periphèria

THE COOKBOOK

HUMAN SMART CITIES

The Human Smart Cities Cookbook
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THE HUMAN SMART CITIES COOKBOOK

PREFACE

"In the real world, economic systems are made of human beings, not anonymous gears." Hwang V.W. and Horowitt G. (2012), *The Rainforest: The Secret to Building the Next Silicon Valley*, Regenwald, California, USA

During the last two and a half years, it has been my privilege to coordinate Perihèria, an EU "Smart Cities" project carried out by twelve organisations from five EU countries. During this time, we have realized that the term "Smart City" is becoming rapidly meaningless as it is applied to many not-so-smart technologies, as well as implying that technology alone can solve big urban problems.

In Perihèria, **we instead focused on the role of citizens in the Cities of the Future,** developing the model of the Human Smart City. Human Smart Cities are those where governments engage citizens by being open to be engaged by citizens, supporting the co-design of technical and social innovation processes through a peer-to-peer relationship based on reciprocal trust and collaboration. In the six Perihèria pilot cities, we concretely addressed real problems in real places, co-designing services through collaborative processes while also stimulating local development with new business models for apps, products, services and solutions.

We believe that the Human Smart City is an important new approach and that its widespread adoption can make a difference in addressing the big challenges of our time, which require not only innovative technologies but, above all, mass behaviour transformation of the kind that can only be achieved through the involvement of people.

This Human Smart Cities Cookbook is designed to help bring the leaders of city governments into this movement by explaining in simple terms how to apply the methodology and understand its added value. It is fully illustrated with cases and examples from the Perihèria project, and is also supported by a wealth of additional material, from policy guidelines to video clips, freely available from the Perihèria website. With this Cookbook, we aim to reach out to the Mayors of the cities of Europe and the world sign up to the Human Smart Cities Manifesto, to create a network of places where citizens' sense of belonging and identity, wellbeing and togetherness can form a better and happier society.

Álvaro Duarte de Oliveira,
Perihèria Project Coordinator

OVERVIEW

What is a Human Smart City and why should you want to be one?

Welcome to the Periphèria Arena Cookbook. This document has been prepared as an easy guide to a very complex task – sparking off citizen-driven digital social innovation for new city services within a shared **vision of human "smartness" for the city** where you and your fellow citizens live and work. This is a special kind of Cookbook, since we can tell you about ingredients, tools, and how to mix them, but the specific end result cannot be predicted, as it will be entirely born of the specific blend of people and processes that makes your city special.

An Arena in Malmö: Smart Neighbourhood

More than 100 languages are spoken in this multi-cultural city, where proximity of different ethnic groups leads to a need for communication and respect. Addressing the neighbourhood as an Arena helped identify key semi-private semi-public spaces where new services can play a role in facilitating dialogue.

PEOPLE IN PLACES

As developed in the Perphèria project – an initiative funded as part of the European Union's "Smart Cities" portfolio of projects – the innovation processes we describe unfold in city "Arenas", where the specific features of a street, a square or another typical urban setting lead to the definition of useful and innovative services that correspond to concrete needs. At the heart of the Arena concept is the focus on People in Places: people – rather than abstract concepts of functions and needs, and places – in the sense of real city settings with specific urban roles and meanings.

This should be of little surprise, because the specific problems that affect citizens' lives are normally framed within specific urban locations, and it is in these same specific environments that we want people, as well as public service designers and providers, to come together to address those problems in an innovative way, with the support of "Internet as Platform". This is what we have tried to do in the Perphèria project, and offer to replicate in your City by following the guidelines and examples on the following pages of this Cookbook.

The focus on People in Places is what makes the outcomes of such a process unpredictable. What we can foresee is that it will be owned by the citizens and relevant to their needs, but the actual results should come as a pleasant surprise to all: your own solution to your own problem, with you and your citizens in full control of the technologies rather than the other way around.

You can learn from the experience of others,

adapt and integrate their tools, see how the Internet of the Future can become a platform for innovative services with a real impact on people's lives, and even directly exchange applications, but the final result will need to fit into your own city's context, including available technology infrastructures and policies – and above all, the magic of its genius loci.

Internet as Platform

In a well-known speech in 2008, Web guru Tim O'Reilly declared "the Internet is the platform", referring to the shift from a mere network for the transport of data to the basic service infrastructure for harnessing collective intelligence.
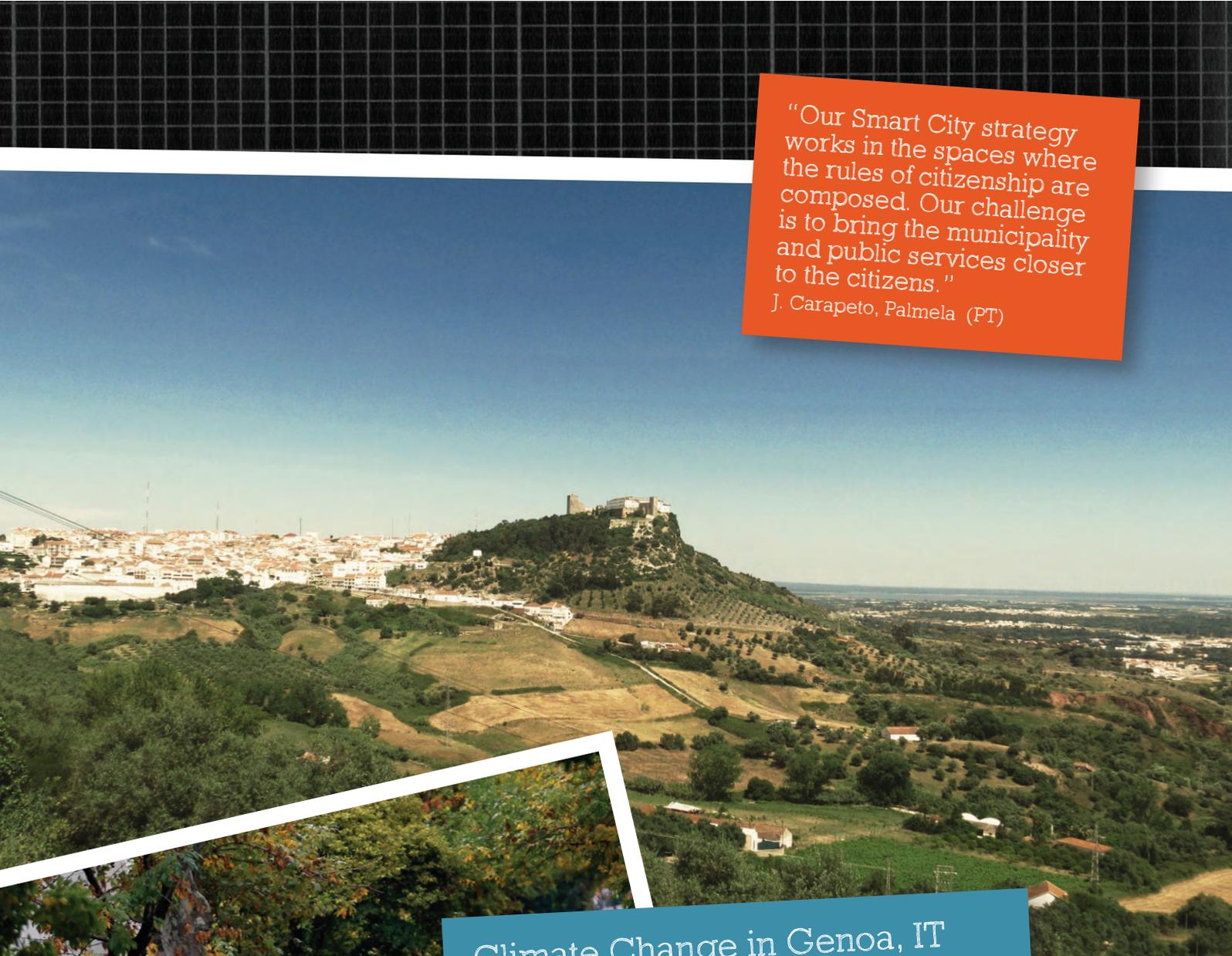
"Our Smart City strategy works in the spaces where the rules of citizenship are composed. Our challenge is to bring the municipality and public services closer to the citizens."
J. Carapeto, Palmela (PT)

Climate Change in Genoa, IT

While the City of Genoa was defining its pilot project related to parks and open air museums, severe flash floods hit the area in November 2011.
The City government found the Periphèria project the right platform to explore ways that new technologies can help raise citizen sensitivity to climate change issues and improve collaboration with city authorities.

TODAY'S CHALLENGES

Anyone with a role of responsibility in a local public administration is well aware that the challenges cities face today are perhaps greater than ever before, and the tried and tested solutions of the past are simply not working any more. The call for innovation in all aspects of policy making and public service simply reflects this need to look for radically new solutions; the parallel call for people's participation reflects the well-founded intuition that these new solutions can better be found by tapping into the wisdom and experience of ordinary citizens rather than relying exclusively on expert advice.

The three main challenges facing the cities of Europe today can be identified as:

- The devastating effects of the **financial crisis** undermining the European social model. This is leading to severe limitations in cities' abilities to invest in new infrastructures, and in some countries is even leading to severe reductions of funds available for the provision of fundamental services such as transportation and social care. At the same time, the crisis is forcing more and more people to discover and adopt new and better alternatives in terms of sustainable policy and service systems.

- The increasing threat and disruption brought about by **climate change** to our territories.

Once perceived as a global issue, climate change by now directly affects everyday life in cities. As major floods and droughts become ever more common in formerly unaffected areas, the environmental implications of urbanisation and the lack of adequate tools and behaviour patterns becomes increasingly evident. Again, this can be turned into an opportunity for sustainable innovation in urban life styles, particularly if we harness new technologies and social media to steer appropriate changes in individual and group behaviours.

- The demand for more **effective representation** set forth by our constituencies. The so-called democratic deficit is a cause for alarm for governance at any scale, but also adds to the difficulty of building trust and engaging stakeholders and citizens in collaborative processes aimed at addressing common problems. While some concrete evidence exists of participatory decision making systems that effectively reconcile quality of outputs with democratic representation and social acceptance, technologies also offer opportunities to involve people directly and actively in collaborative service provision.

These challenges call for a **transformational change** in the way we all work, live, play, and build our future, which in turn places a special burden on those who hold the responsibility to govern such processes with an optimum usage of the public resources available.

Time Bank

Sharing skills

Pay with time

Something to exchange

Needs that link people

...greening the city

Urban gardens

...at a cycling distance

personal production

hobby gardeners

HUMAN SMARTNESS

One model proposed to address these challenges is the so-called Smart City: significant investments are proposed for Future Internet technologies such as smart grids, sensor networks for everything from transportation to the environment, and interactive platforms for citizen engagement in return for an increase in cost effectiveness, a reduction of environmental impact, and better satisfaction of citizens' service needs.

