIRIS) for her expertise and help in conducting the decision three analysis presented in section 4 ('Data Analysis, part 1 – Citizen pre-conditions based on the GPS').