Greenfield Smart District

Strategies, products and ideas to make districts smart

PLANET
IDEA
SMART ENGINEERING

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PART I
Planet Idea

Planet Idea s.r.l. – a Smart City Competence Center - aims at cooperating with real estate developers to design and build the city of the future. Thanks to the experience gained at the national and international level, Planet proposes an innovative process for greenfield districts in order to create living spaces that meet the latest expectations of real estate buyers.

1 Introduction

The greenfield district is the opportunity for Planet Idea to advise on creating innovative solutions that respond to new urban challenges in a clever way.

The Smart City market is rapidly growing and continues to grow globally. It is increasingly clear that the use of advanced technologies and integrated systems within cities will be the ideal solution for sustainable urban development.

Planet Idea, a Turin-based company part of the international group Planet Holding, defines its own design path by identifying areas of expertise, actions and solutions (products and best practices), integrating them for the creation of brand new districts.

Planet Idea is the only System Integrator in the urban area that develops this research through its Competence Center structured in four macro-areas: Ecosystem Resources, Built Environment, Technological Systems and Society.

The Planet group has gained experience thanks to its involvement in the creation of the first Smart City for Social Housing in the world, currently under construction in Croatà, Brazil (launched in 2014, with an expected deadline in 2020), and has built the first Smart Square in Turin, Italy (2016).

Through these projects, Planet Idea has consolidated a partnership network with more than 40 companies of national and international importance that share its vision and offer their know-how, thus becoming a proactive part in the proposed construction of newly built districts, integrating the most innovative products and services.

It is a sort of 'strategic alliance for the smart city' at the service of the Real Estate.

Planet Idea is now able to help the decision makers (real estate developers, administrators and designers) to identify smart strategies for building or transforming greenfield districts and aggregating value at every level of the business process through a method of pre- and post-intervention assessment. The methodology uses the Social Smart City Matrix, a new evaluation framework that gives the project a unique score and is able to make the benefits of the Smart City work permanent and universally recognizable.

The positive effects of working with Planet Idea in this area are multiple and immediately cash convertible: from the media impact that accelerates sales and increases the real estate value of the intervention, to the savings from the energy efficiency improvement up to the innovative, still partially unexplored models for the enhancement of Big Data generated by the App.

2 Planet Idea

Competence Center and Operating Protocol

2.1 Competence Center

Planet Idea is a Competence Center that provides strategic consulting and develops projects to integrate innovation in urban areas (products, ideas and best practices).

The staff consists of over 20 professionals from various sectors: planners, architects, agronomists, civil and energy engineers, IoT experts, social inclusion experts, financial analysts, communications experts (press, video, web and socials). It relies on the collaboration with local and international research centers and serves as a consultant to national round-tables in the field of smart cities.

2.2 Real Estate Operating Protocol

Planet Idea guides customers towards the implementation of a 'smart' strategy through an operating engagement protocol, at all stages of design, from the feasibility to the executive projects.

After the construction site work, Planet Service will handle maintenance and management operations, providing the district App, a local platform for making use of innovative solutions.

2.3 Planet App

In cities of the future, a strategic role will be played by the sharing and collaborative economy services and by the chance to manage energy individually from every location.

The smartphone application will give citizens the ability to control their homes with cameras and sensors, thus managing consumptions, activating home appliances and services when needed. Purchases and payments may be carried out using the App and the transactions will generate revenues for the platform manager.

Gianni Savio, President

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Our qualifications

3.1   Smart City Laguna, Croatá - Brazil

Smart City Laguna is a city under construction in Croatà, in the municipality of São Gonçalo do Amarante, 55 km far from Fortaleza, Brazil.

The construction site has 5,000 dwellings underway, with an expected population of around 20,000 residents.

The peculiarity of the Social Smart City format is that it is directed to people with a medium-low income. This has led to the adoption of intelligent solutions within Social Housing capable of meeting the strict economic parameters that set the sales prices of the Brazilian 'Minha Casa Minha Vida' program.

The added value of the Smart City proposed by Planet consists in the rationalization of the infrastructure processes, thus reducing management and maintenance costs, which will generate economic benefits.

Moreover, a built environment thus conceived is the best platform for making local informal economies and sharing economy possible, because these processes are accelerated by the use of digital technologies. Such dynamics have a positive effect on the livability of the districts and a great return on real estate operations.

Render of "Smart City Laguna" project

Smart implementations in Piazza Risorgimento

3.2   Piazza Risorgimento, Turín - Italy

Piazza Risorgimento is the first smart square created in Italy.

The project was developed under the 'Torino Living Lab' tender, promoted by the Town along with the Fondazione Torino Smart City [Turin Smart City Foundation] and Circoscrizione 4 [District 4].

Planet Idea introduced 25 innovations in the project, including the existing playground and bocce court: from the smart bench for exchanging data or recharge mobiles, to auto-parking sensors in order to know which slots are free; from beacons for receiving information on the mobile, to book crossing places for exchanging books with other citizens, up to interactive totems and shared urban vegetable gardens. The goals stated by the project were to create an urban place for the collectivity as part of a smart city, a place where growing a community by offering innovative material and/or immaterial tools for achieving results in energy saving, social inclusion, improvement of the citizens' life, advancement of technological knowledge, and environmental awareness.

The involvement of citizens in the smart square project also took place through the smartphone App specially developed by Planet Idea. Its virtual platform enhanced the synergistic and relational nature of the innovations included in the project, thus enabling people to fully enjoy the benefits resulting from many of the installed tools.

4

Planet Idea Observatory

Technological evolution is constantly expanding, in particular the variations tied to housing and city. The Planet Idea Observatory is a key element within the Competence Center. The Observatory monitors and selects innovative products, services and best practices to be applied in smart districts.

4.1 How it works

Planet Idea is a System Integrator capable of selecting competitive and innovative products in the global marketplace. The Observatory collects and organizes information on the market of smart products and services, and arranges them in a database accessible by the Competence Center.

Information is organized according to a preset structure that is divided according to the areas of the Social Smart City Matrix developed along with Arup Italia.

The work thus follows a single stream starting from the identification of the products, continuing with the insertion into the database, and ending with the issuance of a product card with costs and technical specifications for the installation.

