



**CO3**

***Digital Disruptive Technologies to Co-create, Co-produce  
and Co-manage Open Public Services along with Citizens***

Grant Agreement number: 822615

# **D4.3 Report on the synthesis of baseline results and final evaluation framework**

Keywords

CO3project, H2020, implementation, disruptive technologies, Blockchain, Augmented Reality, Geolocation, SocialNetworking, Opinion, Formation, Gamification, Co-creation, Co-production, Co-management, Open Public Services, Social impact, Best practices

<b>Dissemination Level</b>		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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## Acronyms

ACA	Augmented Commoning Area
PA	Public Administration
UCD	User-Centred Design

<b>Authors List</b>	<b>1</b>
<b>History</b>	<b>1</b>
<b>Acronyms</b>	<b>1</b>
<b>1. Introduction</b>	<b>3</b>
<b>2. Evaluation in Pilots</b>	<b>6</b>
2.1 Athens 1 - Groceries on Hold	6
2.1.1 Overview	6
2.1.2 Discussing Hypothesis	8
2.1.3 Conclusion	13
2.2 Athens 2 - Mapping community needs on empty buildings	14
2.2.1 Overview	14
2.2.2 Discussing Hypothesis	15
2.2.3 Conclusion	21
2.3 Paris 1 - Contributory Clinic	22
2.3.1 Overview	22
2.3.2 Discussing Hypothesis	23
2.3.3 Conclusion	24
2.4 Paris 2 - Urban Modelling	25
2.4.1 Overview	25
2.4.2 Discussing Hypothesis	26
2.4.3 Conclusion	27
2.5 Paris 3 - Blockchain Knowledge Registry	27
2.6 Turin - Augmented Commoning	27
2.6.1 Overview	27
2.6.2 Discussing Hypothesis	30
2.6.3 Conclusion	33
<b>3. Cross Pilot Evaluation</b>	<b>34</b>
3.1 Cross Pilot Evaluation Framework	34
3.2 Cross Pilot Conclusions	36
3.2.1 Public Participation demands from public authorities to demonstrate willingness to change	36
3.2.2 We need to rethink disruptiveness in terms of social needs	37
<b>4. Conclusion &amp; Discussion</b>	<b>40</b>
<b>Appendix</b>	<b>42</b>
A. Pilot Services Reference	42
B. Digital Literacy tool	42
C. Blockchain Knowledge Registry (Paris)	45



# 1. Introduction

In the following report we will summarise the Evaluation Results of the project. The evaluation process follows the General Evaluation Framework as described in Deliverable 4.1.

Our main evaluation framework is Realist Evaluation in which we have incorporated aspects of Participatory Evaluation. Realist Evaluation is a case-based evaluation approach or 'logic of enquirement' (Pawson and Tilley, 2004)<sup>1</sup> that originated in evaluating social programmes and can be applied to complex projects that are implemented in real social environments and involve several stakeholders.

The process of Realist Evaluation has the following steps as explained in (Hewitt et al - 2012)<sup>2</sup>:

1. **Articulate programme theories to be tested.** In this stage we need to formulate our theories to be tested. These can be related to candidate mechanisms, contexts and outcomes.
2. **Collect data to test the hypotheses.** In this stage we collect data with a variety of methods: quantitative, qualitative or mixed. These methods are tailored to the theories we have formulated.
3. **Test the hypotheses.** Use the data collected to spot patterns in the outcomes of the programme evaluated.
4. **Interpretation and refinement.** Finally we try to answer our evaluation question and make policy recommendations to accordingly revise the programme.

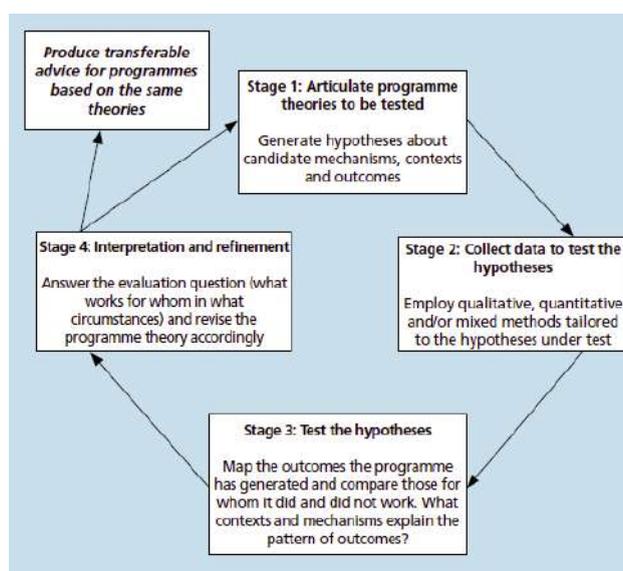


Figure from (Pawson and Tilley - 1997) as adapted by (Hewitt et al - 2012)

<sup>1</sup> Pawson, R., & Tilley, N. (2004). *Realist Evaluation*. 2004. London: Sage.

<sup>2</sup> Hewitt, G., Sims, S., & Harris, R. (2012). The realist approach to evaluation research: an introduction. *International Journal of Therapy and Rehabilitation*, 19(5), 250-259.

To incorporate elements of Participatory Evaluation we worked with the pilot members and the pilot stakeholders to generate the hypotheses to be tested. Over a series of meetings with the pilots, that also took into account their stakeholders views, we framed 81 hypotheses over the three pilots. 23 of them were *Disruptive Hypothesis* aiming to capture the disruptive impact of our pilot intervention on the respected field or service.

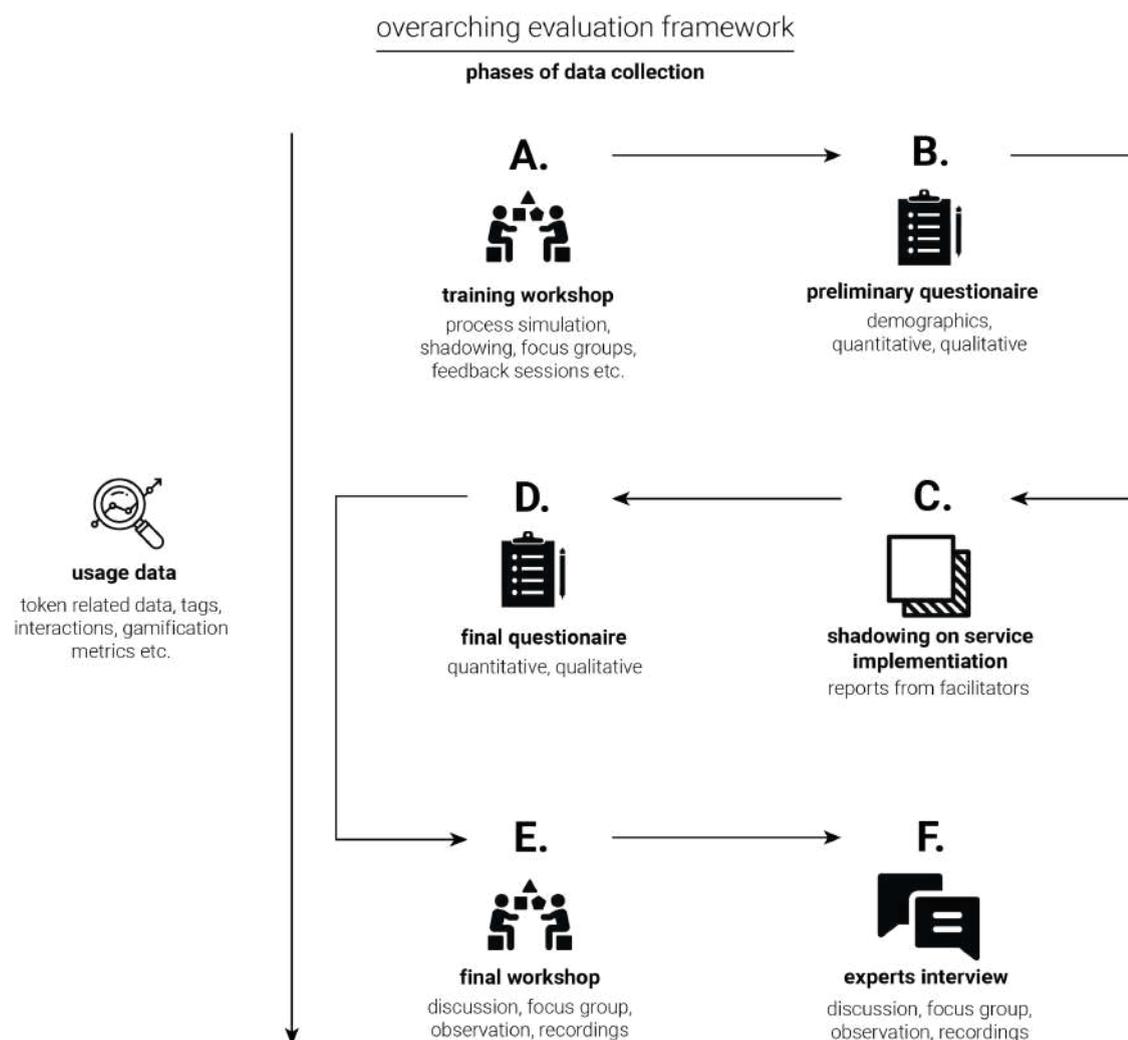
To test these hypotheses we planned 72 evaluation actions across the three pilots. The actions included both quantitative and qualitative methods and were grouped in the following phases:

**Usage data.** We aimed to extract 26 different data points from our digital applications. You can find a comprehensive table of the Usage Data in the Appendix.<sup>3</sup>

- A. **Training Workshop.** Depending on the service, different workshops were organised in each pilot to simulate the process of the proposed service to users and engage them. During these sessions, facilitators should shadow the interactions of participants without interfering but by keeping notes.
- B. **Preliminary Questionnaire.** These questionnaires collected demographic data and quantitative data related to the conditions of the field in which the designed service will operate. We also include qualitative open questions in order to get thoughts and impressions of the participants about the project or things that could be designed differently.
- C. **Shadowing on service implementation.** In this phase, we closely monitored the progress of the service in the field and any significant incidents related to the delivery of the service. To collect data we shadowed the service implementation without intervening.
- D. **Final Questionnaire.** We developed sets of questions similar to the Preliminary Questionnaire in order to have comparable data at the beginning and at the end of pilot implementation of the services.
- E. **Final Workshop.** This workshop functioned as a more focused feedback session with users and people who participated in the phases of co-design and the implementation of co-production of the service.
- F. **Experts in the field interviews.** Interviews with public officers helped us acknowledge our thematic lenses and give more depth to our analytical framework. It also helped us understand how specific stakeholders perceive the service and its sustainability.

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<sup>3</sup> See Appendix to Deliverable D.3.5 - Pilot Report.



