

D1.2

Report on the conceptual, innovative, evaluation and ethical framework for youth citizen social science

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D1.2 Description

D1.2 Report on the conceptual, innovative, evaluation and ethical framework for youth citizen social science [m11] stems from the work, that has been conducted under WP1. This report describes the conceptual framework for youth involved citizen social science in the YouCount project. Moreover, the report presents the use of citizen social science as a mean for social innovation, highlights the dialogical framework for co-creative youth citizen social science, explores the conceptual and methodological framework for evaluation of the outcomes, and discusses ethical considerations and risk mitigation strategies when conducting youth involved citizen social science. The conceptual, innovative, evaluation and ethical framework is a starting point for setting a strategy of empirical research and, as a living document, will be developed during the implementation of the YouCount project.

This deliverable is public. As concerns the Horizon 2020 Work Programme types of deliverables, it is classified as: Report (R).

Table 1: Revision history

VERSION	DATE	CREATED BY	COMMENTS
0.1	10 / 06 / 2021	7, KTU	Draft structure and content of D.1.2 has been created and presented for comments to EB
0.2	13 / 12 / 2021	7, KTU	Version of D1.2, incorporating inputs from tasks 1.2, 1.3, 1.4, 1.6, has been finalized.
0.3	17 / 12 / 2021	7, KTU	Version of D1.2 has been sent to internal reviewer and all consortium partners
0.4	29 / 12 / 2021	7, KTU	Version incorporating comments and suggestions by internal scientific reviewer and all partners has been finalized.
1.0	31 / 12 / 2021	1, OsloMet	Final version 1 submitted
2.0	15/02/2022	1, OsloMet	Version 2, corrected header/footer/ name

Table 2: Terms and Abbreviations

ABBREVIATION	FULL TERM
AB	Advisory Board
CS	Citizen Science
CSS	Citizen Social Science
RRC	Responsible Research Communication
RRI	Responsible Research and Innovation
R	Report
EU	European Union
WP	Work Package
Y-CSS	Youth Citizen Social Science

Executive Summary

D1.2 presents a report on the conceptual, innovative, evaluation and ethical framework for Y-CSS. D1.2 has been developed under WP1 “Developing framework and stakeholder mobilisation” and is based on work in four tasks of WP1 (Task 1.2, Task 1.3, Task 1.4 and Task 1.6).

D1.2 is composed of 4 major parts: (1) conceptual framework: key concepts and innovation approach; (2) methodological framework of co-creation; (3) evaluation framework; and (4) ethical framework.

The first part of the framework presents key concepts and explains the innovative approach which is applied in YouCount. This part introduces concepts of social exclusion, social participation, social belonging and connectedness, citizenship and civic rights, youth empowerment, social innovation, and explains how citizen social science can be applied in an innovative way to empower youth and strengthen social inclusion. It also indicates the links among the key concepts, presenting an overall understanding what are the main elements of empirical study.

The second part presents methodological framework of co-creation and describes co-creative principles and theoretical framework of youth involvement strategy that will be applied in YouCount project through hands-on citizen social science.

The third part explains the overall framework for the evaluation of YouCount empirical research outputs and impact measurement. This part explicitly shows the strategy for a process and outcome evaluation.

The last part summarises all findings into one conceptual, innovative, evaluation and ethical framework which presents the YouCount approach to proceed with data collection and analysis framework and with implementation of empirical research (cases).

D1.2 is the fifth milestone in the implementation of the project. This deliverable is very important to set the research strategy. However, Task 1.2, which aims to develop a conceptual framework for co-creative Y-CSS, is still in progress and will be finished in its final version almost at the end of the project (M33), based on the research experiences working with youth and local stakeholders. This means that the conceptual, innovative, evaluation and ethical framework for Y-CSS is a “living document”, an initial starting point to be tried out in practice. The YouCount project seeks to increase knowledge on how to set up and evaluate hands-on Y-CSS in the best way, thus the framework will be constantly updated, reflecting empirical findings, till Month 33 of the project implementation.

Introduction

YouCount is an EU project funded under Horizon 2020, *the Science with and for Society* (Swafs) programme. The overarching objective of YouCount is to generate new knowledge and innovations to increase the social inclusion of youth at risk of exclusion across Europe through co-creative youth citizen social science. The YouCount project aims to develop, try out and validate an interdisciplinary conceptual and methodological framework for conducting Y-CSS in practice.

This report describes the conceptual framework for youth involved citizen social science in the YouCount project. Moreover, the report presents the use of citizen social science as a mean for social innovation, highlights the dialogical framework for co-creative youth citizen social science, explores the conceptual and methodological framework for evaluation of the outcomes, and discusses ethical considerations and risk mitigation strategies when conducting youth involved citizen social science. The conceptual, innovative, evaluation and ethical framework is a starting point for setting a strategy of empirical research and, as a living document, it will be developed during the implementation of the YouCount project. Figure 1 shows the life cycle of the Framework (D1.2).

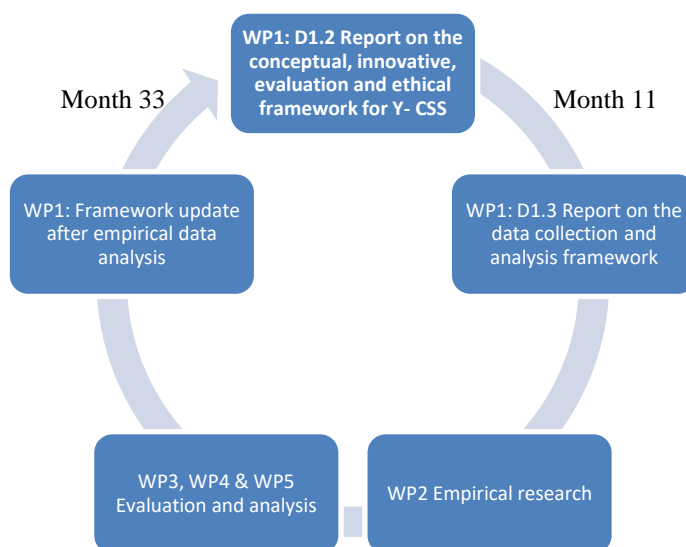


Figure 1. Framework Lifecycle: YouCount Project

The creation and development of the Framework (D1.2, by M11) is an important milestone in achieving the main goal of the project. The parts of the framework have been discussed in three workshops organized by ECSA and LKN Working Group on Empowerment, Inclusiveness & Equity (<https://ecsa.citizen-science.net/working-groups/empowerment-inclusiveness-equity/>).

This conceptual, innovative, evaluation and ethical framework (D1.2) is supplemented with D1.3 Data collection and analysis framework. These two documents are the major ones setting up the research strategy. Empirical research is implemented via WP2 and evaluated and analysed via WP3, WP4 and WP5. The results of empirical research will be also important for WP1 to update the theoretical framework with new insights based on empirical data analysis. This report is a starting point in research on Y-CSS as an innovative way for youth social inclusion. It frames initial understanding by presenting broad concepts, that need the update, interpretation and reflection using empirical data. This means that the conceptual, innovative, evaluation and ethical framework for Y-CSS is a “living document” that will be constantly updated till Month 33 of the project implementation based on the experiences of working with youth and local stakeholders.

The Framework, presented in this report, seeks to reflect a holistic perspective on the YouCount project research strategy. The Framework has four major structural parts (see Figure 2).

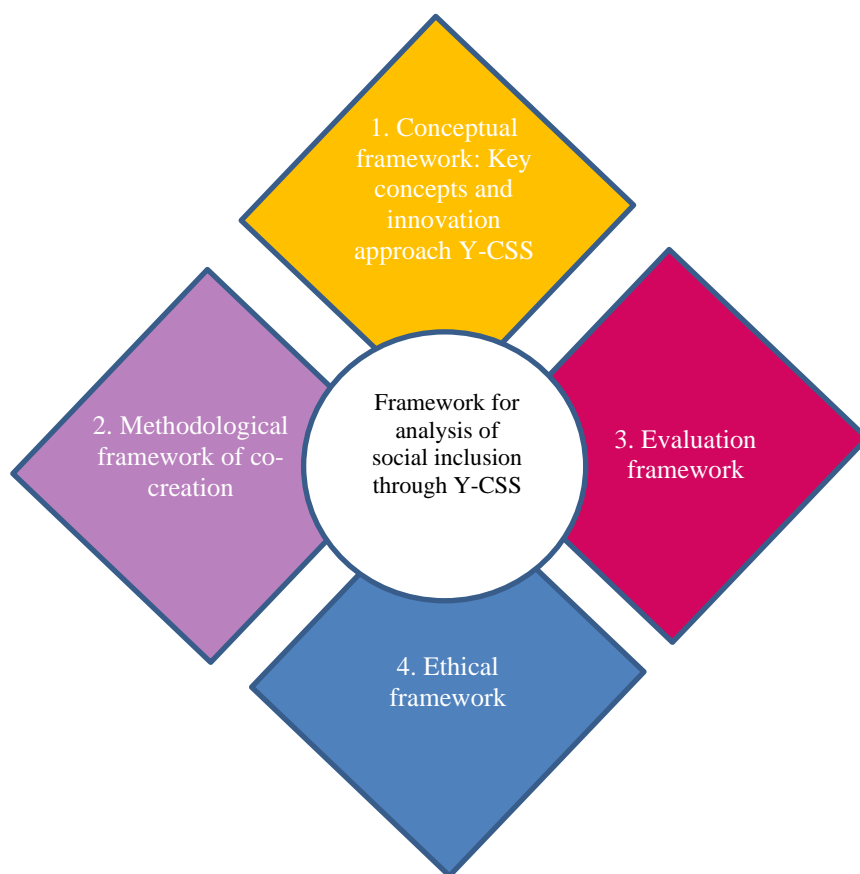


Figure 2: Major structural parts of the Framework

The Framework consists of these structural parts:

- (1) **Conceptual framework which explains key concepts and innovation approach of Y-CSS.** This part will try to answer ontological questions and guide the research in these directions:
 - a. What is social inclusion in YouCount project? What are its positive drivers? How do we understand social participation? How do we understand sense of belonging and connectedness and civic participation, citizenship, citizen rights?
 - b. How do we understand the concept of youth and the concept of youth with disadvantages?
 - c. What are innovative ways to empower youth?
 - d. What is citizen science? What is citizen social science? How can we describe its specifics?
 - e. What is relation between social innovation and citizen science? How can CSS contribute to social innovation?
- (2) **Methodological framework of co-creation.** This part will explain the co-creative principles and the theoretical framework of youth involvement strategy. The main questions that are analysed in this part and will be tested in further analysis through empirical research, are as follows:
 - a. What should a social scientific framework for co-creative Y-CSS look like?
 - b. What is the best way to set up co-creative Y-CSS in practice?
 - c. How can we set up training of R-YCS in practice?
- (3) **Evaluation framework.** This framework discusses strategy evaluating a process as well as a result of Y-CSS. The main questions to answer:
 - a. How and what should be evaluated?
 - b. What are the individual, social, and scientific outcomes of Y-CSS? How can we measure/ evaluate these outcomes?
 - c. What are the costs and benefits of Y-CSS and the impact of the YouCount project?
- (4) **Ethical framework.** This framework presents ethical principles and guidelines to be followed in empirical research and co-creative social change. The main questions to answer:
 - a. How can ethical principles of traditional research be applied to youth citizen social science?
 - b. What challenges and risks arise in youth citizen social science?
 - c. How can these challenges and risks be addressed?

Thus, this Framework presents initial strategic guidelines for implementation research and activities in YouCount project.

1. Conceptual framework: key concepts and innovation approach of Y-CSS

In Europe, and globally, substantial numbers of young people are at risk of social exclusion, and there is therefore a pressing need to develop more knowledge and innovation to create more inclusive and youth-friendly societies. Social marginalisation and exclusion significantly affect young European citizens' well-being and social welfare; it also contributes to constraining civic participation, increasing the problem of 'disenfranchisement', where youths find themselves unable to change their social conditions and, thus, withdraw from civic and political engagement. This can create a lack of citizenship and trust in governance and social belonging. The challenges of social exclusion accentuate the importance of finding mechanisms that can improve young peoples' situations and shape more cohesive societies across the EU. This need has also been recognised as a priority in current and future policy in the EU, for example, in the EU Youth Strategy.

The YouCount project and framework responds to these needs by seeking to achieve social inclusion of youth in Europe, with a particular focus on youths that faces several challenges concerning inclusiveness or disenfranchisement. These challenges might be of different origin, including place, socio-demographic factors, etc., thus the YouCount project has a broad perception of the term youth with disadvantages. Also, the project counts on the unique experiences and competences of youth and emphasizes that factors, often described as disadvantages, might be also interpreted as a potential resource for innovations.

One key mechanism to pursue that youth social inclusion is through youth empowerment. Citizen social science can be applied in an innovative way to fulfil this goal. However, there is a need of new knowledge for the main concepts to be applied in this context. Figure 3 explains the rationale of this approach. This part details the **main concepts** that will be developed for an application in the youth context while implementing empirical cases. These concepts include "social inclusion", "social participation", "social belonging and connectedness", "citizenship and civic rights", "youth and youth with disadvantages", "youth empowerment", "citizen science", "citizen social science" and "social innovation". It also explains the **innovative potential** of Y-CSS. Through the development of new knowledge based on literature review (and later, on empirical data), the innovative approach of YouCount project emphasizes youth empowerment and social inclusion through citizen social science.

The major conceptual emphasis is concentrated on exploration of several definitions:

- **Social inclusion** and its positive drivers, which include *social participation, social belonging and connectedness*, and *civic participation*. In this context there is also important to understand the concept of *youth and youth that faces many challenges due to several kinds of disadvantages*.

- **Youth citizen social science as social innovation**, showing the innovative potential of youth empowerment for social inclusion through new methods such as of *citizen social science*.

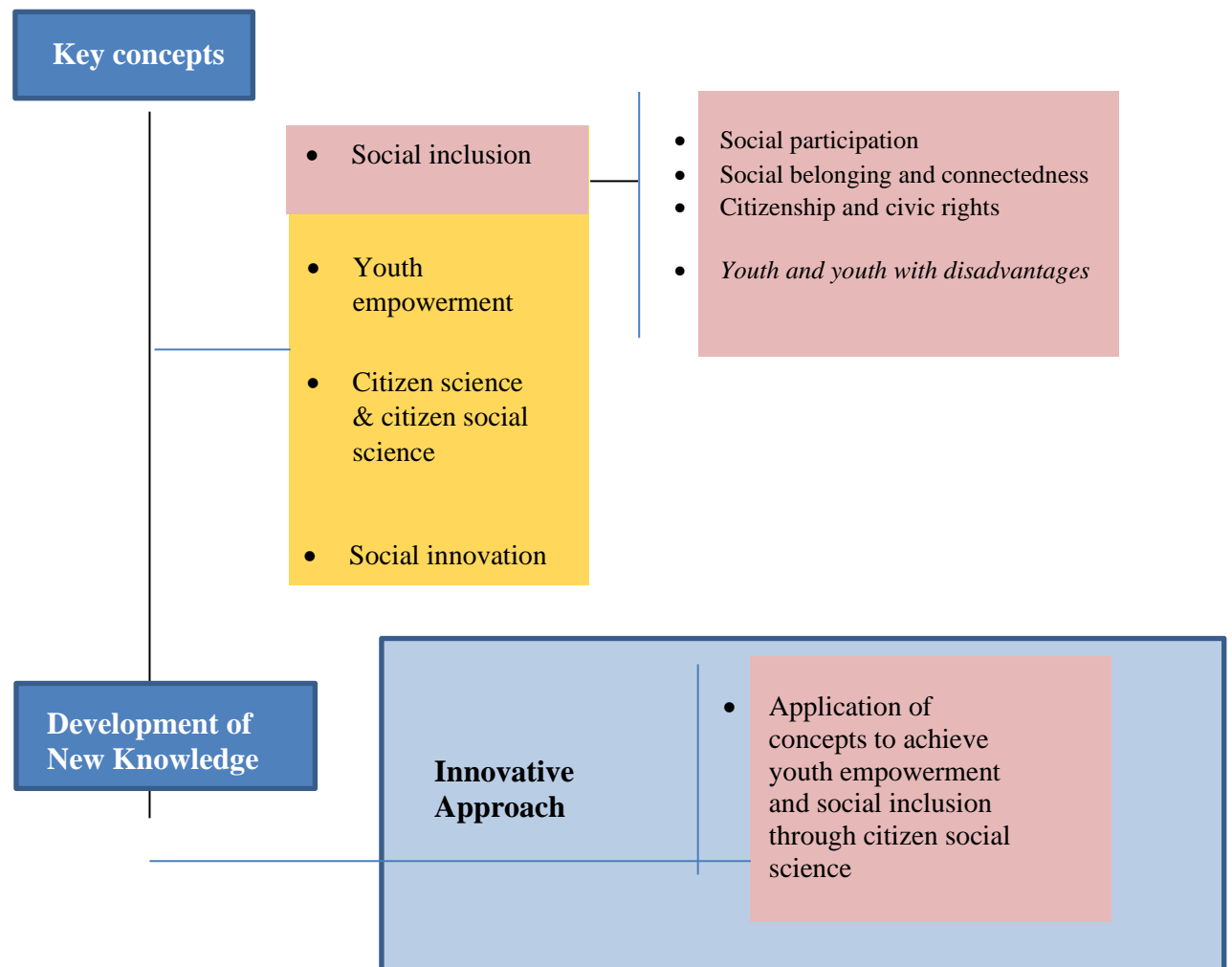


Figure 3: Application of the key concepts and development of innovative approach

This part is structured into two chapters: the first chapter discusses the concept of social inclusion, and the second one presents an analysis of CSS as an innovative tool to empower youth to strengthen social inclusion.