The Observatory's staff is continuously kept up to date, providing evidence of the technological evolution of products and studying the latest Smart City research developed by researchers and partner companies at a national and international level. The assessment of the Technology Readiness Level (TRL) has been carried out by the European Commission and is based on a scale from 1 to 9, where 1 is the lowest value (definition of basic principles) and 9 is the highest value (system already used in the operating environment). Planet Idea monitors the scientific advancement of international researches as a whole, so as to predict what will be the technological evolution of a product or service and to include in the Observatory's database only products with a high technology readiness level, i.e. those products and services already immediately available on the market. This choice guarantees the real estate developer the utmost reliability of the products both in the implementation and management stages. In some particular cases, Planet Idea may suggest to apply very advanced technological solutions (e.g. 5G in the telco domain) even if they are still characterized by an experimental level, when the characteristic placement of the smart district is also to become a pilot district, an avantgarde example for the entire local geographic area to which it belongs.

4.2 An always open window on innovation

Planet Idea Observatory has established relationships with research centers and specialized companies at a national and international level. Building the city of the future also means knowing which are the trends to follow and the technologies still under development that can have a positive impact on people's lifestyle in the future.

For the customer, this means the possibility to access a well-developed know-how coming not only directly from Planet, but also from the external network of professionals and researchers in contact with Planet. The goal is to simplify the access to the innovation market and select the most efficient products.

The Observatory is currently developing 'all inclusive' solution packages that can be applied in different contexts to provide the basic services needed for the digitization process:

/ Broadband and free wi-fi;

/ Smart grid;

/ Home automation;

/ Street lighting;

/ Smart mobility;

/ Urban operating system.

4.3 Business models and services

The Observatory is not only concerned with product and service research, but also analyzes the business models of supply companies for their implementation in the smart district. Solutions are always offered to the customer by hypothesizing multiple financial scenarios, proposing a network of suppliers selected by Planet in order to optimize their economic resources.

The several scenarios are differentiated according to the economic effort and the applicable model. Technologically high results can often be achieved with a near-zero initial investment by the developer, thanks to:

/ Operating lease

/ ESCo model

/ Margins realized on services

LED smart public lighting

Public wi-fi hotspot

Green IQ Smart Irrigation

Urban gardens in collective spaces

PART II
Greenfield district

At present, the creation of new districts (greenfield projects) is an opportunity to offer innovative housing solutions on the market. These solutions give future residents the chance to experiment, on a day-to-day basis, the system of innovations provided by the latest technological advancements, if desired according to their own aptitude or sensitivity.

Designing and building new smart districts is an operation that can rightly be considered the boost for improving the living conditions of citizens, provided that the aspect of social inclusion is considered fundamental, as suggested by Planet Idea's strategic vision.

With the greenfield smart district, Planet Idea contributes at outlining a new definition of smart city: no more the theoretical scope of the utopian project that can only be achieved with high investments, but more and more opportunity for sustainable local development.

Working in a smart city environment should not be considered as a cost but as a business opportunity that generates active cash value models capable of multiplying the economic potentials of real estate investments.

5 Smart City: the theoretical field

The concept of smart city is a recent definition. It is the evolution of the concept of sustainable development established in the late 1980s (Brundtland Report, 1987). The first accredited smart city explanation was formulated around 2007 by the University of Technology in Wien, when the Centre of Regional Science (SRF), wrapping up a debate at a European level, published the 'Smart Cities - Ranking of European medium-sized cities' study.

This description showed how the smart city is linked to the potential of Information and Communications Technology (ICT) structures for their ability to stimulate economic growth, and how it must be supported by the development of human capital, new governance models, and as mentioned, sustainable environmental development.

In 2012, the Italian ANCI [Associazione Nazionale dei Comuni Italiani - National Association of Italian Municipalities] founded the Osservatorio Nazionale Smart City (Smart City National Observatory). The 'Rapporto Monografico Smart City. Progetti di sviluppo e strumenti di finanziamento' [Smart City Monographic Report. Development projects and financing tools] written in 2013 defined the Smart City as: *"[...] an abstract projection of communities of the future, an applicative and conceptual perimeter defined by a set of needs that find responses in technologies, services and applications that can be recalled at different domains"* such as *"smart building, inclusion, energy, environment, government, living, mobility, education, health."*

However, the report highlights how *"Such technologies, services and applications do not form, individually or collectively, a Smart City unless they are integrated into a platform that ensures interoperability and coordination, but above all, the definition of appropriate governance and financing tools [...]"* so that, through the integration of information, collective smartness is generated, which produces social and generational inclusion and improves the citizens' level of life.

5.1 Smart designing: references for programming the cities of the future

The smart city features are not uniquely defined, given the large number of people working around the issue, and especially the rapid evolution of technical solutions that the smart concept refers to.

Identifying the fields that define a smart city is a necessary path to fix the elements that contribute to determining the city's smartness. The goal is to have objective, and possibly shared, methods and tools to reach a city's assessment and comparison. Several subjects have already been involved, such as the British Standards Institute (BSI), the TUWIEN + EU commission project, the IESE University of Navarra. The resulting rankings allowed identifying the most effective solutions and processes to achieve the set goals, and also outline a prospect of improvement for less successful cases.

The first evaluations of Planet Idea have led to the identification of six qualities that can be associated with the smart city and that need to be balanced in order to achieve the smart development of the city. These are: attractive city, healthy city, digital city, informative city, efficient city and inclusive city.

6

Planet Idea's Smart Program

The advice offered by Planet Idea to Real Estate Operators is part of a strategic program to enhance their ongoing projects in order to meet the smart city requirements that today have become essential for the sustainable development of urban housing.

6.1 Advantages

The added value in the interventions suggested by Planet is immediately identified in five areas, beginning with the high media return that the transaction triggers. This resonance, today due to the excellence of the smart district proposal over the many traditional property deals, exponentially accelerates sales. The media return also generates interest both in the public and private sectors, a useful focus for triggering support partnerships both in terms of implementation and, in the future, in the management of the Smart City.

The smart district will certainly be more energy-efficient, with economic returns for the resident or the provider, which results in time savings, or even in a source of revenue, if active systems for energy production are introduced.