*Diagram of the continuity of data collection phases*

The action plan is described in detail in Deliverable 4.2. In addition we created a cross pilot digital literacy measurement tool based on the European Commission 8-Level approach<sup>4</sup> which can be found in the Appendix<sup>5</sup> which was also presented in detail in Deliverable 4.2<sup>6</sup>

The Covid19 pandemic disrupted the pilot implementation and subsequently the collection of data. As such, the data we collected from system logs<sup>7</sup> indicating how the technologies were used, were less valuable for our overall evaluation than initially anticipated. In addition, some evaluation actions were forced to be postponed or cancelled due to limits affecting in-person meetings. More details on pilot activities and action implementation can be found in Deliverable 3.5.

<sup>4</sup> [https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110624/dc\\_guide\\_may18.pdf](https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110624/dc_guide_may18.pdf)

<sup>5</sup> See Appendix C.Digital Literacy tool

<sup>6</sup> See D.4.2 Appendix 2, for Athens A1 and A2; and adapted for Turin - included in section 4 of the questionnaire A2.3

<sup>7</sup> See Appendix to Deliverable D.3.5 - Pilot Report.

Nonetheless we were able to collect valuable information and test our main hypotheses and thus formulate specific conclusions and consideration which we present in the following sections. First we present evaluation results per pilot following a deductive approach in which we present results regarding specifically our hypotheses. Then we go on to present the cross pilot evaluation based on our overarching framework taking under account two basic concepts: Technology Acceptance and Smart Urbanism. Through our framework we aim to draw conclusions that can provide useful considerations. Finally we make some final remarks reflecting on the basic concept of the project and provide some discussion points and propositions for future work.

## 2. Evaluation in Pilots

For each pilot we are going to present a short overview of the service and it's main hypothesis. Then we will discuss each sub-hypothesis separately. Finally we will make a conclusion statement for each pilot and provide any meaningful policy recommendations. Athens Pilot have been more extensively analysed for two reasons:

- OLA team was based there and has direct participation in operations
- Athens Pilot scenarios were less affected by the Covid19 situation

### 2.1 Athens 1 - Groceries on Hold

#### 2.1.1 Overview

The pilot service takes place on an agricultural open market “*Laiki Agora*” where customers donate money at the market’s benches in an IoT device named CoopBox which are then tokenized and distributed to beneficiaries. Beneficiaries use the tokens on the benches as currency to receive free vegetables. With this system in place the beneficiaries are able to get fresh groceries from the flea market for free by using their cellphones while the whole system will be funded by donations. This way the beneficiaries have freedom of choice and access to fresh food in a discreet and dignified way. The municipality has a facilitating role in the system, making sure everything works properly and also promoting the services to potential donors. A more detailed description of the service can be found in Deliverable 1.2

<sup>8</sup>

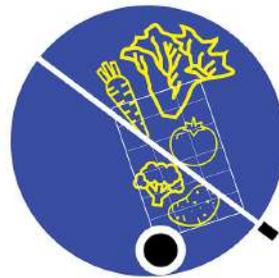
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<sup>8</sup> See D.1.2 p.148





*A Coopbox on a participating producer's bench*



## ΠΡΟΣΒΑΣΙΜΕΣ ΛΑΪΚΕΣ ΑΓΟΡΕΣ

πυλοτικό πρόγραμμα για την διάθεση φρούτων και λαχανικών  
σε ευπαθείς κοινωνικές ομάδες με την χρήση νέων τεχνολογιών

*The service logo: "Affordable open markets"*

The main hypothesis for this pilot was:

*The capabilities afforded by CO3 Wallet Application and Coopbox can help create and maintain a service where citizens contribute to groceries provision to citizens in need.*

In order to test this hypothesis we implemented the service in two separate open markets. One in the working class neighbourhood of Patisia and one in the affluent neighbourhood of Kolonaki. We chose those markets because of the different economic environments in which they operate. We wanted to see how people from different social classes would respond to the service. Our main data collection method was the *Open Market Diary* which each team member kept separately during the pilot implementation. We were present at the

flea market 9 times, most of them between April and June 2021: 6 times at Patisia and 3 at Kolonaki. We also collected questionnaires from producers and beneficiaries. At the end of the pilot implementation we explored the possibility of an alternative setting for the service: cooperative groceries. For this purpose we conducted two interviews with representatives of such cooperatives.

## 2.1.2 Discussing Hypothesis

*[A1.SH1] Citizens will be eager to contribute economically to the on-hold food provision service*

From the 9 times we visited the open markets, 7 of them were focused on collecting contributions from citizens. We stayed at the market at least three hours each time. The donations were collected either in a Coopbox that was placed on a participating producer's bench or in a Coopbox placed on the team's table. We placed Coopboxes on three different producers. While unattended no donations were made to them. As such all donations were made under the direct supervision of the support team. Direct communication with bypassing citizens took place in order to inform them about the service and convince them to donate. In total we collected 30.15€ from 39 citizens. 18.75€ of them in Patisia and 11.4€ in Kolonaki. Kolonaki had a larger donation per visit ratio (5.7€ compared to 3.75€ in Patisia).



*The team's spot in the open market at Patisia, July 2021*

In general we consider that the citizens were not particularly eager to donate to the service. They had to be talked into it. The main idea of promoting the service through the Coopbox and leaflets on the producer's bench did not work at all. Citizens are in a hurry to buy their vegetables and fruits in an almost permanently crowded setting and don't even spot the existence of the Coopbox there. During the interaction with citizens a lot of different dimensions emerged on why people donated and why not regarding both economic and sociocultural conditions.

In Patisia most people who donated were younger and seemed more affluent. Two middle aged women who donated were very close to the Orthodox Church. One of them was cooking in a nearby church for the poor. She donated 2€ and said congratulations. After June 2021 the Open Market changed venue and we had to move further into the neighbourhood away from the main Patision street. This resulted in a sharp decline in donations since we were now in the center of one of the poorest areas of Athens (Kato Patisia). On the first day in our new position we received only a 0.50€ coin donation from a girl selling handkerchiefs for a living. Generally most people were very hesitant to donate. Some of them cited the fact that the municipality should be the one providing food to those in need and not citizens. *“The municipality has money for all those things but not for buying the food?”* (Male citizen around 50 at Patisia, 21.7.21). In such cases the technological installation was perceived as a symbol of hypocrisy. The question implied here is why can't the municipality just provide vegetables instead of spending money on high technology to collect donations for the vegetables. In other cases citizens said that they can hardly afford vegetables for themselves and they should be beneficiaries of the service not donors.

In Kolonaki, one of the most affluent neighbourhoods of Athens, we faced some similar and some different problems in the process of collecting donations. A new problem was that many people visiting the open market were not eligible to decide whether to donate or not. The reason for this was that they were housekeepers and servants that went out to buy vegetables for their employers. As such they did not own the money they used and proved pointless to approach them. In a more similar to Patisia tone many citizens, especially younger (40s - 50s) , were hesitant to take on themselves to support the food provision service which they regarded as the duty of the municipality. *“Why the Municipality does not give to the poor and we have to do it? It gives everything to stupid things and Kolonaki is a mess and we almost kill ourselves while walking [she points at the narrow and damaged sidewalk]”* (Female citizen around 40 at Kolonaki, 21.5.21). An older female citizen (around 70) was more eager to donate and did so both times we visited the place. She was enthusiastic about the mayor. It was obvious that political affiliation had an effect on how some citizens saw us.

Conclusively, a more consistent and long term presence in the open market might help with the collection of donations. This though is obviously unsustainable and against the concept of the service as a self-sustainable food provision service with the municipality in a facilitating role. As such we understand that we should seek donations elsewhere, such as online donations or in busy public spaces. For this purpose we attempted to install a Coopbox in a Municipal Office (ΚΕΠ) but we didn't succeed due to bureaucracy.

*[A1.SH2] Producers will be positive on selling products through the on-hold food provision service*

*[A1.D3] Producers are more eager to conceptualize the digital tokens from the wallet than the paper food stamps*

Before we start we must note that the producers in both open markets (Patisia and Kolonaki) were the same. The same market moves around Athens on different days of the week. Every Monday the market is in Patisia and every Friday in Kolonaki.

In the open market there is already in place a food provision service by the Region of Attica. This service works with paper stamps which the Region distributes to the beneficiaries. The paper stamps are used at the participating benches which are then contemplated by the Region. The Region is notoriously late at contemplating the stamps and this is one of the main reasons producers don't want to participate in the service. It is important to note that the food provision service is funded by the Open Market Producer Association and the Region of Attica is limited to an operational role.

As such along with the hypothesis regarding the acceptance of the service by the producers we formulated a *disruptive hypothesis* [A1.D3] aiming at exploring how the new technologies implemented (digital wallet, blockchain token, IoT device) disrupts the established food provision service. This was reflected in the questionnaires we used and in the discussions we had with the producers. The main outcome from this was that producers perceived our service not as disruptive but as similar with the existing service using paper stamps. We understand that instead of disrupting a process with technology as intended, we were seen as digitizing the process without significant alterations. When we approached producers to explain the service they would remark *"Oh just like the food stamps right?"* to such an extent that we started to use it proactively as an example to help them understand.

Generally we had a very hard time to get producers on board, a situation that deteriorated dramatically after the summer. Our main contact was the president of the local producer's association who at the beginning was quite helpful. In our initial visits in the open market most producers were not keen to participate but we managed to persuade three of them to get the Coopbox on their benches. The only openly supporting producer was a male around 40 who said that the project *"is very nice and I wish people would donate so poor people can be helped"* (19.4.21).

The same person was very negative by the end of the project. In the final questionnaire he answered everything negatively (1/5 in the likert scale) and said *"With all these digital things they are going to control us and they are going to stop us from working and all the market is going to go to companies. They will impose it on us regardless of what I think. You don't see what is going on?"* (29.11.21). This seems to be a direct reference to a new law introduced by the government that allowed private companies to own part of the open market, which is now controlled by individual producers and traders. The law was very unpopular with the producers who went on strike against it more than once during the pilot implementation.

The hostility towards technology and research was a common theme especially in our last visit (29.11.21). Producers were openly disapproving of everything and most of them did not even want to talk to us since we were "researchers". In one of the questionnaires where the responder was completely negative (1/5 in the likert scale) about the service this was stated clearly *"I am a denier, unvaccinated and anarchist"* (29.11.21). Even the fact that our

Digital Wallet uses a QR Code, the same technology the Covid Pass uses, was enough for many people to disengage.

Another aspect of hesitancy that was permanent throughout the pilot process was the perception of the service as an unfair competition tool. Through the co-design of the service it was concluded that the fact that the money collected in the Coopbox would be returned to the producer hosting it, is a strong motive for adoption. In practice it proved a very strong counter-motive. Producers did not want to host the Coopbox and even if they did they wouldn't promote it at all. They perceived that this would be unfair competition to other producers since the spare coins that would go into the box would be deprived from shopping on other producers. This was in our opinion the core problem for the service.

Another aspect of the service highlighted in the co-design was that blockchain, due to its decentralised and rigid nature, would create trust to the producers to participate in the service. This was not the case at all. Most did not understand what blockchain is to begin with and the few who knew considered it an unstable financial commodity identifying it as Bitcoin. Whether it was digital tokens or paper stamps did not make a big difference for them. What they perceived as the main factor of trust was the operator (Municipality, Region of Attica or else) and whether it would provide the payback quickly. (*Facilitating Conditions*)

As such we conclude that large changes in both the sociocultural and the economic conditions present now in the open market must change in order to pave the road for the adoption of such a service. Even if these changes occur it seems unlikely to surpass the core problem of the service which is the perception of the donation process by the producers as an unfair competition tactic.