1.1. Social inclusion as a driver of social sustainability

Social inclusion is a broad concept, which fits within different theories and perspectives. It refers to citizens' chances to access the same opportunities and resources to participate in economic, social, political, and cultural life within a given society. Historically, social inclusion has been closely linked

to (but not exclusively) to that of social exclusion, which became a prominent concept across many scientific disciplines and in policy-making throughout Europe and internationally during the 1980s and 1990s (The World Bank, 2007). At the end of the 1980s, the concept of social inclusion emerged as a policy response to counter social exclusion (Cordier et al, 2017). During the 1990s, both concepts entered state policy discourses and resulted in a proliferation of 'inclusion policy' across Europe and internationally, seeking to counter the detrimental effects of exclusion for a range of groups (O'Donnell et al, 2018). Subsequently, a growing body of literature has sought to clarify the nuances and implications of various definitions.

This chapter explains the concept of social inclusion and its positive drivers, presents three major factors of social inclusion that have been chosen in YouCount project – namely, (1) social participation, including employability, (2) social belonging and connectedness, and finally (3) civic participation. Additionally, this chapter discusses a perspective of youth and youth with disadvantages.

1.1.1. The conceptual definition of social inclusion and its positive drivers

Overall, social inclusion can be defined as a multidimensional and complex process (Yang et al., 2019) "of improving the terms of participation in society for people who are disadvantaged on the basis of age, sex, disability, race, ethnicity, origin, religion, or economic or other status, through enhanced opportunities, access to resources, voice, and respect for rights. Thus, social inclusion is both a process and a goal" (Rich et al., 2015, p. 20). Consistently, it is often referred to as the social exclusion-inclusion continuum (Moyano et al., 2020).

Specifically, its multidimensional nature refers to several dimensions of daily life: (a) social capital, sense of belonging, and participation in community life and spaces, (b) job opportunities and access to public and private services and to the relationship with institutional referents, (c) positive appraisal of the environmental surroundings, of one's housing conditions, and of one's safety, (d) citizenship and equal civil and political rights and obligations, both formally and informally, and (e) commitment and effective participation in the community to improve the quality of life (Chen & Wang, 2015; Giarè et al., 2020; Juvonen et al., 2019; Kukulska-Hulme et al., 2015; Littman, 2021; Major et al., 2014; Morén-Alegret, 2008; Moyano et al., 2020; Pienimäki, 2020; Pirani, 2013; Sampredo & Camarero, 2018; Wu & Sun, 2020). For this reason, participation in local shared activities, social capital and local connectedness to other citizens, and embeddedness in the community and sense of belonging are often considered the most common indicators of functioning social inclusion processes (Chen & Wang, 2015; Colombo & Santagati, 2010; Correa-Velez et al., 2010; Giarè et al., 2020; Harney, 2013; Juvonen et al., 2019; Kukulska-Hulme et al., 2015; Littman, 2021; Major et al., 2014; Moyano et al., 2020; Pienimäki, 2020; Sampredo & Camarero, 2018; Yang et al., 2019). In regard to this, social inclusion has been defined as the extent to which individuals

“are able to achieve their needs and fulfil their interests” (Anisef & Lanphier, 2003, p.5), “have greater participation in decision making which affects their lives and access to their fundamental rights” (European Commission, 2010, p. 1), and “are empowered to achieve their full potential” (Chen & Wang, 2015, p.420). In this vein, social inclusion has been meant not only as having the chance to express one's views and ideas, but also as having the opportunity to be heard and understood by other community members (Pienimäki, 2020; Sampedro & Camarero, 2018).

Therefore, social inclusion processes highly depend on the social context where it happens – that is, the community – and on what is considered normal and acceptable in terms of both conditions of life and reciprocal behaviours within it (Pirani, 2013; Yang et al., 2019). Building on this and consistently with an ecological perspective (Bronfenbrenner, 1979), social inclusion processes have been described as dynamic and interactive, and as involving several different levels (Giarè et al., 2020; Moyano et al., 2020). At the macro-level, the culture in which individuals are embedded influences how they live together in the community and relate to each other, since everyone develops personal values, norms, and beliefs about how to behave in a given social context by being exposed to and embedded in social groups and institutions (e.g., families, churches, schools, neighbourhoods, associations) (March & Olsen, 1989). Indeed, these aspects can contribute to the inclusion or marginalization of individuals having stigmatized attributes (e.g., those with disabilities) or identities (e.g., ethnic minorities, immigrants, sexual minorities) (Juvenonen et al., 2019), that happens at the exo-level – that is, in the social contexts which can have an indirect influence on individuals' lives (e.g., the work context of the parents of a child) – as well as at the meso-level – that is, the relationships and interactions between those having direct contacts with the individual. These latter contacts compound what Bronfenbrenner defined as the micro-level, which refers to all the social groups and dynamics in which the individual is directly involved. In this vein, an inclusive social climate is expected to be characterized by positive peer relationships, social acceptance, and intergroup harmony at the micro-level (Juvenonen et al., 2019), but is also impacted by the cultural norms, values, stereotypes, and prejudices which characterize the meso-, exo-, and macro-levels (Juvenonen et al., 2019; Pirani, 2013) and that individuals derive from their family as well as from the social contexts they are embedded into (Colombo & Santagati, 2010; March & Olsen, 1989). That is, individual- and contextual-level factors interact in shaping the inclusiveness of each social context as well as the attitudes individuals have towards others (Chen & Wang, 2015).

Building on this, in order to be effective, social inclusion processes require the active engagement of the whole community – and not only of the vulnerable citizens – for the promotion and spread of values built upon more open and respectful patterns of communication and interactions, as well as upon openness towards others being different (e.g., for their sex, race, religion). That is, social inclusion is a two-way process in which both parts have to adapt to the other and their characteristics in order to live together in the same community (Korac, 2003; Phillips, 2010; Pienimäki, 2020) while maintaining their own identity (Sampedro & Camarero, 2018). Thus, interventions aimed at improving social inclusion should rely on fostering social dynamics that can be accepted by all the involved individuals and able to contribute to modifying their systems of

values and beliefs (Giarè et al., 2020). An example is promoting positive representations and an adequate language in workplaces/schools and in meeting places, which can represent a strategy to reduce the number of stereotypes and prejudices towards minority or disadvantaged groups (Giarè et al., 2020; Major et al., 2014). In this vein, a proactive approach to social inclusion, mainly relying on strengthening individuals' social capital, was pointed out by Juvenonen and colleagues (2019), who suggested maximizing the opportunities for contacts, interactions, and positive relationships among the different groups involved, as means to allow individuals to meet and match across social groups within the community (Chen & Wang, 2015; Littman, 2021). Specifically, these authors suggest four strategies towards this goal: (a) to maximize the diversities while guaranteeing equal access to everyone; (b) to raise the awareness of social inclusion strategies among group leaders; (c) to promote the setting of shared goals in and out of the groups; (d) to facilitate the relationships and interactions among groups (Juvenonen et al., 2019). Indeed, creating common projects and setting shared goals to be achieved through collaborative actions and everyone's active contribution allow the involved individuals to spend time together and share their experiences and ideas about their culture as well as about their daily lives (Pienimäki, 2020), promoting higher rates of reciprocal acknowledgment as well as of trust, reciprocal adjustments, and the exchange of viewpoints and beliefs (De Lima, 2011). Thus, this approach could produce a community spirit and an informal and interpersonal acceptance among peers (Pienimäki, 2020) as well as a more inclusive community at last (Giarè et al., 2020). Thus, in order to promote social inclusion, it is important "to design a complex system of action and relationship to connect the internal with external inclusion dimensions" (Giarè et al., 2020, p.3). In this regards, local stakeholders, councils, and associations may play a critical role, since they could provide contexts and opportunities for these inter-group meetings to happen and could also play the role of mediators among them (Sampedro & Camarero, 2018). "Comparisons [...] are also helpful to understand the difference between and detect problems in improving socially inclusive society. Those enable analysts and policymakers better dealing with provisions to improve living conditions with clearer measures in desired ways" (Yang et al., 2019, p.17).

1.1.2. Social participation

Social participation is considered as an important factor and consequently as a result of social inclusion. In YouCount project, **social participation** is understood *as attendance and involvement in social and community spaces and activities; including education and work*.

Literature analysis shows that there is an ongoing debate about the concepts of participation and social participation. As mentioned by Ruth et al (2008), the concept of participation has not been clearly defined. Neither is there a common definition of social participation (Piškur et al, 2014). This concept received a particular attention in health and social care literature when in 2001 the World Health Organization introduced this concept (Piškur et al, 2014). In sociology or education sciences, social participation is understood as interactions among people (Koster et al, 2009). Koster et al

(2009) describe social participation as “positive social contact/interaction between pupils and their classmates, acceptance of pupils by their classmates, social relationships/friendships between pupils and their classmates and the pupils’ perception that they are accepted by their classmates” (p.135), which shows a close conceptual relation to our other factor of social inclusion, namely, social belonging and connectedness.

It is important to notice that social participation is often seen as an important condition for development of young people (Piškur et al, 2014). Piškur et al (2014) argues that through social participation, “children gather knowledge and develop social skills while interacting with other people” (p.212). Thus, it becomes a factor of successful social inclusion of youth into community or society life.

Social participation is a crucial factor for social inclusion of people with disabilities. Social participation might be diminished by different factors such as disease related health problems (Ruth et al, 2008) or disabilities caused by accidents. Piškur et al (2014) interpret social participation as two-fold process, including both engagement of people in society as well as the societal responsibility to provide the conditions necessary for social engagement” (p.215).

Thus, the central focus in describing social participation is “an active involvement”. This active involvement might be related to levels of participation as well as different spheres of life and different activities. Piškur et al (2014) refers to the work of Levasseur et al (2010) where these authors, aggregating understandings of social participation from 43 original definitions, state that social participation might be understood as “the person’s (who) involvement (how) in activities that provided interactions (what) with others (with whom) in society or the community (where)” (p.213). They also suggest a taxonomy of social activities in relation to the level of involvement.

However, the involvement might differ not just by level but also by sphere/ type of activities. For the youth, major activities are education, sport, work, i.e. youth daily social life.

Several successful attempts to improve social participation through everyday activities were observed. So far, sports activities have proved to affect positively local communities (Fonseca et al., 2018; Meir & Fletcher, 2017; Stanton-Salazar, 2011). Meir & Fletcher (2019b) have pointed out how vital for inclusive youth communities are participatory actions, especially sports. However, that is not enough. For long-term stable social inclusion, youth must have “a voice and ensure that any programme is culturally, socially, economically and politically relevant” (Meir & Fletcher, 2017). The EU institutions seek to establish perpetual support for youth work via strong social cohesion and social inclusion measures. That is why various guidance documents are present and active as well as open funding opportunities.

Despite above listed positive examples, Baldridge (2020) presented the youth work paradox. The researcher discussed how the necessity to have after-school programs are always linked with

minorities and poor communities and is never associated with affluent youth. Additionally, Baldridge (2020) pointed out that some youth work or after-school programs could be rooted in racism, and sometimes they perpetuate negative attitudes about minorities or poor communities. Meanwhile, Kapoor et al. (2018) state quite the opposite. Researchers provide convincing arguments and examples that improved education and lifelong learning opportunities help youth employment. Additionally, it “reduces societal disparities, ensuring better inclusion of vulnerable and marginalised groups” (Kapoor et al., 2018). In other words, such changes build up social inclusion and support economic growth.

In conclusion, youth work and social inclusion have a strong relation. They could be linked through a positive feedback loop. However, it is crucial to be conscious about particular perspectives, and it is necessary to avoid any hints of patronising attitudes towards youth, especially due to their social situation or economic background.

1.1.3. Sense of belonging and connectedness

Social inclusion is also often analysed in the context of sense of belonging and connectedness. In the YouCount project, ***sense of belonging and connectedness*** is understood as *social and community relationships/networks, as well as a perceived sense of being part of or belonging to social networks and/or to a particular place. Includes the quality of reciprocal processes between individuals and the community (e.g., in terms of trust and cohesion).*

A concept of *connectedness* first of all, refers to social networks. Since the term “social networks” was introduced by Barnes in 1954 (Mitchell, 1974), the concept received a lot of attention from scholars of different disciplines, starting from the role of social networks and connectedness in social capital building (Bourdieu, 1986; Putnam, 1993, 2000, 2005, Field, 2008, Fukuyama, 2001), perception of strong and weak social ties (Granovetter, 1973), trust building (Fukuyama, 1995), sense of community and belonging (Quan-Haase, A., Wellman, B., Witte and Hampton, 2002), just to name a few.

A concept of *sense of belonging* is intertwined with the concept of connectedness. Xin Ma (2003) refers to Albert’s (1991) work where they provide a conceptualization of sense of belonging describing it in three C’s (connect, capable, and contribute), where connectedness and social networks play a central role.

Sense of belonging might be also shaped by positive social environment. There are many studies that suggest evidence for this connection. For example, Xin Ma (2003) did research on the sense of belonging and school environment, where they argue that school’s climate is very important. They understand sense of belonging as “the extent to which students feel personally accepted, respected, included, and supported in the school social environment” (Xin Ma, 2003, p. 340). They argue that there is research evidence that “sense of belonging to school is critical to the success of public

education” (Xin Ma, 2003, p. 341) and low sense of belonging is a direct cause of dropping out of high school (p. 340).

Sense of belongingness might be influenced by different factors. The research by Jang’s et al. (2021) investigates relationships between ethnicity, gender, and socioeconomic status and the experiences of belongingness and national belonging to China among youth (aged 18–24 years) living in Hong Kong. The literature has typically only identified the link between belongingness and singular social categories of youth; this has often been based on the universalizing assumption that the belongingness of all subgroups within a certain group are the same; however, such an assumption has not adequately identified the hidden disparities of belongingness both within and between diverse groups.

Belongingness is expressed through sensitivity to the effects of one’s actions and as care for others and for society (Baumeister & Leary, 1995; Lee & Robbins, 1998). Thus, belongingness is a critical resource for youth through which they find the purpose, identity, security, value, and recognition that enables them to build adult lives (Halse, 2018).

Sociologists (e.g., Lareau & Horvat, 1999) have shown that limited access to cultural and social capital contributes to weaker belongingness among youth. First, studies conducted in Hong Kong and elsewhere (e.g., United States) have suggested that these factors are the most crucial contributors to differences in belongingness among youth (Gao et al., 2019; Jury et al., 2019). Second, several cross-national studies have demonstrated that these factors affect a wide array of behaviours and attitudes (Dubrow, 2013). Third, quantitative intersectionality studies have revealed that these three social factors are particularly prevalent intersectional factors that affect belongingness among youth (e.g., Rainey et al., 2018).

Social belonging and connectedness are also related to social cohesion. One of the most used simplified definitions of social cohesion describes it as a glue holding society together. As Kalolo et al. (2019) indicated, social cohesion is composed of social trust and social participation. Meanwhile, the canonical definition of social cohesion was proposed by Chan, J.T.H. and Chan, E. in their article published in 2006. They stated that social cohesion is “a state of affairs concerning both the vertical and horizontal interactions amongst members of society as characterised by a set of attitudes and norms that include trust, a sense of belonging and the willingness to participate and help, as well as their behavioural manifestations” (Cloete, 2014). Furthermore, later research by Kalolo et al. (2019) provided five distinct ways to define social cohesion. It could vary from society’s ability to “manage collective action and solve problems”, to “social climate”, to “absence of social exclusion”, etc. (Kalolo et al., 2019). Meir & Fletcher (2019a) described social cohesion as togetherness and solidarity.

Chan et al. (2006) proposed several indicators to indicate good social cohesion where they emphasize the role of belongingness. The researchers analysed social cohesion on five dimensions: (1)

belonging versus isolation; (2) inclusion versus exclusion; (3) participation versus non-involvement; (4) recognition versus rejection; (5) legitimacy versus illegitimacy (Chan et al., 2006). According to these dimensions, it is possible to indicate the actions, which could/should be taken in order to improve social cohesion, sense of belongingness and connectedness.

Additionally, social cohesion, sense of belongingness and connectedness are closely linked to social capital. Social capital could be described as “sacrifice (time, effort and consumption)” that is done to achieve cooperation and keep connectedness (Kalolo et al., 2019). Social capital represents resources, which could vary from a person’s time to an institutional support system (Stanton-Salazar, 2011).

Social cohesion and connectedness are contextual (Cloete, 2014). It depends on the local situation, relations between society members, behaviours, culture and many other socio-economic factors (Chan et al., 2006). The complexities of the social fabric establish the necessity to analyse the connections every time anew. It also requires a different set of solutions. Here it is impossible to find “one fits all” solutions. Furthermore, in the modern world, social cohesion depends less on community networks and more on “organic solidarity on the basis of universalistic rules” (Cloete, 2014).

Although its positivity, social cohesion could be disintegrated, the threats of social cohesion are strongly related to social problems in society such as “fault-lines of race and identity”, polarisation, racism, along with economic troubles like lack of service delivery, neo-liberal macro-economic policies, high levels of crime, emigration, etc. (Cloete, 2014). Other researchers expand this list even more. For example, research conducted in South Africa indicated that religion could be a significant dividing factor for society, although others state that religion could act as a bedrock for the community and could unite society (Bramadat, 2005; Cloete, 2014; Preduca, 2011).

Moreover, social cohesion is directly linked to good governance (Cloete, 2014). It increases trust, tolerance, acceptance and diversity (Cloete, 2014). Strong social cohesion and connectedness could act as an empowerment measure, which leads to a higher civic engagement level (Speer et al., 2001). As an example, extensive research was conducted on health and social cohesion and community empowerment. It showed that they have a positive correlation and tend to increase each other. So, a positive feedback loop could be started, and could expand through other measures.

1.1.4. Citizenship and civic rights

Social inclusion is also often analysed in the context of **citizenship and civic rights**. In the YouCount project, *citizenship* is understood as *the link between the state and individual, implying membership of society*. The concept of citizenship also includes broader social perspectives of civic engagement, including formal and non-formal citizenship.

Public participation firstly enters the academic research in the middle of the 20th century with the canonical work of S. Arnstein (Arnstein, 1969). Later on, this concept expanded and diversified into several other concepts, like civic involvement, public engagement, civic engagement, civic collaboration, and many others. Each of them has its place in academic research as well as practical and legal implications.

