

Institutional changes required to support CS in RPOs

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To better support the adoption of Citizen Science (CS) as research methodology, institutional transformations in the majority of Research Performing Organizations (RPOs) are still required. The EU funded project TIME4CS aims at supporting such institutional transformations through the implementation of concrete actions triggering institutional changes and embedding, in turn, CS within research institutions. Here we present the concept of institutional roadmaps and the reflection tool designed to support RPOs in designing those concrete actions to stimulate institutional changes described in the personalized roadmaps.

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1. Introduction

Citizen Science (CS) is experiencing an increase in the number of CS actors, projects and initiatives, with a wide range of models and outcomes. Despite such growth, the majority of Research Performing Organizations (RPOs) (e.g. universities, institutes of technology and research institutions) in Europe still do not support the official implementation of CS by fostering institutional transformations, which are based on a combination of social (bottom-up) and organisational (top-down) changes.

TIME4CS [1] is a H2020 project aiming at exploring the institutional changes needed to embed CS in RPOs, building on the concept of personalised institutional roadmaps to promote sustainable institutional changes. TIME4CS has identified 4 "Intervention Areas" that, alone or combined, can stimulate such institutional changes: "Research"; "Education & Awareness"; "Support resources & Infrastructure"; and "Policy & Assessment". For each Intervention Area, specific "Grounding Actions" (GAs) have been defined as actions that can be carried out concretely within research institutions, paving the way for institutional changes. Within the project, 4 RPOs, called "Implementers" are currently facing the challenge of introducing CS in their structures. To support this process, 3 experienced organizations within the consortium, called "Front Runners", will provide advice and mentoring on a personalized institutional roadmap for each Implementer RPO, including a set of tailored grounding actions.

The current article summarizes the main outcomes of our workshop at the Engaging Citizen Science Conference 2022. The workshop provided the participants with an overview of the concept of institutional roadmaps and possible GAs that can be carried out within RPOs. It was divided into 2 parts: 1) an introduction to the project methodology and an overview of the experience of two TIME4C2 Front Runners (i.e., University College London (UCL) and Citizen Science Center Zurich (CC-CS), and 2) the presentation of the reflection tool used to discuss participants' challenges in implementing CS in their organizations. In the end, participants had some concrete examples on how to stimulate institutional changes to promote CS.

2. TIME4CS preliminary results

2.1 Institutional adoption of Citizen Science

2.1.1 TIME4CS Front-Runners analysis

To better understand what actions are required to embed CS in RPOs, TIME4CS analysed the experience of three Front Runners (UCL, Aarhus University (AU) and the CC-CS). They all have a comprehensive expertise in CS as well as all already having undergone institutional changes in one or some Intervention Area(s), (e.g. changes in organisational structures or functions, organization of education/training courses, establishment of contact point, protocols and dedicated funds, elaboration of new norms or explicit mission statements).

Front Runners have carried out the actions in slightly different ways, with tactics and methods that depend on their cultural, historical and scientific specificity. UCL for instance has a clear grassroots, bottom-up and organic approach in its evolution and achievements, while CC-CS methods and history show a structured, top-down and carefully planned development. This analysis led to the identification of 24 GAs.

2.1.2 Success factors

TIME4CS also directed a Qualitative Comparative Analysis (QCA) of 38 case studies (RPOs around the world where CS activities were taking place) to understand success factors for institutional transformation in support of CS. The analysis showed that the path followed by RPOs (Figure 1) with a higher level of institutional integration of CS includes the *development of CS projects from different disciplines*, including but not limited to the humanities, natural sciences, biology/ecology, social sciences and multidisciplinary projects. Moreover, *having multiple CS champions* seemed essential. This could be related to the fact that students and staff can provide the bottom-up pressure to push for institutional transformations. In addition, senior management CS champions can also influence the decision-making processes from top-down, which would have a direct impact on modifying the structures in the organisations. Finally, the *availability of an institutional plan that includes or considers CS and public engagement* was a shared condition by the RPOs with higher institutional integration. While having a *funded coordinator* did not appear as essential to supporting the institutional integration of CS, qualitative data supported the case that it is rather a consequence of either the internal bottom-up efforts of research and staff to push for the recognition of CS within the institution or as an external requirement of national or regional policies [2].

