



**CO3**

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

Grant Agreement number: 822615

# D3.2

## Pilot Requirements

Keywords

Dissemination Level		
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)	
C O	Confidential, only for members of the consortium (including the Commission Services)	

## Authors List

Partner	Author(s)	Sections
UNITO	Guido Boella, Alberto Guffanti, Cristina Viano	1, 2, 3, 4
OLA	Villy Mylona, Gregory Tsardanidis	3 (inputs from pilots engagement actions and periodic reporting)
DAEM	Iliia Christantoni, Dimitra Tsakanika	2, 3 (inputs on pilot developments)
IRI	Giacomo Gilmozzi	2, 3 (inputs on pilot developments)
CTO	Vittorio Bianco, Elena Ghibauda, Michela Pollone	2, 3 (inputs on pilot developments)

## History

Version	Date	Reason	Revised by
0.1		First draft of structure and content	OLA, LINKS
0.2	9/07/2021	Writing Sections 1, 2, 3	UNITO
0.3	13/07/2021	Writing Conclusions	All partners
0.4	29/07/2021	Inclusion of partner comments and cross-check with D.3.3 and D.4.2	UNITO

## Acronyms

ATH1, ATH2	Athens Pilots
------------	---------------

PAR1, PAR2, PAR3	Paris Pilots
TUR / TUR1,2,3,4	Turin Pilots

# Table of Contents

**Description of D3.2 (from the DoA):** The requirements derived from the pilots will be gathered and generalized in order to support an omni-comprehensive implementation approach together with the case studies. It will include procedures and criteria that will be used to identify/recruit research participants respecting ethical requirements.

## **1. Introduction**

- 1.1. Purpose
- 1.2. Connection to other deliverables

## **2. Evolution of pilots at M24/30**

- 2.1. Original scenarios and pilot
- 2.2. General considerations on pilot evolution (pandemic)

## **3. Generalization of requirements**

- 3.1. Technical features and usability
- 3.2. Functionalities
- 3.3. Technology application management
- 3.4. Disruptive co-production management
- 3.5. Socio-economic interaction models

## **4. Conclusions**

# 1. Introduction

## 1.1. Purpose of the Document

Deliverable 3.2 presents overall and **cross-pilot** considerations on the **requirements for technology development**, building on the initial technology and pilot scenarios design, and as derived from the **iterative elicitation process during the pilots preparation and initial implementation phase**, that further developed and fine-tuned the initial concept.

It builds upon Deliverable 1.2 - REQUIREMENT AND PROCESS MODEL DEFINITION and 3.1 - ENGAGEMENT PLAN, in order to account for the evolution of the requirements during the second year of project implementation (2020) and up to M30 (June 2021). In this period, on the basis of the first co-design, requirements have been fine-tuned **according to the feedback collected from the pilot referents and from the local stakeholders**, through:

1. working sessions between technical partners and pilot partners, coordinated by WP2 leader (FlexiGuided) and by the technical task leaders (Geomotion, Links, UniTo, Unit 8);
2. bilateral working sessions between WP3 and WP4 leaders (OLA and Links) and the pilot partners, aimed at defining and coordinating the local engagement plans and evaluation actions;
3. local engagement actions and initial evaluation actions, implemented by the local partners DAEM (Athens), IRI (Paris) the City of Turin/RdC (Turin). These generated incremental requests and feedback on the technologies, gathered systematically through the working sessions of point 2 above.

All this led to improvements of the technologies and of the pilots implementation approach, both on a general level and on a pilot-specific level.

## 1.2. Connections to other deliverables

For a detailed and **pilot-specific** description of how the project evolved, **we refer to** the following deliverables, which the present one aims to complement:

- Deliverable 3.3 - PILOT REPORT I - It describes in detail the context in the involved cities/areas in 2021, with a focus on the Covid-19 situation and the impact it had on the services interested by the project and on the pilots strategy, design and planning. It reports on the pilots implementation up to June 2021 (M24), as regards both stakeholder engagement and technology demonstration.
- Deliverable 4.2 - SITE-SPECIFIC EVALUATION METHODS AND PRELIMINARY REPORTS - It presents the adaptation of the overall evaluation methodology to the three pilots: for each of them, the context-specific evaluation plan, the hypotheses, metrics and evaluation activities are explained.