Civic engagement has several definitions, they are created by researchers and/or practitioners. For example, UNICEF defines civic engagement as “individual or collective actions in which people participate to improve the well-being of communities or society in general” (Cho et al., 2020). Here researchers also provided the definition for digital civic engagement. It was described as “civic engagement activities specifically done by young people and involving digital media of some kind” (Cho et al., 2020). Meanwhile, Shaw et al. (2014) argue that civic engagement is a person’s ability to look outward and based on Amnå (2012) works, it is a sum of the “values, beliefs, attitudes, feelings, knowledge, skills and behaviours concerned with conditions outside of the immediate environment of family and friends” (p. 613) (Shaw et al., 2014).

Furthermore, Li (2020) observed that in recent years, an epistemological shift appeared where the definition of civic engagement was expanded. Civic engagement became not just about political agendas and volunteering, but “a series of political and non-political acts”. Additionally, researchers argue that such a definition of civic engagement would create a more sustainable political process (Li, 2020).

In general, there has been an epistemological shift among the majority of academics to the broadening of the definition of civic engagement, not confined to the political sphere and volunteering, but “rather to be thought as, in contrast with a notion based on the idea of more sustained political engagement” (Li, 2020).

However, a new definition of civic engagement did not minimize its importance in the political realm. It is still considered strongly linked with democratic principles and their manifestation in society. Additionally, it could boost trust in governmental institutions (Kassen, 2021). It creates and establishes a more open dialogue between society, various stakeholders and bureaucratic institutions. However, in the case of youth, due to the deeply rooted perception that youth are apolitical and not mature enough to have a meaningful debate, it leads to the exclusion of youth and even more children (Hedlund, 2017; Mattheis, 2020; Norbekov, n.d.). However, recent examples of Fridays for Future and Black Lives Matter prove the opposite. Moreover, widening the definition of civic engagement could help avoid the exclusion of certain groups of society or elitism.

Moreover, Liben et al. (2020) asked youth themselves to define what is civic engagement. The youth’s answers showed that youth understand civic engagement differently from person to person and together covers a very wide spectrum of ideas. Surprisingly, quite often, they are active participants of civic engagement measures without acknowledging it. Researchers argued that it

could be because often, youth associate civic engagement with a formal institutional process (Liben et al. 2020), which leaves volunteering or helping other members of society not included. Such a situation shows the necessity for open debate and fostering more precise knowledge.

Some researchers point out that civic engagement could have different forms and could manifest differently in society. Civic engagement forms, according to Checkoway & Aldana (2013) are four: citizen participation, grassroots organizing, intergroup dialogue, sociopolitical development. Researchers provide very detailed descriptions and thorough comparisons between them. In general, the most significant difference stems from where power lies (Checkoway & Aldana, 2013). All other differences derive from it. So, if this notion would be applied to youth engagement, it would mean that power resides in youth (participation form), youth grassroots organizations (grassroots organizing form), dialogue between different youth identity groups (intergroup dialogue form), and lastly, institutions for and regarding youth (sociopolitical development form). So, every form has its application area and context, as well as expected results and its impact on youth.

As was mentioned above, civic engagement is closely linked with democratic values and processes. Further, democratic processes quite often are regarded as decentralized and allow to make a decision at the lowest responsible actor or stakeholder. Additionally, the internet and online tools empower dialogue creation even more. Kassen (2021) conducted extensive research regarding decentralized involvement via traditional and online measures. Results showed that despite the lack of in-depth knowledge about de-centralized online engagement measures and processes, such activities are quite influential and could be used for various purposes to establish civil communities (Kassen, 2021).

In gamification theory and bulking body of practical examples, engagement in certain online activities proves its benefits in building trust and democratic values in society (Ampatzidou et al., 2018; Hassan & Hamari, 2020). In the case of youth, engagement applying versatile games or game-like activities. Adachi & Willoughby (2013) observed the positive impact of games on youth and children's ability to solve problems. Meanwhile, the rising popularity of hackathon activities supports the notion that youth (as well as adults) feel responsible and are willing to dedicate their time and skills to solving societal problems (Hassan & Hamari, 2020). So, in order to promote civic engagement amongst youth, gamification activities should be considered and explored.

Regrettable, field research proves that the potential of youth quite often ends up being used up and missed or even neglected (Liben et al., 2020). Even though the first examples of the first youth and children engagement in civil rights movements dates as long back as 1899, when New York newsboys protested against low wages (Mattheis, 2020). As previously mentioned Fridays for Future movement is still regarded as a unique and exceptional phenomenon. Even though the majority of youth do understand political processes and are willing to be active participants despite dominating exclusion towards youth and children.

1.1.5. Perspectives on youth and youth with disadvantages

Youth, as a description of a certain part of the human population, has had different age gaps as identifiers. Currently, the youth in EU law is identified as people between 15 and 29 years of age. This definition of youth grants them rights and responsibilities. Additionally, youth could be described as “the passage from a dependant childhood to independent adulthood” in the EC Communication “Youth – Investing and Empowering”. However, as emphasized by Aina Landsverk Hagen (2021), “youth” is clearly not a homogeneous group, although often treated or perceived as one, hence a multiplicity of identities and subject-positions will inform both agency and practices in urban development” (p. 278). Following the description of social inclusion, the YouCount project takes a life course and contextual perspective to understand youth. This means that the project includes the concept of youth in a broad sense. Life course perspective sees people in different stages of their life which will influence their possibilities and challenges in each case. These specific challenges include, e.g. opportunities to get education, employability (getting a first job), etc. The age will also affect the level of dependency of their parents/guardians and relation to their family.

Since youth are dependent on adults yet wish to be independent, often end up in a vulnerable position. This situation is strengthened by COVID-19 pandemic causing lockdown followed by economic and social disruptions.

With regards to the evidence from psychological and sociological research, (Centeno et al., 2012) state that the “factors that shape social exclusion or the risk of exclusion, for young people are complex and multi-dimensional”. Initially, social science studies focused particularly on exclusion from the labour market and poverty, with some consideration of the barriers to effective or full participation in society. Later contributions have conceptualised social exclusion as a multidimensional form of disadvantage, including the aspects of material and nonmaterial exclusion. Thus, YouCount perspectives focus on the heterogeneous, multicultural and complex reality of social exclusion and social inclusion; emphasizing a variety of socio-demographic and socio-cultural variables and insisting that social inclusion should be regarded as reciprocal processes between the individual and society. Successful social and policy strategies for inclusion must address both conditions regarding the individual/group at risk of exclusion, the host society and the relationships between them. In addition, many underline the cumulative interrelationships between disadvantages instead of focusing solely on individual demographic variables, such as income. Recently, ethnicity and migration status or the intersectionality between e.g. ethnicity, gender and class, has been emphasised. Similarly, youth research finds multifactorial and complex causes to exclusion and, conversely, social inclusion. As emphasized by Centeno et al. (2012), “youth at risk of exclusion cannot be viewed as a homogenous group as it encompasses different categories such as: marginalized youth, young offenders, long-term unemployed youth, etc. Further, the different factors and situations that put them at risk, such as: financial problems, dropping out of school and low qualifications, having a dysfunctional family, unemployment, etc.” (Centeno et al., 2012).

Moreover, having a job for youth could be positive and could guarantee at least financial independence. However, if during schooling time youth have a job, this often pushes teenagers to drop school. This leads to more disadvantages throughout the lifetime (Acar & Afacan Findikli, 2020; Staff et al., 2020). Meanwhile, if job training and entrepreneurship are included in the schooling program, they do show long-term positive changes in the personal financial situation of the participant (Das, 2021).

Furthermore, as a solution (Sichling, 2020) promotes increased diversity on the neighbourhood level that should “potentially benefit disadvantaged and minority youth by providing access to more diverse social networks and relationships”. Diverse communities could withstand higher and longer social turmoil; additionally, they are more inclusive and supportive for their members, including youth. Youth, especially migrants, might be also considered as a transformative resource. However, this potential of youth is underused for community development.

Literature review shows (Hagen, 2021) that there is a need to better include youth and children voices in policy making and strengthen participation, especially including such youth groups as migrants, ethnic or racial minorities, the socially excluded, people with diverse backgrounds, and low-income earners. Thus, the YouCount project makes a special effort to address these issues in empirical cases.

1.2. Citizen Social Science as an innovative tool of youth empowerment for social inclusion

This chapter highlights innovative part of the framework by arguing that one of the innovative ways to increase social inclusion and empower marginalized youth is through using citizen social science. It has several sub-chapters: (1) the brief introduction on innovative ways of youth empowerment, where citizen social science is one of the tools to achieve empowerment; (2) conceptualization of citizen science and youth citizen social science; and (3) explanation of conceptual issues of citizen social science and social innovation.

1.2.1. Innovative ways of youth empowerment

Historically, the concept of empowerment in this framework is associated with the work of Paolo Freire, who defined empowerment as *“the ability to understand social, political and financial contradictions and the ability to act against the oppressive influences of real life”* (Freire, 1974). In line with Freire’s thought, empowerment can be defined as *“processes through which social groups improve their ability to create, manage and control material, social, cultural and symbolic resources”* (Andersen & Siim, 2004).

As a critical paradigm, the empowerment approach has had a revival over the last decades because it places collective action, and changes of unjust opportunity structures in the centre of societal change in contrast to neoliberalism. Strategies of empowerment can focus on changes on the societal level (macro), on organizational and institutional levels (meso) and changes in peoples' everyday life nexuses (micro level).

Firstly, empowerment fosters horizontal empowerment, strengthening trust, commitment and networks inwards and downwards, e.g. between different groups at the workplace or in the community. Secondly, it concerns vertical empowerment strengthening power and the possibilities of multilevel influence outwards and upwards, e.g. in relation to power centres outside the workplace or the community, including governmental policies. Successful action research implies robust empowerment, which often results from a mix of horizontal and vertical empowerment processes, and becomes mutually strengthened over time (Andersen, 2005).

As Lardier et al. (2020) pointed out, empowerment theory is a useful framework for understanding the processes and outcomes to prevent social problems (Christens & Peterson, 2012; Lardier, 2019). An empowerment framing contrasts with a prevention orientation to community problems. A prevention framework "implies experts fixing the independent variables to make the dependent variables come out right" (Rappaport, 1981, p. 16). However, empowerment recognizes the capabilities that exist among individuals, groups, organizations, and communities, and how societal barriers are in place that hinder growth (Christens, 2019; Rappaport, 1981). Discussions on empowerment theory have further elaborated that empowerment is developed through culturally focused groups, activities, and contexts, as well as "enhancing wellness instead of fixing problems, identifying strengths instead of cataloging 'risk' factors, and searching for environmental influences, instead of blaming victims" (Zimmerman, 2000, p. 44).

Empowerment is identified among three interdependent subcategories at the community, organizational, and psychological levels. Empowerment positions the ways individuals may engage in community-based activities toward social change, and indirectly experience greater social group connection (e.g., ethnic group identity and attachment) (Christens, 2019; Zimmerman, 2000) and reductions in negative outcome behaviours including substance use (Christens & Peterson, 2012; Lardier, 2019; Opara et al., 2019). As Rappaport (1987) argued, through this lens, empowerment is understood as a multilevel, relational construct where change at one level becomes intertwined with other levels (Lardier et al. 2020).

The concept of empowerment is sometimes used in a different way unlike the heritage and understanding from Paulo Freire (Craig & Mayo, 1995). The literature shows a variety of ways to achieve empowerment, and some of them are quite innovative.

One of the ways to achieve empowerment is to engage citizens in action research. Action research is an umbrella term for research based on democratic and inclusive values where democratically

developed knowledge contributes to collective actions. In action research researchers and practitioners work together in “a shared commitment to democratic social change” (Brydon-Miller et al., 2003). Action research is not a fixed method but a collection of principles, theories and methods.

Action research is as a research approach in which research supports collective action and at the same time produces new knowledge. Together with the participating practitioners, action researchers define their research questions, and the agenda for collective action is based on the participants’ needs, experiences and visions (Reason & Bradbury, 2008). An optimal knowledge creation is obtained through shared learning cycles of problem definition, design and implementation of strategies for social change (Nielsen & Svensson, 2006).

The ideal of the action research approach is the co-production of knowledge between social actors and action researchers who contribute actively to democratic change within the field where the research is conducted. Thereby, action research gives the social actors a role as “subjects” in the research process and challenges at the same time research methods, which separate the researchers and their research “object” (Clausen & Hansen, 2007).

Another important characteristic of action research is the close connection between understanding the world and changing/transforming the world. Knowledge develops as a collective product of through creative processes and practice cycles, which consist of 1) *criticism* of unsatisfactory conditions within a given field, unfairness, underprivileged groups’ conditions etc., 2) *investigation and documentation*, 3) *reflection* which includes the *development of a concrete vision and transformation strategy* and 4) *action* (Andersen & Bilfeldt, 2010).

The ontological starting point within the tradition of action research is that societal structures can be changed. Social groups engaged in action research can be empowered and influence their social conditions. Epistemologically, action research frames the creation of knowledge where reflection is linked to action and can be defined as research, which contributes to social mobilization and empowerment (Kemmis, 2008). Kemmis employs the concepts of “practice” and “praxis”. “Practice” is based on ingrained behavior and habits. “Praxis” is the social and morally obliging action that can arise from the critical and self-critical reflection and dialogue in the action research process (Kemmis, 2008). All these basic elements of action research are important to achieve empowerment youth, especially the participatory approach that is applied in action research.

Action research and its participatory approach for empowerment might be combined with different perspectives. Currently, the emphasis on open science and co-creation of knowledge where researchers work together, as equal partners with communities and lay citizens, is one of the dominant perspectives, which is also called as citizen science. As emphasized by Evans-Agnew and Eberhardt (2019), “citizen science emerged in the 1990s as a movement for participatory research that sought to involve the public in the collection and analysis of data addressing issues of concern

including action for policy change”. By employing a case study on the engagement of youth in the collection, analysis, and dissemination of photos and home air-sample data, these authors show how that “photovoice is a feasible method in combining principles from both citizen science and action research movements” (p. 370). This case study is a good example showing how citizen science and action research might be combined, suggesting a new way to engage marginalized youth in transformational research.

1.2.2 The concept of citizen science and citizen social science

Citizen science is often described as scientific activities in which non-professional scientists volunteer to participate in data collection, analysis and dissemination of a scientific project (Haklay, 2013). Being a relatively new but rapidly growing field, citizen science expands public involvement in science and research and supports alternative models of knowledge production (Hecker et al, 2018).

The development of citizen science concept has some contradictions and challenges:

- ***How to describe a citizen scientist?***

The concept of citizen scientist is still blur and is inviting for a debate among scholars and society. Citizen science doesn’t include people who take part in a scientific research as participants without playing any role in the study itself – for example, participation in an interview as interviewee or volunteering in a medical trial. Defining the concept of “non-professional scientist” is quite complicated. This is because it is quite easy to identify professional scientists because they are employed at some scientific institution to carry out scientific work. The situation with volunteer scientists is more complex. As emphasized by Muki Haklay (2013), many will not identify themselves as scientists even if they are carrying out scientific work.

Another criticism is concentrated into the term “citizen”, because the emphasis is on lay people, non-professionals, rather than on citizenship. In understanding the term “citizen science” the emphasis should be on a distinction between being or not being professional scientist, but not on national citizenship. This emphasis is important for the YouCount framework as citizen scientists might be refugees, non-citizens or other marginalized or vulnerable groups.

- ***Is citizen science a novel or an old issue?***

As Muki Hakley argues (2013), until the late 19th century, science was mainly developed by people who had additional sources of living that allowed them to spend their free time on data collection and analysis. For example, Charles Darwin joined the Beagle voyage not as a professional scientist and his engagement in research might be interpreted as an early sign of citizen science. There are many more examples from the history which indicate that non-professionals had their contributory

role in doing research. Although citizen science is not a new issue, the concept “citizen science” to describe participation of lay people in research emerged just in the last decades of 20th century. In the past decades, since 1990s, when the concept of “citizen science” simultaneously emerged in the United States and in the United Kingdom, we witnessed an increasing number of citizen science projects with the recent year’s explosion of citizens’ engagement into science (Hackley, 2015).

- *What is **regional difference** in engagement in citizen science projects?*

Citizen science is mainly concentrated in advanced economies, especially the US and Western and Northern Europe (Hackley, 2015:16), but is currently starting to get recognition in Central and Eastern Europe as well. However, the number, maturity and development of citizen science projects varies across countries significantly. The development of citizen science projects has had different roots in different countries. As emphasized by Hackley (2015), in US citizen science started to evolve as “volunteer data collection to support ornithological research”, on the other hand, UK took different perspective to refer “the integration of science and citizenry to advance policy goals” (Hackley, 2015:2). Thus, some countries have more developed strategies towards citizen science than others. In some countries, especially in Central and Eastern countries, the citizen science projects are just on the initial development stage, where people are mainly joining to the international level initiatives rather than creating national or local level citizen science projects (Butkeviciene et al, 2022 forthcoming). Empirical studies (Hecker et al. 2018) showed that there is uneven distribution of CS practices within Europe with the domination of Western European countries and comparatively small number of CS projects in Central and Eastern Europe (such countries as Lithuania or Hungary). This is an aspect that will be taken into high consideration in the framework and especially in implementation of empirical cases in different EU countries.

- *What is an **impact of technologies** on citizen science?*

The development of internet technologies has even fostered involvement of lay citizens in scientific activities. A lot of citizen science projects use technologies, such as online platforms, apps, etc. One of the best known citizen science platforms is Zooniverse, a home of thousands of citizen science projects. The popular way is to engage citizens into research using apps. The emphasis on technological tools, especially apps, that engage youth in contributing to citizen science projects in a gamified, visualized and/or creative way.