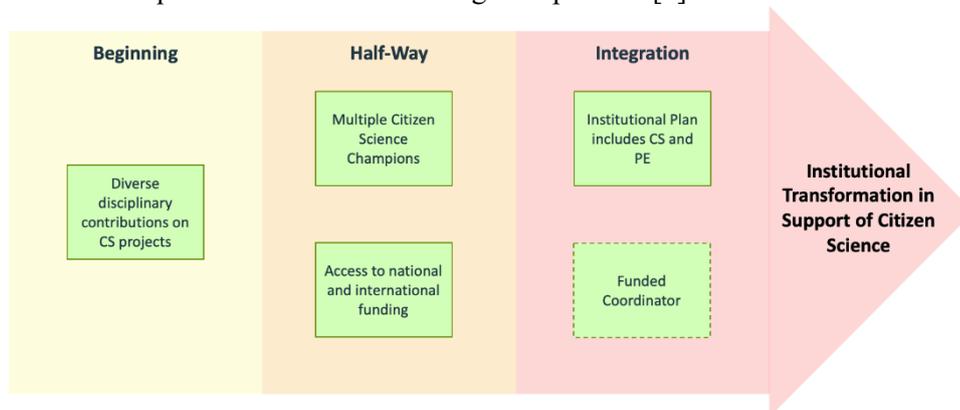


Figure 1: Chronology of institutional transformation based on the QCA results

2.2 Reflection Tool & Roadmaps

To assist the Implementers in developing the GAs and roadmaps for change, TIME4CS developed a "Reflection Tool" [3] based on a similar tool used for the GRACE project [4] but adapted to CS. The tool guided the Implementers through initial consideration of the aims, stakeholders, implementation steps, potential obstacles and necessary resources associated with each planned GA. To ensure effective institutional changes, GAs cannot be implemented in isolation, but should be embedded in a broader strategy: the roadmap. A roadmap is an action plan that sets the GAs into a common strategic framework and timeframe, and has the key feature of being flexible and progressive. The first version of the institutional roadmaps of the Implementers could serve as an inspiration for other institutions to start building their own roadmaps [5].

3. Outcomes of the workshop

During the workshop, participants were divided into 4 groups (one for each Intervention Area) to work on the first steps of TIME4CS Reflection Tool (Figure 2 & 3). The tool contains five steps: (step 1) Grounding Actions; (step 2) big vision; (step 3) success criteria; (step 4) stakeholders; and (step 5) change agents (steps 1-3 (Figure 2); steps 4-5 (Figure 3)).

Within each group, participants were asked to brainstorm about possible GAs and then to collectively choose one to be further developed. First, the participants were asked to propose a big vision (i.e., the long-term CS vision for the institution) that the chosen GA could contribute to. Then, participants reflected on what could be the success criteria (i.e., the specific achievements that would help them to assess goal attainment) for that GA. Next, participants had to think of all the involved stakeholders, the ones needed for the action, as well as those affected by the action (internal/external). Finally, the stakeholders from the previous step and, in some cases new ones, were placed on a chart according to their "Level of Influence" (y axis) and their "Knowledge/Expertise"(x axis).