Moreover:

- Deliverable 2.3 - SECOND RELEASE OF CO3 TECHNOLOGICAL PROTOTYPES - is the reference for a complete description of the technologies and of their integration in the CO3 platform and app, as developed and evolved at the end of the second year of the project (December 2020).

- Deliverable 6.7 - POLICY BRIEF II - drawing on the initial co-design phase, it reports positive and negative stakeholders *perceptions* associated with disruptive technologies, co-production and related policies, and advance policy recommendations accordingly. This Deliverable D.3.2 instead draws on a more advanced phase of work in the pilot sites, reporting on *feedback from first actual trials* of the technologies and operations of the pilot models.

#### INTRODUCTORY REMARK1

D3.2 has been postponed due to the delay in some pilots preparatory and engagement activities, in the launch of the pilots and of some of the initial evaluation activities, as a consequence of the COVID-19 emergency.

The consortium agreed on postponing the drafting and submission of the three complementary Deliverables 3.2, 3.3 and 4.2 from December 2020 to June 2021, in order to be able to provide a more complete and incremental view on: pilot-specific actual implementations (D3.3) and consolidated evaluation plans (D.4.2), and on cross-pilot considerations on the social and technical requirements (D3.2).

*The purpose of this Deliverable 3.2 is to **bring forth some emerging considerations, coming from the technology experimenters in the pilot sites, on how to make them effective in co-production process.** A complete picture on final findings and evaluation results will come at the end of the project with the final Pilots and Evaluations Reports.*

## 2. Evolution of the pilots

### 2.1. Original scenarios and pilots

The original ideas for the use cases to be tested in each pilot context have been defined through the co-design processes implemented in the very first months of the project (WP1). The local services scenarios for Athens, Paris and Turin have been presented at the end of the first year (December 2019), in Deliverable 1.2 - REQUIREMENTS AND PROCESS MODEL DEFINITION. These descriptions provided the first set of requirements to the technical partners, in order to prepare the applications needed for the pilot implementation during WP2. Further elaboration on the pilot execution are provided in Deliverable 3.1 - ENGAGEMENT PLAN.

Subsequently, the local services use cases have been grouped in 3 categories, in order to contribute to the design of an overarching conceptual framework for grounding the Evaluation

methodology and for enabling a cross-pilot evaluation of disruptive technologies in a variety of conditions and uses (see Deliverable 4.1 - EVALUATION PLAN - Section 5.1)

Hence, the framework presented in the table below.

## 2.2. General considerations on pilots evolution

The updates about the pilot situation, and the main changes with respect to the original ideas, as evolved during the second year 2020 and as of June 2021, are presented in detail in D.3.3 - PILOT REPORT I, and recapped in D.4.2 - EVALUATION REPORT 1.

Here we provide a synthetic overview:

CATEGORY	PILOT	SERVICE SCENARIO	SHORT DESCRIPTION	MAIN CHANGES
<b>Socio Economic Networking</b>	ATH 1	Groceries on old	Social distribution of quality food excess in flea markets (Blockchain and Gamification).	Not major changes, but for organizational issues due to Covid-19: logistics in the market, and consequent postponing of some engagement activities.
	TUR 1.2.3.4	Augmented commoning in the Houses of the Neighborhood.	<ol style="list-style-type: none"> <li>1. Augmented contents with information on social activities (AR, Gamification, FirstLife).</li> <li>2. Prepaid cards, coupon and crowdfunding to enhance local socio-economic services (Blockchain).</li> <li>3. Managing volunteers activities (AR, Blockchain and Gamification)</li> <li>4. Participatory definition of the yearly activities programme (Blockchain)</li> </ol>	Starting date has been postponed to autumn 2021 since all the activities require physical presence of users. Alternative applications of the technology to support Covid emergency services where not feasible within the CO3 technology scope.
<b>Digital Urbanism</b>	ATH 2	Urban Modelling in empty buildings	Mapping and open debate on the potential re-usability of empty buildings (AR, FirstLife, LiquidFeedback, Gamification)	Not major changes, but for organizational issues due to Covid-19: group meetings with citizens and consequent postponing of some engagement activities.
	PAR 2	Urban Modelling in Augmented Classrooms	Citizens and students map their territory, for the development of a shared and critical knowledge about the urban spaces, and the experimentation of decision-making processes. (FirstLife, LiquidFeedback, AR)	Not major changes, but activities adapted to distance learning and/or postponed.
<b>Knowledge sharing</b>	PAR 1	Contributive Clinic	Creation of a space for contributory help about issues regarding the danger of	As a consequence of Covid-19: more emphasis on virtuous practices for using digital