- *How does citizen science affect **transformative change and policies**?*

Regarding policy issues, the scope and geographical aspect matter. Citizen projects may help in solving different social problems on local (neighbourhood), city, national, and international level. These aspects are directly related to policies in two ways: (1) how much attention and support is given by local government, municipalities, national governing bodies or international organizations and their strategies and (2) how much citizen science is being used by politicians and public servants

to make decisions regarding one or another issue / social challenge. In this regard, there are two types of relationship between citizen science and policies: (1) policy to support and fund citizen science; and (2) policy that is consulted by citizen science projects (when the results of citizen science project are being used for recommendations and decision implementation).

Hackley (2015) notes, that “national and multinational environmental policy was the first area to demonstrate an awareness of citizen science” (p. 17), and further interest is demonstrated internationally by European Environment Agency (EEA), the Environment Directorate General of the EU, and on the national level by the UK Environmental Observation Framework, the Scottish Environmental Protection Agency (SEPA), the UK Parliamentary Office for Science and Technology, etc. In the recent years, there is much attention to citizen science paid by European Union (e.g. Horizon 2020 Science with and for society (Swafs) calls; COST Actions such as CA15212 “Citizen Science to promote creativity, scientific literacy, and innovation throughout Europe”). The role of associations such as the European Citizen Science Association (ECSA) that work on international level, is also important for general policy formation as these organizations advance citizen science through different activities such as dissemination of results and education of society. Some countries such as the United States or Australia have placed citizen science at the forefront of national science policy (Rowbotham et al., 2019). As pointed out by Rowbotham et al. (2019), for example, the Australian Government’s Inspiring Australia programme provided grants of up to \$500,000 to support community participation in scientific research projects that have a national impact. However, some other countries do not exhibit much interest in citizen science in their policy documents and programmes.

- *How does citizen science **differ among disciplines**?*

Another issue is the concept of CS within different scientific disciplines. Review shows that CS differs among disciplines. Kullenberg and Kasperowski (2016) performed a systematic literature analysis. The results indicate that there are three main focal points of citizen science. The largest is composed of research on biology, conservation and ecology, and utilizes citizen science mainly as a methodology of collecting and classifying data. A second strand of research has emerged through geographic information research, where citizens participate in the collection of geographic data. Thirdly, there is a line of research relating to the social sciences and epidemiology, which studies and facilitates public participation in relation to environmental issues and health (Kullenberg & Kasperowski, 2016).

Citizen social science is a term associated with some citizen science activities: (1) a form of citizen science in the social sciences or (2) one that has a specific focus on the social aspects of citizen science (Albert, A. et al, 2021).

The conceptual difference between citizen science and citizen social science might be summarized to the following points (see Butkeviciene et al, 2022 forthcoming):

- Citizen science is a broader concept while citizen social science might be an integral part of citizen science;
- Citizen social science is still an emerging concept;
- *Differences in the object of citizen science and citizen social science:* Citizen social science uses citizens gathering data about the social world they observe (Purdam, 2014);
- *Differences in the social impact:* Citizen science usually uses citizens for research as policy passive objects while citizen social science includes citizens into exploration of “transformatively changing institutionalized research and policy systems” (Kythreotis et al, 2019);
- *Differences in the methods:* Citizen social science is often linked to the participatory approaches, especially participatory action research (Albert et al, 2021) which is not necessarily a case in other citizen science projects;
- *Citizen social science is underpinned by multiple disciplines* (Tauginiene et al, 2020). Citizen social science is “practised as both an approach and a bridging concept between the natural and environmental sciences and the social sciences and the humanities” (Albert et al, 2021).

CSS is a novelty for social sciences as well. There is not much research on this topic. The YouCount project will try to explore how CSS might be used to better address social inclusion through empirical cases.

1.2.3. Citizen social science and social innovation: Conceptual issues

The scientific vision of YouCount is to strengthen the transformative and participatory aspects of CS and social science, by enabling citizen participation in all facets, reaching out for a more egalitarian way of conducting science. The societal vision of YouCount is to contribute to create inclusive and innovative societies for European youths and to empower them in promoting active citizenship and a just and equitable future, particularly for youths with disadvantages. These project aims lead us for discussing innovative potential of citizen social science for social inclusion.

Both social innovation and citizen science aim at social change. The former usually addresses wicked social problems, for example social exclusion and inclusion, in order to generate and implement innovative solutions. Among other aims, the latter also seeks to empower people for exploring social or environmental issues. Thus, it seems obvious that social innovation and citizen science both might contribute to positive social impacts.

Some authors in the extant literature directly link citizen science and innovation, either by claiming that citizen science is an innovative approach or by arguing for citizen science as a tool for innovation (Butkeviciene et al. 2021). Citizen science may reconfigure the relationship between science and society. Clearly, there is a potential in citizen science (or rather in the practice of citizen science)

that provides space for rethinking the design and process of knowledge production in terms of the actors involved, their roles and the timing and extent of their involvement. Citizen science can challenge the identity of professional scientists and push them to rethink the boundaries of science and challenge existing structures of knowledge hierarchy. Citizen (social) science might well be considered as an innovative institutional solution for a dynamic interface of science-society relations – where the relationship between science and society is re-created by multiple actors in collaboration with each other as equal partners.

Similarly, it can be argued that citizen (social) science can produce new knowledge that is actionable and, therefore, can be used to enact positive social change. In that sense, citizen science can serve as a tool for social innovation. Furthermore, it can be argued that citizen science can be a tool for improving the scientific practice in terms of the quality and quantity of data to be generated.

Social innovation as an academic field of inquiry is characterised by multiple research streams. There are various ways to categorise social innovation research. It seems useful for the purpose of linking citizen social science and social innovation to focus on three streams of research within social innovation inquiries: (1) **PROCESS**: social innovation as transforming social and power relations; (2) **IMPACT**: social innovation as creating societal impacts, and (3) **TECHNOLOGY**: social innovation as restructuring social-material relations. All these three aspects are important for the YouCount project in different ways:

- ***PROCESS view: social innovation as transforming social and power relations.***

It is important to understand social innovation as a process unfolding over time in specific contexts. From a process perspective, social innovation can be organised as a collaborative exercise among multiple and diverse actors who are concerned with the wicked problem in question. Since social innovation is co-generated by different actors, social relations are often transformed and new forms of social relationships may emerge. Consequently, understanding social innovation as a process requires an exploration of how existing relationships among actors are re-arranged and new relations are formed. Changing social relations inevitable entails a restructuring of power relations; together with new forms of social relations new constellations of power will also emerge. Thus, analytical attention should also be directed to the exploration of the unfolding and reconfiguring of power relations during social innovation. In addition, innovative activities are always attached to practices; consequently, social innovation has to do with some forms of doing. By implication, social innovation means changing existing social practices and creating new combinations of social practices. The YouCount project will establish living labs operating at the local case study level. The research objective is to explore and understand how the living labs establish co-creative and innovative processes with multiple stakeholders in wider community, where data provided by the participating young citizen scientists will be used to cocreate policy-making and innovations in terms of new ideas, products or methods as a way to create social change. This will be a process of organising and governing that aims to enable co-creation in a real-life setting which will empower

all actors (primarily, youth at risk of social exclusion) to collaborate on responding to both the knowledge and social change needs of the citizen social science research on the social exclusion and inclusion of young people. Thus, a process analysis will significantly contribute to generate new knowledge on innovative processes unfolding in citizen social science.

- ***IMPACT view: social innovation as creating societal impacts.***

Since social innovation often focuses a wicked social problem, it might change social practices, change in attitudes and values, change in social structures, change in power relations, etc. (Pel, Haxeltine et al, 2020). Change is aimed for and implemented in order to achieve positive social impacts. At the bottom line, social innovation can be understood and analysed with regard to the impacts achieved. There is a substantial literature that puts the impacts into its focus and attempts to evaluate and even measure the social impacts resulting from socially innovative processes and initiatives (Pel, Haxeltine et al, 2020). Understanding the nature of social impacts social innovation and citizen science achieve, will significantly enhance our project understanding of the potential impacts of citizen science and social innovation as research strategies.

- ***TECHNOLOGICAL view: social innovation as restructuring social-material relations.***

The important innovation in YouCount is to develop new/better ICT tools for data collection in Y-CSS. The benefits and potential of CS have often been linked to the potential of obtaining new knowledge through new digital opportunities for data collection by involving citizens. The YouCount project seeks to contribute to this by developing more knowledge of how to use ICT tools in data collection with youth with disadvantages, and from multicultural backgrounds, along with making sure the needs for sufficient preparing planning and follow-up of the youth are handled. This aim makes technological aspects of social innovation very important for the successful implementation of the YouCount project objectives.

Literature review shows that social innovation is frequently connected and traced back to technological innovation. This connection often indicates a techno-optimist approach, shading lights on how technological and digital innovation are often correlated and directly linked to social innovation. In contrast, social inclusion/exclusion and empowerment/disempowerment have been less discussed concerning digital technology, despite that social inclusion is predominantly connected to the field of education, scientific literacy and public engagement. Taking a critical look at the scientific literature on the intersection of digital technology, social innovation, and citizen science such themes as digital technologies and public engagement in science, digital technology design in citizen science (e.g. AI, mobile apps, platforms, etc.) or digital social innovations are encountered more frequently compared to such topic as citizen science and digital divide, exclusion and inclusion. The YouCount app seek to meet these challenges by developing ICT tool for Y-CSS in co-creation and collaboration with youth participating in the case studies and providing knowledge

on how technologies might be used for Y-CSS. Currently the framework presents general views on digital technologies and citizen social science which will be later updated with empirical findings.

Digital technologies and public engagement in science. Digital technologies and citizen science research interplay as the former provides the latter with support infrastructure to facilitate data collection and the direct participation of citizens (Aristeidou and Herodotou 2020, Ceccaroni et al. 2019, Newman et al. 2021, Skarlatidou et al. 2019, Mazumdar et al. 2018, Sturm, 2017). Due to this mediating support via an internet connection, citizen science research can be implemented from distant locations when internet access and digital literacy materials are adequately provided to its participants (Aristeidou and Herodotou 2020, Mazumdar et al. 2018). Digital technology, thus, is directly related to the broader theme of participation and engagement in citizen science. Participants can be mediated by well-designed tools and co-design digital technologies to achieve social innovation in the form of a new solution to existing societal challenges (Novak et al. 2018, Ceccaroni et al. 2019). Citizen science research, including digital technologies applied in the research, needs to accommodate context-sensitive conditions, which is crucial in the research design to achieve social innovation (Butkevičienė et al. 2021) successfully.

Lemmens et al. (2021) argue that without research-adjusted, advanced and contextualised technologies like mobile apps (e.g. SPOTTERON), online platforms (e.g. iNaturalist, Zoonivers) websites, measurement tools and AI programs, citizen science research might not be successful. With advanced technology, social media features can be adapted in citizen science. This way, more participants can be attracted by the familiarity of the digital tool. Digital technology design also needs to be adjusted to the target group's age. Citizen science projects, with the mediation of digital technologies, considerably capitalise on digital natives as participants. Youth groups who grew up being familiar with digital technologies might find comfort in using those tools (Lemmens et al. 2021).

In an overview article on different citizen science technologies, Mazumdar et al. (2018) conclude that fast-paced technological development, specifically, that of mobile technology, can offer innovative participatory and collaborative tools for effectively engaging various social groups such as youth in citizen science research. Digital technologies can provide a base for innovation for engaging new communities and stakeholders. Ceccaroni et al. (2019) also argue in a review article that digital technologies (AI, ML, algorithms, etc.) bear a great potential to incentivise citizen science participants, developers, researchers and volunteers alike, to make an economic and social impact within their projects in the long run. Speculatively they argue that community-oriented robotic systems can generate social, educational, economic and health benefits for the general public.

Technological innovations bring changes, as Skarlatidou et al. (2019:1) notes "not only in the economy and the workplace, but also in the ways people choose to live their lives, spend their free time, and interact with others. Such changes have led to social innovations, which have ushered in a new wave of social change. One such change took place within the scientific context, with the

ongoing growing number of amateur volunteers, with the help of technology, now work together with scientists to explore and address scientific issues."

It might be intuitive to assume that technological innovation directly leads to social innovation when exclusive and rigorous scientific research procedures can accommodate volunteers. It might count as social innovation itself in some instances. To evaluate, more empirical research is needed on the connection of technological and social innovation. One might argue that accommodating volunteers in scientific research is about witnessing the Open Science endeavour in the making. In other words, implementing public engagement strategies closes the gap between science and society (Irwin 1995), more than fostering social innovation alone.

Technology-mediated citizen science also raises significant issues to be considered. Any application of technology will immediately and inevitably influence the existing patterns and structures of social inclusion and exclusion depending on how the technology was designed and used. Some actor groups might be included, while others might feel excluded or alienated by the same technology applied in citizen science. Technology also relies on, strengthens or require knowledge and skills, while, at the same time, make some existing knowledge and skills obsolete – thus, social implications cannot be avoided. What is built into a given technological solution and how its use is unfolding should receive critical scrutiny by citizen social scientists (both professional and volunteer). Beyond the social, also the material and environmental aspects of any technologies are important to consider. All technologies have their imprints from existing socio-material relations and may reconfigure those relations through their use and application. How these socio-material relations are constituted and re-constituted in a citizen social science project is important to observe and analyse.

Digital technology design in citizen science. In an overview study on citizen science platforms, Liu et al. (2021) noted that so far no systematic impact evaluation has been undertaken on platforms designed for citizen science research. Statistical data such as monitoring the number of users is often available on these platforms. Without having any qualitative data on the social or other impacts of the project, only the potentiality of these platforms, including SPOTTERON, received recognition: these online tools can encourage participants to start their own projects.

In a systematic review of the learning impact of participation in online citizen science, Aristeidou and Herodotou (2020) claim that, when digital tools are deployed in a research project, the participants and volunteers can give insightful feedback on how successful the adaptation of these digital tools was. Yet, more interventions and follow-ups is needed for a more extended period to detect long-lasting changes in attitudes.

Digital social innovation and citizen science. Novak et al. (2018) bring together digital and social innovation in one term: 'Digital social innovation explores new models where researchers, social innovators and citizen participants collaborate in co-creating knowledge and solutions for societal

challenges.’ The authors draw attention to the similarities of Do-it-yourself (DIY) science and digital social innovation. There is a community-based problem and a community-driven, collaborative solution that counts as social innovation in both cases.

In the case of digital social innovation, Novak et al. (2018) talk about a co-created participatory citizen science where digital technology supports the birth of innovation. Hybrid LetterBox is an excellent example of digital social innovation in citizen science. It is a community-based initiative aimed at connecting digital and analogue communication channels by ‘augmented mailbox where anyone can throw a physical postcard that is automatically digitised, and uploaded to an internet platform to be spread and discussed’ (Novak et al. 2018, p. 127) The prototype was designed with the participation of local elderly residents to provide inclusive access to digital media in the neighbourhood. Later on, families from the neighbourhood joined the initiatives to test the product of digital social innovation.

Citizen science and digital divide. In reviewing systematic reviews and case-study analysis, merely sporadic knowledge can be collected on the way in which digital technology applied in citizen science poses potential risks and benefits to various social groups. Applied digital technology and tools, such as low-tech sensors, bear the potential to be both facilitators or barriers in for example environmental justice in health-based citizen science.

In a review article on health and environmental citizen science, Ceccaroni et al. (2021) summarise the main barriers to participation and, thus, indirectly to the possibility of social innovation. Introducing specific digital tools can bring a community together or alienate users from the fieldwork itself (pp. 226). The digital divide is a current barrier that needs to be removed to co-create a participatory, user-driven citizen science. Without fulfilling the participants' basic digital needs, facilitating innovation at the science-society interface is challenging.

Technology has often been regarded as neutral to social factors. The expertise of designers provides standards and methodologies; nevertheless, technologies such as online websites or technical devices as novel innovations have undesirable effects (Strate 2021). Gender, racial and political biases in technological design may exist. It is specifically remarkable in the case of AI and machine learning daptation in citizen science projects.

Further, mobile apps, online platforms and other digital tools have frequently been tailored without seriously considering the users' needs and social contexts that greatly influence the participants' technology-adaptation strategies (Sunyoung et al. 2015, Butkevičienė et al. 2021). Again, an unpleasant experience with digital technology may alienate citizen scientists from effective engagement (Ceccaroni et al. 2019) and reinforce the digital divide among participants (Ceccaroni et al. 2021). This is an important part of YouCount project to address these issues, including young people into development of YouCount app in order to develop youth-friendly digital communication tools (such as social media and webpages).

1.2.4 Key Points for Critical Reflection in YouCount

CS is promoted as a promising scientific approach in policy and science. Still, the YouCount project includes a more critical and reflexive stand to explore the costs and benefits of CSS as social innovation.

Both citizen science and social innovation might be considered as vulnerable concepts. They are vulnerable due to the great expectations attached to them and the significant promises they make. In order to understand better the potential vulnerabilities, the following three issues might need to be addressed: (1) The nature of social change, (2) Politics, and (3) The beneficiaries and agency of co-production.

It is fair to argue that both citizen (social) science and social innovation promises positive social change. However, they both miss exploring this substantive issue in more details and be more reflective upon what kind of social change they promise or will ensure. If the broader social context in which citizen science and social innovation are carried out is characterised by striking structural inequalities and injustices how far is citizen science or social innovation able to proceed with positive social changes? Are they able to challenge the structures or will they be captured by them? Will they promote, or even be manipulated for engineering social change by currently privileged social groups? Or alternatively, will they challenge the existing social order that reproduces structural injustices? Researchers who aim for co-creation and partnership with marginalised and vulnerable social groups need to move very cautiously and with due sensitivity in order to avoid reproducing those structures that are themselves part of the problem and not the solution.

If citizen science and social innovation promise social change they cannot avoid being political concepts. This means that they implicitly or, less often, explicitly imply a vision of a good society. Positive social change can only be judged from a normative standpoint that will be based on such a societal vision. Even if one would argue that doing (citizen) science and implementing (social) innovation in society are good in themselves this position cannot avoid assuming a pre-existing social order based on normative grounds. At the very least, researchers are expected to be aware of their own commitments to a normative societal order and find the way to make them explicit and ready to be discussed.