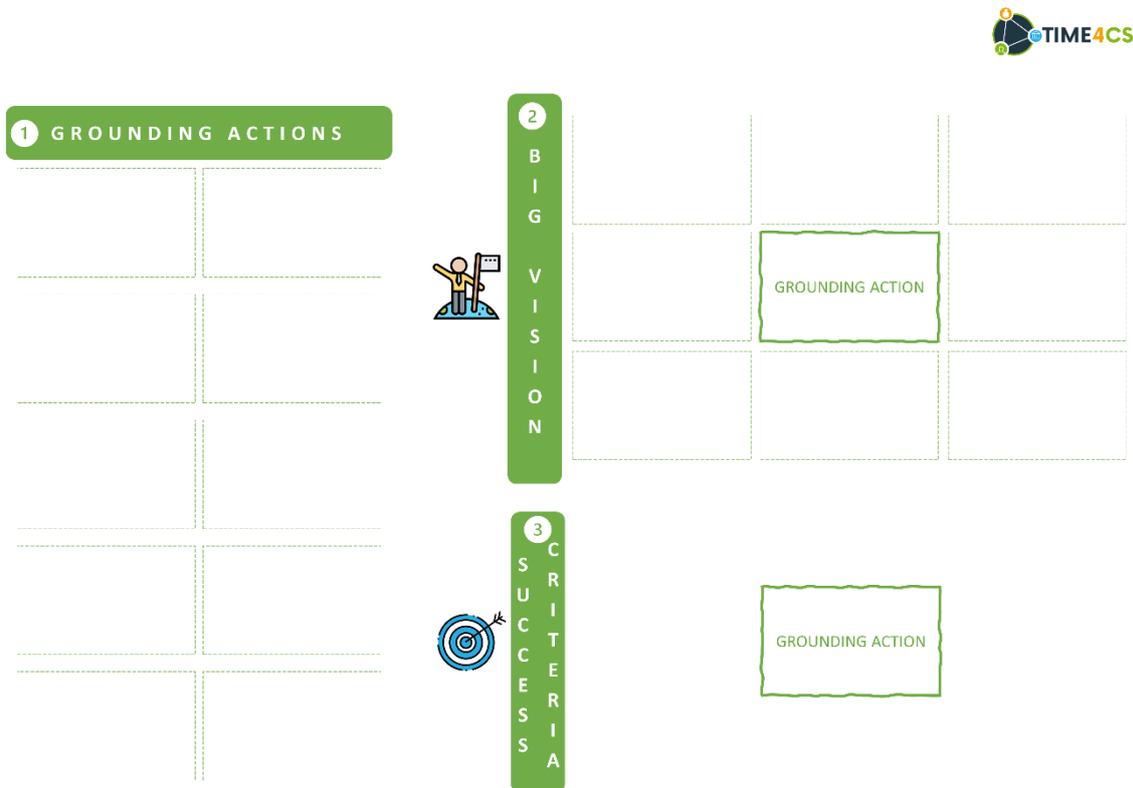


Figure 2: TIME4CS Reflection Tool as adapted for workshop (continued on page 5)

3.1 Intervention Area: Research

(Step 1) The participants proposed 14 GAs related to Intervention Area "Research", among which "Training researchers" was chosen.

(Step 2) The big vision responses revolved around benefits for:

- the institution: increases institutional reputation and visibility; attracts funding; results in openness to society and various stakeholders.