*[A1.SH3] Citizen in need are willing to shop with tokens through the on-hold food provision service*

*[A1.SH4] Users will accept to use the CO3 Wallet Application*

To test this hypothesis we went on to conduct a personal interview with a beneficiary who received part of the donations. The interviewee, a migrant woman around 40 and mother of three, was willing to use the system merely out of necessity. She said that she is not very good with digital/technology tools and the whole process with the scanning makes her hesitant but she will use it in order to get the groceries. It was important for her that we go together the first time she uses the Wallet. This underlines the importance of *Facilitating Conditions* on whether citizens are willing to use the digital application *[A1.SH4]*.

*[A1.D2] Citizens in need prefer to be able to shop with tokens than get groceries from a foodbank*

Citizens in need generally prefer to be able to buy fresh food of their own choice instead of getting whatever is at hand in the foodbank. Usually foodbanks provide dry food like rice or pasta and very rarely are able to offer fruits or vegetables. Providing citizens in need with fresh and nutritionally rich food was one of the core concepts of the service since its

co-design phase. There was some scepticism over the issue of tokens since they restrict the citizen in the use of the money to the open market while he/she may have other more urgent costs to cover. Through our interview with the citizen in need we understood that this was not perceived as a serious problem since fresh food from the open market is a basic everyday necessity that needs to be covered regardless of other circumstances.

*[A1.SH5] The service will be feasible to sustain within the greek legal and accounting framework*

*[A1.SH6] The service will be adopted by the municipality*

It was particularly challenging to make the service compliant with the Greek legal framework. The legal department of the municipality concluded it is very difficult to adopt such a service legally. Tokens can not be legally used as means of transaction. The only legal way is to treat them as prepaid coupons as it is done now with the coupons of the Region of Attica. Another issue is the collection of donations. The municipality can't collect donations anonymously and en masse. Instead it is necessary to give a personal receipt to each person donating something that would make the donation process through the Coopbox disproportionately costly.

Given the legal difficulties and the attitude toward the municipality from citizens/potential donors, we conclude that major shifts in economic, legal and sociocultural conditions must take place for the service to be adopted by the municipality.

*[A1.SH7] The service will be adopted by commoners*

To explore this potential we conducted two in-depth interviews with members of two food coops. We received mixed reactions. One interviewee expressed serious ethical considerations over the use of technology in such a context while the other was very supportive that such a service can have a positive impact. The main idea was to install the Coopboxes in the food cooperatives in order to collect money for “on hold” products of the food coops.

This service was partially implemented from another “On Hold” project in one of the coops with very limited success.<sup>9</sup> The interviewee from this coop was very negative. *“The box seems hideous to me. All this seems to me so inhuman.”* The interviewee was negative generally with the “on hold” service and what they perceived as academically motivated intervention with little foodhold on reality in the field. *“It’s ideas that already exist and young academics come and present them as supposedly new things while in reality they have not gone out to society and they don’t know what to occupy themselves with”.* We have to note though that the interviewee did not seem to understand the main concept behind such a service as coined in the co-design process which is fresh food provision in an inclusive way for beneficiaries. Finally the interviewee mentioned the main obstacle we also identified with our visits in the open market which was why the money is not used to directly help people in need *“Wasted money for the research and the boxes. People won’t donate because they are afraid that it is another way to scam them and collect money”.*

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<sup>9</sup> <https://seanamoni.gr>

The response was completely opposite in another much larger food coop. They now have a food donation box operated by social movements but the process never really took off since they never came to collect donations. In general the interviewee said that he/she considers the service very useful since there are a lot of people in need (*Perceived Usefulness*) but “*it needs good support and promotion*” (*Facilitating Conditions*) . An important contribution from the interviewee was that the service should not follow the common “on hold” scheme where anybody comes in to collect the “on hold” products, because most people are too shy to do that. Instead beneficiaries should be selected from social centers and be given a card to collect products and shop like everybody else. This contribution is aligned with the outcomes of the co-design process of the service.

We conclude that *Facilitating Conditions* play a vital role for Commoners who are positive to adopt the service while other Commoners are strongly negative and may not consider adoption at all.

### 2.1.3 Conclusion

Revisiting the main hypothesis [A1.H1] *The capabilities afforded by CO3 Wallet Application and Coopbox can help create and maintain a service where citizens contribute to groceries provision to citizens in need* our main conclusion is that a major change of approach is needed for such a service to be implemented.

The major obstacle for the adoption of the service was the *Perceived Usefulness*. As one citizen stated “*The municipality has money for all those things but not for buying the food?*” Food provision is a very important and sensitive service in which such interventions face a very sceptical reaction from citizens. As such it seems more appropriate for Social Policy to directly address these pressing food provision issues with its own funds than to pass this obligation to citizens and producers with this kind of services. If this occurs then the part of the service regarding the digital wallet and the token compensation by beneficiaries may have better chances of being implemented given the beneficiaries seem more keen to adopt it.

Regarding the technology, Blockchain, seemed to play a limited role in the service as a whole. Stakeholders did not care if we used Blockchain or not. The fact that the service used Distributed Ledger Technology did not help create trust or generally influence in a meaningful way the stakeholders views about the service. Instead of being disruptive our service was perceived as a digitised version of existing services.

Food provision proved an inappropriate domain for our main concept, the *Augmented Commoning Area*. Food provision requires the connection of two different types of stakeholders: donors and beneficiaries. These two though are rarely in the same geographical area due mainly to different economic conditions. As such augmenting a common area as the open market did not help raise funds since donors were not actually there to begin with. The service could work better if funds were raised in different locations

than they were consumed such as online campaigns or by applying directly to public and private institutions. This of course cancels the core characteristic of the *Augmented Commoning Area* which is the location specific nature of the phydigital intervention.

In addition, such interventions in the future must take under account the *Sociocultural Conditions* in the specific domain in which the intervention takes place, especially when it refers to social services that this scenario aimed to tackle and facilitate through disruptive technologies. In our case, the perception of the service from the open market producers as an unfair competition tool, along with *Legal Conditions*, make the wide adoption of the service in the open markets difficult.

Finally, a commoning only approach to the service - without the participation of Public Authorities - may be better suited for the Athens setting given the mistrust and ethical boundaries PA face because of reasons regarding *Economic* and *Sociocultural Conditions*.

## 2.2 Athens 2 - Mapping community needs on empty buildings

### 2.2.1 Overview



Athens has a lot of empty, unused and abandoned buildings that could be used for activities that have a positive social impact on the community<sup>10</sup>. The service allowed communities to map the empty buildings in their neighbourhood and propose potential uses for them. The goal was to make visible to local authorities the needs of the citizens and the potential spaces where these needs can be fulfilled. The main aim was to create discussion in the community for the uses these places can have and potentially spark collective action and local decision making.

<sup>10</sup> The central municipalities of Athens and Piraeus contain 132.000 and 27.300 vacant units respectively, <https://www.athenssocialatlas.gr/en/article/vacant-houses/>

For this purpose the CO3 AR application was used in order to place 3D objects in the urban environment. These 3D objects were vector icons representing services such as social housing, hospitals, parks etc. These 3D objects were FirstLife entities and as a result retain all the abilities First Life can provide. The FirstLife map was used for better visualisation of mapping as well as LiquidFeedback for deliberation over the services proposed<sup>11</sup>.

The main hypothesis for this pilot was:

*The capabilities afforded by CO3 AR app and FL could engage citizens to participate in collaborative urban planning*

In order to test the main hypothesis, we implemented research methods that allowed us to collect the required data for the assessment. The primary method was *workshops/focus groups and Questionnaires* collected during workshops that engaged users with the pilot.

These workshop were organised to have two parts:

- a. the board game “12 common buildings” is a simulation of proposing/implementing uses on empty buildings and discussing urban space by playing the roles of diverse stakeholders. The participants are split to 4 teams (citizens, municipality, coalition of NGOs and business consortium) and their aim is to create new uses on empty buildings of a hypothetical neighbourhood by collecting strategy cards and impact points or by developing collaborations with other teams. The aspects of challenges and conflicts are also integrated in the gameplay in order to give the opportunity to the teams to think creatively over possible resolutions or to create space for agreement.
- b. the pilot implementation of AR mapping and uses proposals in the neighbourhood.

One testing workshop took place before the second round of restriction measures of the pandemic in Athens, in autumn 2020 and four broader workshops between the spring and autumn of 2021. We defined two ACA areas, in Kypseli and Petralona, where the workshops took place. The two neighbourhoods were chosen because they have accumulated diverse urban dynamics in the last decade<sup>12</sup>. Besides the Usage Data, we collected questionnaires from the participants during the workshops and drew upon canvases to discuss participants' profiles and their opinions of the service. At the end of the pilot, we organised a final meeting to present the mapping results to the participants and municipal officers. A detailed description of the Engagement Actions can be found in D3.5 Pilot Report<sup>13</sup>.

## 2.2.2 Discussing Hypothesis

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<sup>11</sup> Further reading on Athens 2 pilot service in D1.2 p. 152-155

<sup>12</sup> Such as migrant communities, touristification, gentrification, population displacement, increase of values and real estate market development, big amount of empty buildings, bottom-up initiatives.

<sup>13</sup> D3.5 p. 10-18

*[A2.SH1] Serious gaming, gamification and AR can make it challenging/interesting for citizens to participate in the service*

To assess this hypothesis, we need to distinguish the outcomes of serious gaming from the AR experience since we asked the citizens to compare the levels of interest between the two processes. First of all, an overall remark - which was a common understanding of the process in both workshops - is that *“the digital aspect of the service is useful to reveal and diffuse the subject of empty buildings in accordance with the community needs. Although any attempt in the digital world should be accompanied with participatory actions and processes with physical presence”* (citizen at Kypseli Workshop - KW). In this realm the aspect of serious gaming in the first part of the workshop helped the participants not only to engage with the theme of the pilot service, but also to create a common ground of interaction among them. The framing of the game produced a field of dialogue in order to make decisions, to express political views about the city space, to critique current conditions and conflicts of interest, to negotiate about hypothetical collaborations between diverse stakeholders.

The position of pretending the role of a stakeholder and the condition of being part of an alternative narrative for your neighbourhood, revealed an important dynamic for the participants to gradually construct a safe space for collective reflection. During the game citizens had the opportunity to express fears of how their neighbourhood is changing by remembering examples of how self-organised spaces which were inclusive for all and were co-managed by the community ended up closed by the decision of public authorities, in order to accommodate different uses (citizen at KW). In addition to this, some of them talked about their dreams for empty buildings: *“It would be nice to have in our neighbourhood a fab lab in the same building with an art space”* (citizen at KW) / *“We should create open community assemblies in our neighbourhoods and discuss how we could use these empty spaces”* (citizen at Petralona Workshop - PW). In the same direction, some participants in both the workshops acknowledged the frame of the game as “utopian” or “unrealistic” (citizen at KW) and they detected crucial differences with the real world of the city, *“especially in terms of how difficult is the cooperation between stakeholders”* (citizen at PW). Despite that it seemed to be “an interesting way to raise their awareness about the conditions of our neighbourhood and specific needs” (citizen at KW).