From a social constructionist perspective, citizen (social) science and social innovation are co-producing science/innovation and society, with co-production understood as defined by Jasanoff (2004) as the on-going shaping of scientific ideas and beliefs and associated technological artefacts in interaction with the representations, identities, discourses, and institutions that give impact and meaning to the ideas and objects. Every social act is creating or re-creating the social order. Again, researchers are expected to reflect upon what it is implied. Critical issues will relate to the beneficiaries and active agents of change who are engaged by citizen science projects and social innovation initiatives. For whom and by whom science and society are co-produced in citizen science

projects? Similarly, for whom and by whom innovation and society are co-produced when social innovation is implemented? Researchers' critical self-awareness is called upon by these questions.

Many supporters of citizen science highlight that citizen science responds to a democratic deficit in the institutionalisation of science. It is argued that the practice of citizen science enacts less hierarchical and more equal relationships between professional scientists (academic knowledge-holders) and citizens (local knowledge-holders). This democratic commitment is particularly relevant in the case of those social groups (and cultures) who typically represent other knowledge forms than scientific. In many policy areas, for example, indigenous people and their communities have received such acknowledgements. Particularly in the field of environmental science, strong arguments have been put forward to enable public participation in order to bring in lived experience and local knowledge in any development process proposed (for example in Irwin, 1995).

However, while this democratisation gain by citizen science is strongly proposed, less attention is paid to some troubling issues. Given the typically widespread, deep and intersecting dimensions of inequalities in current societies, is it really up to anyone to become a citizen scientist if it is offered by a research project? What about the skill-set needed to confidently enter? What about those social groups who can hardly be expected to possess a social imagery that assist them to enter? Moreover, what if some citizens or social groups just do not want to be citizen scientists? What if they are uninterested in the project of science as such? These are some of the troubling questions which a citizen science project might confront and be confronted with, especially if the targeted citizens belong to socially marginalised and vulnerable groups.

What seems to be an important lesson here is that it is better to critically reflect upon such questions than start a citizen science project without unearthing hidden assumptions regarding the relational and foundational issues highlighted above. Thus, the YouCount project will take a critical perspective and test vulnerabilities associated with citizen science application for youth involvement and social inclusion through the empirical research in case studies.

2. Co-creation principles and youth involvement strategy

This part presents co-creative principles and a theoretical framework of a youth involvement strategy. The YouCount project will be built on a traditional participatory action research perspective and will align to the basic principles of RRI. The YouCount project adopts the basic normative principles for the RRI by aiming to conduct scientific practices that are diverse, inclusive, flexible and reflexive. It will do this by envisioning and reflecting on the underlying assumptions, values and purposes to better understand the implications and impact of the R&I undertaken. Further, by being open and transparent by communicating research in meaningful and accessible ways that enable public scrutiny and dialogue and that are responsive to change by modifying methods in response to changing circumstances, knowledge and perspectives. This approach is particularly important when working with youth with disabilities.

This framework also be a foundation of the YouCount critical and dialogical approaches. The project will use a multi-layered approach involving young people in different ways and degrees having an ambition is to make co-creative hands-on Y-CSS.

Thus, this chapter explains: (1) what is co-creation in a research process; and (2) what is co-creation in communication of research results. This chapter provides co-creation principles, youth involvement strategy and concrete recommendations for dialogical process implementation.

2.1. Co-creation in the research process

The action research for territorial development (ARTD) framework developed by Karslen & Larrea (2014) focuses on how social researchers can act as agents of change in their territories working at the micro level. The authors argue that in order to play that role, researchers need to **change their communication patterns from linear to dialogical patterns**. The starting point is that communication patterns are socially constructed and can therefore be changed (Berger & Luckmann, 1971; Escobar, O., 2011).

In practice this means that instead of understanding research as writing up a report with conclusions and recommendations to hand in to the government or the actor who commissioned the project (the transmission of messages to receivers), researches need to engage in dialogical research processes in which academic knowledge and experiential knowledge co-generate actionable solutions to specific territorial challenges. That is, changing communication patterns from linear to dialogical patterns through action research can lead to change in territorial development.

This approach to territorial development is relevant for co-creative citizen social Science, where researchers and young co-researchers will engage with other territorial agents (policy makers, community leaders, etc.) in dialogical research processes aimed at co-creating actionable solutions to increase youth social inclusion in 10 different territories.

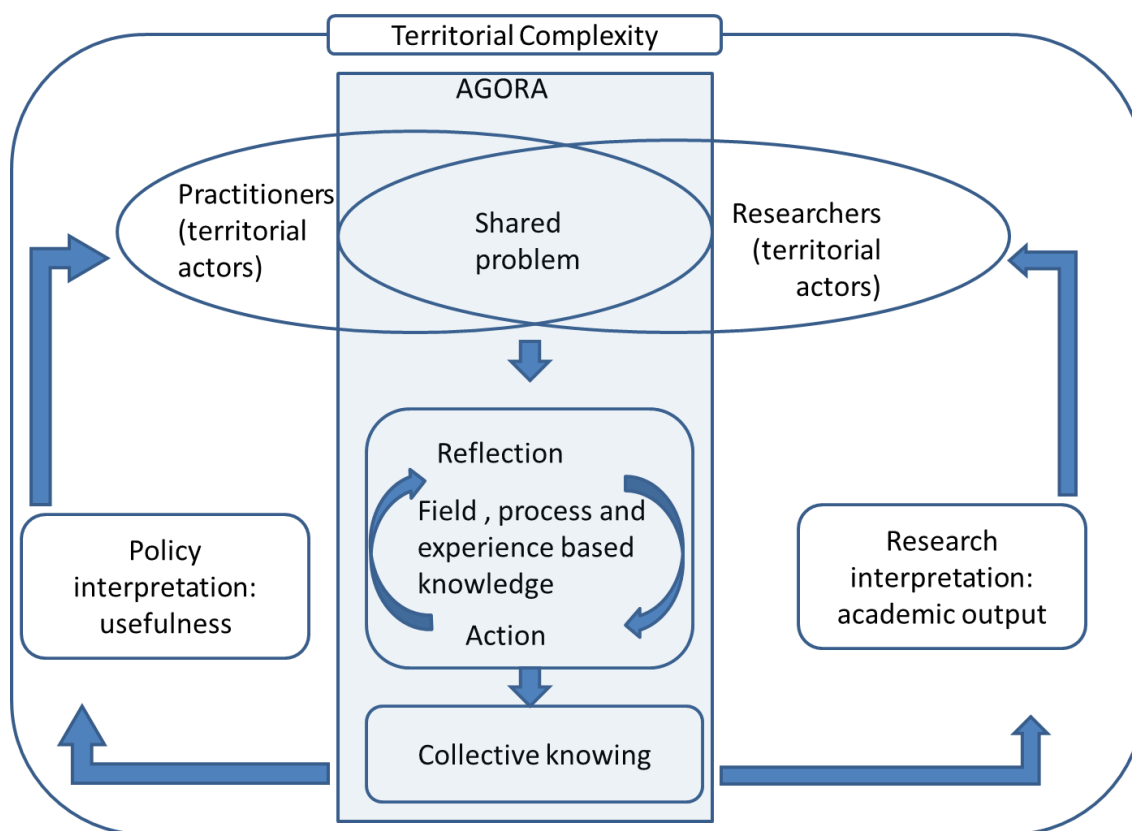
In ARTD, **territory** does not necessarily refer to any single territorial level (local, regional, national) and rather gives a central role to actors. Indeed, territory is understood as the actors who live in a place with their social, economic and political organisation, their culture and institutions as well as the physical environment they are part of (Albuquerque, 2012).

From this perspective, **territorial development** is understood as micro knowledge creation processes between territorial development actors and researchers facing the challenge of finding actionable solutions in their territories. In this approach, the process perspective becomes critical and poses questions of *how* territorial development happens. It is important to note that from an ARTD perspective, there are no recipes for territorial development. Territories are different and it is not possible to copy and paste successful policies- Moreover, learning from differences is as important as learning from success (Ennals and Gustavsen 1999). This is also highly relevant for the dialogical processes that will take place in the different territories where the YouCount project develops.

The agora is the space for living lab, where researchers and young co-researchers meet with different territorial actors. It is the space in which societal and scientific problems are framed and defined and where what ultimately is accepted as a “solution” is negotiated (Nowonty et al. 2001, p. 247). The agora as a space is therefore relational, generated by interactions and interrelations, by both organisations and individuals where individuals are guided by emotions, and not only by rational thinking. While the agora is a space, dialogue is the process continuously going on in the agora. The agora is therefore a space shaped by dialogue. Through dialogue, “theoretical concepts, discourses and real-life situations connect to create a mutual foundation for action and change a given situation in a territory” (Karlsen & Larrea, 2014, p. 68).

The YouCount project includes territorial (place based) perspective. This means that many case studies will have a place based (or territorial) approach (e.g. as reflected in YouCount App). They are not detached researchers analysing it from the outside but engaged researchers trying to change it from the inside. As such, they contribute process knowledge (they facilitate dialogue among others), experience-based (actor) knowledge and field (academic) knowledge. In YouCount’s dialogical agoras, researchers, young co-researchers and other territorial actors will engage in a democratic co-creative dialogue, contributing different types of knowledge to find actionable solutions that increase youth social inclusion in the different territories. Among these different types of knowledge, none is supposed to be superior to any other.

Figure 4 adapts the framework for co-generative process in ARTD proposed by Karlsen & Larrea (2014) to co-creative youth citizen social science. Social researchers and policy makers are kept as distinct figures with distinct roles in the agora, but they are both considered territorial actors. The framework has been adapted to include young co-researchers together with researchers to engage in a dialogue with other territorial actors. They contribute to the dialogue process with all the types of knowledge they have. This means that in the same way that researchers and young co-researchers can contribute experienced-based knowledge, policy makers can contribute theoretical concepts and frameworks into the discussion. Through repeated cycles of reflection and action, collective knowing is generated. Collective knowing is a capability, a learned pattern of collective action, where the actors in the agora systematically modify their actions over time, through the learning process that develops in the agora (Karlsen & Larrea, 2014, p. 68). This way of working will influence creation of LL and innovation processes.



Karlsen & Larrea, (2014 p. 100)

Figure 4. Creation of Collective Knowing in the Agora

The democratic dialogue that takes place in the agora is connected to practice and how practice can be changed through dialogue. Following Gustavsen (2008), dialogue is talk, but not only talk. In his words, "If research wants to communicate outside the research community it is necessary to merge the research process with a process of restructuring of language which encompasses those who have to understand the research if the research is to become socially significant" (Gustavsen, 1992,

p. 33). Indeed, Gustavsen argues that language development and the development of new practice cannot be separated.

Dialogical agoras in ARTD are based on Gustavsen's principles for democratic dialogue. Those principles are based on his work on new forms of work and enterprise organisation in Sweden. If we adapt these ideal principles to YouCount, they would largely remain the same. They are ideal principles for *how* to participate in a dialogue and *who* can participate in it.

Principles for Democratic Dialogue that are relevant in the Youcount project:

1. Dialogue is based on a principle of give and take, not one-way communication.
2. All concerned by the issue under discussion should have the possibility of participation.
3. Participants are under an obligation to help other participants to be active in the dialogue.
4. All participants have the same status in the dialogue arenas.
5. Experience is the point of departure for participation.
6. It must be possible for all participants to gain an understanding of the topics under discussion.
7. An argument can be rejected only after an investigation (and not for instance, on the grounds that it emanates from a source with limited legitimacy).
8. All arguments that are to enter the dialogue must be represented by actors present.
9. All participants are obliged to accept that other participants may have arguments better than their own.
10. Among the issues that can be made subject to discussion are the ordinary work roles of the participants (no one is exempt from such discussion).
11. The dialogue should be able to integrate a growing degree of disagreement.
12. The dialogue should continuously generate decisions that provide a platform for joint action.

When reflecting on how to engage in dialogical co-creative dialogue with young co-researchers participating in agoras with other territorial actors, YouCount partners identified the following challenges¹: (i) how to keep a balanced dialogue between youth and other stakeholders; (ii) how to handle conflict among youths themselves, who may have different backgrounds; (iii) how to deal

¹ Workshop on a Dialogical Framework for Co-creative CSS facilitated by Orkestra-Fundación Deusto on June 16, 2021

with different levels of knowledge; (iv) how to make diversity meet and match and allow for reciprocal acknowledgement among different social groups; (iv) how to address ownership and accountability, especially for policymakers; (v) how to handle working in different languages; (vi) how to raise and keep up stakeholder/community interest/engagement? and especially (vii) How will young people continue to benefit after the project.

Some of these challenges may be addressed by the facilitative role that researchers need to play when they participate in dialogical processes with other territorial actors to co-create actionable knowledge able to address a concrete territorial (or place based) challenge (Costamagna & Larrea, 2018):

1. **Creating spaces for dialogue.** Dialogue is one of the essential core elements of ARTD. Dialogue is not merely conversation; it is closely linked to processes of change. It is not possible to be part of a true process of dialogue without changing or producing change in others.
2. **Constructing a shared vision.** A shared vision is the result of dialogue and enables territorial actors to take action, although not necessarily together. A shared vision does not mean that everyone in the territory thinks alike, but rather that they are familiar with the positions of the other actors and make an effort to understand them.
3. **Managing situations of conflict.** Conflict management is closely tied to the process of dialogue. It is a hallmark of ARTD. One of the main challenges that facilitators encounter is that territorial actors frequently keep their conflicts on the tacit level. Therefore, part of this role involves making these conflicts explicit.
4. **Forging relationships of trust.** Together with developing spaces for dialogue and constructing a shared vision, forging relationships of trust is a basic role of the facilitator. Trust can only be built in the medium and long term.
5. **Constructing shared agendas.** Shared agendas are a tool for moving from reflection to action. A shared agenda does not necessarily require formal documents or detailed action plans. A shared agenda is in place where enough agreement is built among the actors to take action. And this agreement can be informal.
6. **Connecting the territory with outside schools of thought and debate.** It is important to open up this dialogue to outside influences. These sometimes come in the form of schools of thought, the observations of specific authors, political approaches, etc.
7. **Linking theory and practice, reflection and action to build collective capabilities in the territory.** This role brings together all of the others. A facilitator creates the conditions for praxis. In other words, they are keeping alive reflection on what is being done and continuously promoting action

based on these reflections. An image that captures a facilitator is the person who constantly moves the wheel that shifts from reflection to action and from action to reflection.

2.2. Co-creation in the Communication of Results Process

If changing communication patterns within research processes leads to change in territorial development, then changing communication patterns when communicating the outputs of those research processes may also lead to change (Canto-Farachala, 2019). Indeed, communicating research outputs from ARTD resorting to linear communication patterns is not only inconsistent with the processes from which they emerge, an opportunity is also lost to extend the learning process beyond the dissemination or publication of results. This is relevant for YouCount because it can enhance the actionability of the new knowledge generated in its co-creative dialogical agoras in other social contexts. It is relevant when disseminating the results of said co-creative agoras at the local, national or European level and also when designing the exploitable results of the project in the form of handbooks, toolkits etc.

Indeed, following Berger and Luckmann (1971), the interpretation of academic communication is socially constructed and can therefore be changed. This means that communicating research outputs can shift from linear transmission of messages in packaged products to key audiences (e.g. reports to policymakers, press releases to the media, or journal articles to researchers), to communication patterns that are non-linear because they are based on dialogue. This shifts from an understanding of what is being communicated (i.e. communication as the transmission of messages), to *how* it is being communicated (i.e. communication understood as dialogue). In other words, the communication *process* becomes critical.

The concept that proposes a change in communication patterns when sharing the results of dialogical research processes is Responsible Research Communication (Canto-Farachala 2020). RRC is the theoretical development of the connectivity concept coined by Karlsen & Larrea (2014). Connectivity is defined as a dialogical approach to the transferability of research results. It builds on Lincoln and Guba (1985) who place the written text at the centre of transferability of knowledge and argue that transferability can be enhanced by how well a text is formulated, but that the responsibility of the author ends with the production of the text. Connectivity, however, requires the direct engagement of researchers in a dialogue and therefore faces a challenge of scope.

RRC specifically addresses this challenge of scope. The aim is to explore dialogue's transformation potential in a meso space situated between the micro one, in which academic knowledge is communicated dialogically to a small number of participants in in-person dialogical agoras, and the macro one, in which academic knowledge is communicated in linear ways to a larger number of researchers and practitioners through the distribution of printed or digital copies of books, papers or reports. In the macro space dialogue, and its potential to transform, is no longer present, in the meso space created through RRC, dialogue is still feasible. RRC has also been depicted as an

approach to experiment with third person action research (Canto-Farachala, 2020). Third person action research tries to move beyond the group to reach a wider audience and promote change within organizations, regions or society more generally (Gustavsen, 2014).

RRC draws from the literature on Responsible Research and Innovation (RRI), a process approach to research that seeks to produce socially robust and sustainable knowledge and innovations. From within that literature, the concept of responsibility as care developed by Bardone & Lind (2016) is central to RRC. Responsibility as care suggests that “responsible” research is not something that can be “implemented” but a type of active engagement that cannot be separated from researchers becoming part of the practice themselves. It is a way to reach high-level objectives, but in an indirect way. This connects with ARTD’s focus on micro processes. Moreover, responsibility as care brings researchers’ agency to the forefront and makes a natural connection with connectivity, which is ultimately about how researchers interpret their responsibility in the transferability of the knowledge they create.