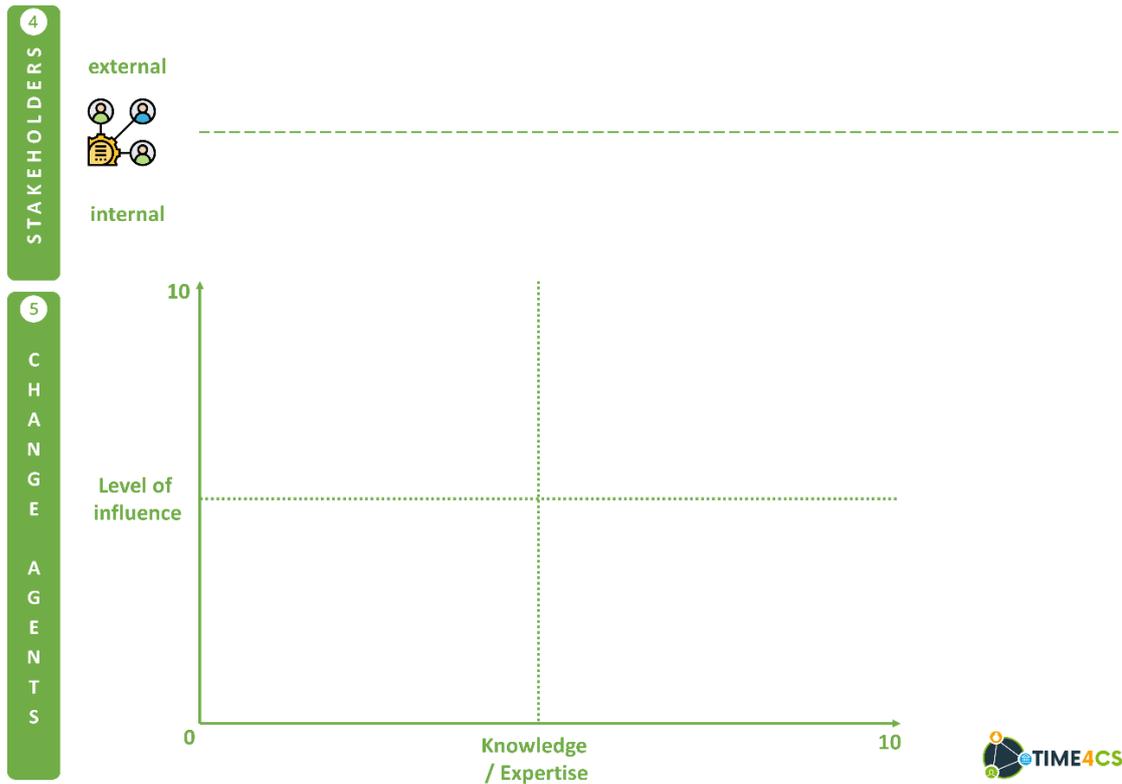


Figure 3: TIME4CS Reflection Tool as adapted for workshop (continued from page 4)

- researchers: increases their autonomy to conduct CS projects; creates new ways of thinking; nudges researchers to develop research directions more relevant to communities.
- society and academia: creates societal impact through research; increases links and balance between science and society; creates opportunities to include "outsiders" in the research process; allows for melting of epistemologies through bidirectional exchange towards a general scientific citizenship.

(Step 3) The proposed success criteria can be grouped into two categories:

- to prepare the action implementation: convince the board of directors; find relevant training for researchers (aligned with their career and research needs); ensure the staff are diverse (background; disciplines);
- to assess the implementation of the action: joint vision; transdisciplinary approach; good CS practices; conference with citizens, exchanging knowledge and experiences

(Step 4 and 5) Several stakeholders and change agents were identified: rectory board; local/national policy-makers; directors of scientific institutions; internal management; CS champions; researchers (training receivers or trainers); teachers; foundations; university library; local communities; data end-users (e.g., environmental management agencies); communities impacted by the CS project; local clubs/associations linked to the research topic; practitioners with CS knowledge.

The stakeholders identified as more influential and more knowledgeable (key change agents) were: CS champions, researchers (trainers/receivers), teachers and the data end-users.

3.2 Intervention Area: Support resources & Infrastructure

(Step 1) The participants proposed 9 GAs related to Intervention Area "Support resources & Infrastructure", among which "Professional development for CS practitioners" was chosen.

(Step 2) The big vision responses revolved around 2 main benefits for:

- the institution and researchers: increasing research excellence; aligning with the ambition of regional impact through engagement; creating more attractive conditions for junior researchers; gaining trust in CS.
- academia: contributing to redefining research.

(Step 3) The proposed success criteria focused on assessing the implementation of the initiative: learning platform set; grades; surveys; more publications and dissemination activities (long-term).

(Steps 4 and 5) Several stakeholders and change agents were identified as key actors for this GA: science communication officers; senior management; funding administrators; municipality workers/policy-makers; CS champions; "diversity officer" roles; "tool detective" and "knowledge and resources detective" (i.e., a person appointed to actively search for CS tools and for teaching resources, trainings, respectively); trainers; researchers; citizens; and expert advisors.