The integration of smart services for residents creates business opportunities on transactions for accessing them, hence fees - transaction fees - in the field of material services (e.g. personal assistance, gyms, sports activities, etc...) as well as on sharing economy services (e.g. exchange of small tasks on the APP) which become a source of revenue for the real estate developer. Finally, the high amount of data generated very fast by a smart system (Big Data) has a strong appeal to those who analyze and re-use it to improve the performance of the complex and the services offered (telephone and energy providers, etc ...).
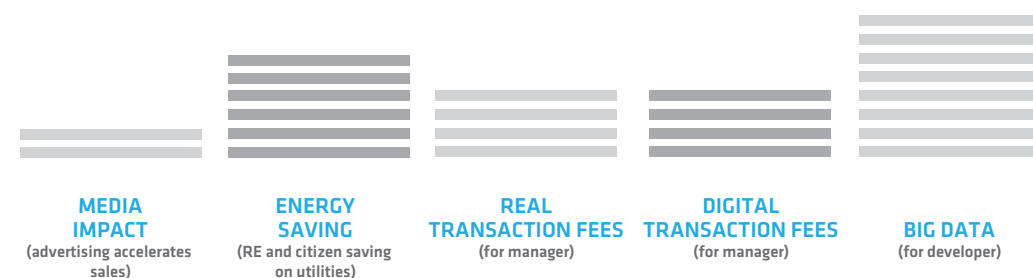
6.2 Methods

Planet offers the integration of smart solutions when designing the intervention, whether it is a new construction or the redevelopment of an existing item, and this allows:

/ reducing costs compared to progressive implementations of smart solutions thanks to a scale economy

/ increasing the yield of the products thanks to a favorable synergy of the whole system

/ facilitating the support of Local Administrations for the Real Estate proposal as it supports smart public management, generating social consensus for the Local Administration

/ attracting partnerships with private companies for the supply and management of the smart system, thanks to the extended size of the interventions

/ planning post-sale management of the complex, which determines long-term economic benefits for the real estate manager.

6.3 Tools

Planet Idea, thanks to its wide international experience, operates in four thematic areas: ecosystem resources, built environment, technological systems and society. Within each area, it has identified categories of smart solutions to be proposed to the customer. These are specific intervention areas that include 'hardware' solutions, i.e. physical objects to be implemented in the city, such as smart lighting for streets and other public venues, and 'software' solutions, i.e. innovative best practices that make the new smart district more livable and more socially cohesive. The solutions are shown in the following chapters.

Planet provides an economic plan of intervention by highlighting, on a case-by-case basis, the degree of economic involvement that the proposed solutions require from the customer, i.e. the real estate operator. From free solutions – possible because of agreements with external operators who will later provide services and supplies in the district (e.g. smart metering of utilities), to low cost solutions, up to solutions that require greater economic involvement of the real estate developer but are characterized by higher return on real estate value and for which specially-made agreements with third-party companies can be promoted.

Planet Idea has also developed the Social Smart City Matrix (SSCM), a standard and international evaluation tool, and the format for a local App that integrates the smart solutions, in order to further enhance its support role in terms of tangibility and effectiveness.

MEDIA IMPACT	ENERGY SAVING	REAL TRANSACTION FEES	DIGITAL TRANSACTION FEES	BIG DATA
(advertising accelerates sales)	(RE and citizen saving on utilities)	(for manager)	(for manager)	(for developer)

Monetisation models of innovative solutions

6.4 Planet's macro-areas

The definition of Smart City given by Planet is based on four macro-areas that are directly related to one another: many solutions lie on one or more macro-areas and contribute to increasing the degree of 'smartization' of the city. For each of these, five areas have been defined:

Ecosystem resources

/ Nature

/ Air

/ Soil

/ Water

/ Energy

Built environment

/ Architecture

/ Urban Functions

/ Infrastructure

/ Public Space

/ Mobility

Technological Systems

/ Operations & Administrations

/ Data & Sensors

/ Network & Devices

/ Materials

/ Life cycle

Society

/ Community

/ Well-being

/ Education

/ Economy

/ Security

7 Ecosystem resources

The city is an ecosystem in which humans play a crucial role in defining the flows of matter and energy and in regulating the relationships between the various constituent parts.

Starting from this premise, the development of a smart city must consider those practices that, acting virtuously on flows, will help to maintain the quality and reproducibility of natural resources, with positive effects on the economic and social sustainability as well. The planning of ecosystem resources should also have an interdisciplinary approach, addressing issues ranging from the pollution control to the management of green areas, waters and all elements that sustain and feed the territory in broad terms.

Living in a smart district designed by Planet Idea means living surrounded by greenery, in a high quality environment.
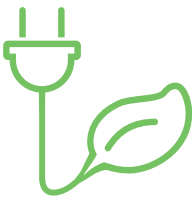
Areas

NATURE
AIR
SOIL
WATER
ENERGY

7.1 Beyond sustainability for an efficient city

The key topic is to operate according to a systemic scheme where the outputs of a subsystem become inputs of another subsystem, thus minimizing investment and management costs, and significantly reducing power consumptions.

RESPECT FOR THE ENVIRONMENT AS A FUNDAMENTAL REQUIREMENT

Smart communities that feel part of a common urban ecosystem have a greater sensitivity and respect for the environment in which they live

Some of the innovative solutions selected by Planet Idea to be integrated into the smart district:

micro-CHP

smart lighting

solar lamp with external storage

photovoltaic panels

wind micro-generators

heat exchangers with groundwater

urban ecological network

micro-habitats for fauna

use of native plants

CO2 high-capture plants

plants with a low water demand

green areas with natural evolution

forestation in urban environment

tanks for the recovery, storage and re-use of rain water

storage system via tanks

gray waters recovery

rain gardens

water retainers

phytoremediation system

smart irrigation system

discontinuous / targeted pruning

biological treatment of wastewater

grazing of grasslands

filter trenches

sewage sludges as fertilizers

zero-km urban agricultural areas

green management entrusted to farmers

smart metering of electrical consumption

smart metering of water consumption

power generating bumps

wetlands

solar bricks

air purification filter

water desalination system

thermodynamic solar panels

Advantages of proper use of ecosystem resources

When supporting nature, benefits are immediate and collective. Some examples are:

/ significant improvement of quality of life

/ reduction of emissions that could cause health problems over time

/ recovery and saving of resources that represent an avoidable economic expense

/ positive effects on psychological well-being: scientific evidence shows that effective distribution of green spaces in urban areas improves moods and reduces stress

PERCENTAGE OF BENEFITS

40% *Water resource saving with recovery of graywater**

76% *Energy saving with use of street lights with adjustable lighting***

57% *Water use reduction with smart irrigation system for vegetable gardens****

*   http://www.tuttogreen.it
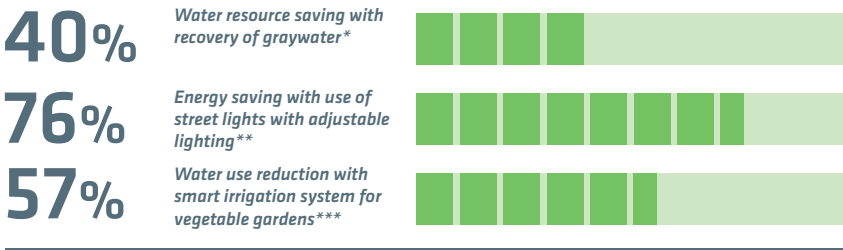
**   http://www.planetidea.it (dati piazza smart monitoraggio progetto "Piazza Risorgimento", Torino

***http://www.planetidea.it/smartsquare/

8 Built environment

Rethinking the way we live the city through fluid, multipurpose and sustainable spaces in order to improve the quality of life.