			screen's overexposure between 0-3 years. Parents, researchers and medical professional co-design good practices through the civic social network (FirstLife)	screens; rescheduling of activities and reduction of beneficiaries due to other emergent priorities for the service.
	PAR 3	Blockchain Registry	In vitro experiment of how the blockchain could modernise the system of the intermittents du spectacle in France; how it could be used as a registry for the knowledges acquired by citizens on the territory within the contributory economy of Plain Commune.	Focus shifted to modelling a scenario for this Blockchain application, rather than analysing real-world cases.

Changes and improvements had the purpose to keep the experimentation consistent with the actual situation of the local social and economic contexts, and to fine-tune the technical requirements of the technologies according to evolving social and organizational requirements.

Even if an iterative fine tuning of the social and technical requirements was foreseen as part of the co-design approach of the project, various aspects have been heavily **influenced by the Covid-19 pandemic emergency**, as reported thoroughly in Deliverable 3.3.

In all the CO3 partner countries, the lockdowns and restrictions delayed the pilots development; in some cases, it has been necessary to make more relevant changes to some of the scenarios initially described in D1.2.

As regards the social and technological requirements, some adaptations have been done in order to ensure a regular implementation of the action or to address contingent social and organizational needs. However, the consortium decided to **avoid making substantial changes to the pilot specific objectives and rationales**, that could have hampered the achievement of the core project objectives on the experimentation of technologies and co-production methodologies.

Generally speaking, when changes occurred due to Covid-19, they regarded:

- Rescheduling of the in-presence activities, without major changes in their contents.
- Switch to online meetings when feasible, if not counter-productive in terms of engagement.
- Removal of ancillary activities in order to focus on the core objectives specific to the pilot.
- Adding of new activities to enhance the engagement strategy, in order to compensate for the consequence of the Covid restrictions.

An important consideration regards the fact that all the local partners **did not consider as an effective option to move online the core engagement activities**: both the **locally rooted nature** of the experimentations, and the **complexity of the technology**, require a **careful introduction of the latter to the wider public**, which appears to be more effective when done in person.

# 3. Generalization of the Requirements

In this section, we present an analysis of the technical and social requirements as emerged in WP3 activities. These included local community engagement, the iterative elicitation of requirements, and in the trial set up and operation of the technologies.

D.3.3 reports a punctual description of the first phase of engagement work in each pilot context. On the technical side, details are reported in D.2.3 as final deliverable of the trial set up at M24 (December 2020). On a more abstract level, this deliverable offers a general and cross-pilot overview that complements D.3.3, by adding considerations that emerged after December 2020, through a framework based on the following dimensions:

- **Type of requirements.** This will be the driving dimension for the analysis that follows. They range from the very technical ones to those concerning the socio-economic models addressed and the engagement processes:
  1. **Technical features and usability:** improvements required for adapting the technology to the specific pilot contexts, when necessary, or to improve the user experience (see D.2.3 for technical presentation).
  2. **Functionalities:** adaptations or additions to the first list of functionalities, required for addressing specific needs of the different local services.
  3. **Technology application management:** administrative and organizational aspects that are needed for a full exploitation of the CO3 App and platform features and functionalities, or that are addressed by their introduction.
  4. **Disruptive co-production management:** requirements concerning the engagement of the stakeholders for using the CO3 App, from involvement to training and coordination.
  5. **Socio-economic interaction models:** strictly related to the previous one, this type of requirements concerns broader social and organizational requirements that are not the core focus of CO3, being not directly linked with the project specific approach to co-production and technologies, but rather to the services and social dynamics addressed.
  