The stakeholders identified as more influential and more knowledgeable (key change agents) were: CS champions and trainers. The senior management of the institution was recognised as the most influential actor, while lacking CS expertise. However, having them on board would have a positive effect and give legitimacy to the action, while supporting the CS champions and researchers to get involved in the activities.

3.3 Intervention Area: Education & Awareness

(Step 1) The participants proposed 9 GAs related to the Intervention Area "Education & Awareness", among which "Work for inclusive practise about/with/for CS" was chosen. Also this GA points to the need for CS training; however, it emphasizes the importance of incorporating inclusive practices at all steps in the CS process.

(Step 2) The big vision responses revolved around 4 main benefits for:

- the institution: attracting more/different collaborating partners; recognition for engaging with vulnerable groups; inclusive work environment for staff involving new audience that will bring new ideas/content/ways of thinking; accessibility to be built-in from the start.
- researchers: citizen scientists and CS practitioners' empowerment; better knowledge of CS and where to find support.
- students: practice CS in their studies; field labs to contribute to "real world" problems.

- society and academia: science to be truly open for everyone; citizens' empowerment; description of inclusive strategy to be included in grant applications; funding schemes requiring participatory aspects; science and society work together closely on big challenges; CS integrated/embraced in the education programmes.

(Step 3) The proposed success criteria focused on assessing the implementation of the initiative: most researchers are aware of CS; increased number of researchers/teachers/students involved in CS projects; basic web accessibility online (e.g., alt text; ANDI tool; subtitles offered); CS courses organised by the library.

As the previous discussions were very extensive, the group did not have time to work on the identification of stakeholders and change agents (steps 4 and 5).

3.4 Intervention Area: Policy & Assessment

(Step 1) The participants proposed 9 GAs related to Intervention Area "Policy & Assessment", among which "Make the involvement in CS initiatives count towards promotion/tenure tracks" was chosen. The participants expressed a general concern in the current way that research assessment is conducted and the importance of considering CS practices.

(Step 2) The big vision responses revolved around 2 benefits for:

- the institution and researchers: more prestige; enhanced interest towards CS; opportunity to engage the public with "being a scientist"; societal impact, dialogue with local communities.
- society and academia: CS recognition; making CS a standard part of academic/research practice.

(Step 3) The proposed success criteria can be group in two categories.

- institutional/national policies and strategies: institutional vision includes CS; a strategic goal to plan how to implement CS locally; change regulations on performance assessment (at university/national level); CS introduced as a mandatory part of the study programmes; CS included in the management agenda; assessment of positive impact of the CS projects; more individual and collective incentives to promote CS in academia.
- funding: clear criteria of (good) CS; more funding for involving citizens; more CS specific funding schemes.

(Steps 4 and 5) Several stakeholders and change agents were identified as key actors: politicians and decision-makers; influencers from various communities; local government; university/RPO/RFO top management (rectors/department deans); researchers; citizens; local communities; CS associations; innovators outside academia; municipalities; CS Hubs or "promoters"; legal "clinics" within universities to support CS communities.

The stakeholders identified as more influential and knowledgeable (key change agents) were: university/RPO/RFO top management (rectors/department deans) and CS Hubs or "promoters".

4. Conclusions

A cross-cutting concern (3 out of 4 groups) was the need for the provision of training in CS to researchers (from early-career to senior). This might come from the fact that most of the science education curricula are still oriented to the traditional way of doing science (i.e., placing citizens as end-users of the scientific outcomes rather than main actors of the scientific process). Regarding the perception of some stakeholders as change agents, top-management of research institutions, policy-makers and funding administrators were perceived as having a high level of influence but very low knowledge/expertise. Champions and trainers were perceived as having a high level of knowledge/expertise and moderate to high level of influence, while researchers and citizens in general were clustered together attributing to them a high level of knowledge/expertise but from moderate to low level influence.

Finally, the high attendance at the workshop and the positive feedback received suggest that more spaces is needed to discuss institutional changes, even within CS experts and practitioners. TIME4CS engages to continue promoting the project tools and results that could serve for inspiration to other institutions to set up these dialogues and start building their own institutional roadmaps.

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