The urban context, depending on its size and number of residents, will have an adequate system of services to meet the daily needs of individual residents.

Small, intimate public areas, designed to be used by small groups, will mediate the transition from the dwelling to the large urban space scale to foster social integration in the district: intermediate venues of gradual transition from individual to collective dimension.

Areas

ARCHITECTURE
URBAN FUNCTIONS
INFRASTRUCTURE
PUBLIC SPACE
MOBILITY

8.1 Smart infrastructures and governance

ELEMENTS FOR AN
EFFECTIVE URBAN
PLANNING
*A balanced city for high
quality living*

The Built Environment is not just a static background where a community lives but is designed to interact with the new social needs, actively involving people in the use of inclusive public spaces also through smart furnishings.

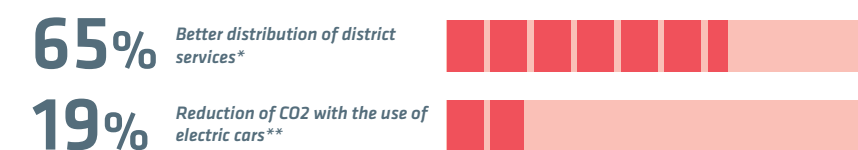Some of the innovative solutions selected by Planet Idea to be integrated into the smart district:

systematized green bike and walk pathways	walk routes	bike paths	optic fiber	30 Km/h zone
shopping street	smart walk crossings	high-quality street furniture for everyone	pathways for visually impaired people	bike sharing
car sharing	mixed craft districts	electric car recharge areas	smart shelter	responsive bench
playground areas	sewer system control	water system control	outdoor cinema	green roofs
green walls	differentiated collection areas	communal composting areas	market areas	fitness areas
rational and environmental construction site setup	housing customization	smart dog-areas	info points	roads hierarchy

Benefits of a proper and effective planning of the built environment

If the smart city is strategically planned, the following advantages can be achieved:

/ ease of use of conventional services, which become more efficient and faster resulting in saving resources and time

/ better use of local and global services due to the extensiveness of networks and the fair distribution of functions on the territory

/ increase in the quality of public spaces

/ increase in smart and inclusive mobility that facilitates accessibility for all citizens, making transportation easier thanks to efficient public infrastructures having a reduced environmental impact.

/ monitoring of infrastructures with quantitative flow analysis.

PERCENTAGE OF BENEFITS

65% *Better distribution of district services**

19% *Reduction of CO_2 with the use of electric cars***

* *Recs Architects*

** *http://www.sietitalia.org/wpsiet/Danielis%20-%20WPSIET%202017.pdf*

9 Technological Systems

As part of the Technological Systems, most of the innovative solutions relate to digital infrastructures conceived as qualifying facilities, an essential prerequisite for the development of smart services.

4G/5G coverage and public Wi-Fi hot-spots are included.

Living in a high-connectivity district provided with technological services that improve the quality of life with efficient transportation means and real-time data monitoring systems will become an achievable dream for everyone.

Areas

OPERATIONS & ADMINISTRATION
DATA & SENSORS
NETWORKS & DEVICES
MATERIALS
LIFE CYCLE

9.1

Technology at the service of citizens

THE FUTURE IS INCREASINGLY CONNECTED

The connection between systems and people in the district encourages not only the management and energy saving, but social relations as well

With Systems we mean the set of technical solutions that support an increasingly connected and mobile society with new needs. Automating and facilitating responses to people's new requirements in residential environments is effective at upper levels.

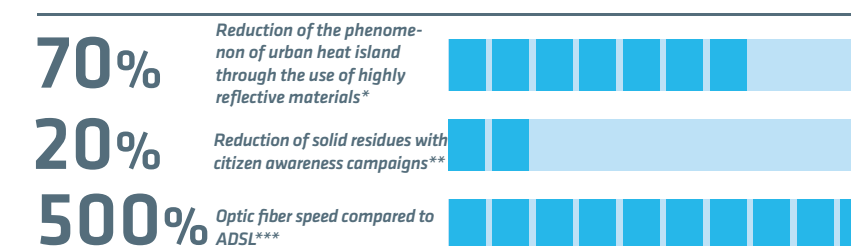Some of the innovative solutions selected by Planet Idea to be integrated into the smart district:

free wi-fi

wearables for personalized diets

building automation

smart thermostat

sound-absorbing road pavement

door-to-door waste sorting with RFID

intelligent waste bin

maintenance digital register

draining pavement

power generating floor

latest anti-trauma materials (asphalt with rubber powder)

photocatalytic interlocking blocks

latest materials for drinking water distribution network

use of special paints

antinoise barrier

sensors noise monitoring

use of smartphone as acoustic detector

water quality control system

pet tracker

fire sensor

flood sensor

seismic detectors

beacon

encouraging open date sharing

nowcasting systems

rainfall video monitoring system

health care delivery device

App: environmental information about the city

APP: shared community services (baby sitting, nursing, cleaning)

APP: Portal for personal security

App: mobility (unique app for public transport, car & bike sharing)

child tracker

BIM designing

DIM designing

CIM designing

Benefits of smart systems

The technological solutions that meet people's real needs bring countless benefits to the community, such as:

/ more security and free time, spared from activities that are speeded up and automated, resulting in reduced stress

/ faster communication speed, both between the components of a local community and towards the entire district

/ new community relationships and efficient space management with reduced traffic and hence waiting times

/ control of public lighting, LED lights with photovoltaic panels and dimmable lights with sensors, resulting in energy and hence economic saving.

PERCENTAGE OF BENEFITS

70% *Reduction of the phenomenon of urban heat island through the use of highly reflective materials**

20% *Reduction of solid residues with citizen awareness campaigns***

500% *Optic fiber speed compared to ADSL****

*   *Report Ricerca di sistema Elettrico, ENEA 2011*

** *Reducing Municipal Waste through Promoting Integrated Sustainable Waste Management (ISWM)*

    Practices in Surabaya city, Indonesia.pdf

*** *https://www.wired.it/internet/web/2014/12/12/adsl-fibra-ottica-quali-differenze-tempi-download/*

10 Society

Social inclusion is the specific goal in the Society area.