The second part of the workshop was also interesting for all the participants. The gamification elements in the AR application was “challenging” for a participant and his opinion was that *“the points and the badges give added value to the service”* (citizen at PW). Moreover the majority of citizens participating in the workshop agreed that *“AR was very complicated to use”* (citizen at KW). *“The process could be done with a simple photo and a pin in the map. The AR would only make sense if it could have more realistic 3D models of how the building could be transformed because of the proposed use”* (citizen at KW). Thus, the 3D objects representing the proposed uses were not adding to the overall concept of the service. Nonetheless some participants found the AR component of the service interesting *“It’s not essential but it makes it more interesting and appealing to use”* (citizen at PW).



*[A2.SH2] Educate citizens about the management of urban space and processes about it*

Although it is obvious that this hypothesis has some particularities to be explored in depth through a series of workshops or questionnaires, we had some basic remarks which help us detect an educational aspect in the proposed service. A participant recognised that she *“observes for the first time the big amount of empty buildings near her house during the mapping session”* (citizen at PW). She added also in the final workshop (Final Workshop - FW) that she *“started thinking of possible uses in empty buildings during her walks”*. Another crucial point is the interaction developed between participants in the first part of the workshop <sup>14</sup>, which was mainly based on sharing experiences and opinions about their neighbourhood in order to construct arguments in the gameplay. *“There was a political decision to commercialise a part of Filopappou hill where citizens self-organised their actions against the Municipality to protect this public space. We can not trust the Municipality to start a collaboration”* (citizen at PW). These experiences were integrated in the way the participants played their roles and functioned as triggering points that also produced contradictory views. *“As citizens we should get out of our comfort zone and explore new potentials in possible collaboration. We are facing different crises and we should be more open if we want to keep our neighbourhoods alive”* (citizen at KW). These comments prove that despite the little time to engage with the theme, the process of the proposed service and the aspect of serious gaming contributed to develop a general discussion and reveal key points relating trust on institutional processes and the need of involvement of citizens in the formation of urban space.

Another educational aspect of the process was in the final workshop when citizens had the opportunity to discuss with public officers of the Urban Planning Agency of the Municipality. The presentation of the whole service along with the result of some proposals for Kypseli and Petralona, create conditions for public officers to present the reality of Greece relating to the theme of empty buildings and how they could be exploited. *“There is a central plan to create a use to cover a community need in the neighbourhood. It is a decision of the administration through a specific fund and we just implement it. In the administration is the starting point of such discussions”* (public officer at the FW). She also added that there are some steps before the proposal. *“We have to investigate the condition of the building, the cost of restoration for example is very important, and also the legal condition of the building and the appropriate uses for the area which are determined centrally from the state”* (public officer at the FW). These annotations helped citizens to understand deeper that although the proposed service is being tested by the municipality, it seems totally advanced as a process and in a different direction from how the decisions are made and implemented.

*[A2.SH3] AR and LF are inclusive for broad population*

As mentioned above in A2.SH1, AR was not acknowledged as something that was necessary in the proposed service. Most of the participants had difficulties understanding the functionality of the camera in relation to how the 3D object could be put on the building. In addition to that low lighting in the street, during the KW which was held in the afternoon, was making AR mapping even more difficult and to this extent the application has

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<sup>14</sup> Board game/serious gaming. For more information see section 2.2.1 p.15 or D3.5 Pilot Report

restrictions of use depending on the time of the day. In this realm the proposed service could be more efficient without the AR and only with the functionality of GPS and a photo that could be pinned in each mapped location. In addition almost all of the mobiles of the participants could not support AR and instead mobiles provided by us were used.

According to Liquid Feedback participants were very interested in the prospect of an online platform for deliberation but were not attracted by the visual appearance of the Web Application. Only one citizen made an account and put proposals under consideration in the platform but no one else responded. During the presentation of LF in KW and PW, most of the participants were interested in the basic concept of the platform and the way it is used in other contexts (facilitators notes). At the same time it was hard for them to understand the mechanisms of voting and the logic of representatives as a digital alternative to direct democratic processes (citizen at KW).



*Empty building for Social Housing mapped in Petralona Workshop, 22/10/2021  
Gamification feature is visible stating “You earned 12 points”*

*[A2.SH4] The service could create a discourse about the city between citizens and public authorities*

*[A2.SH5] Discourse created from the service is fruitful for the public authorities (added value, realistic)]*

*[A2.SH7] Both citizen and PA through service they get a better understanding of the urban environment*

These three hypotheses relating to urbanism awareness and institutional change summarise the way our proposed service developed. Having a clear view of how difficult is the bureaucratic framework in Greece according to the management of urban space, our intention was to deploy a process that could create a discourse between diverse stakeholders about unexploited urban capacities in the city in order to gain better understanding and ideally create the conditions for the development of strategies for institutional change. Firstly, the board game and the discussions after the mapping revealed the potential of the process to trigger a wide discourse about urbanism and the position of public authorities. *“There is a great need for co-design between stakeholders. The Municipality should show patience and develop mechanisms to educate citizens for the purpose of amplifying their participation in public affairs. These transformations need time”* (citizen at PW). This opinion was confronted by a participant's opposite view about top-down education. *“Education is possible to have a repressive effect on bottom-up initiative”* (citizen at PW). These contradictory views revealed, except the mistrust to institutional processes of intervention, a very crucial fear of active citizens on how urban movements or practices initiated by communities, are being capitalised for political reasons. This last argument leads us to the conclusion that in terms of education, municipalities should also learn in some occasions by the paradigm of citizens' actions or just leave the necessary space and provide minimum resources to initiatives in order to “flourish”.

Moreover the discourse between citizens and public authorities became more focused during the final workshop. A participant mentioned the major safety issues that are creating because of the absence of maintenance to abandoned buildings. *“Municipality should take action and give incentives to the owners. There is the example of Zaragoza where 60 sites (some of them privately owned) were renovated by the local municipality with extremely low cost through the framework of temporary uses and now accommodate community uses”*. The reaction of public officers to this was a little bit reluctant. They acknowledged the interesting points but at the same time they were trying to argue that the reality in Athens is different, especially in terms of the legal framework which doesn't integrate such logics. *“There are the formal community assemblies where citizens could participate and make proposals to the Municipality”* (public officer at FW) but *“we all know that these processes are controlled by the mayorship and they don't have any substantial impact on the city”* (citizen at FW). The willingness of the participants to discuss politically about urban space led the conversation to the housing crisis Athens faces in the last decade. *“The Municipality has to take action in order to protect the right to affordable housing. People are being displaced because of tourism and online platforms such as Airbnb, gentrification and the changes in the real estate market while at the same time there is a huge capacity of empty buildings in the city. Housing should not be a commodity in the market for the profit of big enterprises. In other European countries there is the legal framework which recognises*

*housing as a right and regulates a minimum access of wider population to renting, social housing or ownership without a profiteering perspective. In Greece there is nothing”* (citizen at FW). Consequently, the discourse emerged through the proposed service designated crucial axes on institutional change relating to co-management of the urban space as well as a wider awareness on socio-economic aspects of urban planning which could form a privilege field for social policies and provision programs by Municipalities.

The different discussions made in the series of workshops have a significant impact on the conception of urban space for both public officers and citizens. On the one hand, citizens proposed uses for empty buildings in their neighbourhoods by *“having in mind the surrounding environment”* (citizen at KW), *“the needs of the area, as well as the special characteristics of each unit they were mapping”* (citizen in PW). This approach on the process of mapping proved that public authorities through such a service could gain a better understanding of the urban environment in order to develop public policies and plan more socially sustainable interventions in the city. On the other hand, active citizens who took part in the workshop had the opportunity to reflect with public officers of Urban Planning Agency and become more aware of how the built environment is managed by the public authorities, which are the mechanisms of intervention and how the legal system makes almost impossible community led initiatives.

*[A2.SH6] Proposals from the service are adopted by the municipality*

The interviews with employees from the Municipal Agency of Urban Planning showed that it is not realistic to incorporate the proposal into the broader urban planning strategies of the Municipality. The proposals presented in the final workshop for Kypseli and Petralona were not properly documented according to the capacity of the buildings, the cost of restoration and the allowable uses in each area of the neighbourhood. The two employees mainly doubted the correspondence of the proposed uses standards with the building’s characteristics. As they said *“Before we propose such a precise use we have to answer a few questions: Is the building properly maintained? What is the legal status? Has it been declared protected? For example, Health Care Centres have very specific specifications”*. Another objection on the importance of the proposals was that the sample of citizens participating is low and it is not able to form a substantial argument for a pilot implementation. On the other hand, citizens acknowledged that the lack of trust in the municipality is an obstacle when public authorities call for participation. *“Maybe the implementation of a first example with the creation of a new use in an empty building, could communicate that the process of the proposed service functions and it produces results. In that way it will be proved in practice that it is worth the time citizens contribute”* (citizen in PW).

*[A2.SH8] AR will help map items in the urban environment / FL help visualisation*

Based on the comments of the citizens participating in the Kypseli and Petralona workshops we can argue that AR was not very helpful in mapping items (see A2.SH1 & SH3) in the urban environment. Although all the participants agreed that a digital representation

of empty buildings and proposals is an idea that will *facilitate conditions* in order to gain visibility of such urban issues.

*[A2.SH9] The asynchronous communication afforded by Liquid Feedback will help citizens and public authorities to express ideas and make decisions*

We can't conclude if the asynchronous communication of LF helped citizens and public authorities to interact since LF was not used. As mentioned in the KW "*any digital platform is a deficient participatory design tool without the physical presence and participation of the citizens in urban space*". The greek socio-cultural context is not very familiar with participatory approaches in public administration and consequently adapting a digital platform of direct democracy was almost impossible to be achieved. On the contrary, the Final Workshop achieved to create this frame of interaction but just in terms of expressing ideas about the city and the relation of public authorities with the citizens.

### 2.2.3 Conclusion

Revisiting the main hypothesis *[A2.H1] The capabilities afforded by CO3 AR app and FL could engage citizens to participate in collaborative urban planning*, our main conclusion is that some changes in terms of technology could facilitate the conditions of adapting the proposed service by the citizens. In addition to that any attempt in the digital world should be accompanied by participatory actions and processes with physical presence.

The basic concept of the service proved very challenging for the participants. The aspect of mapping empty buildings and proposing community uses was very engaging for the participants in the workshops but they pointed out difficulties in using these tools. In contrast, a more simple version of the app for the proposed service will be more efficient (a map with pins and photo attachment) as most of the participants indicated that such a process needs every day engagement in order to have a significant impact. Probably because of the greek socio-cultural context, LF could not replace the physical interaction between citizens or between citizens and public authorities. This was very obvious during the board game and their willingness to discuss in person about the challenges their neighbourhoods are facing. In addition to that, the final workshop designated that a more systematic interaction between public officers and citizens could produce fruitful results.