While we hold that these important infrastructures can play a significant role, more frugal alternatives can actually be more effective in achieving the desired impacts, if the starting point is shifted from abstract system concepts to a people-based perspective: how do people see these problems affecting their daily lives, how do they see the possible solutions emerging, and how do they think smart technologies can and should be used? Most importantly, how can the different answers to these questions come together to define a collective vision and, from that, concrete action?

By asking these questions and pilot testing this perspective in the Perièria project, a new vision has emerged for a Human Smart City. This is based on the application of citizen-centric and participatory approaches to the co-design, development and production of next generation Smart City services that balance the technical proficiency of sensors, meters, and infrastructures with softer features such as social engagement, citizen empowerment, and people interaction in physical and virtual settings. In this context, technologies can play different roles in social and even political processes: not only can they offer scenarios of increased efficiency and functional performance of city services, they also help people imagine new approaches and solutions and thus discover how creative co-design processes can indeed be possible. In addition, by supporting new forms of collaboration and empowering citizens with new abilities to source information and actively propose alternative approaches, new technologies increasingly play a role in redefining political power relationships.

Working with frugal solutions. Some Rules:

- Promote the role of simple ICT solutions by providing a repertoire of working examples.
- Set up long-term mutual learning environments where stakeholders can learn the potential of ICT and become active rather than passive users.
- Always document the ways you are using different ICT tools, and maintain an open library for others to access.

ADDRESSING THE CHALLENGES

It often seems that big challenges need complex solutions, but we have seen that the opposite can also be true: small solutions to concrete problems, leading to limited but real behaviour changes, can interact systemically and ultimately lead to wide-scale bottom-up shifts in the way a whole community addresses a big problem. A simple service allowing people to exchange used items can lead to new viewpoints: how can we collaborate in this same way to save more resources, how does this improve social cohesion in neighbourhoods, how can we find new fields of integration with the city government's policies? These questions in turn lead to new service ideas, building new partnerships and addressing new issues in a snowball effect that ultimately can have a concrete impact, perceivable at the broader scale.

Key to this "frugal solution" concept is that people stay at the centre of the entire process, from problem identification to service delivery. No longer are citizens seen as passive receptors of city services, "using" a bus or a library or a football field, they rather become an active part of the service itself, signalling a refuse bin ready to be collected, helping maintain a city park clean and safe, or reaching out to those in need.

Scenarios with citizens as active participants in services that solve their own problems

drive citizen engagement in the co-design process from the start, as it becomes clear that through their contributions they will be able to make a difference for their own individual well-being. In this perspective, public institutions have a new and unusual role to play: in fact, the emphasis shifts from the procurement and management of city services tothe orchestration of collaborative co-design processes involving citizens, local businesses, the ICT industry, and the local digital innovation community together with relevant offices and services of the city government and other public authorities and agencies in charge of health, transport, etc. To win community engagement, cities must not only open up their processes to participation, but also demonstrate the political commitment to being in turn engaged, responding to the concrete ideas of citizens with the required degree of institutional innovation. In Periphèria, we have learned how important it is to give evidence of the transformative impact of digital social innovation in the public sphere, if we wish to increase the community's trust in local institutions as well as individuals' confidence in their own ability to creatively experiment with new technologies.

Definitions: co-design and co-production

Co-design occurs when all the relevant stakeholders are actively engaged in service conception and development.
Co-production occurs when the service beneficiaries take an active part in its delivery, for example through volunteer collaboration with the agencies in charge.

The Human Smart City movement

An increasing number of cities in Europe (but not only) are seeing the benefits of the Human Smart Cities approach, particularly in these times of budget cuts for large-scale infrastructures. 15 cities participated in a kick-off event in Bologna (IT) in October 2012, and an even greater number is signing up to the Human Smart Cities Manifesto launched in Rome in May 2013.

Lesson learned in Bremen, DE

In Bremen, the local parking authority developed a concept to allow monitoring and reservation of individual parking spaces. Its implementation was however hindered due to the complexities of the underlying IT infrastructure and closed sensor network, spread across suppliers and subcontractors. More simple and open alternatives would have improved the chances of success.

REAPING THE BENEFITS

Still too many politicians today prefer to spend new money on complicated ICT solutions (thus avoiding the need for institutional innovation) instead of committing themselves to the levels of transparency, openness and accountability required to fully engage citizens and innovators in co-design processes. An increasing number are being left little choice, however, as the financial crisis not only cuts available resources, but also increases citizens' sensitivity to public spending. Those policy makers who have taken the leap – whether by choice or not – are now discovering that the benefits of adopting a Human Smart City approach are greater than expected, even though harder to measure and demonstrate using traditional indicators and metrics.

The huge and expensive ICT solutions at best address a specific sector such as energy or transport, and their innate complexity often causes unforeseen complications during implementation, including interoperability and service maintenance across different organisations and numerous suppliers and subcontractors; above all, ignoring the citizen perspective, they do not always end up to be as useful and welcomed as expected.

The small and frugal solutions are not only cheaper,

but also faster to implement; they also lead to more effective uptake, since they are devised by the very same people who will adopt them. As an example, the co-design of a service to coordinate the voluntary participation of rural citizens in social services for the elderly can lead to better cooperation between citizens and government, significant cost savings, greater satisfaction for those needing care, and a lowering of extra work and travel time required for professional health workers: these systemic benefits all derive from the engagement of citizens and the original and creative innovations that result from it. Most importantly, the Human Smart City approach can lead to new growth and job opportunities for your community. Most public administrations seriously underestimate the potential of creating a local demand for innovative products and services, and do not drive the attention of the ICT industry to the market opportunities represented by services in the collective interest. Yet any local community benefits as well from having the creative talents of its local ICT developers and micro-firms address the concrete needs of the population rather than (only) imagining abstract, generic or all-encompassing digital service infrastructures. Finally, by promoting social innovation through the application of the Human Smart City approach to address your city's needs, all parties will contribute to an increase in the quality of life and well-being of the local community, which in turn may add significantly to its attractiveness for external investors.

Startups in Milan, IT

The Milan pilot of Periphèria has involved different student groups as well as large and small industry players.
Several ICT start-ups are emerging from the process as well as new forms of technical collaboration with existing SMEs as service providers.

MAKING YOUR CITY HUMANLY SMART

Applying the Perphèria Methodology

Alignment in Malmö, SE

In Periphèria, MEDEA has engaged with different citizen groups – women and youth associations, including rappers – and through them identified needs and built user communities.

THE ESSENTIALS

If you are now beginning to realise the potential of human smartness for your City, the natural question you may be asking is: "where do we start?" To answer this question, think of what a good cook will do before preparing a meal: he or she will look into the kitchen cabinets, the refrigerator, and the pantry to see what's in there (and of what quality and quantity). During this exploration,

mental lists will be made of the possible combinations

of the available ingredients and how they could be combined and prepared.

Preparing to initiate engagement and co-design processes for the development of Human Smart City services follows a similar procedure. First we should make an assessment of what resources are available. These can be roughly classified according to three main categories:
- The local community of citizens and (non ICT) businesses, including the third sector.
- The ICT community, comprising universities, R&D centres, industry, SMEs, micro-firms, and even individual would-be entrepreneurs.
- Your own municipal government and the various public agencies and administrations that play a role in policy making and service provision.
- The physical and technological infrastructures available in that arena.

Each of these groups will be represented in your community in two ways: as people and organisations on the one hand, and as structures and traces or elements of the social, technical and institutional capital they all contribute to build. Citizens and businesses will have existing associations and other similar initiatives, the ICT actors will have already built infrastructures, services and applications, while government agencies and administrations will bring in predefined policies and projects. In the following paragraphs, we will briefly look at each of these groups, and explore different engagement strategies that have proven effective in Periphèria.

Building Trust

At first glance you may think this is an easy step, since it is likely that you already engage with citizens, work with ICT service providers, and know your local administration. The problem is that these pre-existing dialogues will have generally been taking place as one-to-one relations in a traditional framework dominated by the public authority as having greater political weight, financial clout, or both.

In order to open up a new form of dialogue, it is fundamental to build a new relationship of trust. To do this, you can start by putting your own problems and issues on the table, invoking the engagement of citizens and business to help solve them in a win-win approach.

LOCAL CITIZEN AND BUSINESS COMMUNITIES

It goes without saying that a citizen-driven strategy is by definition based on the deep and active engagement of the people who are expected to be the direct beneficiaries of Smart City policies and services. Some administrations may well have solutions for participation already in place, but these are usually consultation tools, where the agenda has been set by the public authority itself. Arena-building mechanisms instead require creative and active (not re-active) citizen groups, and since this in turn is a dynamic with a life of its own, the trick is to

be able to capture the weak signals of active citizenship

already in process and align to them.

The best place to look for emergent active communities is where you might least expect to find them. Well-formed citizen and business groups or associations you already work with, while they prove to be valuable assets for the later phases of scaling up, can actually hinder "out of the box" thinking. More creative impulses can instead be found in recently self-formed groups such as musical and artistic communities, a school mothers' association, a shop owners' alliance, and so forth.

These groups often come together to address a specific topic, which can well become the focus of your first engagement strategy with them. Rather than convening them with your own questions, take a look first at how innovative co-design methods could help solve the problems they have already identified. Here, the introduction of ICT can further stimulate fresh approaches and also convey a new sense of openness of your administration to innovation and change.

As you begin to re-frame issues and problems in this alternative and creative light, it will become soon appropriate to call other citizen and business groups to the table. You will learn to explore how different stakeholders can contribute to and benefit from the various opportunities offered. By adopting a "who's missing here" approach, you will also reinforce the engagement of the original participants with an open and co-creative mind-set, while gradually broadening the constituency of citizens and businesses engaged in your Human Smart City strategy.

TIP:

Make sure to include groups that are often marginalized in both decision-making and technological development, such as ethnic groups or youngsters and even children.

A BarCamp in Genoa, IT

The City of Genoa is also engaged in a "traditional" Smart City strategy with some of Italy's larger ICT industries, who were however reluctant to engage directly in citizen co-design actions. Therefore, a BarCamp (unstructured participatory event with the population) was organized by the newly elected administration, which has kickstarted a new style of listening and dialogue between the ICT community and the Municipality.

ICT ACTORS

At the base of the Smart City concept is the strong role that Information and Communication Technologies play in supporting both collaboration and co-creation processes and the technology-based services that are the main result of those. Your inventory of the ingredients to work with should be continued with a survey of existing ICT infrastructures, applications and services in your City, as well as the on-going policy initiatives, both within and outside the public sector. From there, you will be able to acknowledge and map the different types of actors from within the ICT sector that can be engaged, both as agents of digital literacy in your community and administration and as key players in the co-design of new services.