- **Scenarios categories.** We will highlight if the specific requirement has been expressed as a general need, or if it is specific to one or more of the three categories that group the pilot service scenarios:
  - *Socio-economic networking: ATH1, TUR*
  - *Digital Urbanism: ATH2, PAR2*
  - *Knowledge sharing: PAR1, PAR3*
  
- **CO3 technological components.** Requirements are often referred to one of the CO3 components: AR, LiquidFeedback (voting), FirstLife (mapping), the Blockchain wallet, Gamification. Others address the CO3 App in general. Finally, other engagements and

organization requirements, transversal to the technologies, are mentioned referring to the types 4 and 5 listed above.

Not all the components are equally addressed, since at the time of writing this Deliverable, some pilot scenarios were still in an initial phase due to the Covid-related delays. The purpose here is to start bringing forth some emerging considerations, coming from the technology users, on how to make them effective in the co-production process. A complete picture will come at the end of the project with the final Pilots and Evaluations Reports.

### 3.1. Technical features and usability

GENERAL ON CO3 APP - In general, the pilots gave positive feedback on the app UX. Some improvements have been required related to the functionalities of major interest for each pilot: the *Socio-economic networking* scenario (ATH1, TUR) pointed out the need for having the blockchain wallet unified with the app, for a smooth UX in the most relevant functions for the socio-economic exchanges. It has been stressed that the user interface must be simple and capable of actually making the organisations' and citizens' interaction easier and more effective. *Digital Urbanism* scenarios (ATH2, PAR2) focused their attention on refining the function of placing objects in the augmented spaces through AR, asking for more accuracy in geolocation.

AR - besides the point just mentioned above, an important issue that emerged from all the scenarios is the fact that some smartphones still do not support the AR functionalities, thus limiting the possibility of reaching 100% of the potential users addressed by the initial plan. Due to the novelty of the technology, solving this issue is out of scope for the CO3 project; still it is known as one of the most relevant warnings related to technical digital divide. Some partial adaptations have been made, to allow the use of the wallet by creating transactions independently from the AR application, and also by third-party actors that have no direct involvement in the CO3 project.

FIRST LIFE MAP and GEOLOCATION: minor issues related to the visibility of objects and attachments, and to the accuracy of the AR geolocation have been reported and fixed.

GAMIFICATION - Certain items of the interface have been adjusted, in order to satisfy the requirements for giving more importance to collaborative rather than competitive processes (see below 3.2). Graphic features are being customized according to each pilot's requests.

INTERACTION WITH OTHER DIGITAL TOOLS. Regardless of the scenario category, the use of the CO3 App in some cases required the integration, or other kinds of interaction, with other digital tools. ATH1 required an API to link the CO3 wallet with the coopboxes. PAR2 required the integration with Minetest for importing 3D objects. TUR1/2/3/4 more simply discussed the need for having systems for users' registration to events/activities as functionalities of the CO3 app or as link to external tools, such as spreadsheets, or forms, or emails.

### 3.2 Functionalities

GENERAL ON CO3 APP: Scenarios characterized by more complex interaction models, such as the *Socio-economic networking* TUR1/2/3/4, required for an in depth diversification of functionalities in order to reflect this complexity. Not all of them have been validated as feasible within the CO3 project scope, still they represent relevant factors to be considered for the transferability and scalability of the technology. In the Augmented Commoning in Turin, stakeholders play different roles (commons administrators, commons workers, volunteers, customers and beneficiaries of the services) that require for different permissions when creating, editing and deleting AR and Blockchain contents, or when registering for activities and events.

BLOCKCHAIN WALLET - Transfer of tokens in the beginning was meant to happen through QR codes, requiring in presence exchanges, in order to no crowding out physical meetings with the virtual ones. Both the pilots in the *Socio-economic networking* scenario (ATH1, TUR) pointed out as important the possibility of transferring in distance, by directly transacting with the other users' accounts. This need was pushed by the Covid-19 constraint; still the local partners agreed on the importance of not overlooking the incentives to physical meetings.

Within the scope of the experimentation, the blockchain wallet does not incorporate fiat money payment methods. This functionality has been identified as of interest for local stakeholders (namely, retailers in TUR pilots) for future developments; in other contexts (ATH1) the digital wallet features generate some hesitation from the end-user due to its perceived association with money-exchange.