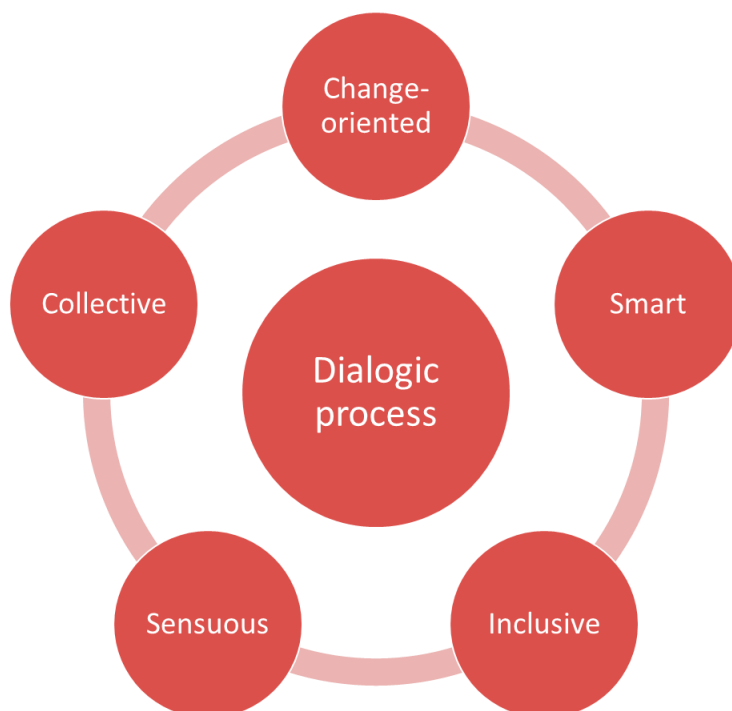
RRC also draws from participatory communication, a field developed from Paulo Freire’s dialogic communication approach (1996, 2008). Participatory communication emerged in the 1970s as a challenge to the top-down, linear communication patterns that dominated the international development field (Huesca, 2008) and which were criticized because they were based on a knowledge-deficit assumption (Gumucio-Dagron & Tufte, 2006). Cornish and Dunn (2009) define participatory communication as “a continual process of dialogue, listening, learning and action between people” (p. 667) and suggest that action researchers are better equipped to communicate their research in non-linear ways, such as through participatory video, radio and theater. This school of thought understands participation as dialogue (Gumucio-Dagron, 2008), so it connects with ARTD’s dialogue-based approach to research.

Finally, RRC, that was initially designed as a theoretical framework, was made actionable in an action research process that involved two action researchers who agreed to experiment with changing the communication patterns of their research results from linear to dialogical (Canto-Farachala & Larrea, 2020; Canto-Farachala, 2020). This is also relevant for YouCount due to its co-creative approach to research and because many of the researchers working in the project have a tradition of working with action research and other participatory methodologies, in which dialogue is a powerful tool for change both during research processes and when communicating research results.

However, the RRC framework was made actionable with so-called “established” action researchers and the YouCount project involves young people as co-researchers. To that end, drawing from Brown, C. et al. (2019) and Vestby (2020), the framework has been adapted to incorporate a new feature: “sensuous” which not only considers verbal and written communication, but also tactile, visual and audible communication. Moreover, dialogue between youth and other (adult) stakeholders is dependent on someone creating an equalizer effect (Tolstad et al. 2017), where the power differences are balanced as much as possible. Training the youth in research methods is one

strategy for doing this. Moreover, when it comes to communication, youth interviewing journalists or communication advisors is another strategy for enabling actual and meaningful dialogue (Listerborn, 2007).

Based on the above, Responsible Research Communication for Youth Citizen Social Science is therefore a dialogical process with the five features illustrated in Figure 5 and described below. The description of each feature is followed by the main suggestions and challenges raised by partners when reflecting on the RRC framework. These are a good point starting point to explore and be aware of in practice. Comments by partners that explicitly recognize the co-creative role of young co-researches in the communication of results process are highlighted in bold letters:²



Source: Adapted from Canto-Farachala (2019, 2020); Brown, C. et al. (2019); Vestby (2020).

Figure 5. Responsible Research Communication for Y-CSS

1. Change-oriented. RRC is about communicating research results to extend dialogue's transformation potential beyond the publication of results. But it needs a targeted approach and requires an answer to the questions: What do we want to change by engaging in a dialogue to communicate our research results? (Raise awareness? Promote an issue? Influence policy? Build capabilities?) Who do we need to engage? (Policy makers, community leaders? Society in general?)

² Workshop on a Dialogical Framework for Co-creative CSS facilitated by Orkestra-Fundación Deusto on June 16, 2021

Ideas for transformation objectives:	Challenges for transformation objectives
<ul style="list-style-type: none"> • The main goal is making an impact; • Connect with local stakeholders; • Contribute to the development of individual and group capabilities; • Change the perception of both youth, public officials and the general public on the problem oriented view on local youth not being able to find jobs, attend higher education or start a business; • Highlight the positive drivers and processes which can lead to change; • Focus on social inclusion, not exclusion; raise awareness among wider youth community, parents, influence policymakers; • Transformation objectives may be different for young people and other stakeholders; • To inform about findings; • Raise awareness; • Policy and change-oriented; • Contribute to scientific knowledge and fill research gaps. • Communication should be understood as action planned and delivered by youth and youths should be the change-makers in the communication process. 	<ul style="list-style-type: none"> • Being aware of, and responsive to the needs and preferences of different target groups; • Being mindful of small changes as well as the big ones - these may up add to something bigger, eventually; • Involve policy makers to influence policies; • Very difficult to measure impacts of communication as we don't have a laboratory environment

2. Smart. RRC is smart because it needs to consider its sustainability for researchers and the other territorial actors involved. Communicating research results always takes place in a setting where other projects are going on, so YouCount cannot expect researchers to engage in dialogue to communicate research results that has the same intensity as their dialogical research processes. The smart feature requires a creative mix of communication tools and products that help to save time and gain scope incorporating ex-ante and in-situ facilitation through its deferred and emergent sub-features:

- **Deferred:** A deferred dialogue is a written dialogue that takes place delayed in time between researchers and young co-researchers sharing a specific research output and the other territorial actors with whom they want to share it with. A deferred dialogue needs ex-ante facilitation, which means that it needs to be self-explanatory and reduce barriers that may

emerge from participants' different contexts, profiles, backgrounds, disciplines, etc. This sub-feature can be planned ahead (like frozen meals that are later just placed in the oven).

- Emergent: An emergent dialogue is facilitated in situ by researchers and young co-researchers. It may take different forms (virtual or non-virtual). It is dynamic, ongoing and changing and cannot be planned ahead.

Ideas for transformation objectives:	Challenges for transformation objectives
<ul style="list-style-type: none"> • Regular time to reflect on whether communication strategies are working; • Decide with young co-researchers what is important to communicate to stakeholders, public etc; • Innovative ways of communicating with public/policymakers/wide audiences - exhibitions; • News articles, ask policymakers to attend an event arranged by young people; • Continuous dialogue that enables a shared language and reduces barriers; • Giving voice to the youth in the final for a and national workshops; • Continuous communication; • Achievable goals; • Adapting youth's own channels; • Sign language and other methods to include hard of hearing groups; • A diverse toolbox of dialogic objects: making stuff together; • Virtual dialogue using zoom, breakout rooms and jamboard; • New tools and approach to communication (film, drama, apps); • Decide with young co-researchers the social media channels; • Plan an exhibition to inform society, mixing photos and explanations of research outcomes; • Send out newsletters; • Publications and conferences. 	<ul style="list-style-type: none"> • Being aware of, and responsive to the needs and preferences of different target groups; • Set common ground of specific words and meanings; • Avoid using specific language without previously clarifying it.

3. Inclusive. RRC is about helping other actors and researchers to make their research results actionable in their own contexts so, by definition, it is open to the views, reflections, approaches, knowledge and perspectives originally excluded from the research output that is being communicated. It is perceived as meaningful and relevant to the participants and communicated with empathy and respect for difference.

Ideas for transformation objectives:	Challenges for transformation objectives
<ul style="list-style-type: none"> • Co-creative approach to communication process/planning with YCS; • Planning communication to be delivered to youths, by youths; • Dialogues to be established across researchers and local groups; • Encourage YCS to participate in communication activities; • Include YCS with skills in visual and social media communication; • Use diagrams, icons, visuals, to communicate; • Produce communications in the languages used locally, as well as English; • Many voices heard, especially of YCS; • Communication plans should include youths from all the social groups involved in the case; • Hard of hearing group should validate and control communication; • Build trust between the research team (specially the pre-doc and the youth); • Collaboration in publications, blogs, press, communications, conferences, participation in events; • Make YCS participants in relevant meetings at the local, national and European levels whenever possible; • Dissemination dimension: publications, films and other research outputs should be reflective on the youth's need; • Cooperative groups -trust, solidarity, respect for each other's rights, everyone should benefit from being in the group; 	<ul style="list-style-type: none"> • How to measure impact/outreach of communications (e.g. number of interactions/likes/followers); • The app and the other research methods adopted will be crucial; • Not everyone of the YCS might be interested in the communication or face hurdles (e.g. being shy/afraid to interact publicly); • Some means of communication may not be interesting for particular stakeholder groups.

<ul style="list-style-type: none"> Communicating in teams -ensure different ways of communicating (e.g. visual methods and well as spoken ad working individually and with small groups as well as large ones). 	
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4. Sensuous. Words are not always what helps youths communicate best and other ways of experiencing and expressing knowing need to be considered, including the tactile, audible and visual.

Ideas for transformation objectives:	Challenges for transformation objectives
<ul style="list-style-type: none"> Walkalongs to discuss location-based findings; One of our stakeholders is a city museum that will be a venue for exhibiting results; Personal meetings with parent with coffee and cake; Have young people take stakeholders and policymakers for a walk around the community and tell them about concerns; Reflecting emotions: through lived experience and photos; Hard of hearing should validate and control communication; Capture what we are doing in different ways -a photo or artwork can communicate much more than formal writing; Think about visual and sounds as well as spoken words (Including on public tools such as the website); Make a film (we are hoping to document our case by engaging students from film/media/journalism in the project) the Spotteron app will help by mixing photos and emoji/reactions; Consider communication activities in digital formal, like videos etc; Create some graphics with youths; Produce visual materials: theatre, photo and video. 	<ul style="list-style-type: none"> Maybe YCS will not be willing to disclose their feelings and emotions; Ethical issues to be addressed: no people in photos without Informed Consent (IC); Being careful about the language used.

5. Collective. Keeping the dialogue alive is a collective responsibility and depends on the extent to which all participants find that their participation makes sense, is valuable and meaningful.

Ideas for transformation objectives:	Challenges for transformation objectives
<ul style="list-style-type: none"> • Exhibitions or social media output that invites responses from larger audience; • Collective value will depend on target/stakeholder group -different needs/values must be considered; • Think of different circles: YCS, stakeholders, local society, research community; • Ask youth at the beginning of the dialogue what they care about when thinking of the topic they want dialogue about; • Regular dialogues define the collective; • Local languages and definitions are applied at collective level; • Planning communication to be delivered by youths to youths; • Planning contents, formats, and opportunities for dissemination and communication with youths; • Co-created products such as blogs and articles; • Activities that can be done together to bring together ideas and understand each other - something that grows with the project e.g. graffiti wall; • Monitoring participation in the platform and fora; • Always reflecting on the value of the communication activity: is it worth it? For whom is it valuable? 	<ul style="list-style-type: none"> • Unwillingness of all stakeholders to participate in communication and dissemination activities; • Research concepts might not fit into the meaning-making of youth might clash with local collective ideas and used vocabulary.

3. Co-evaluation and impact assessment for creating and measuring social change

An important part of the YouCount project is to evaluate the process of conducting of hands-on Y-CSS and measure its outcomes and impact. Thus, this part presents a co-evaluation and impact assessment framework for creating and measuring social change in the YouCount project. The design of evaluation will be built on co-creative perspective, meaning that young people will be included evaluation process. In this chapter we will present basic principles of YouCount evaluation framework (for more detailed description see Juricek et al., 2021³) and impact assessment. The YouCount project will also conduct a cost-benefit assessment of Y-CSS based on a broad multi-criteria framework, which will be developed in later stages of project implementation.

3.1. Pillars of co-evaluation and impact assessment in YouCount

The aim of the evaluation in YouCount is to evaluate impact assessment and how co-created citizen social science worked across the cases as well as within each case, focusing on both, process- and outcome-oriented, criteria. In all these pillars of the evaluation and impact assessment (within- and cross-case analysis, process- and outcome oriented), citizen scientists are involved as well, leading to the co-created character of the evaluation. They therefore can and should also contribute to the choices of criteria to evaluate, especially since the criteria important to the citizen scientists may differ from those researchers would usually consider.

The evaluation and impact assessment per case allows to consider the special characteristics of each case, which is especially important since the cases cover different questions and expected changes. The cross-case evaluation allows to assess how citizen social science worked in YouCount, which changes and effects were produced across the different dimensions, and can show what we can learn from YouCount for future CS projects. Since the cases differ in their research questions and in the youths that participate the cases are likely ending up with different foci as well as different methods used, which is a challenge for the cross-case evaluation.

The process evaluation assesses the implementation of citizen social science and allows capturing the information on how impact is progressing along the steps of the process. Criteria for the process evaluation develops around the strengths and weaknesses of the project and include the recruitment and involvement of the citizen scientists, the collaboration and communication between researchers and citizen scientists, as well as scientific, ethical, and methodological facets

³ Parts of this chapter are a reprint of Juricek, S., Freiling, I., Matthes, J., & Lorenz, U. (2021, forthcoming). Co-evaluation of citizen science: A framework proposed by YouCount.

of the collaboration and the data management. Criteria for impact develops around the changes that project outcomes produce at the scientific, participant, and socioecological and economic dimensions. This, therefore, also encompasses social change explicitly. The process evaluation consists of self-evaluation reports of the research team per case, recording of the costs (for a cost-benefit evaluation), and visits of each case by the evaluation team. To facilitate impact assessment progress analysis, a tiered level system will be used to reflect on the maturity of the indicators.

Both, process and outcome evaluation will be used for an impact assessment focusing on dimensions and indicators that should be considered in future citizen science projects. Regarding impact in citizen science, both evaluation approaches are important as impact is related to understand the short- and long-term effects and outcomes (outcome evaluation) that are a consequence of the project activities or outputs (process evaluation).

3.2. Aims and Methods

Following a citizen science evaluation framework developed by (Kieslinger et al., 2018), YouCount conducts a process- as well as outcome-oriented evaluation. For the process and feasibility, the scientific aim is to reach scientific quality and openness in the collaboration, while the aim for participants from a researcher perspective and the socio-ecological and economic aims are an active and equal collaboration. The aim for the participants may differ though, when considering not only the perspective of professional researchers for this aim (i.e., active and equal collaboration), but indeed considering the perspective citizen scientists themselves have on the aim for participants. To get to know the citizens' aims, we, therefore, need to start working with the research citizen scientists on that and openly ask about their aims. For outcomes and impacts, the scientific aim is to advance scientific knowledge, the aim on the dimension of participants is from a researcher perspective to shape individual knowledge (of citizen scientists and researchers alike), and attitudes and behaviours towards the topic of the project (and the perspective of the citizen scientist may differ here, again) and science in general, and the socio-ecological and economic aim is to influence youth-focused policy-making as well as create social innovation.

YouCount added a new aim for the outcome evaluation from the perspective of participants, since participants may decide at some point that they are not only participating on their own but that they actually are a collective, a group. If participants decide to be a group, the individual participant perspective might therefore not cover every aim they pursue as a group. Because this group and their aims is driven by participants, we as researchers do not know in beforehand what exactly those aims would be, leaving this is a placeholder to be filled in with participants later. However, with the use of focus groups, we can prompt the participants with some questions and therefore measure this, if a group thinking emerges. Assuming a group thinking emerges, this also means that the aims we evaluate vary from the micro level (e.g., individual participant) over the meso level (group thinking) to the macro level (society), making the evaluation as comprehensive as possible.

By summarizing the aims, Table 3 provides crucial and clear input for Figure 6 and Figure 7, which show for outcomes and process evaluation, respectively, how the aims will be reached – by (a) employing which methods and (b) evaluating which indicators during the lifespan of the YouCount project.

Table 3. Aims per evaluation type and category.

DIMENSION	PROCESS AND FEASIBILITY	OUTCOME AND IMPACT
SCIENTIFIC	Scientific quality and openness in collaboration	Advancing scientific knowledge
	Professional researcher perspective: Active and equal collaboration	Professional researcher perspective: Shaping individual knowledge, attitudes, and behavior towards topic and science
PARTICIPANT	Citizen scientist perspective: [can only be filled in by citizen scientists]	Citizen scientist perspective: [can only be filled in by citizen scientists; has individual and group level, with group level meaning becoming a collective]
SOCIO- ECOLOGICAL AND ECONOMIC	Active and equal collaboration	Social innovation; youth-focused policy-making

Both, Figure 6 on the outcome evaluation and Figure 7 on the process evaluation are organized around the time span of the project that is divided into the pre-case-implementation phase, the case implementation phase, and the post-case-implementation phase. The methods might include focus groups, interviews, dialogue forums, local living labs, national workshops, and the data collection via an online platform.

Above the timeline (at 2024) is a box showing when an external evaluation through an online expert panel meeting and an ECSA workshop will be conducted. Furthermore, above the timeline are the specific evaluation methods also pointing to the timeline to indicate when they will be applied. Figure 6 covers those that are focusing on the outcome evaluation, while Figure 7 covers those of the process evaluation. However, some evaluation aims might require using methods that were originally planned to inform the other evaluation type (either the process- or the outcome-oriented evaluation). The evaluation and impact assessment methods that are analysing other case study or evaluation methods are, for reasons of clarity, not pointing to a point on the timeline as well. Due to the co-creative nature of citizen science, the aims, methods, and indicators will be refined or

developed during the process of CS, meaning with input of citizen scientists. The grey dashed lines indicate which of these boxes will be done in which phase of the case implementation. In Figure 6 the box on the aim to create societal and ecological impact and social innovation crosses the border of the case implementation phase and the post-case implementation phase, as it relies, on the one hand, a lot on the focus groups that will be conducted during the case implementation phase. On the other hand, this aim will also be reached by using the self-evaluation reports. Those self-evaluation reports that will be considered here, are the ones written during the case implementation phase and – especially concerning impact – after the case implementation phase.