The awareness programs focus on security, energy saving and waste reduction.

Interventions that create engagement in the local community are highly important as well.

The Smart District will become the place where people come up with innovative solutions that trigger virtuous behaviors and generative paradigms.

Areas

COMMUNITY
WELL BEING
EDUCATION
ECONOMY
SECURITY

10.1 Designing solutions with high social impact

NO INNOVATION WITHOUT INCLUSION

A smart environment promotes new relationships between the residents, involving them in common activities and providing them with collective services.

Each inhabited place is characterized by specific relations and interrelations between individuals that contribute to the creation of a cohesive community. Such positive effects involve all the other aspects.

Some of the innovative solutions selected by Planet Idea to be integrated into the smart district:

responsible water consumption guidelines

food education guidelines

energy demand reduction guidelines

waste reduction guidelines

food waste reduction guidelines

Urban orchards - didactic itineraries

co-working space

open designing lab

repair and reuse lab

library of things

social kitchen

pop-up market

smart gym

playful equipment that produces energy

smart fitness path

defibrillator points

SOS columns

television camera of security

supporting shopping circuit at points of sales

info interactive totem

book crossing

public panel or boxmail to collect citizens' ideas

horizontal and vertical infographics for communication

fun theory

storytelling corner

social game about environmentally responsible lifestyle

green areas managed by schools

micro-job exchange

business incubators

sharing card

Benefits of innovative solutions for the society

Promoting actions that result in wide benefits which may be applied to other areas, such as:

/ reduction in harmful behaviors for the people and the environment

/ better quality of relationships by sharing things, support services and leisure activities for community engagement

/ greater sensitivity and awareness of the environment

/ increase in the quality of life and guarantee of individual health and security thanks to aggregation sites that stimulate social cohesion

PERCENTAGE OF BENEFITS

44% *Increased number of platforms dedicated to sharing economy**

40% *Improvement of the air quality in cities that use bike sharing***

*   *http://www.westartitaly.com/news/-non-comprare-condividi-il-boom-della-sharing-economy*

** *estudio de la Comisión Europea (ECF, 2011, Cycle more often 2, Cool down the planet! Quantifying CO2 savings of Cycling*

PART III
Added value

Planet Idea, giving high value to the use of innovative technologies at the service of social innovation, has developed a well-structured and strong network of partners with international companies.

The collaboration allows the real estate developer to benefit from zero-cost products thanks to innovative business models that can also support the latest sharing economy proposals.

11

App - Digital platform

11.1   District App: an essential tool

Planet Idea offers the customer, upon completion of the smart project created together, to develop a local App to enhance the potential of the implemented solutions.

In Planet Idea's vision, the Smart City is the city of the present and future, where the available technologies are integrated and interact together to provide citizens with a safe, social, and service-rich urban environment in which sharing and collaborative economy play a strategic role.

However, the different technologies developed in the Smart City alone fail to interconnect and create the holistic system that amplifies the results. For this reason, an instrument panel is needed, which allows monitoring the various technologies, acquires information that is useful to the citizen, serves as an 'information hub', and allows the user to interface with the various service providers. This tool, being essential for structuring, interconnecting and amplifying the effectiveness of different technologies, consists in the Local App. It is a free downloadable application, which represents the perfect means to get in touch with everything available in the Smart District.

11.2   Information from the APP

The App is a service that displays information at different levels for the district resident: from the urban level to the interpersonal level.

For the citizen, the App is the tool that will provide information on events, city issues, traffic or weather conditions; it will allow receiving, through proximity sensors, special offers from the shops in the area where it is located; it will enable people to benefit from smart mobility (car and bike sharing) and food delivery; it will give the citizen the possibility to control his/her home, managing consumptions by turning on or off home appliances and home services.

The App will be an open system in continuous evolution. In the future, it will incorporate the management of new technologies that will be well established, thus becoming a commonly used tool. Its use will allow a customization of the offer and a 'dialogue' between citizen, public administration (PA) and private operators, a sort of panel that will be able to increase progressively, thus enriching itself even with subjects or other urban scenarios that today are unknown.

11.3   Big Data

A technologically advanced and interconnected system such as the Smart City generates Big Data, a large set of data and indicators that are fundamental to managing services and consumption by private operators, and to a timely and continuous programming by the Public Administration. Again, the App will be the tool that enables the investor to manage, plan, and take advantage of all the externalities of the new smart urban context, as well as provide public services for citizens, which services will improve the relationship between the citizen and the urban environment or the administrations (collection of local taxes and the payment of utilities with the use of the application, information on important events, real-time information for citizens, supervision of school activities, etc.).