In any case, the workshops have the potential to develop a discourse about new approaches in the co-design and co-management of urban space. The core process gave the opportunity to citizens to express political views about the city, to develop arguments about a wider framework of collaboration among diverse stakeholders and to propose community uses on empty buildings for their neighbourhoods as a beneficial response to dynamics of gentrification and touristification of Athens areas. These elements produced a common ground for raising awareness relating to urbanism for both citizens and public administration. Hesitation, visions and problems about the city were put in a creative and reflective framework through serious gaming, while the challenge of citizens' participation transformed into collective walks in the city during the mapping sessions.

These qualities of the process on community building were the most valuable insights from the 2nd pilot case in Athens, revealing also the most crucial problematic of Athens ecosystem. The limited capabilities of public authorities for institutional change proved to be the main obstacle for a wider implementation of the proposed service. Another important aspect was that the main concern on the proposed service by the citizens was the lack of trust for the institutional processes relating to urban space. In this realm, the surrounding environment is not yet prepared to adopt such a process, but the whole experience could be conceived as a first attempt to open up the discussion for alternative approaches in the management of city space.

Finally, a future development of the service proposed by a participant in the PW would be a policy making tool about urban planning interventions based on the general idea of the service. A bigger platform where the mapping and proposing process is a feature for generating user-sourced data, could also host the digital space for developing cooperation between stakeholders or the possibility of offering resources by groups on specific proposals. Concluding, any proportional initiative by the Municipality should be supported by educational processes in order to cultivate citizens participation, although this be developed on the basis of a truthful respect about existing bottom-up interventions.

## 2.3 Paris 1 - Contributory Clinic

### 2.3.1 Overview

The pilot is developed around the PMI (Protection Maternelle et Infantile) social service. PMI provides mother and infant protection (childcare, nursery). Our focus is at *PMI de Saint Denis – Pierre Sénard* which is located in the deprived Plaine Commune area of Paris.

The pilot consists of two scenarios. The first scenario aims to create a geolocated social network that could simplify the dialogue between parents, public health institutions (such as PMIs) and parents' associations – filtering only activities on the territory that could be interesting for these stakeholders, as well as serving as a base for storing a retrieving information.

The second scenario wants to explore whether the Augmented Commoning Area can also serve as an exemplary “digital detox benchmark” where comments, annotations, and knowledge can be shared in a less toxic way. The idea is to evaluate the experience with Augmented Reality with people that are already sensitive to the problem of the toxicity of digital technology. The main objective was to assess with the parents attending the Contributory Clinic of the PMI if there is any difference between Augmented Reality and other digital technologies in terms of toxicity.

A more detailed description of the services can be found in Deliverable 1.2 <sup>15</sup>

The pilot had two main hypotheses:

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<sup>15</sup> See D.1.2 p.144

*A geolocated social network will allow parents of the Plaine Commune to exchange and develop good digital practices, parenting-knowledge and in-person activities.*

*The use of screens via AR is less toxic than the usual use, especially for children*

In order to assess these hypotheses we went to organize meetings and workshops in the PMI, with parent associations (FCPE) and with participants of the Contributive Clinic. Unfortunately the Covid19 pandemic had a lasting effect on the pilot environment. Almost all in-person meetings had to be cancelled or be turned into hybrid, while PMIs focused all their resources in battling the consequences of the pandemic on the local population and it was hard for them and their users to engage in pilot activities.



*Workshop preparation with Céline, nurse from the PMI Staff*

### 2.3.2 Discussing Hypothesis

*[P1.H1] A geolocated social network will allow parents of the Plaine Commune to exchange and develop good digital practices, parenting-knowledge and in-person activities.*

Because of the disruptions brought by the Covid-19 pandemic to this pilot, IRI has rearranged its activities mostly online. Several meetings were held online with the Parent's Association (FCPE), as well as theoretical seminars with the PMI. There we presented FirstLife as an example of a geolocated social network – discussing its design and functionalities – and debating around the concept of ACAs, proximity, virtuality, digital-twin,

and the like. FCPE members were very interested in these concepts and decided to develop one social network for their association after having seen the potentialities of FL and its links with the CO3 app. For the PMI, beyond the theoretical workshops, IRI has intervened physically and tested with members of the staff the CO3 app. In these workshops, the main goal was to clarify the distinction between AR and VR, between mainstream social-network and Firstlife or other privacy-secured social networks or apps, creating a shared knowledge around technology and its social and political repercussion at the same time with the PMI staff and with parents of the Seine-Saint-Denis. The pilot referees testify that if the sanitarian conditions have not let IRI test the app with a large amount of people with in-person activities, this scenario has helped to foster the knowledge creation and capacitation of the PMI staff, local parents and FCPE members as well as vulgarise normally highly-technical topics to a public that often have a passive role on these matters.

*[P1.H2] The use of screens via AR is less toxic than the usual use, especially for children*

Unfortunately due to Covid most meetings with Contributive Clinic users could not take place and thus the data to discuss the hypothesis are limited. Nevertheless, thanks to the online seminars and the few on-site activities led by IRI, discussions with parents concluded that AR (Augmented Reality) technology is definitely less toxic than VR (Virtual Reality) technology mainly for two reasons:

- (i) AR lets discover one's real-proximity-world instead of locking people up in an individual informational filter-bubble, too often completely detached from local situations and/or community interests.
- (ii) As it has been designed within the CO3 Project, the interaction with AR object is empowering for people since it does not nudge them into commercial and/or repetitive tasks (e.g. catching ar-creatures inside cafés or in the street) but drive them to an active contribution to the common good.

### 2.3.3 Conclusion

Due to the limited data available no generalized conclusions for the pilot can be drawn directly from the use of the CO3 platform. Nonetheless, the richness of the dialogues during the online workshops, interviews and the few on-site activities and meeting with local authorities showed the interest of this scenario not only for the PMI staff, but also for the City of Saint-Denis that is now endorsing another EU Erasmus+ project (Surviving Digital) and a National Research program on screen addictions and the dissemination of the knowledge, practises and methodologies developed within the PMI thanks also to the CO3. The Contributory Clinic scenario has given the technical support for actively testing technologies as well as the methodology for understanding the different potentialities opened up by the digital when users have an active role to play in the co-design of these technologies. Debates and controversies on the use of gamification and nudging tools were very often raised and studied thanks to the CO3 workshop organised in Paris at the beginning of the project.



## 2.4 Paris 2 - Urban Modelling

### 2.4.1 Overview

In this scenario, the main goal was to give inhabitants, and more specifically students from the middle and high schools of the Plaine Commune territory, a higher control and broader understanding of urban processes – designing, building, and recycling – and territory planning. The aim was to raise awareness over the disruptive technologies that are revolutionizing urban planning and urban design, as well as informing students, teachers, professionals of the territory and PAs on these issues.

To achieve that IRI organised workshops inside 12 schools. In these workshops students, with the help of their teachers, used Minetest to create 3D models of their plans to redesign their schools. The CO3 App was used to display these models with AR to help students better understand the Urban Modelling process while also posting them on the interactive map of FirtLife. A more detailed description of the services can be found in Deliverable 1.2<sup>16</sup>

*The enhancing of the capabilities of the students, professors and professionals via CO3 AR App, FirstLife and Minetest can contribute to the understanding of the new ways in which inhabitants can be put inside the loop of deciding for territorial urban planning.*

To test this hypothesis we collaborated with 12 educational institutions, capacitated more than 30 professors and worked with more than 300 students during almost 100 in-class-interventions. Reports from the workshops have been used to draw conclusions over the course of the pilot.



*Workshop at Lycée Jacques Brel*

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<sup>16</sup> See D.1.2 p.138

## 2.4.2 Discussing Hypothesis

*[P2.SH1] Building information management (BIM) technologies' and territorial data, articulated with Minetest and CO3 platform, will help students understand the problems and the potential threats risen by digital platforms while letting them actively contributing to the urban environment*

**BIM Technologies and Territorial Data::** The initial idea of working with the data coming directly from the BIM projects of the Olympic and Paralympic Village thanks to the partnership launched by IRI with the SOLIDEO has been momentarily abandoned because of the lack of collaboration from SOLIDEO in 2021. Nonetheless, the Minetest server has been designed using data made available by the French IGN (Institut Géographique National). The Minetest server is a 25km square digital-twin of the territory and all the data created in the server are displayed on the [Mapserver](#). The work done within the different schools (ACAs) is documented in [FirstLife](#). Hence, proposals made within the Minetest server are then used as case-studies, presented to PAs, analysed by architects and urban planners who will translate some of the relevant inputs into real-world urban planning projects. The possibility of working in an 3D environment with the data of the territory – hence, within a virtual environment which greatly represents the real espaces of the Seine-Saint-Denis – has been recognised not only by the students and professors, but also by professionals and PAs, as of utmost importance for understanding the new digital democratic “agoras” opened up by certain kind of digital technologies, and the potentialities – as well as the threats – driven by the urban planification for the Olympic and Paralympic Games 2024.

*[P2.SH2] The use of AR will give a better grasp of the urban development for students and all the inhabitants*

During the workshops we used the AR app to export 3D models designed by the students in Minetest – with the help of architects and urbanists – and import them inside the CO3 app, then we used AR for projecting them in the school-courtyard and other relevant places. This helped students understand the real nature and impact for their proposed models. After seeing the 3D design in the school-yard and walking inside their AR models at almost real-world size, they said “Now I better understood how this could actually look like!”. A problem we faced was that the students could not use the CO3 App through their phones due to the Terms of Use, since they were underage. As such the students needed to use the App through one phone provided by us.

*[P2.SH3] The use of the system will lead to the development of links between the educational institutions and professional paths in the territory*

Since the pilot commenced we have started to have application internships to both IRI and partners involved in the project (e.g the urban planners and architects - O'zone Architectures). Students are required to have one week of Internship to familiarise themselves with potential working environments. Because of the *Social Conditions* in the

Plain Commune area, students usually choose to apply for internships in big retailers and other low-skill jobs. So applying to a research institute like IRI or urban planning agencies because of the project shows a positive effect that leads students to explore new potentials.

*[P2.SH4] The use of the system will create an environment for dialog between middle schools and high-schools.*

We need more data to assess this hypothesis. During the training for the pilot middle schools and high-schools teachers met and worked together.

### 2.4.3 Conclusion

Revisiting the main hypothesis *[P1.H1] the enhancing of the capabilities of the students, professors and professionals via CO3 AR App, FirstLife and Minetest can contribute to the understanding of the new ways in which inhabitants can be put inside the loop of deciding for territorial urban planning*, our main conclusion is that our intervention influenced both students and urban planners.

Students through redesigning their school understood the transformational capacity 3D design can carry while with AR they better perceived how this design interacts with the physical environment. This empowered and helped them realise the role they can play in shaping the urban landscape in which they live.

Urban planners on the other hand became aware of the needs of the students and the potential contributions they can make. They understood that they should take them under account as important stakeholders and exploit the capabilities of technologies like 3D design and AR to help them express their thoughts and needs.