We can roughly divide ICT actors into two categories:

ICT industry and businesses (including SMEs) who offer products and services on the market and the so-called ## Digital Innovation Community, made up of micro-groups ranging from amateur or part-time developers to nascent start-ups. This latter is a highly creative and innovative group of normally young, technically literate ICT developers, with a strong sense of ethics, community, and identity (witness the auto-ironic use of originally disparaging terms such as Nerd or Geek). It also tends to be a rather self-referential group that generally views the public sector (as well as the big industrial players) with extreme diffidence, which makes it easy to underestimate the value of their potential contribution.

The consolidated ICT businesses are likely to already be suppliers to your administration, so that you will need to clearly distinguish between what is within the remit of existing contracts and what is really new joint experimentation. This entails clearly defining the boundaries of the co-design process, including where experimentation stops and business begins.

Most companies, especially SMEs, are understandably hesitant before engaging in informal relations with a public authority, particularly in these times of crisis. However, in the context of a Human Smart City initiative you have two strong arguments to use: a) early engagement can provide a low-risk opportunity to explore new business models, often a pressing issue, and b) through active participation the company can positively interact with the Digital Innovation Community, something as difficult for them as it normally is for you.

Indeed, identifying and engaging the Digital Innovation Community members is not an easy task. Scouting them out in your City can occur through searching local blogs, identifying local User Groups related to relevant technologies (Java, Google, etc.), or monitoring local events that are part of international movements such as BarCamps, Hackathons, etc. To engage them in a co-creative partnership, we suggest strong gestures of openness and willingness to innovate (and not just publish a free app on the city website). This will considerably help you to learn about the potential of new technologies and take steps to appropriately re-align your administrative structures, especially to the potential offered by increased citizen participation in service delivery.

TIP:

Scan the websites of NGOs and citizen groups active in your city to identify the more intensive users of social media and ICT tools. They can play the role of mediators between the ICT community and other stakeholders.

GOVERNMENT AND ADMINISTRATION

A truly citizen-driven innovation process will inevitably have a strong impact on the structure and operations of your own City management as well as on the dozens of public administrations and agencies involved in service delivery, from healthcare to transportation, from employment to social assistance, from water to energy supply and other local utilities. Since your daily work as a civil official may likely consist in a continuous battle against the innumerable difficulties plaguing public administrations today, it is easy to overlook the significant potential of the "hidden" (tacit) knowledge about the city that is embedded in the collective minds thousands of public servants, including yourself. Indeed, the full potential of a Human Smart City approach can only be reaped if the professionals who make up local government and public administration become active and creative participants in the co-design processes on a par with individual citizens. This involves a strong cultural shift from the idea of a public body as administering a legal mandate to maintain existing services over time, to the requirement of flexibly adapting to new needs for public services in response to emergent challenges in a rapidly changing context. In fact, the inherent conflict between the push for real innovation and the rigid and conservative structure of most public administrations is a cause of much frustration within the public sector itself. One approach to transforming problems into potentials in the public administration is to open up internal structures to direct engagement with citizens and businesses in co-design processes. This requires an appropriate framing of the process to avoid generating excessive conflict with existing operational structures, and above all to shift the focus of collaboration from a traditional "complaint management" to a win-win "let's explore this together" approach. By starting from one or more concrete issues and exploring the alternatives and possibilities, cross-sector links with other bodies and agencies will inevitably come to the surface; however, it is better to follow the paths and links that emerge from a co-creative process than trying to "convene" those who may first appear to be the relevant actors at the outset. In this process, it is also likely that new resources within the public administration will emerge with a readiness for engagement and innovative thinking, so that you can gradually build and extend a transversal team on which to base the operational aspects of your Human Smart City strategy.

Citizen feedback in Athens, GR

The City of Athens explored the use of location-based services to gather citizen feedback on green policies. Although many examples such as Fix-my-street have been developed, they often fail to take into account their "back-office" implications for the public administration involved.

TIP:

Encourage collaboration between city representatives who can affect real policy changes and civil servants who are knowledgeable about ICT and can help identify potentials and opportunities.

WORKING WITH ARENAS

As stated previously, an Arena is an identified place in a given city where a specific mix of Human Smart City ingredients comes together to spark off co-creation processes for new urban services. The Arena concept is based on the model of the Urban Living Lab, but with specific emphasis on the problem-driven identification of a particular city space as the starting point for micro-patterns of human interaction. This means that the citizen and business groups, ICT actors, and civil servants discussed in the previous section do not necessarily all come together in one single Arena: they rather constitute a reservoir of innovation potential that can be drawn upon when the time and place are right. Understanding when is the right time, where is the right place, and who are the right actors to engage is the key to activating an effective Arena for co-creation.

A potential "candidate" Arena, for instance a particular square or park in your city where you might be interested in activating co-design processes, can be understood across the three dimensions of past, present and future. Throughout the past, different elements of the city fabric have accumulated and developed to define its current form, including the socio-economic make-up of the surrounding area as well as specific infrastructures ranging from tram tracks to wifi networks. In the present time, one can spot and identify construction works, citizen initiatives, or even an open-air concert: activities that may focus attention on that specific place beyond the ordinary. Finally, city plans or trends having an impact on the area can shape people's attitudes towards the future.

TIP:

Interaction should occur "about" an Arena, but also happen "in" the same Arena. This requires a mix of face-to-face meetings and virtual (online) platforms. Social media usually work more efficiently when mutual trust has been established between participants. This is also true for the specific roles related to the Arena in question.

In a successful Arena, these elements all come together, often driven by a policy-led or citizen-driven desire to address a concrete issue, in such a way that the problems are highlighted, the opportunities and potential contributions of the different actors are clarified, and the joint conception of new service ideas and concepts is facilitated. In this process, technology plays the important role of supporting collaboration, provoking the imagination, and helping define service scenarios for specific Arena dynamics. In addition, as it captures and structures co-design processes, technology also constitutes an essential platform for sharing and learning from experiences in other cities: for instance, an app developed for the needs of a distant city Arena can have a strong impact on the way people creatively imagine how to address issues pertaining to the same Arena in your own City.

ARENA MODELS

In the Perphèria project, we hypothesized that there exist common types of Arena with similar characteristics across different cities and cultures. We initially identified six archetypal urban spaces, namely representing the kind of basic elements that can be found in any city: **Neighbourhood, Street, Square, Museum & Park, City Hall, and Campus**.

The idea, proven effective in practice, is to shape Human Smart City dynamics within a general model of the urban space in which they unfold, in order to support reciprocal learning between cities and the effective transfer of pilot results.

We have explored the specific nature of each of these Arenas, mixing insights from the disciplines of design and urban planning, expertise in the deployment of Future Internet infrastructures, and the practical experience of those working hands-on with city administrations to address the concrete problems of people's daily lives. This has led to a deeper understanding of the spatial, symbolic, and social aspects of different city spaces and how these inform the co-design of Human Smart City services.

Arenas in Perphèria Pilot Cities

Each Arena Model was tested in a Peripheria pilot as representative of specific issues that the City managers were interested in addressing:
- Malmö (SE) chose Smart Neighbourhood to work with the city's numerous ethnic groups.
- Bremen (DE) chose Smart Street to address is sues of sustainable mobility.
- Athens (GR) chose Smart Square to engage ci tizens in debates on green policies.
- Genoa (IT) chose Smart Museum & Park to explore their role in environmentally sustainable and safe lifestyles.
- Palmela (PT) chose Smart City Hall to identify new forms of service delivery for rural, remote areas.
- Milan (IT) chose Smart Campus to build new links between the university and citizens.

RFID

Internet of Things

Location Based Services

Sensor networks

PEOPLE IN PLACES

Community Interaction

Internet of People

Media and 3D

Internet of Services

Social networking

Service composition
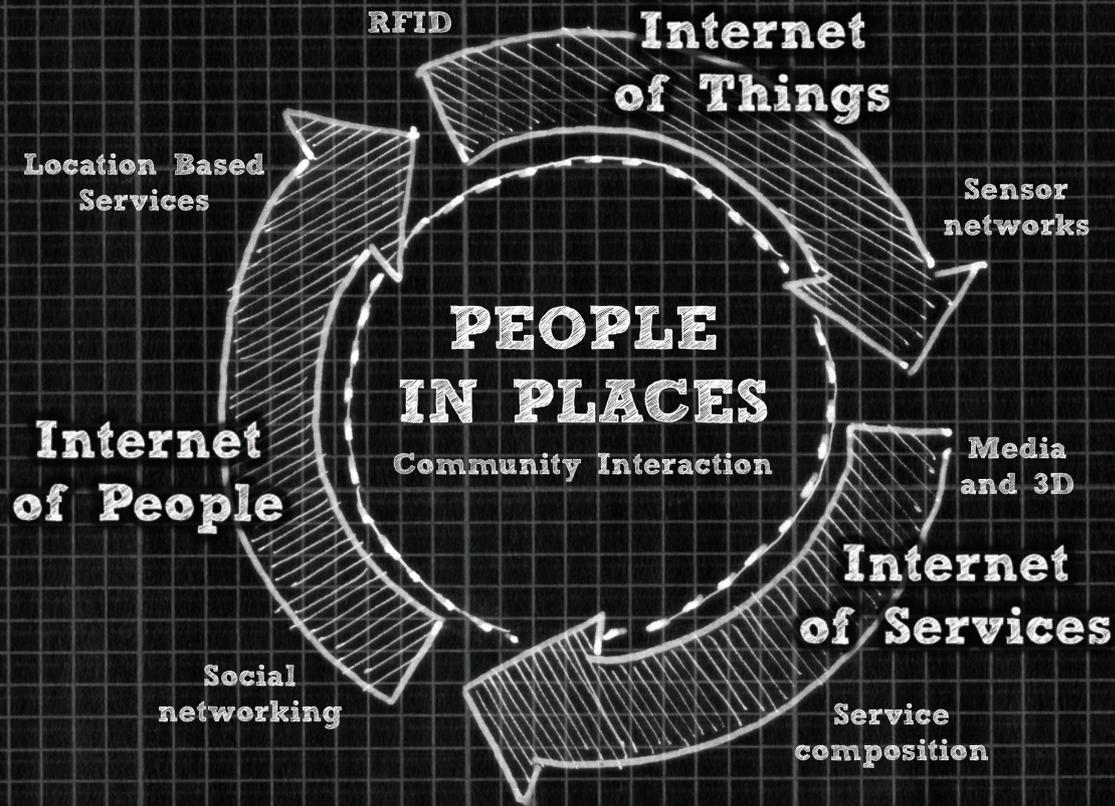
Future Internet Paradigms

Emerging trends in Future Internet services and applications are often grouped according to basic paradigms. Of particular relevance for Smart City technologies are the following three: Internet of Things (IoT) refers to technologies that sense and act on the world of things: heating systems, transport networks, movement of people and goods, etc.
Internet of Services (IoS) involves the use of online tools and facilities to dynamically deliver customised services such as a delivery, a reservation, or a tourism route.
Internet of People (IoP) introduces the active role of people and social networks in providing content as well as enhancing the other paradigms of IoT and IoS.