This creates a scalable, sustainable business model, thanks to Big Data development and to the generated transaction fees. Therefore, it is an economically viable, strategic tool for all stakeholders involved. It is also completely functional to the full development of the Smart City and of the services that are naturally generated and amplified, having the territory as a support and feeding source.
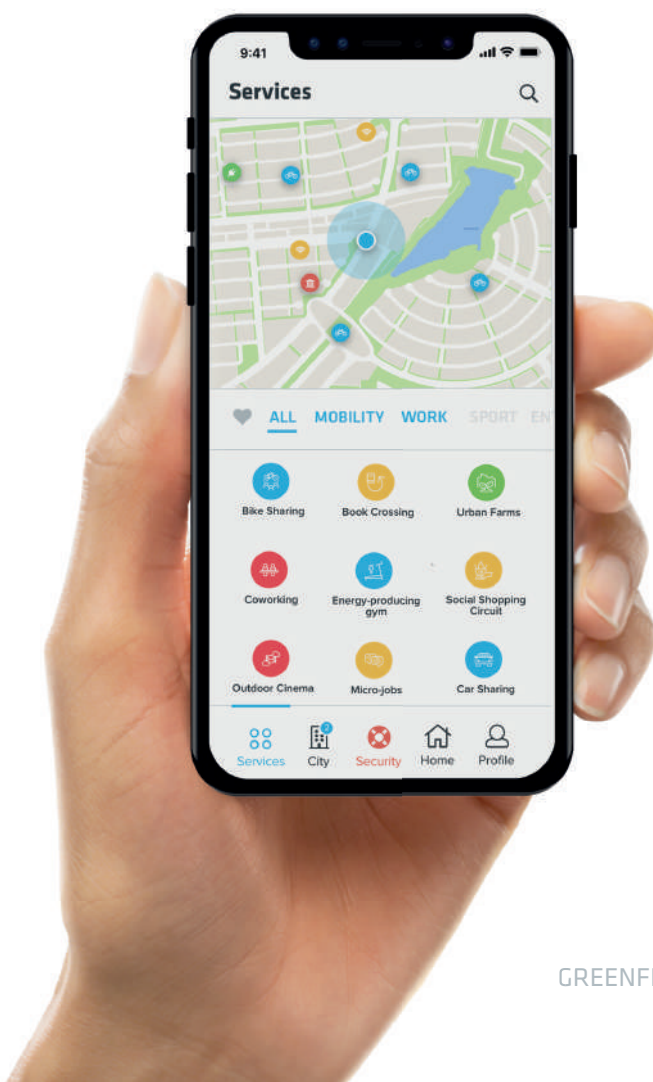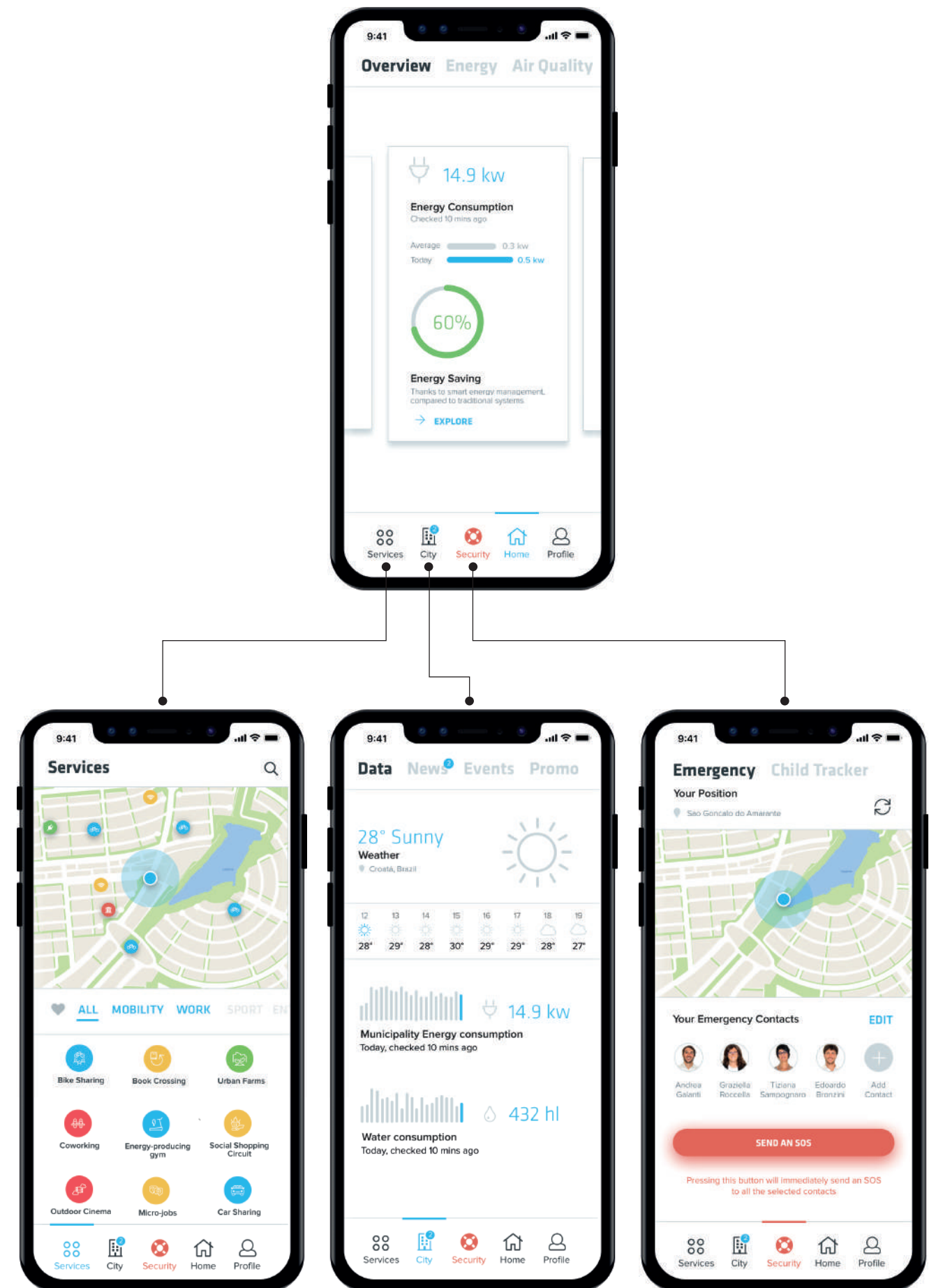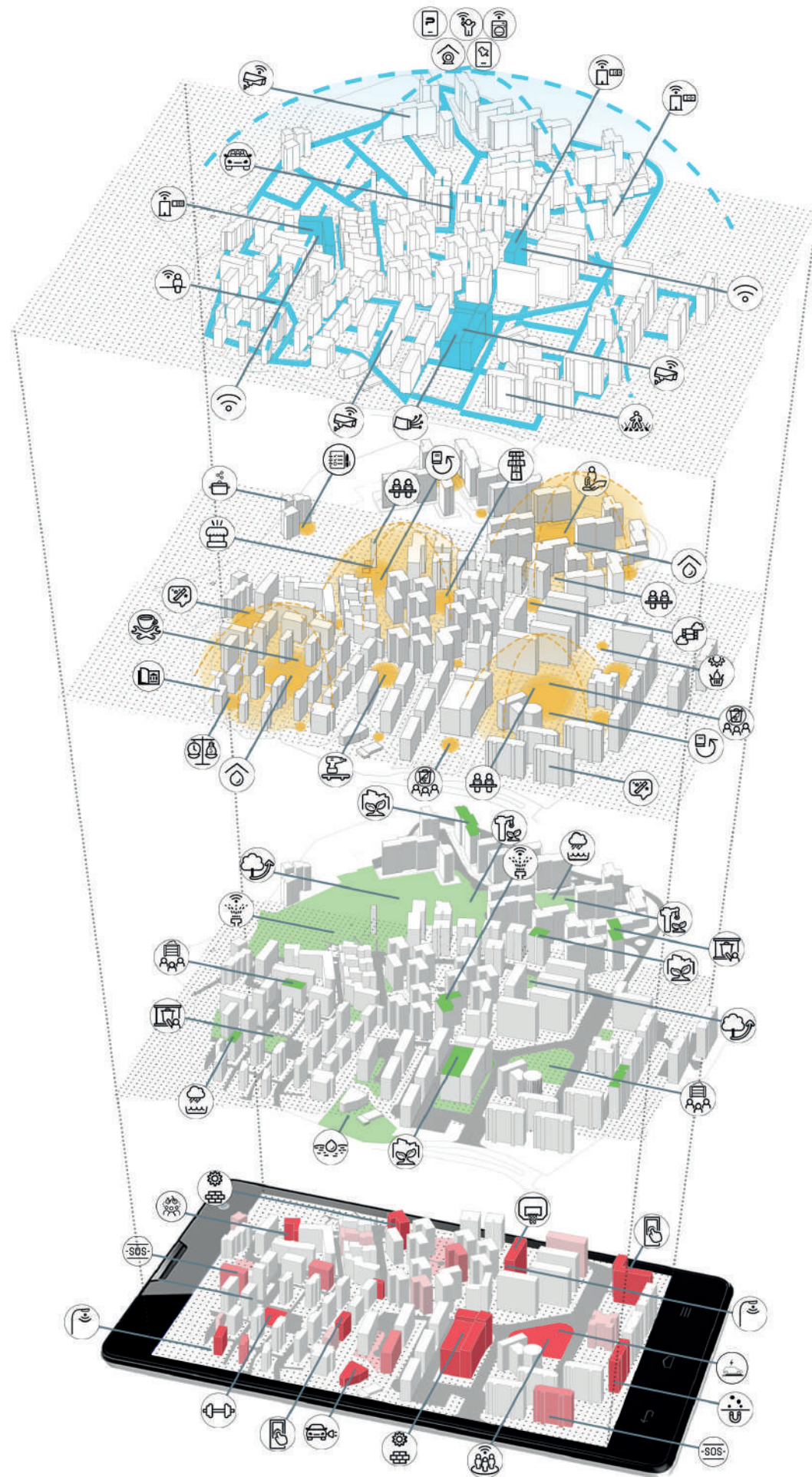
12