There is also a box on an aim, “Cross-case evaluation of employing citizen social science”. The cross-case evaluation was not accounted for in the Citizen Evaluation Framework (Kieslinger et al., 2018), but it plays an important role in YouCount. The cross-case evaluation focuses on how citizen social science was employed, how well it worked, and what we can learn from YouCount for future CS projects, also involving learning potential due to cross-collaboration. In short, the cross-case evaluation assesses the process, even if it will be mainly done after the case implementation period. We, therefore, added this part of the evaluation to the process evaluation in Figure 7. Note, however, that in the cross-case evaluation YouCount also consider data generated using methods of the outcome evaluation. Methods included in the cross-case evaluation are self-evaluation reports, individual interviews, the cost-benefit analysis, focus groups, the pre- and post-survey, as well as the analysis of that collected via the online platform.

3.3. Impact assessment

Following the impact literacy concept (Bayley & Phipps, 2017), the six guiding principles for a consolidated Citizen Science Impact Assessment Framework (Wehn et al., 2021), and based on the discussed challenges regarding impact assessment, we suggest defining a tailored approach for YouCount to the impact assessment that will be embedded within the co-evaluation and impact assessment framework of YouCount:

- The **What** refers to the identification of the changes or effects arising from our research, the identification of metrics, understanding the timescales and the evidence of the effect. Ex-ante impact assessments can capture the baseline and allow monitoring progress from there (principle 1, Wehn et al., 2021). A starting point for such a reflection comes from YouCount’s approaches to impact assessment and from project activities in line with the European Commission’s policy priorities. To avoid silos in the impact dimensions, reflections on the causal relations between dimensions, outputs, and outcomes can be done at the beginning of the research process (principle 2, Wehn et al., 2021).
- The **How** refers to the method and means to create impact. The methods fall in two categories: the dissemination methods and the co-production methods.

As citizen science is rooted in the co-creation of research by professional scientists and non-expert volunteers, it is, in essence, a process in which impact may be taking place all over the process. Monitoring impact will be crucial to capture the effects of the research process in the different dimensions of impact. Data collection methods and sources will provide the evidence of impact through the methods described in the co-evaluation approach of YouCount.

The monitorization method will be embedded within the process and outcome evaluation method proposed in YouCount, and the first stages of the method can be focused on the agreement and shared vision of the expected effects of the project (principle 3 and principle 5 in Wehn et al., 2021). Proposed implications for the evaluation framework in YouCount:

- In the pre-case implementation case, the approach to impact assessment needs to be shared and agreed upon with YCS and RCS in the first steps of the evaluation process. Due to the co-creative nature of citizen science, the impact goals and metrics should be shared and agreed upon between participants. The process and outcome co-evaluation of YouCount will consider these elements. For YouCount, impact will be defined as the changes that the project initiatives are producing in the different dimensions (scientific, participant, as well as socioecological and economic) in the short and long term. Outputs will be a consequence of the project activities. So, it needs to be defined what societal impact means to YouCount and what does it mean for the different participants. A shared understanding of that was already co-defined in the project proposal where YouCount was committed to address some of the complex challenges posed by the United Nations Agenda 2030 and the RRI concept.
- In the case implementation phase, to understand how impact progresses, indicators, or measures at each stage of the research process should allow capturing progress and understanding the pathway to impact starting from project activities. Providing the same structure and points of reflexivity will allow reflection, data collection, progress towards impact, and cross-case analysis. The method proposed for the impact assessment is framed within the framework of the Co-evaluation method of Youcount. To allow reflection on impact progress, a tiered level system will be used to reflect on the maturity of the indicators, and it will be used for the self-evaluation reports and other methods (principle 6 in Wehn et al., 2021).
- In the post case implementation phase, the cross-case analysis of impact assessment will be conducted.

The Who refers to the PRI (practitioners of the research impact) that have the ability and skills to guide the research process towards impact (following the impact literacy concept). The implications for a citizen science project are multiple in this regard as one of the specific features of this science is the participation of non-professional scientists in the scientific research. In the case of YouCount, impact assessment will consider the perspective of the YCS in addition to the perspectives of other participants in the process. This is especially critical as one of the dimensions of evaluation and impact assessment is that participants will benefit from project activities. Therefore, YCS will play a central role in impact assessment

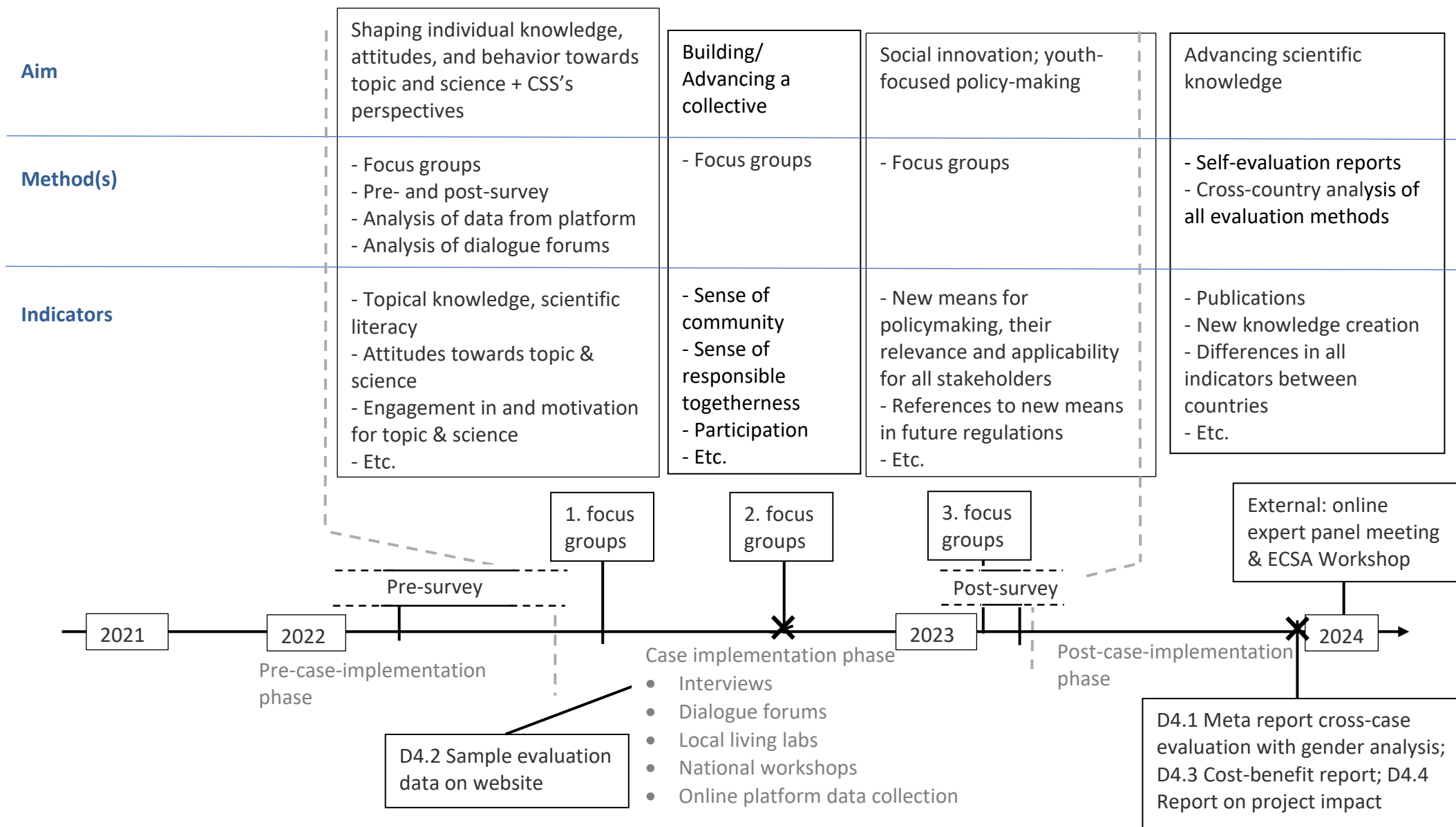


Figure 6. Initial framework for Outcome evaluation in YouCount

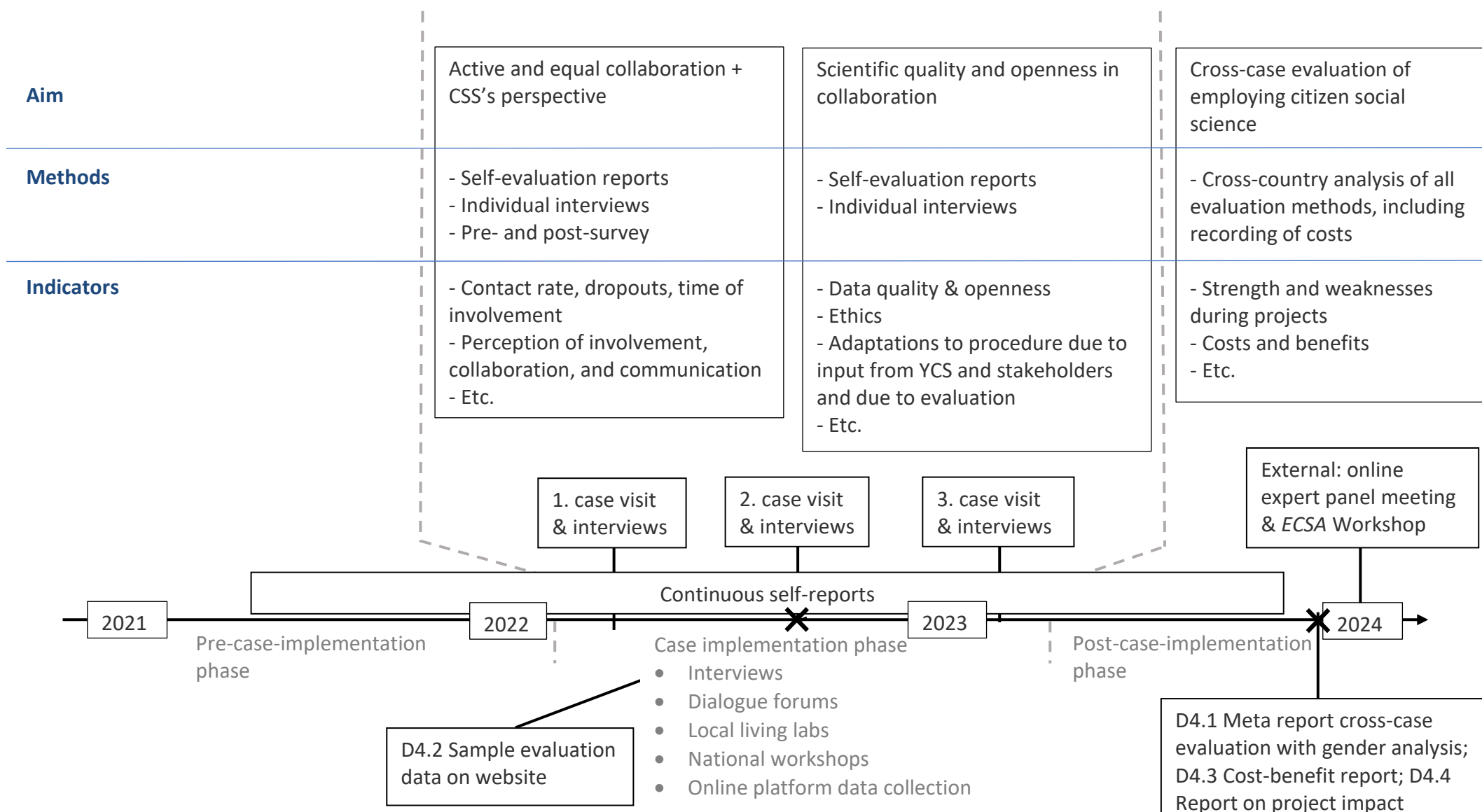


Figure 7. Initial framework for Process evaluation in YouCount.

4. Ethical framework of Youth Citizen Social Science

This part describes the ethical framework of Y-CSS in the YouCount project. As citizen science is a relative young methodology, the general principles of research ethics apply only to a certain extent (Rasmussen, 2021). Ethics in CS requires consideration to the specific character of CS as participatory research involving young people with a dual role, i.e. the one of research participants and researchers. This ethical framework consists of three parts: (1) it discusses the key ethical principles of traditional research with a critical reflection on their applicability to CS; (2) it describes some typical challenges and risks that the project consortium will consider in their research process based on the literature review; and (3) finally, mitigation strategies from the perspective of Y-CSS are proposed.

4.1 General research ethics principles and their implications to CS

The key principles of research ethics involving human subjects include autonomy, dignity, justice, beneficence/non-maleficence, and care ethics (Koepsell, 2017). All the principles are interrelated and mutually supportive.

The principle of autonomy means that decisions and actions made by researchers and research participants are driven by free will and rational agency, making informed choices to engage into or withdraw from research activities. The dignity principle rests on Kantian ethics which holds that all human subjects must be treated as ends in themselves not only as means to ends. Research participants are usually means to some end, therefore, informed consent is crucial for protecting research participants' rights. All the procedures related to securing privacy of personal data are further steps to ensure dignity of research participants and security of their private lives.

Citizen scientists' dignity is traditionally addressed by informed consent. Yet, as Rasmussen (2021) argues, the principle of respect to participants' dignity is valid just to a certain extent, i.e. while citizen scientists are treated as data sources. Yet, when they perform the role of researchers informed consents may no longer apply, in particular, if they collect data from still other research participants.

Another implication to CS stemming from traditional research ethics is consideration of vulnerability of citizen scientists as part of the respect to research participants' dignity and justice principles. The vulnerability aspect of research participants has been addressed in D6.6 of the YouCount project, yet, shortly put, it is both a given/categorical (e.g. historically developed by being oppressed and denied of rights) and a situational/contextual (e.g. stigmatisation and discrimination as a result of

poor research designs - Panelfit, 2021) characteristics (Gordon, 2020). In practice, vulnerability of citizen scientists presupposes the obligation for professional researchers to rely on the principles of inclusivity (e.g. identifying proper advertising strategies to attract and recruit volunteers), adaptability (e.g. giving specific considerations to enable vulnerable research participants to make informed consents), sensitivity (e.g. to community needs for recognition or prior history of disempowerment), safety (e.g. by distributing the research tasks fairly), and reciprocity (e.g. considering other than financial benefits for contributing to research) (Chesser et al., 2020). This means the need to present the information about the research beyond a textual form, e.g. in pictures or audio records if research participants are illiterate, cannot read in a particular (foreign to them) language or because their vision is impaired, and explain potential risks in the language that they understand. In addition, particular groups such as minors may require consideration of legal obligations to rely on their parents or guardians for informed consent. Importantly, when realizing the justice principle researchers should not to act in an overly protective way so that that a vulnerable group's voices would not be eliminated from research.

Moreover, when it comes to vulnerability in traditional research, it is usually individuals which vulnerability is considered. In CS, a community's vulnerability may be in focus as well (Rasmussen, 2021), in particular, where social change in communities of, e.g., rural youth, ethnic minorities, immigrants is targeted. These groups may already be socially and economically disadvantaged or even discriminated and stigmatised.

Respect to citizen scientists as researchers and justice to their contribution has implications to the principles of authorship. There are cases where professional researchers did not properly acknowledge the contribution of citizen scientists in research papers or reports, undermining their trust and motivation to participate in further CS projects (Chesser et al., 2020; Rasmussen, 2021). Respect and justice principles demand from professional researchers to give credit to citizen scientists who have made substantial contribution to the research. Drawing on the authorship guidelines developed by International Committee of Medical Journal Editors (2021), which are also applied by the Committee on Publication Ethics (COPE), authorship is based on substantial contributions to the conception or design of the study, acquisition, analysis or interpretation of data for the study, drafting the study or revising it critically for important intellectual content, final approval of the version to be published agreement to be accountable for the study, meeting the principles of accuracy and integrity of the entire study. Finally, the justice principle imposes a moral obligation to both professional and CS researchers to report the findings not only in research papers but also to the communities in which they acted or/and collected data (Rasmussen, 2021).

Precautionary measures not to harm the quality of life of research participants also define the non-maleficence principle (Koepsell, 2017). The beneficence principle holds that research is carried out to solve some issue and promote wellbeing not only of research participants but society at large, creating positive social impact via research activities. Beneficence implies the necessity of reliable and validated research methodologies and rigid research methods to achieve expected research

outcomes. In addition, beneficence accounts for the need of proper compensation for research participants, also ensuring the principle of justice. Compensation of costs safeguards against the exploitation of, often volunteering, citizen scientists (Tauginienė et al., 2021). In addition, the beneficence principle sets the obligation to citizen scientists and professional researchers to agree on the ownership and sharing of the collected data. This agreement is seen as a precautionary measure against premature or accidental release of the data and helps to secure public trust in science.

Finally, the principle of care integrates the other four principles, and obliges researchers to consider contexts of the research process and, for example, react to sensitive information discovered during the research, seek for dynamic informed consent from research participants. In particular, in citizen science, where research participants also act as researchers, yet, without formal training and respective remuneration, the principle of care raises a normative requirement to professional researchers to act as trainers and mentors to citizen scientists, responding to potential changes in their personal and professional environments.

4.2. Challenges and risks of ethical Y-CSS

Certain challenges and risks to conducting YCSS in the YouCount project stem from the traditional research ethics. Securing confidentiality of personal data and hence enacting non-maleficence and respect to research participants principles is among key points addressed when applying for ethical approval. Procedures for personal data managing such as processing and storing are rather well set in the institutional designs of the partner institutions (discussed in more detail in D6.2 of the YouCount project). The key consideration is to ensure that personal data and any documents related to it (e.g. coding of research participants) are kept separately from research data in an institutional password-protected data cloud or institutional computers with limited access and deleted after an agreed period of time.