ACTIVATING ARENAS

The co-design process in an Arena starts by examining the current situation and working together to build a scenario for a desirable future in that specific place. This structuring "to-be" scenario can be developed using a variety of group animation techniques, but should basically involve the relevant stakeholders for that Arena in defining both a long-term vision and the short-term steps that can be thought of as moving in the right direction. The Arena Modelling Toolkit developed in Periphèria helps to develop the concrete implications of each Arena scenario, by exploring aspects such as built-in dichotomies, spatial concepts, policy issues, specific behaviours and behavioural changes, and relations with other arenas.

In addition, the Arena Scenarios need to be explored from the technology perspective, which was done by using the analytical framework of IoT (Internet of Things), IoS (Internet of Services), and IoP (Internet of People) as concurrent Future Internet paradigms. Under each of these three perspectives, the Arena model presents itself with specific infrastructural features: for example, diffused wifi connectivity, sensor networks, or large screen displays can be more or less appropriate according to the organisation of urban space. In addition, different types of applications can be relevant in particular to achieving specific objectives in terms of sustainable behaviour changes by individuals and groups. The Arena Modelling Toolkit includes illustrative Service Cards that allow for co-creation groups to collectively discuss, reflect upon and shape technology tools

and new service concepts.

Although the methodology of Arena Modelling provides a clear framework and simple tools to guide the co-design process, activating citizen engagement also requires an original and creative inspiration that can only come from a desire to work together and bring about real change. Our experience has shown that the required creativity is there, latent in the different groups of people and even in the city's streets and walls, but that in order for that creativity to emerge the first essential step is to (re)build trust. As a public administration, gaining a renewed trust from your constituency is not an easy task, indeed it is listed as one of the key challenges at the outset of this Cookbook. A good way to start is to demonstrate with your own actions a new ability to engage with people, new eyes to see the places in your city, and new ears to listen to emergent demands and desires: some suggestions based on the pilot experience in Periphèria are set forth for each Arena in the following tables.

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Human Smart Neighbourhood

Model concept
Where public policies promote urban renewal as well as urban development and social cohesion.
Where integrated policies can be launched and experimented.

Pilot scenario
The Smart Neighbourhood Arena was tested in Malmö, Sweden. MEDEA, a design-oriented research arm of the local University worked with local citizen groups to explore ways to promote inter-cultural communication and building mutual respect. This included both means of expression as well as building a collective consciousness on practical issues such as energy saving.

Activation tips

People to engage:
Women's groups, music groups, rappers, elderly, city writers, school children…

Places to watch:
Churches, green areas, where the elderly meet, ethnic shops, flea markets, building entrances…

Desires to capture:
Be seen, be heard, be integrated, feel safe, feel at home, my neighbourhood my family, feel support…

Human Smart Square

Model concept
Where citizens "feel at home" because they are involved in public decision-making and service co-creation. Where people can share and discuss collective problems; it can be virtual but spatially oriented and eventually gain a physical dimension.

Pilot scenario
The Smart Street Arena was tested in Athens, Greece. The city's IT company DAEM worked with different active citizen groups in relation to an identified set of city squares to explore involvement in new approaches for the co-design of the city's green policies.

Activation tips

People to engage:
Citizen groups, NGOs, tourists, users of open spaces, elderly groups…

Places to watch:
Open air cafés, "speakers corners", monuments, cultural events, vendors areas, public buildings on the square, underground entrances…

Desires to capture:
Be part of public life, engage with others, be welcoming, have new urban experiences…

Human Smart Street

Model concept	Where noise and pollution are reduced through e-mobility in the context of city-logistics. Where opportunities for providing mobility related services are available. Where noise and pollution are reduced through e-mobility in the context of city-logistics. Where opportunities for providing mobility related services are available. Where new mobility behaviours are experimented.
Pilot scenario	The Smart Street Arena was tested in Bremen, Germany. The BIBA research institute paired up with the parking management company Brepark, in order to explore services promoting efficient parking, e-mobility, and integration with downtown shopping. The complexity of the company's sensor-based information system inhibited experimentation, so together with local SMEs and student groups of the University of Bremen, new ideas are being investigated for the supply of goods to local stores, to support a reduction in commercial traffic and a return of streets to the people.

Activation tips

People to engage: Car drivers, shop owners, people at bus stops, bike riders, street vendors, logistics services…

Places to watch: Street corners, parking places, building entrances, bus and tram routes, jogging and bike lanes…

Desires to capture: Pedestrian spaces, efficient traffic, healthy air, safe walking and biking, sustainable transport, new uses for parking areas…

Human Smart Museum and Park

Model concept	Where security, safety and quality of life can improve liveability and accessibility of open urban spaces, including historical and natural heritage. Where tourists and citizens experience safe and serendipitous learning about material and immaterial heritage.
Pilot scenario	The Smart Museum & Park Arena was tested in Genoa, Italy. The city government engaged with different citizen groups exploring issues of appreciation of monumental parks, environmental emergencies related to climate change, and co-design of sport and tourism activities in a historic fort.

Activation tips

People to engage:	Families with children, elderly, school groups, sports groups including joggers, tourists, people crossing the park to go to work…
Places to watch:	Picnic areas, monuments in the park, play areas, jogging paths, sports areas, gates and entrances…
Desires to capture:	Be green, be safe, have culture, know the city, park as my garden, relax…

Human Smart Campus

Model concept	Where scientific knowledge interacts with urban life. Where knowledge is transferred and created. Where scientific knowledge is challenged by needs for change and innovation in urban life.
Pilot scenario	The Smart Campus concept emerged with the Milan Polytecnic applying the Arena concept to the on-going "Campus Sostenibile" project, in order to better blend the campus environment with the surrounding neighbourhood.

Activation tips

People to engage:	Student clubs, cineforum organizers, lab classes, research leaders, citizen groups, decentralised local authority…
Places to watch:	Student meeting places, student/faculty eating places (especially off-campus), laboratories, public spaces in or near the campus…
Desires to capture:	Transfer research into real life environments, capture urban problems, experience real professional life, be useful…

Human Smart City Hall

Model concept   Where citizenship is not affected by the distance from the city centre.
Where public participation is possible for peripheral citizens.
Where the digital divide does not prevent participation.
Where opportunities for providing mobility related services are available.
Where new mobility behaviours are experimented.

Pilot scenario   The Smart City Hall was tested in Palmela, Portugal. Starting from an original concept of equipping a Van with terminals having access to the city information systems, the local authority engaged with citizens in the remote areas of the municipality to re-examine how city services can be delivered.

Activation tips

People to engage:	"Silent citizens", peripheral residents, residents in agricultural areas, activists, elderly, family members having moved to the city, public servants…
Places to watch:	Places where services are delivered, in order to understand places where services are not delivered; barriers to access…
Desires to capture:	Extending public services (citizenship), integrating the rural environment (harmonious territorial development), access to urban services, be part of public life, be considered by the Mayor…

Key elements of the Periphèria Methodology

The Peripheria Methodology is illustrated as a Metro map with six "Lines", each representing an iterative and concurrent process in service co-design.
_ Arena Line: focusing on problem-driven engagement and interaction
_ Transfer Line: focusing on sharing and transfer of tools and experiences with other cities
_ Challenges Line: focusing on the structured service co-design process in a specific setting
_ Validation Line: focusing on the validation of services with users and institutions
_ Technology Line: focusing on optimising technology usage and development processes.

Technology As-Is

Survey of SotA

Planning

Assestment

(smart) city policies

Toys

Service idea Cards

Arenas

Arena vision

Service Co-Design

Storyboards

Service ideas

Scenario Co-Design

Challenges

Technology Co-Design

Toybox

Transfer

Projects

Use cases

Service pilots

User requirements

Pilot Platoform

Application Co-Design

Service Prototypes

Transfer

Transfer

Arena Line
Transfer Line
Challenges Line
Validation Line
Technology Line

FROM CHALLENGES TO SERVICES

A typical drawback of many participatory methods is that they allow people to freely express themselves and generate new ideas, but offer little support in moving on towards tangible results. Indeed, as the Arena or Arenas you have activated in your city begin to define scenarios and engage stakeholders, you will soon reach a point where the co-design process requires a more structured framework to drive creativity towards the definition of concrete services. This is one of the key aspects that the Periphèria project has addressed and experimented in the six pilot cities.

Among the resources freely available through the Periphèria website is the Methodology handbook, which brings together a suite of tools supporting service co-design. The overall methodology is synthesized in the diagram on the following page, humorously depicted as a Metro system with different "lines" to convey the complexity of the different paths and iterative processes involved. For instance, the "Arena Line", related to the discussion in the previous section, starts at the "Arena Vision" station and connects the Technology and Validation Lines, respectively in the directions of service and scenario co-design.

In the following pages we will focus on the core methodology for service co-design, namely the Periphèria Challenges. A Challenge is an open call for proposals of innovative city services using one or more technology tools, either existing or developed ad hoc. What makes a Periphèria Challenge special is that it is directly linked to the city where it has been launched and is backed up by a real commitment from the local government to implement the most appropriate solutions proposed in response. While a Challenge may also be launched by a private company or a local citizen group, it will more likely be supported by the local public administration, namely you.

Indeed, as the stakeholders in an Arena build future scenarios and explore technology potentials, it is likely that the issues raised may be related to a measure that your city has already been planning, ranging from a strategic initiative not yet defined in terms of detailed actions to a tender that has already been assigned but with the additional possibility of engaging citizens in the implementation process. Therefore, the ideal framework for a Human Smart City Challenge is linked to an existing, budgeted action planned for your city, where you open up to the possibility of a different approach for realization, including an innovative usage of new technologies and the active involvement of citizens and stakeholders. This requires real political commitment to innovation and engagement, which will certainly be rewarded by the unleashing of an unexpected level of collaboration and creativity from within your constituency.

TIP:

While it is important to use Challenges to address issues of concern to your administration, try to avoid an excess of agenda setting and be equally open to addressing issues that emerge unexpectedly from your Arenas. You'll be surprised to see how they can help you discover the potential of innovative ideas for areas that appear to be "under control" but that can strongly benefit from a fresh approach.

Additional documentation on the Perifèria Portal

In addition to this Human Smart Cities Cookbook, the Perifèria website offers three documents with a more in-depth analysis of specific aspects:
The Perifèria Methodology specifies the tools and methods that can be applied at different steps of the process.
Perifèria Evaluation and Impact Assessment shows how Human Smart City initiatives can be evaluated and presents an analysis of the dynamics and impacts of the Periphería pilots.
The Perifèria White Paper discusses the governance and policy issues of Human Smart Cities and presents specific policy recommendations as well as the *Human Smart Cities Manifesto*.