Social Smart City Matrix

12.1 What is this tool used for?

Planet Idea has developed the Social Smart City Matrix evaluation tool to quantify the degree of smartness of the project before and after Planet's intervention. SSCM can be considered as a guide and a means of dialog between Planet and the customer to converge towards the pre-set smart goals, but also as an instrument to validate the investor's involvement in acting towards the smart city.

The SSCM tool, developed by Planet Idea in collaboration with RECS Architects and Arup Italia, is able to guide the key players in balancing social and technological choices, avoiding the 'technocratization' of projects and enhancing the social component.

The Social Smart City Matrix is able to create a final evaluation sheet that summarizes the involvement in the project in the four intervention areas identified by Planet.
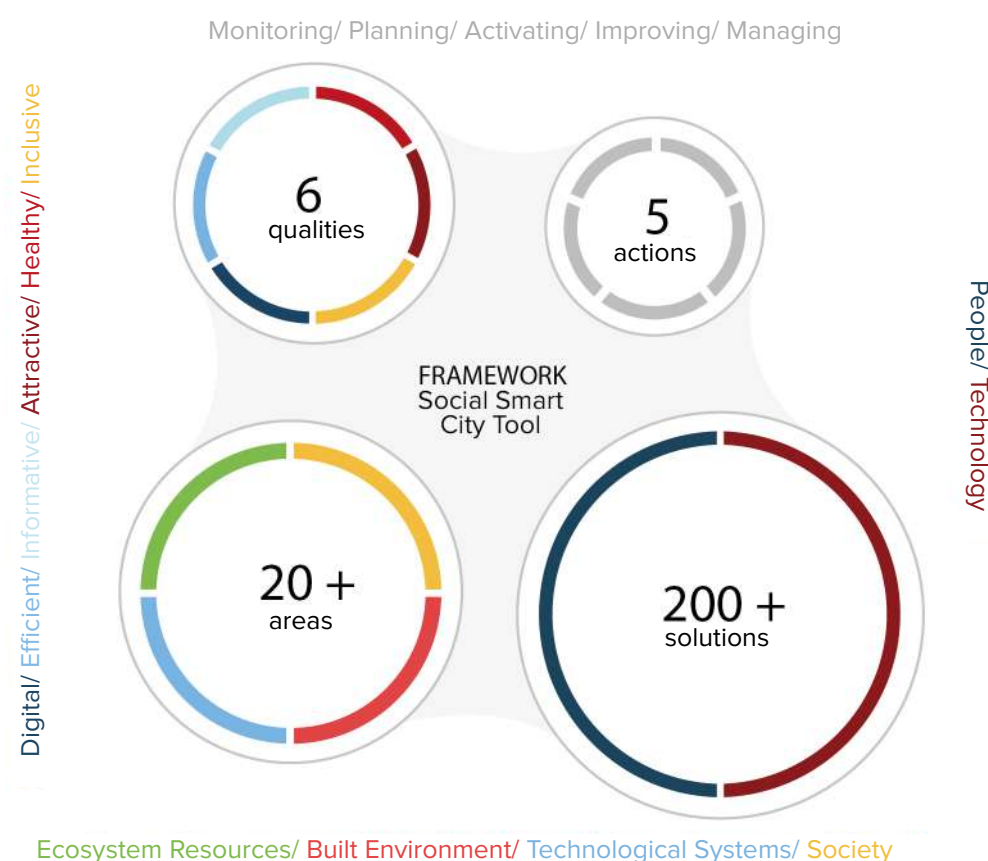
12.2 How the tool works

The project evaluation starts with the selection of the work to be done. The options are: planning, activating, managing, monitoring, or updating a project. Following this choice, which can also be multiple, the solutions/products that will be applied to each area (today more than 200 but potentially expandable) will be reported so as to find the percentage of incidence for each city quality.

The smart city qualities are: attractive, healthy, digital, informative, efficient and inclusive. The qualities are the items for which the project receives the evaluation.