FIRSTLIFE MAPPING and AR - In many aspects, more customization to the pilot-specific needs has been asked: *Digital Urbanism* scenarios (ATH2, PAR2) required the design of new objects to be placed into the augmented spaces or into the FirstLife map.

Some users reported their interest in keeping track of what they did on the map (e.g which objects a user placed); even if reported by just PAR2, this raises the interesting issues of how to balance the individual UX and visibility with the public and common purposes of the CO3 technologies.

GAMIFICATION - The adaptation of the model to the three pilots (from the identification of context-specific rules for points and levels attribution, to the selection of badges and graphics) is an ongoing process. Here we can report some preliminary considerations.

One of the innovative features of the gamification engine is the fact that the pilot managers, and not only the technicians, can act as administrators for setting up and managing the rules and monitoring of the rewarding processes. Pilot managers are currently starting to test this functionality.

As regards additional requirements, a common one for the three pilot is to reward not only the person who performs an action on an object, but also the creator of the object itself, in order to maximize the incentivization mechanism. Similarly, the Turin Socio Economic Networking scenario asked for rewarding not only the person who transfers tokens in the wallet, but also the receiver of a transaction, beside adding specific rewards and badges for those who are active in promoting social activities within the neighborhood houses.

At a general level, the preference for cooperative rather than competitive badges emerged, in order to reinforce the community and co-production nature of the actions in the pilots.

In some specific contexts (PAR1 - Contributive Clinique and ATH1 - Grocery on Hold) the gamification mechanisms have been considered as sensitive topic for the target audiences or the addressed social issues, and not implemented so far.

NOTIFICATIONS and SHARING - A recurring request was about the possibility of notifying the users about events of their interest (e.g. upload on the map of new events in the neighborhood, or creation of new tokens in the ACA of interest), and of sharing news from the CO3 app to social media. Both are considered an added value for keeping users engaged and for reaching the external public (see also below, 3.4).

### 3.3 Technology application management

BLOCKCHAIN WALLET - The Turin pilot(s) highlighted some design issues that are relevant for any *Socio-economic networking* scenario where innovative socio-economic interactions and exchange models are designed, that partially overlap with existing models of resources management.

The creation of tokens, whether they represent coins, or coupons, or crowdfunding schemes, require a careful definition of their functioning rules (and agreed upon by the relevant stakeholders) before they are immutably created onto the blockchain.

Transactions of digital tokens on the blockchain enhance and diversify traditional transactions of resources, goods and services, thus interacting with existing administrative, accounting, and taxation systems; these must be considered in the design of the overall system. Existing legal and taxation frameworks, so far, do not take into account the specificity of the blockchain transactions that are different from cryptocurrencies. In the case of Turin, this meant considering factors such as: how to account and balance the transaction of tokens among the operators within the commons; to which extent the transaction of tokens implies fiat currency exchanges and has accounting and taxation relevance, etc.

LEGAL DOCUMENTS: In order to frame the use of technologies in the EU and national normative framework, templates of a Privacy Policy document and of the Terms of Services of the CO3 platform have been prepared by the Coordinator, and translated and adapted by the pilot operators in accordance with the national regulations. They have been presented in Deliverable 5.2. Data Processing Agreements between Data Controllers and Data Processors have also been prepared and signed by the partners in charge of the different roles.

### 3.4 Co-production management / Engagement

TRAINING - The novelty and disruptiveness of the technologies made it necessary to implement both engagement and training tools for introducing the general public to the CO3 tools. These took different form: divulgative webinars on the technologies for a wider audience (TUR); games for introducing to the specific pilot scenario (ATH2 - board game with roles, that proved to be effective for simulating the Urban Digital Modelling Scenario); preliminary workshops/trainings for stakeholders with specific responsibilities (e.g teachers in PAR2, social workers and Houses

managers in TUR), before reaching the final beneficiaries (e.g teacher and students in PAR2, Houses volunteers and citizens in TUR).