Yet, a challenge with respect to personal data in the YouCount project relates to the plan to use mobile devices for CS research. Although the data that are planned to be collected by young citizen social scientists (Y-CSS) in the project do not seem to pose risks from the perspective of the location where research is carried out (e.g. in contrast to data related to environmental pollution produced by large companies) nor do they relate to extinct species when locating them could also pose risks to the species (cf. Rasmussen, 2021), yet, the geolocation data and metadata of the research participants through pictures are collected. As noted by Rasmussen (2021), ethical commissions may treat these data as personal data, although a mobile device is just conduit of data for building social inclusion in a community. Moreover, when registering to YouCount App on the SPOTTERON platform Y-CSS may authenticate themselves by real names and pictures. Still another risk of violating a third party's privacy may arise if Y-CSS take pictures of community members in, e.g. community events in a way that their identity can be recognized.

Informed consent in YouCount may also raise certain challenges from a procedural viewpoint when applying for ethical approval in academic institutions. The project consortium is planning to collect personal data of two groups:

- Young people (13–30 years of age at the time of recruitment), either as researchers-young citizen scientists (R-YCS), at least two per case country, or community young citizen scientists (C-YCS). The data of the latter will be collected both in written form when recruiting them in different events or digitally via the YouCount Citizen Social Science app on the SPOTTERON Citizen Science Platform (as agreed in each case).
- Local stakeholders participating in the local living labs (LLs, e.g., community administrators, policymakers, social workers, local social entrepreneurs, local influencers, youth councils/centres, non-governmental organisations [NGOs], youth/migrant organisations, city museums) whose personal data will be collected for maintaining the contact throughout the project and carrying out co-creative activities for social change as well as monitoring and evaluation of the project outputs and outcomes.

This means that at least two templates of informed consent must be prepared by professional researchers when they apply for ethical approval for CS research. More importantly, a third template may be needed if Y-CSS are going to interview other community members or collect their personal data via any other research method when the project team will be evaluating the social impact of the YCCS research and co-creation of social change. Furthermore, if both Y-CSS and professional researchers are going to approach research participants through communities which have their own governance body, consent from this body will be needed. For example, if Y-CSS are going to be recruited at high schools, consents to present the research to candidates from school principals will be needed. These potential challenges oblige the research teams to allocate considerable time to the process of getting all informed consents.

Another challenge in the project arises with respect to the justice principle. YouCount aims at building social inclusion through social belonging and connectedness, participation in democratic processes, therefore, Y-CSS' participation is expected to be long-term (e.g. at least one year) and include diverse activities, beyond just data providing or collection. This may become excessively demanding of citizen scientists. Although their withdrawal is guaranteed by the informed consent, withdrawal may significantly undermine research quality and the social change the project aims to build. Some Y-CSS may possess social capital to the communities they represent and be highly trusted, which may be lost with their withdrawal.

Still another challenge to enacting justice relates to financial compensation for Y-CSS as research participants' time or other incurred expenses in research activities (e.g. transportation costs). As the YouCount funding rules do not allow financial compensation to Y-CSS, the consortium partners have to consider other-than-financial rewards for keeping Y-CSS motivated during the research. As noted in the section on ethical principles of traditional research, the justice principle imposes a moral

obligation to report the findings not only in research papers but also to the communities in which they acted or/and collected data (Rasmussen, 2021). Yet, this obligation is not unambiguous. On the one hand, research ethics commissions may see risks of harming the studied communities with published negative findings (e.g. if the findings reassert some social stereotypes rather than demonstrate change in attitudes or skills) about, e.g. ethnic minorities such as Roma people or immigrants who typically experience social exclusion. On the other hand, it may be the studied communities themselves through their governance bodies that object dissemination of such findings beyond local presentations. Both cases may undermine the professional researchers' situation who are nevertheless oriented towards publishing the findings from 2 or 3-year research process in peer-reviewed journals to maintain and/or progress their academic career. However, such scientific publications may build upon anonymised data. Publishing research findings as grey literature may undermine the credibility of the findings from CS research.

The beneficence principle as positive impact of CS on society also contains some ethical risk. In general, citizen scientists, in contrast to professional ones, are not governed nor monitored by, e.g. research institutions nor are they accountable to public funding bodies for research quality or producing certain output promised in the research proposal. The occurrences of research malpractices in citizen science (e.g. Rasmussen, 2019; Roy and Edwards, 2019) strongly undermine academic community's and society's at large trust in citizen science. This means that if unexpected harms occur they will have to be remediated by professional researchers and their institutions. Moreover, professional researchers must also be prepared to take the responsibility for failing to ensure proper control to collect quality data in their institutions.

There are documented cases which explicitly warn of potential risks which may arise due to citizen scientists' conflicts of interest when performing research, which may result in flaws in citizen-sourced data, deviations from standard protocols and biases in research setting (Rasmussen, 2019; Resnik, 2019; Roy and Edwards, 2019). As Rasmussen (2019) notes, professional researchers must not ex-ante distrust citizen scientists as being biased when they explicitly express commitment to the place or motivation to pursue environmental or social justice through co-creation. The ethical values at the basis of co-creation may be helpful in achieving the change. Yet, professional researchers must also exert control to avoid the risks of non-representative data collection, falsification of data to obtain relief resources to the community, gain media attention, or support erroneous scientific conclusions (cf. Roy and Edwards, 2019).

4.3. Mitigating risks of Y-CSS in YouCount

In the YouCount project, Y-CSS will not be just data collectors, which may lead to a feeling of not being included (Rasmussen, 2021) or being just a means to an end. They will have an opportunity to develop research questions and strategies for social change in their community. This should secure the principle of research participants' autonomy.

To mitigate the risks of violating personal data confidentiality, privacy and well-being of Y-CSS as well as communities represented by them, every partner institution will apply for ethical approval from the institutional research ethics committees where they are available. In the absence of this body in certain partner institutions the approval issued by the coordinator's ethics committee will cover their research activities as well. The informed consent procedures and contents are addressed in more detail in the project's D6.6 and D7.1.

Other ethical and legal issues related to personal data privacy are addressed by the project data management plan in D6.2. In all cases, a general principle of data minimisation will apply. It covers both personal data of research participants as well as research data. The YouCount App will not collect any technical nor personal data via cookies. When registering the research participants will be advised to use nicknames and avatars instead of real names and photographs. Contact information such as email address will have an option to be marked as public or private. The Consortium has an App data administrator group with one appointed researcher at each case institution that are responsible for data procession.

Dynamic informed consent (Tauginienė et al., 2021) will be sought after in YouCount. Different forms of informed consent for a) citizen scientists and their parents/legal guardians to be signed together, which is described in more detail in D6.6., b) local stakeholders who will be participating in the living labs, and c) any other research participants as data providers will be prepared in the project.

As some of the project citizen scientists reside in economically less developed rural area, efforts will be made by each case team to properly acknowledge their participation in research to maintain their engagement and motivation for research. To keep Y-CSS engaged, the project partners have planned some budget for YCSS travelling to partner meetings. Some consortium partners will be relying on cooperation with youth non-governmental organizations who can issue certificates for acknowledging civic activities. These certificates can be used when applying for study programmes at higher education institutions. In addition to country-specific benefits from participation, all youths will be offered diplomas and references they can use when seeking places on university courses or on their CV, since this can contribute to increasing employability and employment opportunities.

To ensure that research is not affected by vested interests, statements of interest disclosure will be prepared by the consortium to be signed by citizen scientists. Y-CSS will be given instructions on the steps to be followed once sensitive information about the community is revealed or motivation to advocate community interests start interfering with sound research practices.

To avoid the risks arising from Y-CSS' lack of professional training in research methodologies and techniques, the project consortium will exploit strategies for increasing data credibility of CS as proposed by Freitag et al. (2016). The strategies are grouped under the categories of early actions,

in the field and in the office. Below the guidelines suggested by Freitag et al. (2016) are applied to the research planned in YouCount.

As suggested by Freitag et al. (2016), in early actions the following strategies should be adopted:

1. **Prior expertise:** Setting the formalized minimum standards for recruited volunteers' skills or knowledge is advised. In YouCount, some prior experience in social science research will be expected from R-YCS, while none from C-YCS and they will be trained. Rather, other criteria such as gender diversity will be relied in recruiting Y-CSS. The partners will apply different strategies for recruiting Y-CSS (for more detail, see D6.6.). Once recruited, roles and responsibilities, access to data will be clarified in the induction training.
2. **Training:** The project teams are advised to invest time in volunteer training. In YouCount, training will specifically focus on data collection, processing, and analysis to increase social science literacy of Y-CSS. Y-CSS will also be informed about collecting data in the form of photographs.
3. **Science advising:** The partnering with a university lab, a science advisory team, or other formal arrangement is proposed to ensure credibility of data. In YouCount, the Safety and Ethics Board as well as the Advisory Board of the project will be relied on, besides institutional research ethics committees. Students as R-YCS will be offered supervision and all Y-CSS – the opportunity to be involved in 'real research' and contribute to change in a community.

In the field, the strategies embrace the following:

4. **Ranking system:** It is advised to appoint more experienced/trained citizen scientists or those who have worked in the project for some time to act as experts in CS. In YouCount, Y-CSS may join the project at different levels. To ensure that there are "experts" to provide advice to new-comers, R-YCS will be recruited from University settings (Master or doctoral students). R-YCS will be motivated to work in the project by the opportunity to develop their own research projects/theses.
5. **In-person oversight:** It is proposed that the responsibilities of "expert" citizen scientists embrace data collection control to minimize data collection errors. In YouCount, the national teams will designate R-YCS to directly oversee data collection and cross-checking the data. However, as R-YCS may not be that experienced to control data bias, the professional researchers will also be responsible for the soundness of research processes for quality data.
6. **Retraining:** Extra training or self-study resources during the project is advised. In YouCount, advancing YCSS skills through extra or advanced training will guarantee continual learning. Living labs will also embrace advancement of knowledge and skills.
7. **Technological aids:** Technologies are regarded as instruments for simplifying data collection. In YouCount, challenging forms of data collection will be simplified by collecting data via YouCount app on SPOTTERON platform.

When back in the office, strategies include the following:

8. **Validation of observations:** It is advised to check the data for human error and statistics-driven flagging of incorrect data. In YouCount, professional researchers in partner institutions will ensure validity of the collected data.
9. **Cross-comparison:** Comparing the data collected by Y-CSS and professional researchers is advised. In YouCount, side-by-side comparisons of citizen science data with data collected by professional researchers in partner teams will be relied on to document credibility of the methods and data.
10. **Publication:** Peer-review journals are recommended as sources for disseminating the research findings. In YouCount, the results of the case studies are planned to be published in peer-reviewed respected journals.
11. **Management:** It is advised to present research findings to decision makers so that they produce change. In YouCount, all cases will establish and make use of local living labs to embrace local knowledge and expertise as well as co-create innovations and policy-making. The design and innovative function of the living labs in each case will be flexible and adjusted to the targeted social issue, youth group and local context. Living labs will serve the purpose of co-creating social change together with decision (policy)-makers and implementers who will meet in person at a place that is most suitable to them.
12. **Quality assurance protocol:** It is advised that professional researchers develop protocols to develop standards for proper CS practices. In YouCount, the project consortium will prepare standard quality assurance protocols to calibrate methods, technology, and practice over time. Self-reflection journaling may also be employed for comparing research processes in the cross-comparative cases.

Summary and conclusions: theoretical framework to analyse Y-CSS

As shown by the framework description above, the YouCount project will apply a broad contextual and multilevel approach to Y-CSS and social inclusion. The Figure 8 shows how all these sub-frameworks are interconnected. As showed in Figure 8, conceptual framework presents the main concepts and innovative approach of YouCount. This is done in the perspective of methodological framework of co-creation. The evaluation framework will be applied for conceptual framework and methodological framework of co-creation. Finally, YouCount applies general ethical framework for all project activities.

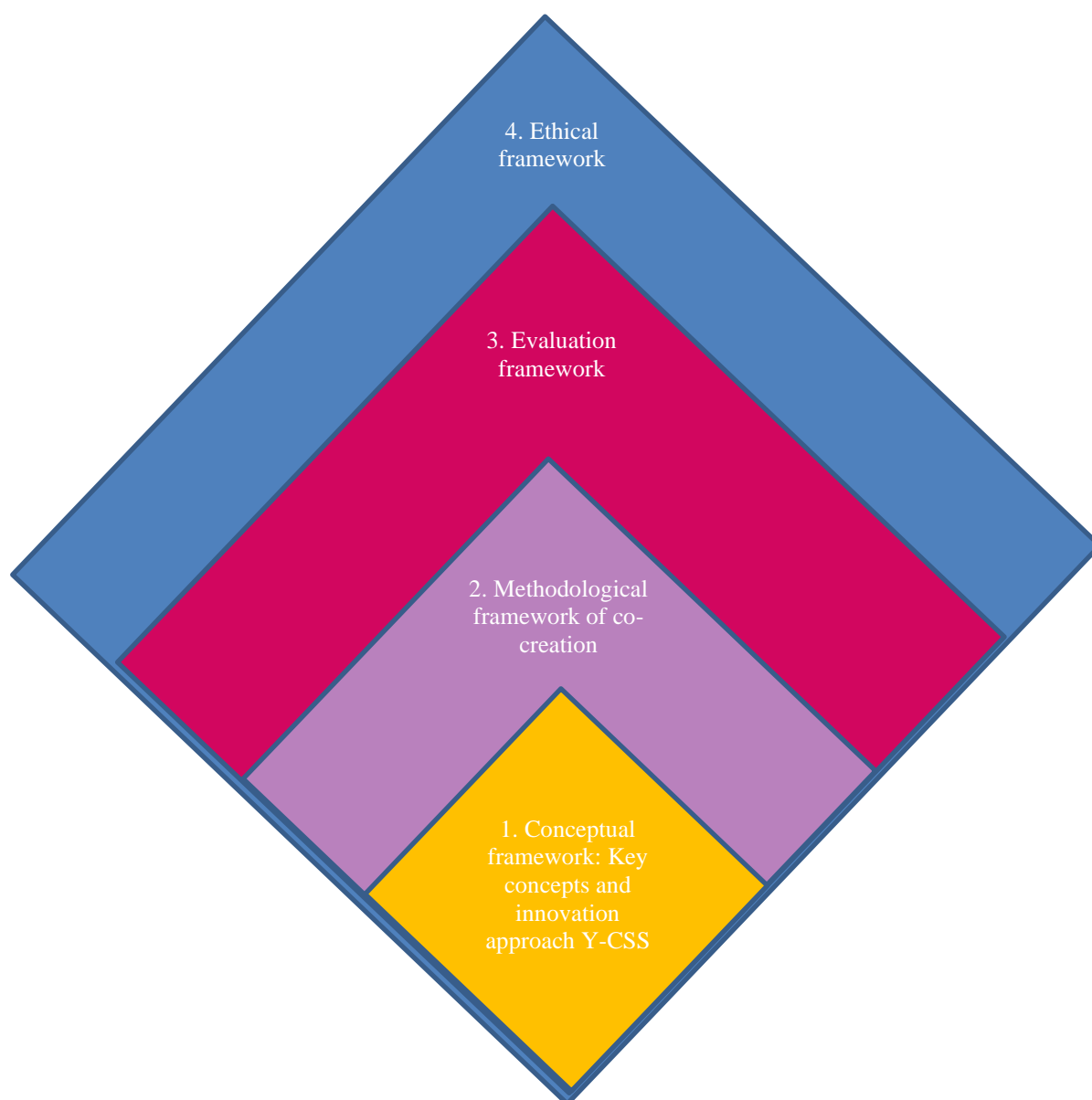


Figure 8. The overall frameworks of YouCount to analyse social inclusion through application of Y-CSS

1. Conceptual framework: Key concepts and innovation approach Y-CSS

@ Social inclusion is both a process and a goal and it is often referred to as the social exclusion-inclusion continuum.

@ Social inclusion is defined as the extent to which individuals are able to achieve their needs and fulfil their interests

@ The mechanism to pursue social inclusion is through youth empowerment.

@ One of the innovative ways to empower youth is through applying citizen social science.

@ Citizen social science might be interpreted as social innovation or as a tool aiming at social innovation

2. Methodological framework of co-creation

@ The action research for territorial (place based) development (ARTD) framework and Responsible Research Communication approach will be used in YouCount.

@ Innovation forums (such as LL) are based on principles for democratic dialogue: principles for how to participate in a dialogue and who can participate in it.

@ Participants need to change their communication patterns from linear to dialogical patterns.

@ Responsible Research Communication is a dialogic process, which is collective, sensuous, inclusive, smart and change-oriented.

3. Evaluation framework

@ The evaluation and impact assessment in YouCount (1) is focussed on within- and cross-case analysis, and (2) is process- and outcome oriented.

@ The evaluation and impact assessment will include analysing the co-created character of the evaluation.

@ The outcome evaluation and impact assessment is implemented using a tailored for YouCount approach, emphasizing 3 dimensions: What, How and Who.

@ The process evaluation assesses the implementation of Y-CSS and provides information on how impact is progressing along the steps of the process.

4. Ethical framework

@The general principles of research ethics will be applied involving human subjects include autonomy, dignity, justice, beneficence/non-maleficence, and care ethics.

@To mitigate risks of Y-CSS in YouCount the following strategies will be adopted: in general (Prior expertise, Training, Science advising), in the field (Ranking system, In-person oversight, Retraining, Technological aids), in the office (Validation of observations, Cross-comparison, Publication, Management use, and Quality assurance protocol).

This document outlines the general strategy and framework for empirical study and will be developed into more specific framework of youth involved CSS during the implementation of empirical research of the YouCount project.

In the next stages, the specific youth involved CSS framework will address how to co-create engagement in science among young people, particularly of those that are not involved in any scientific activities yet and are at the risk of social exclusion. Moreover, the framework will present strategies how to adapt the training and support systems to young citizen scientists. Also, the framework will explore the ways how young people might be better involved in community development and local policy making to create social innovations.

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