THE CHALLENGES PROCESS

The process scheme for Challenges consists two main stages, definition and development, that are both characterised by co-design processes. Definition of a Challenge, namely identifying the issue to address and where and how to address it, is not a simple top-down step in a Perphèria Arena. It is rather a bottom-up process similar to citizen participation as adopted in many fields of policy, but with the difference of the focus on technology-enabled innovation as the path to ultimately achieve a Human Smart City. In this context, engagement takes on greater value for participants since they are part of a creative process that will have a direct influence on their daily lives. As the Challenges definition process begins to mature, the awareness of the possibility for a concrete commitment to implement new services further motivates stakeholders to define their needs n a common and structured way.

Challenges definition is articulated into three main steps:

- **Wishes, interests, needs**, the initial step of gathering first ideas from individual citizens and stakeholders and confronting them with technological possibilities. Here it is important that you allow people and groups to openly express and share their needs and aspirations and thus to become engaged in the co-design process. Tools such as BarCamps or the Open Space method are useful here.

- **Issues**, is an intermediate phase that draws out common themes across the different positions expressed in the previous phase, through a process that results from the convergence of ideas and thus the aggregation of interests. This is an inherently political process, although it may be also driven by technology possibilities, and is where it is important that you take on a role of leadership as well as guaranteeing transparency and an equal say for all in the reciprocal consultations.

- Proper Challenges definition occurs when there is a coherent **alignment** between ideas and issues that emerge and the stakeholders and resources available for the possible implementation of innovative projects. Here again your role is central in facilitating interaction with the offices in the public administration responsible for different policy and funding lines. In the event some sort of selection process is required, this is the time to clearly specify how that will take place.

The next phase is the Challenges development process, which generally initiates when a Challenge has been defined, resourced and launched. The

Moving back and forth

The Challenges process is represented as a linear sequence, but in practice service co-design follows a far more complex path. The experiences in the pilot cities have shown how Challenge development can in fact return to the definition phase, and the link between ideas and projects is quite often a back-and-forth process.

Funding Challenges

In the current financial crisis, there is little or no money available for new projects, but Challenges can be supported in a range of ways with existing budgets:
There may be funding opportunities available but you don't have the resources to develop proposals: this is an ideal opportunity to co-design with a broad team. A new approach called Pre-Commercial Procurement transforms ordinary budget lines into opportunities to fund innovation and re-think they way services can be delivered, with savings of up to 60%. Social innovation and the engagement of citizens and users in collaborative service co-delivery generally lead to significant savings. In fact, the main commitment you will need to make to a Challenge is not financial but of political support to the related institutional innovation processes.

Challenge development process involves different steps of maturation of project ideas towards the co-design of a Smart City service that can be implemented with the resources earmarked for the Challenge. According to the specific context, the definition phase can influence the way the Challenges development phase is carried out, i.e. following a specific timetable, working in a specific place, etc. It should also be remembered that each Challenge carries with it a broader significance, in that it assigns a collective value to a problem that is a) identified by an institution as a key obstacle to policy goals; and b) arising from within the city and recognized as an issue having a broader, urban relevance. The steps identified are as follows:

- **Ideas**: following the launch of a Challenge, a first step is the open exchange of ideas from citizens, businesses, and even civil servants that are related to the Challenge. This is an exploratory phase through with a greater problem-solving focus than the "Wishes, interests, and needs" phase described previously. The ideas launched in both on and off-line collective brainstorming aim to reinforce engagement and open the process up to innovative approaches. Ideas are then commented, discussed and rated by other citizens, businesses, and civil servants on a peer basis.

- **Projects**: are born normally through the maturation of an idea, with a project proposer taking the responsibility of carrying it forward. The Project Leader then builds a project team, using different tools and media to develop the starting idea and explore different aspects of feasibility. You may openly encourage the formation of some project teams to carry forward ideas of particular interest, but be open also to the spontaneous formation of project groups with unexpected alliances and possibilities. Each project group will develop their idea exploring how new technologies can support their service concept on the one hand, and interacting with different municipal offices to make sure the project fits with the administration's goals and structure on the other. Whether or not you have openly promoted some of the project groups, it is important that you make sure this process takes place in a transparent manner, with citizens and businesses following and commenting on the development of all project concepts and freely joining a team if they wish. You will of course also need to follow the development process from the standpoint of implementation feasibility, with the objective of adopting and resourcing projects in line with your Smart City policies as expressed in the Challenge.

"The MyPark app was presented to groups of citizens who were able to verify the ease of access to information about the park. The experience of a real visit is enhanced by a dynamic, virtual level, continuously evolving and able to take on additional user-generated content."
A. Risso, Genoa (IT)

Public authorities

Citizens

Discover → **Wishes interests needs**

Identify → **Issues**

Create → **Challenges**

Submit ← Citizens

Idea

Citizens

Discuss rate

Project proposers

create

Projects

select and endorse

Public authorities

blog videos photos technology

discuss rate

Project teams

Citizens
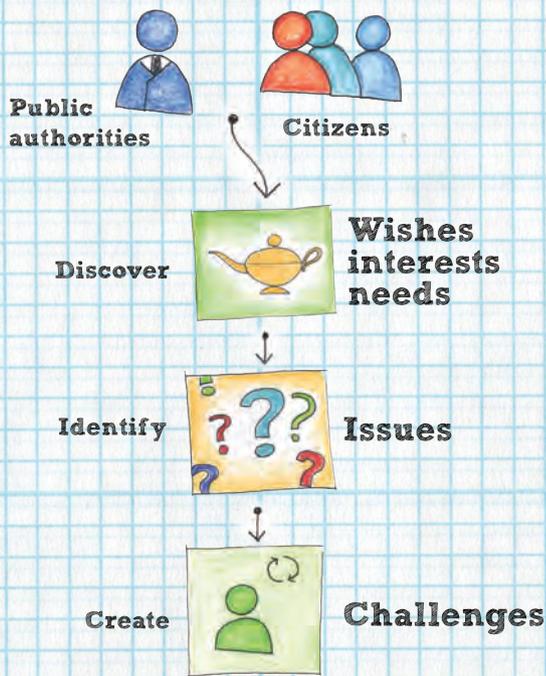
Building co-design project teams

- Promote formation of different new alliances when you can see that actors can gain from each other. Invest in active facilitation and match-making between stakeholders
- Students can make valuable contributions with a design perspective, improve the relevance of ICT use, and help reach out to friends and families.
- Look for supplementary incentives for participation: the potential of technology is often not sufficient, but can be if embedded in the transformation of daily actions and behaviours.
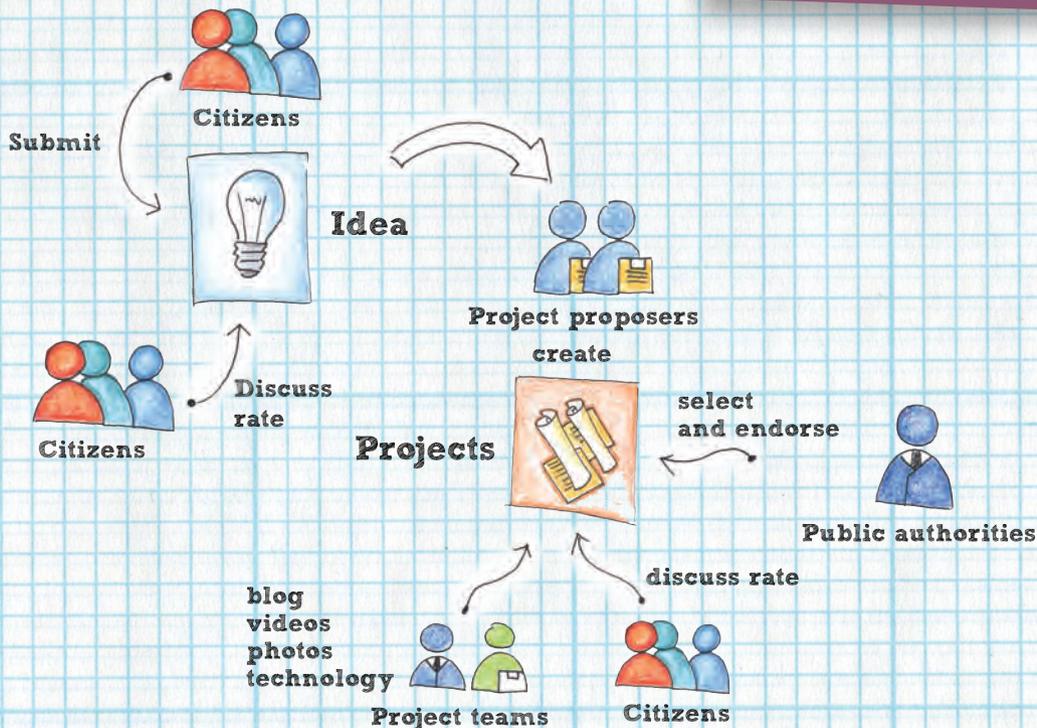
Here she also uses QR codes
To get information
on the botanical species there

While she's walking next to
Villa Pallavicini she discovers
there's free wifi in the park

so he uses the
"Park Watch" service

She buys the ticket
and downloads the museum app
where she checks out the interactive map

THE PERIPHERIA PORTAL

As is evident from the above, the development or co-design of an innovative city service is not something that can occur in a half-day workshop, but requires time not only to develop the concept but also to fully engage all of the stakeholders in the relevant phases. The Perphèria project has developed an on-line portal that supports the Challenges process over time, allowing you to define Challenges and citizens and stakeholders to publish and comment ideas and build project teams. Visibility of the Challenges launched in other cities, as well as the blogs and videos by groups in different Arenas, allow to learn from different teams and to enrich the creative processes in your city. By contacting the Perphèria team, your city can be added to those currently present on the portal. We strongly recommend you to make use of videos in order to record the co-design processes in your city and communicate results. In addition, make sure all the participants in your local Arena groups register with the web portal in order to monitor the progress of Challenges and project co-design activities.

Deeply integrated with the Perphèria portal is an open and interactive catalogue of technologies appropriate for use in Challenge projects, called the Toybox.

The Toybox lists many basic technologies that are widely adopted but seldom used to their full potential, such as Google Maps, but also includes apps that have been specifically developed in the context of a Perphèria Challenge, such as the MySquare app developed in the Athens pilot. Each Toybox listing includes information about what the technology does and how it can be applied, shows which Perphèria Challenge it is being used in and how, and allows to discuss potential applications with technology experts and developers.

We strongly recommend that you engage the ICT businesses and digital innovation community in your city in using the Toybox both to publish and provide support to their tools and services, as well as in helping the citizens and stakeholders of your Arenas to creatively explore their concrete application in Human Smart City service scenarios. Use of the Toybox is free of charge and will carry the additional benefit of networking your local technology community with those in other cities sharing similar concerns.

TIP:

We advise you to nominate a technical contact who will be the responsible for adding information about your city, publishing your Challenges, and updating your city's blog. Keeping the portal up to date with local developments, even if you have few registered users, helps Arena participants know what's happening and gives you visibility in other network cities.