INVOLVEMENT OF PIVOT STAKEHOLDERS - Among the many stakeholders involved at the local level, every scenario includes some group of people that are strategic as active actors and further promoters of the pilot, such as: merchants in ATH1, public officers in ATH2, social workers in PAR1, teachers in PAR2, commons administrators, managers, and retailers in TUR1/2/3/4. The understanding and acceptance of the technology on their side is of crucial importance. So far, this has required some attentions:

- preliminary trainings with these stakeholders are essential (see the paragraph above);
- careful design of the digital tokens transactions together with retailers, commons manager, administrative staffs and, in case, legal consultants;
- youngsters can be an assets as first users and then promoters of new technologies

ENGAGEMENT OF FINAL BENEFICIARIES AND THE GENERAL PUBLIC. Other scenario-specific evidences are listed below. The list is still provisional, since due to the delay in the start of the pilots, not all the envisaged engagement actions have been implemented at the moment of writing this deliverable.

- PAR1: the service addressed (maternal and child protection) is highly sensitive to social emergencies as the pandemic and the related measures. This resulted in a change in the priorities for the experimentation: interestingly, not only forcing to postpone the pilot with respect to other urgent social assistance activities of the services, but also confirming the relevance of some of the technology-related objectives, that the Covid social distancing and consequent relying on digital media made even more urgent (i.e. countering the digital-screen addiction).
- PAR2: in France, the legal restrictions imposed for the use of applications to people younger than 16 years old, have limited the possibility to reach a vast number of active users of CO3 technologies within the schools. This is an external constraint that requires significant adaptations (using the operators' devices during the workshops, and not the personal ones of the students). Consequently, the gamification rules have been adapted to collective users, rather than individual ones.
- TUR: more in general as regard the broader public, the variety of Blockchain objects (coins, cards, coupons, etc) that can be created in the Wallet requires short and clear explanatory texts attached to the digital object (TUR), so that they are immediately understandable by people who have not been personally introduced to the project. The choice of blockchain payments instead of traditional payments, the purchase of the Houses of the Neighbourhood's coins by the public, the adoption of the coins by organisations, need incentives on both sides (citizens and organisations).

Another interesting finding is that CO3 technologies have a huge potential for didactical/pedagogical activities.

TECHNOLOGY ACCESSIBILITY (see 3.1)

### 3.5 Socio-economic models

Other social requirements are not the core focus of CO3, being not directly linked with the project specific approach to technologies, but are rather related to the services and social dynamics addressed. Nevertheless, they can influence the effective implementation of the pilots, also interacting (positively or negatively) with the dynamics generated by the technology adoption.

- In ATH1, the introduction of the social innovation pilot in daily-life contexts such as the flea markets required a frequent and regular presence of the project operators on the field. Some flea markets producers were exitant to ask customers to contribute with offers, being afraid of damages in terms of competitiveness; some citizens think that donating food is up to the local government and not to citizens. On the contrary, some people expressed more trust in digital transactions when compared to the traditional “food stamps”, considered slow in payments.

In *all the scenarios*, the social measures taken in response to the Covid-19 pandemic affected the implementation of the pilots (see above section 2.2). In CO3 is happening the same as for many other innovation projects but also ordinary activities in our societies in 2020 and 2021: some requirements for technology and engagement adaptation, caused by the pandemic, were considered as emergency measures in the beginning, but then started being considered as the standard options (e.g the alternation of distance and in presence learning). Conversely, it's important to notice that, for co-production and social innovation purposes, the “digital only” option has not been considered the best one for an effective introduction of disruptive technologies in local social dynamics.

## 4. Conclusions

Due to the rescheduling of the pilot activities, more feedbacks on LiquidFeedback technology and on the engagement of the final users of the ATH2, PAR3 and TUR scenarios will be available in the next months. Further feedbacks will come for all the technical components and scenarios, since with the summer 2021 all the pilots will fully enter their implementation phase.

### Final Remarks

The policy recommendations proposed in Policy Brief II derived from the stakeholders *perceptions* of the disruptive technologies, of the co-production processes and on the related policies. Here, in a more advanced phase of work in the pilot sites, we can start reporting on *feedbacks from the first actual trials* of the technologies and operations of the pilot models. These can either reinforce the initial policy recommendations, or provide additional and alternative perspectives, that will be completed in the final Evaluation Reports at the end of the project.