## 2.5 Paris 3 - Blockchain Knowledge Registry

For the third scenario, Blockchain as a Knowledge Registry, IRI researchers have studied and worked on the possible use of blockchain within the framework of the contributory economy that is being tested in the territory<sup>17</sup> de Plaine Commune. The research paper is submitted and available at the link in the footnote<sup>18</sup>.

## 2.6 Turin - Augmented Commoning

### 2.6.1 Overview

The Municipality of Turin has chosen the Network of Neighbourhood Houses (*Rete Case del Quartiere*) as the venue of the pilot service. *Rete Case del Quartiere* is a network of eight not-for-profit organisations that manage public spaces for active citizens with the

<sup>17</sup> Cf. <https://tac93.fr/programme>

<sup>18</sup> Cf. [Paris3\\_BlockchainKnowledgeRegistry.docx](#)



aim of making them protagonists of the social and cultural life of their neighbourhoods, creating strong interest in social services. The proposed scenario is the result of a participatory process carried out in three different selected Neighbourhood Houses (*Case del Quartiere*), namely:

- the Multicultural Hub Cecchi Point
- Più SpazioQuattro
- Casa del Quartiere di San Salvario

The scenario of the service evolves around the “*Augmented Commoning*” concept. The idea is to augment Case del Quartiere (CdQ) with disruptive technologies in order to offer more engaging and useful services. Four services have been planned:

- Augmented contents** Provide an area, in a form of a AR marker, for announcements and general sharing of information and multimedia content through AR
- CdQ coin** Each CdQ will create its own coin/token which will be used by participants to pay services inside the CdQ
- Management of volunteer activities** Use of AR to indicate volunteer activities that must be carried out (e.g a broken window) and use of tokens and Gamification to reward those carrying them out.
- Planning of the yearly programme** Using tokens as a voting system to decide over the yearly program of the CdQ.

A more detailed description of the service can be found in Deliverable 1.2 <sup>19</sup>

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<sup>19</sup> See D.1.2 p.156





CO3 AR Markes at San Salvario CdQ

The main hypothesis for this pilot was:

*The capabilities afforded by CO3 use of AR Technology can help to create and maintain a service where managers, organizers and citizens actively participate in CdQ activities*

Due to Covid19 pandemic services C and D could not be carried out. For service C the reason is that no volunteer activities took place in CdQ since the pandemic started. The community houses changed their focus from cultural events to relief efforts for the pandemic that involved no indoor volunteer activities that could be mapped with AR. For service D no yearly programme was produced. Due to Covid restrictions CdQ planning could not go beyond a two week period. As such not all hypotheses made for the Pilot have been tested.

To test hypotheses regarding service services A and B a kick-off event and another four workshops were conducted in the three CdQ. On more than ten occasions pilot members visited CdQ to engage with potential users. Feedback was collected through two separate Questionnaires, one before and one after the engagement activities, and verbally by pilot members during pilot activity. In addition, two expert interviews were conducted with CdQ managers.

## 2.6.2 Discussing Hypothesis

*[T1.SH1] CdQ managers, organisers and citizens alike will be engaged in producing and dropping AR content*

This considers service A. While participants were interested in using the AR technology several issues emerged that prevented the engagement of the users in producing and dropping AR content. First of all most participants could not use the AR features of the CO3 application because their phone could not support them. Specifically during the training workshops with CdQ organisers and managers less than one every four people approached had a device able to support AR. Some User Experience problems have been reported, concerning the scan of the AR marker and the placement of objects, and discussed with the technical partners.

Putting technical problems aside, users had some interest in the application and CdQ managers uploaded some material and announcements. Due to Covid19 restrictions though there were no daily visitors to CdQ and thus we had to invite participants particularly to use the application. As such we could not assess the effect of an intuitive approach where visitors interact with AR markers and the content they can display.

In general participants were interested in AR, they perceived it as something new and were curious to use it. As the data from the Questionnaires show it was considered quite useful (10/18 answered 3/5) but less easy to use (6/18 answered 2/5 while 5/18 answered 3/5 ). They thought of it more as a new technology they would like to try and not as a practical solution to everyday problems.

As such in order for the AR service to be more widely adopted UX improvements need to be made along with mobile phones supporting AR to become more available to users which in turn is linked with the underlying *Economic Conditions*.

*[T.1.D1] AR will replace physical message board*

*[T.1.D2] Communication through AR will provide more feedback on spaces and facilities, improving maintenance than the physical message board*

As we already mentioned the main obstacle was that most participants in CdQ could not use the AR features because their phones could not support them. Even if it was possible for everybody to use it, AR was generally considered harder to use than the physical message board.





*Meeting at CdQ Cecchi Point, 27/10/2021*

*[T2.H1] CO3 Token System can help create and maintain a service where citizen participating in CdQ activities pre-pay services to provide working capital in advance*  
*[T2.SH1] Citizens will be eager to contribute in advance to CdQ activities*

The CO3 Token System was actually implemented in one CdQ instead of three as initially intended. This was the result of the Covid19 situation that shifted the focus of CdQ to relief efforts instead of cultural activities such as music lessons etc. for which the Token System could be applied. The CdQ where the Token System was implemented was *Multicultural Hub Cecchi Point* which is located in a multicultural working class neighbourhood.

Even though data from the Questionnaires suggested that most participants perceived the Token System as both useful (10/18 answered 3/5 and 5/18 answered 4/5) and easy-to-use (12/19 answered 3/5) a limited number of CdQ visitors went on to actually use the service. Two organizations offering services in CdQ opted-in and eight users of the services used it with a total volume of transactions of almost 200 euros. Covid19 obviously played a role in limited adoption since only a fraction of the usual activities were taking place but other actors also played important roles in this limited adoption.

The accounting processes that are necessary for the administrative management of the system have been studied together with an expert in accounting and taxation for not-for-profit organizations, which is the case for most of the organizations involved. All possible use cases within the CdQ have been covered (purchase of tokens, tokens as prepaid cards, donation of tokens, etc.), and procedures identified to manage these transfers in parallel and in compliance with ordinary accounting procedures, since a dedicated legislation on tokens exchange is not already in place in Italy. As mentioned for the Athens case, a viable solution was to consider the tokens as prepaid cards.

However, the organizations in CdQ did not want to adopt the system because they considered the accounting process coming with it very complicated (*Facilitating Conditions*). To implement it they had to keep track separately of all transactions (with euros and with tokens) since the tokens were not a different payment mechanism but a different representation of value altogether even if it was linked with Euro on a one-to-one basis. This made accounting difficult. Having to track both transaction mechanisms, and then having also to spend the tokens inside the CdQ or go through the process to exchange them were important counter-motives for the organizations. It was generally considered too much work for little gain.

Another factor was that users were not very eager to pre-pay services. [T2.SH1] One reason for that was that they did not have great trust in the system (*Social Influence*). They considered it something new and felt uncomfortable to be asked to give money to something new and in a way experimental, since it was presented as a pilot implementation. Another more important factor was that visitors of CdQ, especially in *Cecchi Point*, are usually people in poor economic condition that can't afford to prepay services. They simply can't spare amounts of money that way on an everyday basis.

We see here that *Facilitating Conditions* such as the accounting process as well as *Economic Conditions*, regarding CdQ visitors must change for such a service to be widely adopted.

[T2.SH2] *Organisations that propose activities are willing to promote the system and provide incentives to the citizens to use the system*

As stated previously the testing was limited because of the Covid19 situation but it was clear that the organizations were not willing to give incentives. Having money in advance was not a strong enough motive for them to provide discounts. We also did not have enough time to convince them. If the service had the take to gain pace maybe they would provide more incentives. They did not have confidence in the mechanism. They wanted to see a raise to the volume of transactions to go into such a process. They wanted to provide discounts only if a user reached a specific amount of tokens which was usually very high (e.g. two free tokens after fifty tokens have been consumed).

[T2.SH3] *The system improves daily work and does not create bigger administrative workload*

As we also explained earlier, this proved wrong. The system adoption generated a lot of administrative implications. Keeping track of both Euros and CdQ tokens proved difficult. Separate accounts should be kept at all times. If there was a huge amount of new revenue it would be worth the effort but now organizations did not want to complicate the accountancy for a limited number of users.

[T2.SH4] *The use of prepaid tokens and of an exchange system creates economic links between different activities and organisations*

The service implementation did not go far enough to explore such a possibility. We had only two organizations onboard. One user, because of the token system, went on to use service from both organizations instead of the one he/she initially visited but this is a very limited sample and can't be used to provide concrete answers.

### 2.6.3 Conclusion

Revisiting the main hypothesis *The capabilities afforded by CO3 use of AR Technology can help to create and maintain a service where managers, organizers and citizens actively participate in CdQ activities* we can summarise our conclusions as following.

AR content sharing was considered an interesting service proposition which could not materialise due to technical difficulties. The main obstacle was that most users of CdQ did not have phones which support AR. Some UX problems were reported, and troubleshooted either technically or recurring to usage tips (such as better light conditions in the environment). Addressing both issues is essential for such a service to be implemented. The *Economic Conditions* of CdQ visitors resulted in them having older and cheaper phones, an issue that will probably be diminished gradually as AR supporting mobile phones become more accessible. As for the UX issues, they underline the need for continuous development while implementing such technologies in a complex indoor and outdoor environment to address all issues that will emerge.

Overall though it seemed that stakeholders and especially Public Authorities were interested in exploring the potential uses of such services and maybe CdQ was not the most appropriate environment for their initial implementation. As was stated in one of the expert interviews with PA members: *“Among the public administration services that I see most possibly interested in the use of these technologies, there is certainly the cultural and tourist one, in which these technologies can have a playful cultural function but also a social interaction value. Another appealing use is represented by participatory urban planning.”*

As for the CO3 Token System it was considered both useful and easy-to-use but was halted due to issues regarding the accounting of the transactions. *Legal and Facilitating Conditions* seem to play a great role in money involving services. An accounting framework that incorporated in a practically easier way this kind of reusable tokens would pave the way for a broader adoption of such a service. Otherwise strong economic incentives must be in place to energise participants to overcome such obstacles which was not the case in our pilot implementation.