SCALING UP

At the basis of the Human Smart City approach is the idea that you can start with simple and frugal solutions to concrete needs and then "scale them up" (extend their breadth and extent) to achieve impact at the wider city level. As we have discovered through the Perifèria pilots, facilitating this process only in part depends on "pushing" individual solutions through awareness or decree. In fact, it is more effective if you prepare the ground for viral uptake by creating a fertile environment for the acceptance of innovation throughout your city and allow for the individual solutions to spread on their own momentum. Following are five useful insights on this that we have gained through the Perifèria project.

First, while the Arena approach allows you to focus on concrete needs in specific settings, any project or solution will naturally tend to broaden its horizon in transversal dimensions. This means bringing into play new stakeholders and administrations, and may likely lead to the definition of new Challenges and the co-design of new applications and services. The Arena concept can be useful in shaping and defining this process, in that new Arena models can be invoked as specific situations emerge, leading to re-structuring of the stakeholder make-up and co-design in an autonomous process.
In this sense, we can imagine the scaling-up process as one which generates a network of interlinked Arenas, re-composing the new city by connecting innovative and humanly smart ideas of street, square, neighbourhood, and so forth.

Second, people will more likely adapt and adopt a new practice or service if they see that it has proven successful elsewhere, which means that
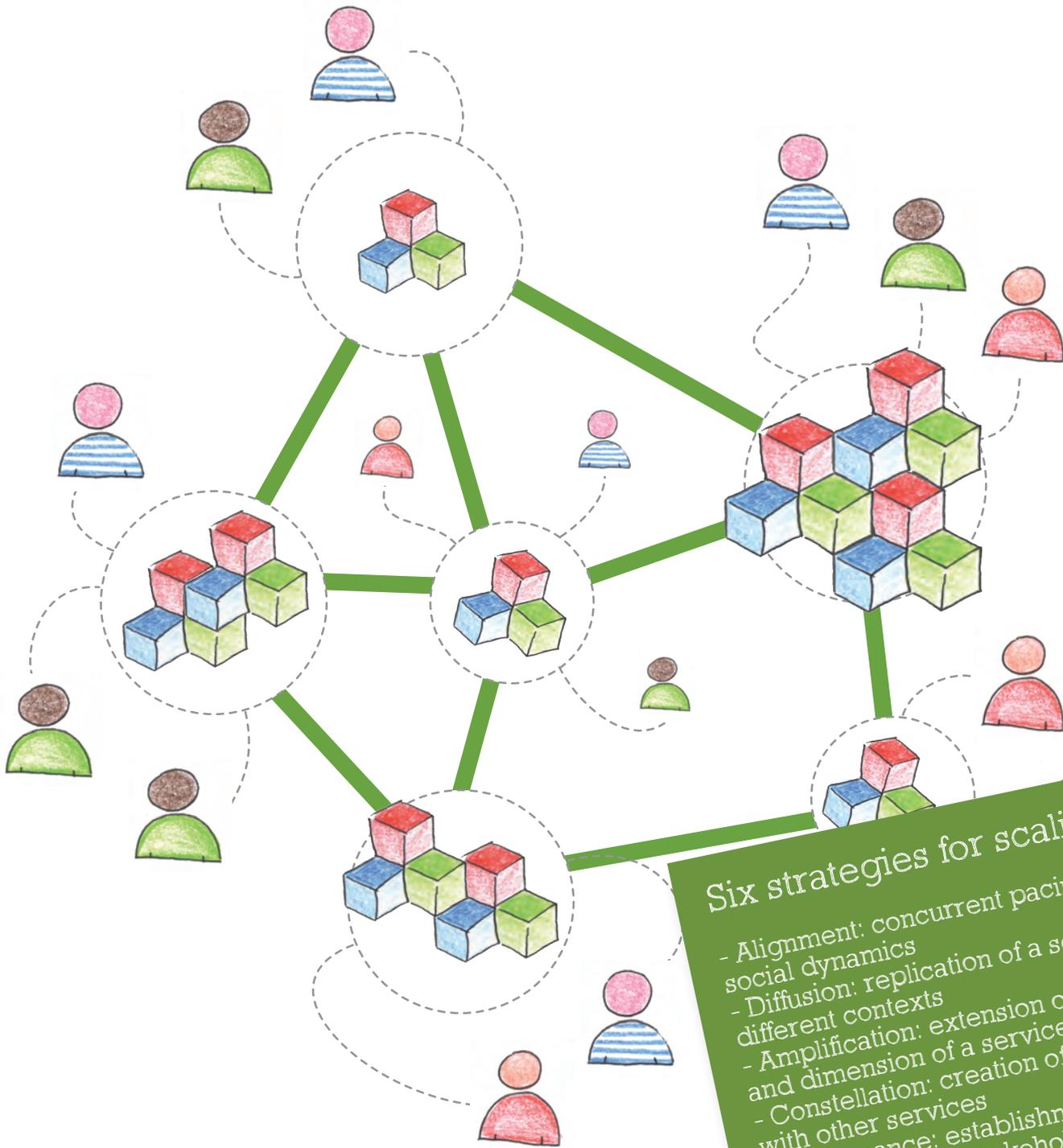
Six strategies for scaling up

- Alignment: concurrent pacing with social dynamics
- Diffusion: replication of a service in different contexts
- Amplification: extension of the extent and dimension of a service
- Constellation: creation of synergies with other services
- Governance: establishment of stable relations among stakeholder roles
- Sustainability: allowance for each of the stakeholders to have a long-term benefit

you should build some "evaluation thinking" into the process from the outset. It may not be easy to measure impact using common indicators such as number of jobs, but that doesn't mean that co-design groups cannot reflect on what they would consider as evidence of success and how that can be demonstrated. With the Internet as a platform, there are many indicators that can be captured automatically - such as numbers of accesses and/or downloads; think also about how to measure things that cannot be counted. The important thing is that whatever metrics you use, they are meaningful to those who might be the next ones to adopt the service.

Third, one of the greatest barriers to scaling up is often the public administration itself. It is already difficult to bring together different departments and offices to address the many different aspects of any given Arena, but this is even more so if the spread of a solution beyond its original boundaries is to be adequately supported rather than hindered. Administrative structures derive their logic mainly for the management of traditional city services, and it has often proven counterproductive to try to establish cross-sectoral coordination offices or the like. Far more effective are steps to loosen up administrative boundaries, encourage communication across departments, and open up to direct interaction with the general public. Initiatives creating a culture of openness and dialogue will then pay off when it comes to promoting innovative city services (and building the back-office protocols to support them), and can equally unlock much of the creative potential hidden in the corridors of the public administration.

Fourth, networking with other cities adopting Human Smart City strategies is an essential component of the strategy itself. There is no better way to save time, energy and money than to share experiences and results with others in a framework of reciprocal learning and respect. Networking brings unexpected benefits to your local stakeholder dynamics as well, introducing a culture of opening up and learning from differences that is most evident with another country but equally applicable at home. To this end, you might consider signing up the Human Smart Cities Manifesto, available on the Periphèria portal.

> "A Human Smart City should be a permanent platform for territorial and institutional innovation and capacity-building. Through a joint effort, we can find new ways to make our spaces more human in terms of inclusion and social and economic development, through a new approach to innovation for building the society of the future and ensuring the sustainable development of our territories."
> J. Carapeto, Palmela (PT)

> "We sought to open up the use of these technologies to all citizens, including those with fewer economic opportunities and little specific knowledge about technologies, seeing how important it is to give citizens the role of active and expert partners, abandoning the 'old-fashioned' way of considering the citizen as a mere subject or passive consumer."
> A. Risso, Genoa (IT)

Finally, remember to keep the focus on the collective, long term vision for a sustainable and humanly smart city that is the strongest driver of collaboration. Once you get started co-designing a concrete service in a specific Arena, it is easy to get lost in the details. At each stage of progress, don't hesitate to continuously ask yourselves the big questions: Are we really improving behaviours and practices? Are we really moving towards sustainability? Is this the city we want for our children? This is the best way to ensure the coherence of your strategy, facilitate the interlinking of individual projects and services into a greater whole, and strengthen your alliance with your local citizens and businesses to make your city truly Human and truly Smart.
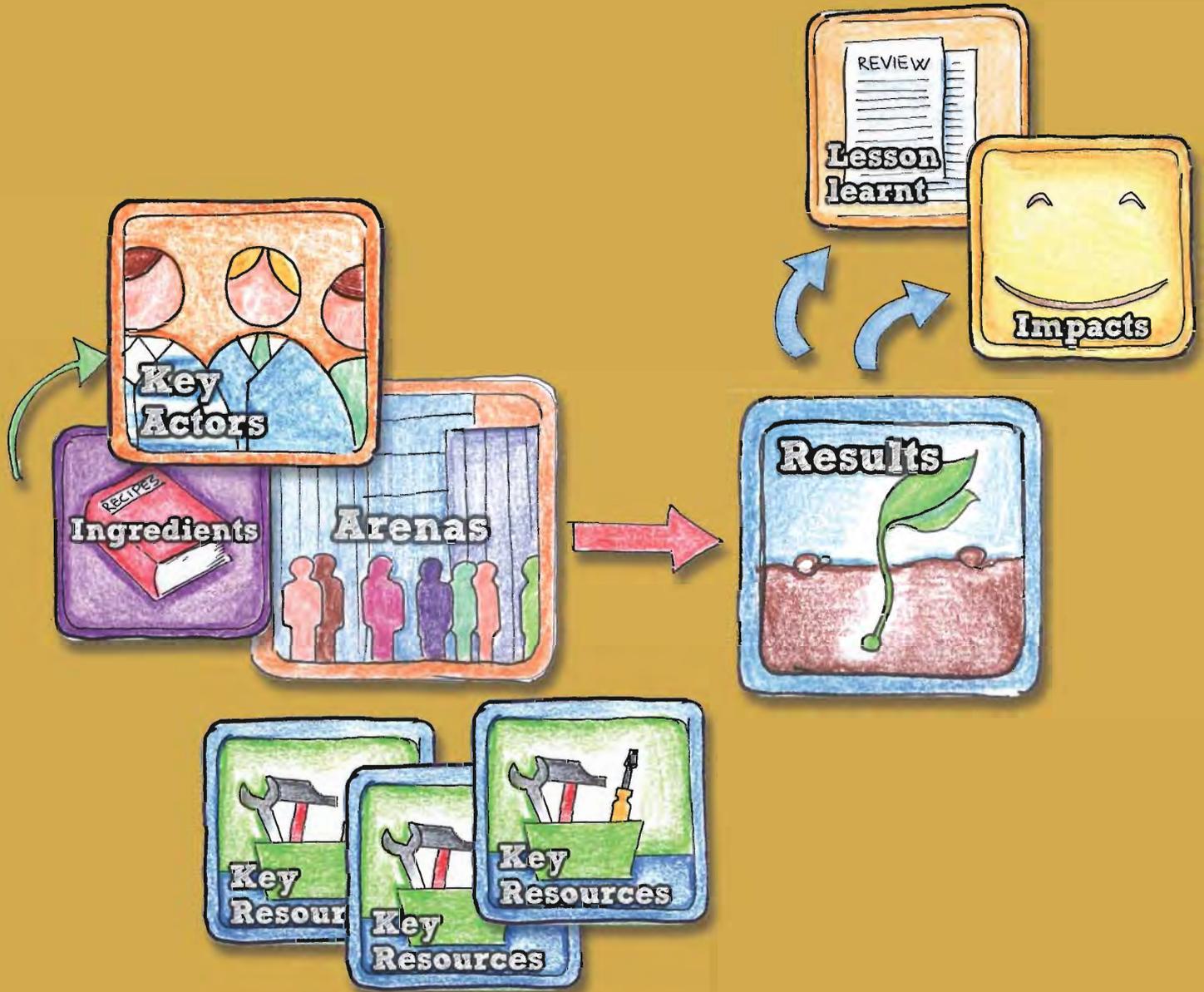
TRUE STORIES

The Periphèria pilots

In the Periphèria project, six cities engaged with local stakeholders, framed Arenas, defined Challenges, and developed services through concrete co-design processes using and co-designing the tools and methods described above. The best way to see how you can apply the Human Smart City approach in your city is to look at what actually happened, note the differences and common features, and imagine what the results might have been had the same process been followed with your people in your places.