Building on the Policy Brief recommendations for overcoming barriers to technology adoption, we recap the requirements presented in the section above, by adopting the same dimensions of analysis as per in Section 3:

## **1. Technical features and usability**

During the initial co-design phase, it had already been widely acknowledged that ease of use is essential for a wide adoption of the technology. This resulted in the integration of the CO3 tools in one app, later on refined following more specific requests of the pilots for improving the UX on the core components for each pilot (e.g. the wallet for the *Socio-economic networking*, the AR+Map for the *Urban Modelling* scenario).

The barrier represented by the AR equipment, not available for some older smartphones, has been confirmed, and mitigated by: developing features for both Android and iOS, adjusting the functionalities to the devices when possible (e.g giving the possibilities of transacting tokens directly through geopositioning or in-distance transfers, when the AR interaction is not supported). Additional requirements came from the pilot as regards the need for interaction or juxtaposition with external applications, digital tools or devices (the coopboxes API in Athens, Minetest in Paris, link to websites and shared online tools in Turin).

## **2. Functionalities**

Additional and more specific requirements on the different functionalities emerged in the first half of 2021, after that the local coordinators of the pilots and some of the stakeholders gradually started to use the CO3 platform and app. The main considerations are related to:

- the need for allowing both in-presence interactions and transactions at distance. The latter have been retrieved in the CO3 app concept, pushed by the pandemic constraints. Balancing the two, by avoiding that digital interactions crowd out physical contacts, will be even more a challenge for the digital cities after the pandemic period.
- The need for considering that public services co-production initiatives can present quite complex governance structures (fully peer-to-peer commons are less present in the CO3 pilots), with different roles that could need to be reflected in the platform users' privilege. This is not for preventing final users from a full exploitation of the tools, but for contributing to the ease of use of a multi-functions app.
- Users such as urban mappers and commons managers highlighted the need of functionalities such as: tracking what a user did on the map, sending notifications about events of interest in the platform, sharing news to social media. These help in making the individual user experience smooth and engaging.

## **3. Technology application management**

Both in the co-design and pilot set up phases, the Blockchain technology is the one that shows the highest potentially disruptive impact in interacting with existing models of socio-economic exchanges. This happens both in terms of perceptions (e.g. hesitations arose due to people's association of the wallet with money-exchange) and of actual management issues. The latter regard the need for understanding if and how the wallet transactions are affected by the existing national accounting, tax and legal regulations (e.g providing different methods for converting real money credits to tokens). It is also necessary to keep in mind that blockchain-specific regulations are still not there in many Countries.

Plain language legal documents such as Privacy Policy and Terms of Services, easily accessible through the platform and app, are important for a complete information of the users.

## **4. Disruptive co-production management**

As regards the engagement of citizens in the co-production processes enabled by disruptive technologies, a general interest and openness to experiment had been observed. The pilots set up added further requirements and attentions in terms of engagement:

- the relevance of proper introductions to new technologies has been confirmed, especially for those who do not present similar features to the apps already known by the general public. In the different pilots, it took different forms such as training seminars (or webinars), role-play, etc. Tutorials and walkthroughs to guide through the core functionalities are under development for the various components.
- The identification of specific categories of stakeholders: on the one side, those who can be strategic promoters of the technologies, due to their inclination to innovate (e.g. youngsters) or to their interest in improving their operational methodologies (e.g. professionals, social workers). On the other side, those who can resist the adoption, such as retailers or local organizations worried about being overwhelmed or hampered by new procedures, so that their concerns can be properly addressed by the co-production methodology.
- The awareness of specific target groups for whom the technologies can be practically not accessible, or not desirable (e.g. students younger than 16 in France are restricted on app usage; gamification has been excluded for parents with some addictions followed by the social services in Paris, etc.).
- Enabling functionalities of the platform and app that help in keeping high the level of engagement (notifications, etc - see point 2 above) and of social interactions (balancing in presence and at distance interactions - see point 2 above).

##### **5. Socio-economic interaction models**

The balance between online/offline and at distance/in presence activities is confirmed as an extremely relevant issue for the (post)-pandemic cities. Designing technologies that allow to enhance, rather than crowding-out, social interaction, is of utmost importance even more so in co-production processes of public relevance.