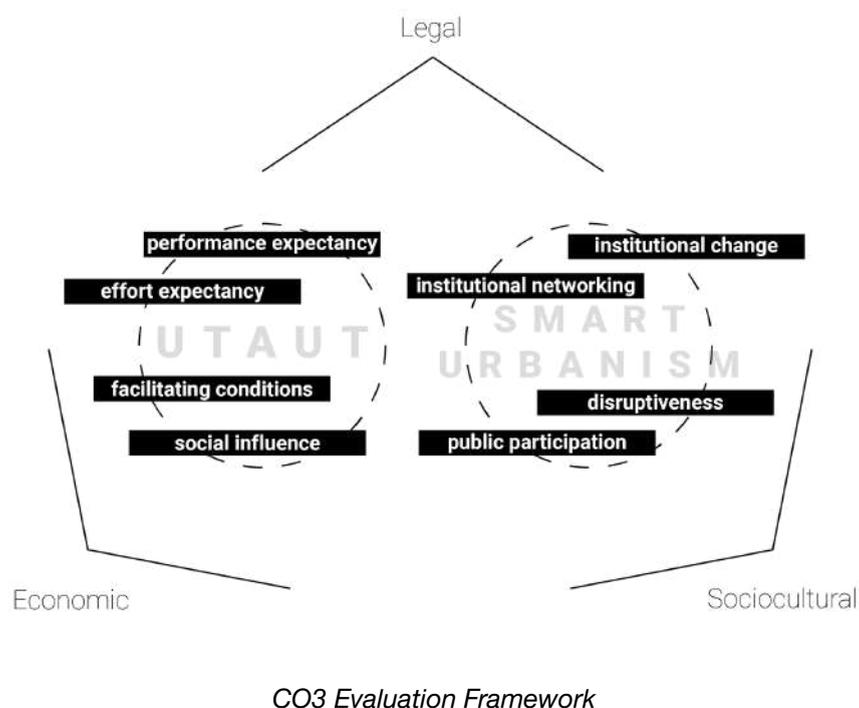
Finally another critical factor is the time and the effort invested in such interventions. As was stated in another expert interview *“The criticality that I see is that these are slow processes, which both managers and users must slowly “metabolize”. They require time but, overall, internal trained staff. This is the mandatory precondition for effective and lasting action.”* Covid19 pandemic unfortunately limited significantly the time available for our pilot implementation and thus the window of opportunity for it's wider adoption.

## 3. Cross Pilot Evaluation

### 3.1 Cross Pilot Evaluation Framework

Following the Realist Evaluation method, we formulated hypotheses, we tested them and we discussed them. The goal though is not to make conclusions for each pilot independently but use the outcomes of the pilot implementation to make broader conclusions for the research project as a whole. As our method makes clear, the target is not to test if hypotheses as true or false but rather to understand “what works for whom and under what circumstances”.<sup>20</sup>

To do that we have developed a General Evaluation Framework which we have described in detail in Deliverable D.4.1.<sup>21</sup>



The concepts described in this framework should be considered more as conceptual lenses rather than specific variables. The complexity of the evaluation process leads us to take a step back and aim to understand the big picture through the observations made. As such we will undertake a general *inductive approach*. We do not draw conclusions from a specific metric or evaluation action. All these different observations and evaluation actions when combined allow us to better understand the impact of our pilot services and technologies.

<sup>20</sup> Pawson and Tilley - 1997

<sup>21</sup> See D.4.1 p29

This framework has two parts. The first part focuses on the technologies and is inspired by the Unified Theory of Acceptance and Use of Technology (UTAUT) <sup>22</sup> The four concepts inspired by the UTAUT variable are <sup>23</sup>:

- **Performance Expectancy**, defined as the degree to which an individual believes that using the system will help him or her better attain significant rewards.
- **Effort Expectancy**, is defined as the degree of ease associated with the use of the system
- **Social Influence**, is defined as the degree to which an individual perceives as important that others believe he or she should use the new system.
- **Facilitating Conditions**, is defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

In the second part we focus more on the Service evaluation and try to collect different concepts within the scope of *Smart Urbanism*, in order to investigate and acknowledge possible new sociotechnical relations emerged throughout the implementation of the designed services. Smart Urbanism is argued that “*provides flexible and responsive means of addressing the challenges of urban growth and renewal, responding to climate change, increasing resilience, promoting sustainable economic growth and building a more socially inclusive society*”<sup>24</sup>. Based on the the meetings we had with local pilot partners and the hypotheses formed we ended up with 4 concepts inspired by Smart Urbanism<sup>25</sup>:

- **Institutional change** refers to transformations of processes, protocols or management models of public sector or other institutions involved in the delivery of the service
- **Institutional networking** is defined as relations emerged between formal or informal organizations during the implementation of the service in order to deliver the service or to transform conditions of existing ecosystem
- **Disruptiveness** refers to practices, workflows, behaviors or views which transformed because of the experience gained during service implementation
- **Public participation** is defined as the degree in which the proposed services promoted civic engagement and created opportunities of interaction between citizens and public administration

All these concepts are set to be examined in relation with the underlying conditions set by the CO3 project:

- **Legal**
- **Sociocultural**
- **Economic**

as well as the core concept of the *Augmented Commoning Area* as presented in Deliverable 1.2 <sup>26</sup>

<sup>22</sup> See Section 3.5

<sup>23</sup> Venkatesh et al. 2003

<sup>24</sup> European Commission (2013a) Energy technologies and innovation: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. COM (2013) 253, Brussels.

<sup>25</sup> Marvin, S. , Luque-Ayala A. & McFarlane, C. (2016) Smart Urbanism: Utopian Vision or False Dawn? New York: Routledge

<sup>26</sup> See D.1.2 p10

## 3.2 Cross Pilot Conclusions

In the following section we aim to summarise useful conclusions that have been drawn by all pilots following the framework described above.

### 3.2.1 Public Participation demands from public authorities to demonstrate willingness to change

Public participation was one of the main concepts investigated through the CO3 project. The whole process was mainly based on the assumption that disruptive technologies could trigger citizens' participation in order to form services of social provision as a common. This trajectory of social innovation related to Smart Urbanism brings to the forefront that any equivalent vision about the city could not be realized in socially sustainable ways without the involvement of the everyday users and actors of the city. Building upon this initial argument we observe that the empirical data (both quantitative and qualitative) collected during the project, leads us to several insights about which practises and policies could frame participation in realistic ways.

To begin with, according to the variable of Institutional Change it was not possible to observe any significant change through the experience of pilot cases in the three cities within the time span of the project. The conditions formed because of Covid-19 pandemic had a crucial impact on actions of interaction with public administrations, citizens initiatives and other stakeholders. As a result, in most of the occasions the proposed services had to adapt to the availability of institutional processes. This limitation proved that disruptive technologies were not able to disrupt the system and the ways public institutions work in the extreme conditions of pandemic. Public authorities were interested in the innovative aspect of the process developed by CO3 (Athens, Turin) - especially on how AR technology or gamification could create a discourse about urban issues and foster participation in city planning - but they were not convinced to adopt any of the results of pilots implementation, on the only basis of an experimentation period shorter than expected. In this realm, we can argue that although the proposed services did not change institutional processes, they are capable of creating the conditions for future transformation in terms of public administration. The technologies implemented throughout the project could be used to map a field of interest or needs and produce invaluable urban data, create a collective platform for citizens' proposals or designate through dialogue the problematic aspects of public institutions and possible directions for improvement.

To this extent, an important insight from both Athens pilot services was that there is a diffused mistrust to public authorities and this has been expressed as a main obstacle for citizens' wider participation. Consequently, the increase of trust could be seen as a first necessary step for institutional change by investing time and resources on the implementation of a tangible urban intervention or service led by community needs. Such an example should be aligned to the following:

- **flexibility in budget allocation during the implementation** to support actions or needs of the specific aim by forming a more open-ended process of technology use according to the tech literacy level of stakeholders, citizens, the stage of digitalization of administration offices and the socio-cultural context in general. The plan should be flexible to adaptations during implementation in order to respond to challenges and obstacles which in most of the occasions are not obvious in the initial planning.
- **the internal legal support** during the development and the implementation of the pilot, as well as the commitment of public institutions/entities to facilitate the legal conditions according to needs. This is relevant in particular for novel domains where dedicated legislations are not yet there, such as Blockchain token transactions, and a conciliation with the existing norms is necessary.
- **a wide educational strategy** to promote citizens' participation through events and participatory actions with physical presence based on the specific aim, which should be inclusive to different social groups and communities. Digital tools are meant to trigger participation or formulate the conditions for encounters, but the development of social relations and of a common understanding is the key element to produce significant change also to a bottom-up perspective.
- **a concrete strategy for institutional networking** in order to activate all the available and potential resources. A beforehand on-boarding of related organizations could facilitate reach-out of the idea as well as the prompt involvement of important stakeholders.

The abovementioned recommendations to amplify participation designate the interrelation of institutional change with an alternative, more decentralised conception of urban governance. Consequently, digital technologies could be an accelerator to facilitate citizens participation, but it is impossible to be realized without a new perception of governance by the public authorities and concurrent support to initiatives which create encounters in the urban space. Through projects like CO3 local Public Authorities are able to see concrete possibilities for positive interventions, which then can incentivize the local actors.

### 3.2.2 We need to rethink disruptiveness in terms of social needs

Disruptiveness was a key concept of the project. As we stated in our description of the Model for PA/Citizen Collaboration: *“Our aspiration is that the implementation of disruptive technology, following the approach of co-produced public service as commons, will produce useful results for both the technologies and the co-production methods applied.”*<sup>27</sup>

The CO3 technologies and methods (Blockchain, Augmented Reality, Interactive Democracy, Geolocated Social Media, Gamification) and all other technologies broadly described as “disruptive” aim at implementing radical change in the way things - and in our case public services - work. Through the course of the project and the pilot implementation we came to realise that this endeavour is very challenging and technologies alone play a limited part in the process. A range of underlying conditions and design decisions can have a significant influence in the way these services, and thus the technologies they implement,

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<sup>27</sup> See D.1.2 p14

work. A technology first approach, that seeks to disrupt services and organizations, seems unable to make significant breakthroughs in technology adoption. If we want to be in a better place to promote the use of technology as a problem solving process with positive social impact we need to adopt a different starting point. Especially when our goal is social services, and not for profit products, we need to be able to build our solutions around the social needs presented on the ground and use the technology in ways it covers those needs. In addition we need to be able to provide the conditions for the technological implementation to be operational and adoptable. In this way technology becomes the trigger to explore social alternatives, the spark to start broader discussions over the social condition in which it is implemented. As such we must consider whether a concept of *Social Innovation Through Technology* seems more representative of the purpose of the project than *Disruptiveness*.

The following paragraphs provide some examples of the preconditions, not only attaining to the technological domain, that need to be in place for technologies to express disruptive potentials.

A prominent example of the conditions in which technologies are introduced is the fact that most participants in the pilot project had phones that did not support Augmented Reality. As such it's wide adoption is impossible regardless of its disruptive force. This underlines the economic and sociocultural conditions present, especially in Athens and Turin, in which getting a new phone that supports AR is not considered a priority. In Paris most students had AR supporting phones even though they come from a difficult economic environment. The fact that they were younger and they just got their first phone may have played a significant role. The role of age is highlighted in other aspects too. Participants in Athens and Turin had serious difficulties in using AR and described it as requiring big effort to adopt. On the contrary, students in Paris were very keen to use it and did not report any problems while using it. Age influences significantly the *Effort Expectancy* of the users of these technologies.

In order to topple this *Effort Expectancy* caused by both the technology itself and the negative *Underlying Conditions* a high level of *Performance Expectancy* is needed. This became very clear with the services regarding *Socio-Economic Networking* (Athens 1, Turin) which were direct attempts of implementing new services in existing institutions, "Laiki Agora" and "Casa del Quartiere" respectively. In both cases the problems of the technology implementation seemed to outweigh the expected benefits. Gamification even though was seen as an extra incentive to use the technology, that was not enough to influence a quick adoption. This even more in an experimentation framework affected by the time and social constraints determined by the pandemic.