The following pages tell the stories of the six Periphèria pilot cities, all with a common thread of people-driven smartness, all following the methodological guidelines of this Cookbook, and all with strikingly different and original kinds of outcomes. There is no single brand of Smartness, but you may be able to discover what your own might look like.

"It is important to be able to prototype possible solutions (relatively) fast, which creates moments of collaboratively trying them out and discussing enhancements and shortcomings to support selection and decisions."
Bo Peterson, Malmö (SE)

MALMÖ STORY

The City of Malmö is characterized by multi ethnicity, cultural production, youth culture and a strong new media industry.

The "Neighbourhood" lab works in the contentious multi-ethnic suburbs of Rosengård and Fosie and focuses on urban development, collaborative services and social media, exploring the potential of new media for co-creation and social innovation.

The smart citizen network in Malmö includes representatives from business partners, the City Municipality, a housing cooperative with a strong sustainability agenda, and, coherently with the focus on marginal groups and social innovation, several grassroots NGOs. This includes a hip-hop youth community, an immigrant women's NGO and a community of young girls.

The Malmö pilot project has focused on the Smart Neighbourhood Arena and on-going work within the "Neighbourhood" lab. The basic strategy to move innovation forward in the Malmö pilot has been to align diverse stakeholder interests and everyday agendas. To manage this we set up a process of continuous match-making between initiatives and interests among the municipality, NGOs, business partners and research/student projects at the university. When interests/agendas showed a potential synergy, we held collaborative workshops or conducted small-scale experiments. These were supplemented by processes where participants learned about the potential of ICT based solutions and how to manage them, working with schools and in particular the Coder Dojo movement, where people learn how to code, develop websites, apps, programs, games and more.

The joint articulation of issues and the Perièhèria Challenges has been the driving strategy, rather than starting out from "projects" with technology as the starting point. Two Challenges were identified in this way: "Be seen be heard", focusing on enhancing social interaction in local places and ex-pressions of opinion from citizens often marginalized in the public debate, and "Visualizing energy consumption", aiming to support collaborative understanding of ecologically smart living. Both Challenges engaged the City Municipality, whereas youth participation was strongest in "Be seen, be heard" and the housing co-operative was more engaged in "Visualizing energy consumption".

For service innovation, an extensive series of co-design workshops took place engaging hundreds of citizens. The network in Malmö proved to be

effective in producing over 100 ideas coming from different constellations and perspectives. Ideas were developed in an "open source" logic and can be taken further by any participant; what is not implemented or developed today can be taken up by participants in future contexts.

Two services were developed, each addressing one of the Challenges. MyOpinion is a "photo-booth setup", where you can take a picture and type a "Tweet sized" text accompanying the image. The image and text are then projected onto a vertical surface somewhere in the local neighbourhood. An SMS functionality allows passer-bys to submit comments that are layered on top of the displayed image/text. This service has been used by a NGO at a street festival and is wanted for use by the municipality. The other service is "Hack your energy", a set of Arduino modified energy meters that display results on an open data internet portal. The residents at the housing co-operative use this service to better understand their energy consumption. As understanding increases, they use social media to share tips and tricks for more sustainable living.
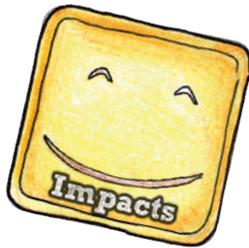
For policy impact, the methodology we tested drew the interest of the municipality and is gradually being picked up in their organizational way of working. An initiative has also been started to set up a regional Living Lab based on participation from citizens and run by the city and regional business clusters, with a life of its own.
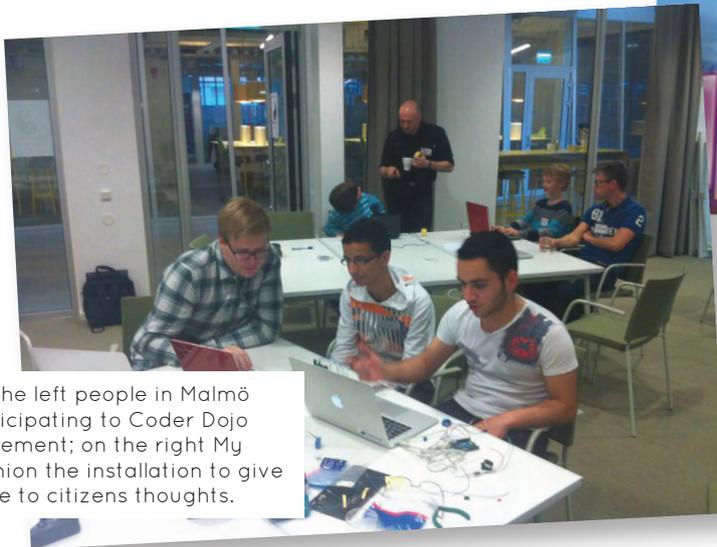
On the left people in Malmö participating to Coder Dojo movement; on the right My Opinion the installation to give voice to citizens thoughts.

BREMEN STORY

Bremen has over the years played a leading role in promoting sustainable transportation, including the the promotion of electric cars or e-mobility.

There are several mobility-related ICT infrastructures spread throughout the city including traffic guidance systems. Each system fulfils a certain and very specific purpose – systems are typically not open though in some cases data is provided to the public (e.g. current traffic situation). The municipal company responsible for parking space management, Brepark, is challenged by changing requirements from the customer/citizen side (e.g. sharing vs. ownership). Their approach is to find new (technology-based) service concepts that complement or improve existing offers. Brepark operates the ICT infrastructure for parking and related control technology, such as sensors for parking space monitoring.

The Smart Street Arena covers the topics of mobility and traffic and the related technology and service integration. While deployment of entirely new infrastructure and systems is costly, mobility providers can experiment with approaches built on-top of existing infrastructure and systems. For citizens, three areas of city mobility are relevant: personal and public transport as well as goods logistics in the city.

Since Brepark's existing sensor system fulfils a purpose that is not exploiting its full potential, possible enhancements through added-value services were explored. For this purpose, a full concept was co-designed and a demonstrator implemented that allows monitoring and (limited) reservation of individual parking spaces in one of Brepark's car parks. A second Challenge was defined in the area of goods transportation, an issue with great potential and interest for improvement of quality of life in Bremen: noise, pollution and traffic. A participatory approach together with recent developments in e-mobility systems will be built on to co-design a platform for city-logistics in Bremen. The stakeholders involved include: logistics providers, policy, citizens, shop owners and technology providers.

Technical problems due to the fragmented and closed ICT infrastructures related to mobility, in particular Brepark's sensor system, inhibited the full development of the first Challenge, the monitoring and reservation demonstrator. The key lesson is as follows: If an existing infrastructure is used, the involved partner should have full competencies and possibility to change the infrastructure. Open infrastructure/technology are far more conducive to the co-creation of enhancements and new services.
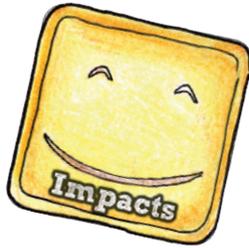
While the activity for the second Challenge is still on-going, the first results indicate a promising business concept for city-logistics. The interest here is due to the fact that, differently from previous initiatives, the new scenario has been co-designed with the involvement of local stakeholders.

The city of Bremen

ATHENS STORY

The City of Athens is characterised by a large citizen community feeling disappointed, even disconnected from the local authority, wishing to be heard but not motivated enough to participate, having changing and evolving needs. The Municipality of Athens on the other hand, is a local authority aiming at promoting social and technological innovation by providing innovative services to its citizens and visitors in order to improve their everyday quality of life, not operating in a vacuum but having to constantly change to address the results and the impact of the large and serious economic crisis, especially in terms of resources available for service delivery.

It should be highlighted that there was neither an established Living Lab in Athens nor existing experience in the respective framework. Therefore, the co-design working environment was made primarily of administrative and elected representatives of the Municipality of Athens, citizens in general (inhabitants, commuters, young citizens etc.), visitors, local businesses, local tourism organizations, municipal employees, NGOs and citizen communities.

The "Smart Square" was initially conceived as a concept for a new form of democracy, highly related to the physical places. Gradually the square notion became virtual but still considered as a place where important collective decisions are made, where participation is encouraged and community building becomes evident, where new ideas, beliefs and behaviours are born, where social innovation may emerge and the distribution of power can be constantly challenged and redefined. The square becomes virtual in the sense that an envisioned technology enables squares to be created where problems are shared and discussed.

The "Greenlife Athens" Challenge invited citizens and communities to participate and compete in suggesting ideas of making as many as possible parts of the city "greener", not only in terms of green spaces but energy efficiency and alternative transportation as well, using a predefined set of resources. They were invited to combine municipal budget items available for such services with other sources of funding (sponsorships and so on), even suggesting ways to attract this external funding if not available. Therefore, new ideas in how public resources can be collaboratively maintained and developed but effectively and efficiently allocated as well were explored.

"MySquare" is a mobile application-service that allows citizens to create a square wherever problems can be posed, discussed, and decided on. "MySquare" is a fundamental part of the technology ecosystem of the Smart Square Arena and gives citizens the opportunity to become proactive in improving their City and as a consequence, their everyday life. Citizens can enter the virtual square for various purposes, since issue raising may sometimes grow into incident-generated common activities or movements, public projects or other innovative forms of collaboration. "MySquare" also supports formal citizen social, cultural or political gatherings.
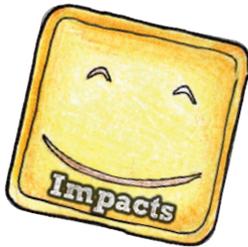
Peripheria Challenges have proven to be beneficial as a driving activity primarily to move forward on social innovation but also to facilitate the establishment of a the Living Lab framework for involving the above mentioned groups in co-creation activities for their first time.
Most of the participants in the co-design process accept that it takes more time for them to understand the concept and become involved and engaged effectively and efficiently. In addition, they appreciate the fact that they are invited to be part of a bottom-up development process instead of simply evaluating or accepting the results of a top-down approach which is still common practice. At the same time they recognize that e-services are missing and are needed in a smart and sustainable city context.