In Athens the problems were mainly political and sociocultural. Citizens believed that the municipality itself should provide for poor people and not themselves with donations. Producers were angry and distrustful to the government and subsequently to technological intervention promoted by what they regarded as "the system" due to both a new law regarding "Laiki Agora" promoting privatisation and the Covid19 pass, which uses the QR code as our application does. More importantly they regarded the whole service as unfair

competition as we described above. In Turin the problem that affected most the “CdQ scenario” was mainly the accounting framework. Keeping track of both means of payment proved a demanding task for the accounts of the participating organizations. As a result organizations did not want to adopt the system if they did not see a significant growth in the volume of transactions and thus to their income. The reluctance of some organisations can also be determined by the fact that this was a pilot implementation, requiring quite a relevant effort in a short period.

All these have little to do with Blockchain itself, the disruptive technology we aimed to implement. Who tries to make the intervention or the place and time have a huge influence on the process - influence that disruptive forces of the technology can not easily surpass. In Athens the supposedly trustful Blockchain, due to its distributed and encrypted nature, could not supplement the lack of trust to Public Authorities. In Turin, the cutting-edge digital infrastructure of the CO3 Blockchain Wallet, which allows the users to easily see all transactions, encountered the barrier of the local accounting framework that prevented it from being fully experimented by the users.

Getting people on board earlier might have helped with all these issues. While designing our pilots we met with a large range of key stakeholders regarding our core concepts and conducted several co-design workshops but it is now obvious that a more focused approach is needed. For example, in the Co-design of the Athens pilot we worked with experts on food provision, social workers and citizens but we did not include the producers of the open market into the co-design. When the co-design took place we didn't even know that the pilot was going to be placed in the open market anyway. Placing the service at the open market was a result of the co-design process. We think that if we had repeated the co-design more times and in a more focused way with producers of the open market this might have helped with designing a more adoptable and useful service.

Through all these observation we conclude to the following considerations:

- **Social needs should be the starting point. Not the single technology.** Instead of focusing on how to implement specific technologies, researchers must offer a wide range of technologies to communities. Communities working with researchers will map specific social needs that in turn open opportunities for the implementation of any technology fitting the occasion.
- **Co-design participation should be repeated with the most important stakeholders.** A broad approach to the co-design process helps us map all stakeholders but is limiting its effectiveness. Research should be more focused on choosing stakeholders closer to the actual implementation site and repeat the co-design process if needed with new and focused participants
- **Long term commitment is needed.** Introducing yourself as a researcher who comes and goes does not help with creating trust. Especially if you work together with Public Authorities in an environment where trust to PA is limited anyway. In order to create trust you need to demonstrate that you are there to help and that you have your user's interest in mind, not only your research targets. You need to show you are part of the community and you will be there after the project ends.

- **Services need to be maintainable.** Implementing a technology which is difficult to maintain creates significant barriers to adoption. Especially if the technology regards services with direct economic value. For this purpose all technology used in these interventions is better to be Free/Open Source and local partners able to maintain it should be provided.

As such it seems that *disruptiveness* as a concept fails to address all these considerations regarding the use of technology, since it places the transformative force primarily in the technology itself. Instead a holistic approach is needed, that starts from the needs of the targeted community and uses technology as a tool - a transformative tool but still a tool. How, where and from whom this tool is used is equally, if not more, important. Consequently, *Social Innovation Through Technology* is a better way to perceive our interventions.

## 4. Conclusion & Discussion

After taking under account all the considerations provided, we are revisiting the main hypothesis of the Evaluation Framework and we discuss the core concept of the project.

Our main hypothesis was:

*The capabilities afforded by disruptive technologies and the co-design process can contribute to a successful collaborative public service provision.*

Through the course of the project we were able to work on this research question and produce useful considerations. Three different Public Authorities in three different countries come in touch with co-design processes in developing public services and technologies like Augmented Reality and Blockchain of which most of them had no knowledge at all. These technologies were also new for citizens who, through the project, learned about them and had the chance to actually use them in use cases trying to cover their needs. All this was a very ambitious endeavour that resulted in providing valuable insights on our core research question.

Trying to summarize these insights in reflection of our main hypothesis we want to stretch the following points:

- Disruptive technologies as a term describes a partial aspect of the techs' potential, but risks to hide the necessary technical, sociocultural and economic preconditions. Instead of focusing on specific technologies, we need to provide a broad scope of technologies to the stakeholders of the co-design process and take under account the reality on the ground when proposing them.
- Stakeholder needs should be the starting point for the co-design of such services and not the technologies.
- Public authorities need to demonstrate willingness to change in order to persuade other stakeholders that the co-design process is meaningful and inspire participation.

- A lot and continuous effort is needed to promote such services. Stable and maintainable socio-technical infrastructure is in a better position to provide change than temporary interventions. On the other hand, temporary interventions have the purpose to assess costs and benefits before stable interventions are set in place;

We also want to reflect on the concept of the *Augmented Commoning Area* which was also tested on the ground. Its basic dimensions (AR, physical proximity) showed complexities in their overall implementation; conversely, some specific application fields appeared of more immediate interest and relevance, as explained below.

Augmented Reality is not yet, as a technology, ready to provide such a service on a wide social basis, since some people either do not have very up to date devices, or can find some obstacles in the user experience. The whole experience is fun and interesting but is perceived by the users more like a fancy multimedia experience than an actual support tool for commoning.

AR proved more useful in helping people understand space and how 3D designs relate to this space. AR in this context is used as a visual tool for architectural design that helps stakeholders take part in urban design. We can't state though that this process develops an ACA as perceived in the original model. Generally user feedback indicated that the 3D model projected in AR should not be symbolic or multimedia content (badge, token, announcement, video) but something that actually interacts with its surroundings. This is the added value of the AR. Otherwise a digital 2D representation seems more adequate since it is more easy-to-use.

We should also take under account the effect of the Covid19 pandemic on this part of the project. ACA is based on people being in the same place where they place and share 3D objects. That is the exact opposite of what was required during the pandemic while the social distancing rules were in place. As such it was difficult for us to fully assess the possibilities of the ACA concept. Generally digital technologies are used to connect people that otherwise wouldn't connect. That commonly means geographic distance. Place based Augmented Commoning goes against this notion and thus it is difficult for stakeholders to find meaningful uses for it in a period when geographic distance is the default option. Future research could work on asserting the use of ACA to connect people that are visiting the same place but on completely different timetables.

Finally we want to acknowledge all the different stakeholders that took part in the process. It was a great step forward for all of them to work with such advanced technologies and they undertook big efforts to learn about them, use them and test possible applications. We hope that both the framework and the insights gained from this project will be a valuable starting point for future research in the field.



# Appendix

## A. Pilot Services Reference

The CO3 Pilot Services and the sections where they are described in other deliverables.

Code Name	Title	D1.2	D3.1	D4.1	D.3.5
Athens.1	Groceries on Hold	5.3.4	3.1.1	5.4.1	2.1
Athens.2	Mapping community needs on empty buildings	5.3.5	3.1.2	5.4.2	2.2
Paris.1	Contributive Clinic	5.3.2	3.3.1	5.4.3	2.3
Paris.2	Digital urbanism in Augmented Schools	5.3.1	3.3.2	5.4.4	2.4
Paris.3	Blockchain Knowledge Registry	5.3.3	3.3.3	5.4.5	2.5
Turin	Augmented Commoning in CdQ	5.3.6	3.2	5.4.6	2.6

**Table 1 - The CO3 Pilot Services**

## B. Digital Literacy tool

We used a survey with questions that request self-assessments of skills. We decided to use yes/no and likert scale questions for simplicity. The question will be as few as possible to help engage better with the target audience.

The question will cover competencies regarding <sup>28</sup>:

0. Fundamentals of hardware and software
1. Information and data literacy
2. Communication and Collaboration
3. Digital content creation

We are going to evaluate in the 3 of the 4 overall levels of digital literacy <sup>29</sup>: Foundation, Intermediate, Advanced. We will use a point system to rank users in 5 of the 8 Granular Levels.

<sup>28</sup>

<https://gemreportunesco.wordpress.com/2018/03/19/a-global-framework-to-measure-digital-literacy/>

<sup>29</sup> [https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110624/dc\\_guide\\_may18.pdf](https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110624/dc_guide_may18.pdf)

*Depending on the target audience more questions can be added to test other levels and competences.*

## 0. Fundamentals of hardware and software

0.1 What type of devices do you use?

- Mobile (1) <sup>30</sup>
- SmartPhone (2)
- Tablet (3)
- Desktop/Laptop (4)
- More than one of the above (5)

0.2 How often do you use your digital devices for something other than communicating (searching on wikipedia / reading online newspapers)?

- Never (1)
- Every 3 months (2)
- Every month (3)
- Every week (4)
- Several times a day (5)

## 1. Information and data literacy

1.1 How often do you search on the internet about information or data in your routine?

- Never (1)
- Every 3 months (2)
- Every month (3)
- Every week (4)
- Several times a day (5)

1.2 How often do you use more than one source to cross-check information you find on the internet?

- Never (1)
- Almost never (2)
- Once in a while (3)
- Often (4)
- Almost every time (5)

## 2. Communication and Collaboration

2.1 How do you interact with your personal and working environment (multiple responses are allowed)?

- Phone Calls & SMS (1)
- Chat (Messenger) (1)
- Group Chat / Share Content (1)
- Regular use of Email, Cloud and relevant tools (2)

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<sup>30</sup> Points are next to answers in parentheses.

### 3. Digital content creation

#### 3.1 How familiar are you with creating digital content?

- I capture photos/videos and keep them in my phone (1)
- I capture photos/videos and share them in chats or social media (2)
- I edit photos/videos on my phone (3)
- I have knowledge of photo and video editing with relevant software (5)

#### Analysis

Minimum points: 4

Maximum points: 25

**Level 1:** 1-5

**Level 2:** 6 - 10

**Level 3:** 11 - 15

**Level 4:** 16 - 20

**Level 5:** 21 - 25

T.4 Main keywords that feature the proficiency levels								
4 OVERALL LEVELS	Foundation		Intermediate		Advanced		Highly specialised	
8 GRANULAR LEVELS	1	2	3	4	5	6	7	8
COMPLEXITY OF TASKS	Simple task	Simple task	Well-defined and routine tasks, and straightforward problems	Tasks, and well-defined and non-routine problems	Different tasks and problems	Most appropriate tasks	Resolve complex problems with limited solutions	Resolve complex problems with many interacting factors
AUTONOMY	With guidance	Autonomy and with guidance when needed	On my own	Independent and according to my needs	Guiding others	Able to adapt to others in a complex context	Integrate to contribute to the professional practice and to guide others	Propose new ideas and processes to the field
COGNITIVE DOMAIN	Remembering	Remembering	Understanding	Understanding	Applying	Evaluating	Creating	Creating

Matrix of the Levels <sup>31</sup>

<sup>31</sup> [https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110624/dc\\_guide\\_may18.pdf](https://publications.jrc.ec.europa.eu/repository/bitstream/JRC110624/dc_guide_may18.pdf)