Athens municipality presents Peripheria to a group of citizens

GENOA STORY

The City of Genoa is built along the Tyrrhenian coast, almost vertically on the slopes of mountains descending directly to the sea. This configuration gives particular value to the city's parks and green spaces, many of which with an important historical and cultural value.

Citizens are insistently seeking for actions to support an increased perceived safety of green and public spaces. To this end, there is the need to network various experiences with new technologies related to video-surveillance and the issue of safety in general. Local SMEs have also expressed their interest in the issue, including demonstrations of software and hardware products for the detection, decoding and warning of threatening or illegal behavior.
In parallel, however, there is a general sense of mistrust with respect to proposals coming from the institutions for citizen participation, due to the lack of importance given to citizens' opinions in the past. There is thus an interest in new services for the city's parks together with obstaclesto building the necessary trust to engage in co-design processes.

The "Smart Park and Museum" Arena was defined in two neighborhoods: Pegli and Bassa Valbisagno. These two urban districts were chosen for their great cultural and social vitality in addition to the presence of important green spaces.
The co-design processes involved the use of the Museum of Villa Pallavicini in Pegli and the green spaces of the Villa and Fort of Santa Tecla in Bassa Valbisagno, exploring the use of new technologies to provide citizens with information about their neighborhood, history, culture and social initiatives in the area, with particular attention to the safety of the public spaces.

The Challenge was to develop new service concepts to enhance the enjoyment of the cultural and natural heritage of the districts involved, including safety. In particular, we aimed to open up the use of new ICT technologies to all citizens, including those with fewer economic opportunities and little specific knowledge about technologies, taking into special account 'differently abled' citizens. This Challenge was launched for both Villa Pallavicini and Fort Santa Tecla, taking different paths according to the different settings and the make-up of the stakeholder groups.

To meet this Challenge, we co-designed the concept for a smartphone app – "MyPark" – to make information available to visitors to Villa Pallavicini, linking the user's location and QR codes to the calendar of urban events and audio guides, videos, podcasts, multimedia content, and Social

Networking, on topics such as on-going exhibitions and botanical information. A first prototype was presented to groups of citizens who were able to verify the ease of access to information about the park. With this application the experience of a real visit is enhanced through a dynamic virtual level, continuously evolving and open to user-generated content. For the Fort of Santa Tecla, a first step was to provide free wi-fi throughout the area. In addition, the group agreed to place an infrared video surveillance camera for the green areas at the entrance, to monitor the entire area day and night and protect the Fort from vandalism. QR-Codes throughout the Fort link to the co-design and institutional websites as well as information on the Forts of Genoa.
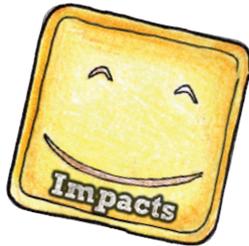
In this experience, the municipal authority learned the importance of giving citizens a real role as active and expert partner, abandoning an "old" culture in which the citizen is considered in a mere role of subject or passive consumer. While new possibilities for ICT were discovered, we also experienced the low level of understanding of its use and potential, especially true for the population brackets that can benefit the most: the elderly, families of people with disabilities, workers in search of employment, etc.
An important new experience for the city that will have a lasting effect is the participation in the organization of the "Diritti e rovesci" (Rights and Reverses) BarCamp, which gave visibility to numerous neighborhood initiatives active in the city.
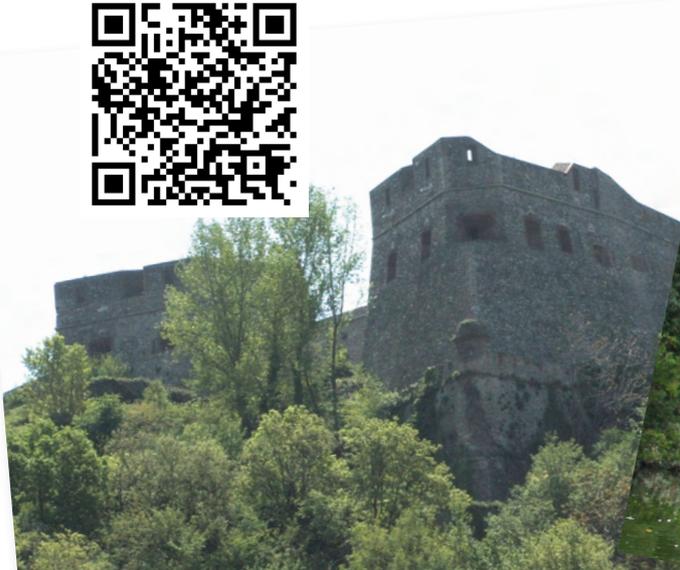
Villa Pallavicini
and Forte Santa Tecla
in Genoa

PALMELA STORY

In Palmela County, urban and rural communities coexist together with a strong industrial presence, particularly in the automotive industry. Decline of the rural areas is significant, mainly due to the low quality of living conditions, scarce access to urban services, and poor public transportation. In parallel, the rural population is rapidly increasing in average age, leading to a significant digital divide.

With the Municipality in its traditional role of creating the conditions and capacity for dialogue among different community groups, a broad range of stakeholders can be engaged: the general population and community representative groups (neighbourhood associations, ONG's), the Parish council, several municipal services (tourism, communication, attendance, finance, culture), the industrial sector (FIApal – Economic Development Association, Volkswagen Autoeuropa, Autovision, and CEIIA an R&D Company) and ADREPES, the Rural development association constituted in the LEADER programme.

The Smart City Hall Arena was defined as a laboratory for citizenship and public policies, with a re-definition of the interface between the back and front office of public services. At the base of the concept is a mobile Van equipped with ICT e-government services, that however leads to a new model of decentralized service delivery, integrated and multi-channel, with the purpose of providing "urban" level services to rural citizens. The broader objective is to see how innovative municipal services can contribute to local development, improve the performance of the public sector, and promote innovation for the benefit of local communities.

The Challenge was defined as follows: "How can rural citizens (or other isolated people) access public services?" This Challenge is part of a broader global concern related to the urban-rural conflict, and it fits a model of governance that seeks to serve all citizens equally, providing the best solutions by using Future Internet platforms and services. Co-design activities included meetings with Neighbourhood Associations, "Parish Weeks" (decentralization of the local administration to the five parishes for a week), public debates, etc., applying the Periphèria co-design method as a space for sharing ideas and finding solutions for the Challenge.

The prototype VAM – Vehicle of Municipality Services – was proposed not only as a platform but above all as a way of helping citizens reflect on

Results

possible service ideas and participate in co-design processes. Ten related project ideas were defined, including: QRCodes in the historic town; Access to basic products in rural regions; Executive meetings on line; Connected TV network; Concept study to a new vehicle for health area support; Cultural activities: information, booking and buying; Interactive panel; On line library; SMS services/email service; and Village beat city.

The following three projects were actually implemented: an extension of the VAM concept to Vehicle of Municipality Services, a mobile "citizen's store" with access to municipal and (through a protocol with the Portuguese government) central administration services like citizen card and passport; the On Line library, booking books and documents online with pickup through the VAM; and QR Codes for access to important information for both citizens and tourists.

Impacts

The Municipality discovered a new way of innovating together with its citizens, with the Challenge process as a support tool for planning, land management, and policy making. Citizens can actively participate in the governance process through the organizations that represent them without giving up their individual participation. Geographical and social isolation can be overcome with simple and efficient technological processes accessible to a range of citizen groups.

The Palmela Municipality Van

MILAN STORY

In October 2010 the Milan Polytechnic and the State University of jointly launched the Campus Sostenibile initiative (www.campus-sostenibile. polimi.it). Considering that scientific knowledge asks more and more for interaction with the real world, the main goal of the Campus Sostenibile project is to transform the campus into an urban space for experimentation, where scientific knowledge is co-produced thus making its production a public, collective endeavour.

Considering the main activities in a university campus, the main resources are represented by research and development activities carried out in cooperation with the urban authority. Through this cooperation, many stakeholders, citizens, and civic actors found a driving and inspiring environment for aligning their initiatives and for proposing new ones. Some of the stakeholders showed a constant interest in the initiative and process and behaved as sort of leaders, heroes of the whole story: those that are carrying on the projects. Some others remained in a sort of "available" condition: they followed the process but doing only what was required without any proactive initiative.

The Smart Campus Arena is where scientific knowledge interacts with urban life. Here scientific knowledge is available, feeds the processes of urban visioning, and activates urban self-reflection at different scales on different domain. Here scientific knowledge is challenged by needs for change and innovation in urban life. Both the private and the public sector look for collaborations thus activating rich exchanges and interactions.

Three challenges were launched: Experimenting the Urban; Behave!; and Inclusive Campus. They played two different roles with regard to the engagement process:
 1) they have been the driver of the initiatives (like in the &Co and TOCTOC initiative) as they worked as conceptual frameworks for co-design solutions;
 2) they have worked as tools for network alignment under the Campus Sostenibile initiative (like in the Piazza Leonardo da Vinci related initiatives).

Three services were developed. TOCTOC was developed together with a dedicated application and aims at allowing the exchange of used goods and personal abilities and competences, so fostering sustainable behaviors; TOCTOC was awarded at the Social Innovation Camp in Milan and has been

incubated by the innovation agency of the Milano 2015 Exhibition.
The &CO service was developed for reducing the waste of materials insmall-medium production activities through innovative supply chains; it started a cooperation with ReMida (http://www.modusriciclandi.info/remida/) for better grounding the service in the production sector. The RiconquistaMI service was developed together with the StickAround application in order to synergize diverse and dispersed urban initiatives to re-conquer public spaces. RiconquistaMI emerged from the experiments made in the Piazza Leonardo da Vinci square.
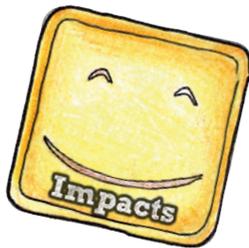
The Campus pilot experience is showing that the most effective approach for engaging people is being discovered through a chain of experiments, each representing a micro experience for learning and discovery.
This appears to have had a clear impact on the local administration, which is introducing urban experimentations as a possible way to achieve the long term transformation of public spaces (as declared in a formal decision of the Città Studi neighbourhood council, April 2013).

On the left TOC TOC happy hour to engage the TOC TOC community; on the right Stormo rEvolution a poster that announces one of the events designed to revitalize the Leonardo Square

THE HUMAN SMART CITIES COOKBOOK

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