12.3 Certificate of smartness

At the end of the evaluation, Planet will produce a certificate of smartness with a numerical evaluation expressed on a scale from 0 to 5.
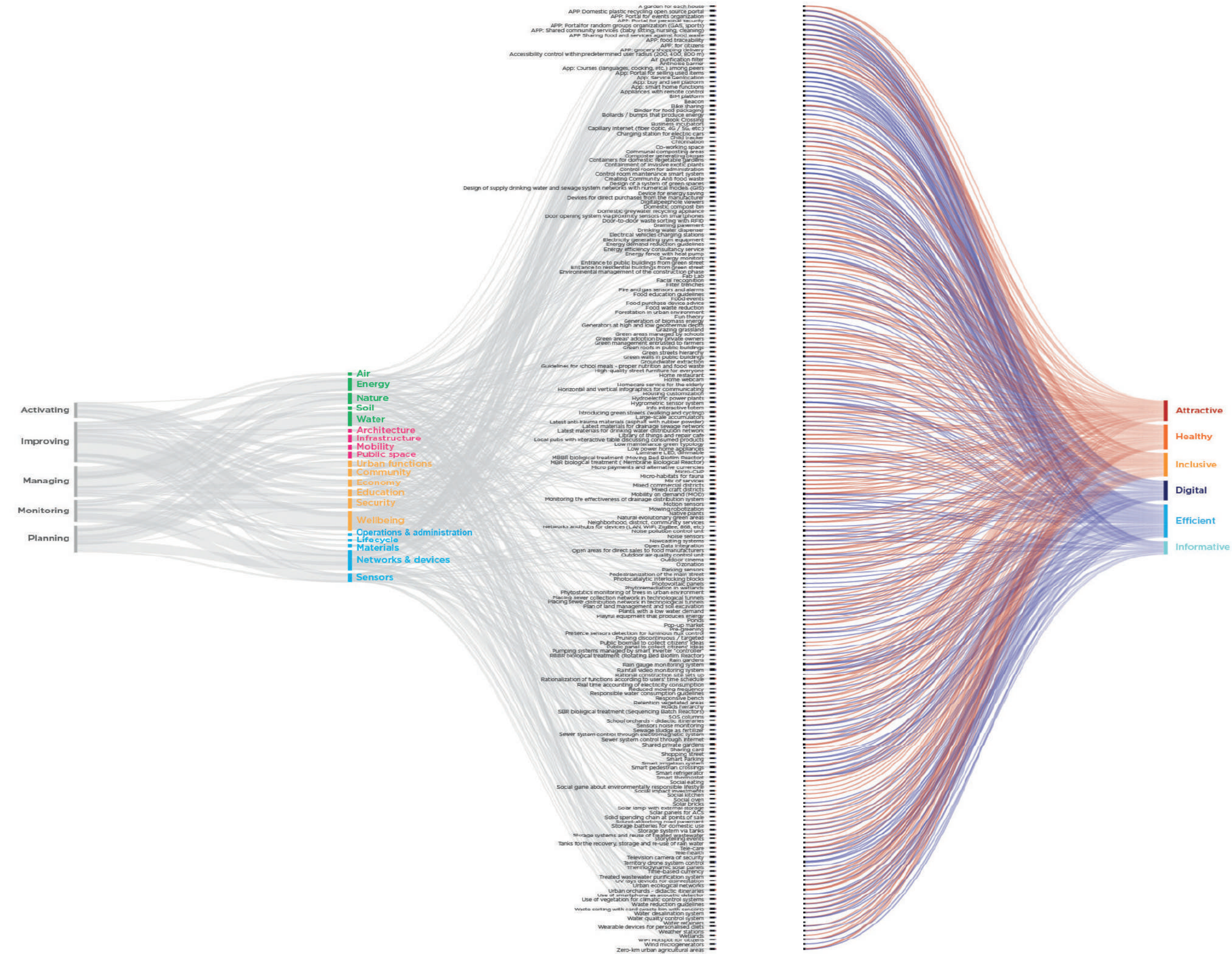
The image chosen for the evaluation certificate brings to mind the DNA helices, in the intention of evoking the necessary synergy between the intrinsic features of the smart city. The evaluation is structured according to the six qualities above.

Each quality has a different score obtained from the number of relevant solutions adopted. The set of scores originates the final result of the assessment.

Planet Idea applies the SSCM evaluation tool to projects in order to quantify the smartization process and give value to the innovation involvement shown by real estate investors. In this way, the smart district has the opportunity to estimate its features and keep the economic value constant in time, thus guaranteeing the investment for the real estate developer.

Monitoring/ Planning/ Activating/ Improving/ Managing

Digital/ Efficient/ Informative/ Attractive/ Healthy/ Inclusive

People/ Technology

6 qualities

5 actions

FRAMEWORK
Social Smart
City Tool

20 + areas

200 + solutions

Ecosystem Resources/ Built Environment/ Technological Systems/ Society

Certificate of Compliance
Development: Smart City Laguna
Date, Place: Croatá

People   Technology
Attractive   3   2   Digital
Healthy   3   3   Efficient
Inclusive   2   2   Informative

3
Final evaluation

Activating
Improving
Managing
Monitoring
Planning

Air
Energy
Nature
Soil
Water
Architecture
Infrastructure
Mobility
Public space
Urban functions
Community
Economy
Education
Security
Wellbeing
Operations & administration
Lifecycle
Materials
Networks & devices
Sensors

Attractive
Healthy
Inclusive
Digital
Efficient
Informative

13 Smart solutions and business models

13.1 Investment for the smart district

Within its market research activity, Planet Idea has selected and ranked more than 200 'smart' solutions divided into 4 macro-areas of expertise (Ecosystem Resources, Built Environment, Society, Technological systems).

As part of this sorting process, Planet has pointed out that the same solutions can be reordered according to the different business models that underlie them when offered on the market by each supplier.

The evidence of this work shows, as seen in the table, that the implementation of smart solutions may have a near-zero cost for the real estate developer as for the first six categories (provider, advertiser, …). This is because the same supplier companies are the subjects that bear the costs, against the exclusive delivery of their services in the future (e.g. smart counters, car sharing services, bike sharing, free Wi-Fi supply), all solutions having an installation cost compensated with the service delivery revenues paid by the end customer.

From the integration of the Planet's App to the next columns, the solutions were rearranged according to the impact level on the real estate developer's income statement.

In conclusion, making smart an urban complex thanks to the integrated design of Planet Idea has a minimal impact on construction costs. The percentages may be from 0 up to 8-10% of the total cost of the intervention. This wide range depends on the type of solutions that will be adopted and on the applied business model.

Designing and building a smart district has reduced additional costs compared to a traditional district and offers several advantages such as improving the citizens' quality of life and the value integration for real estate transactions.

13.2 Business models

/ *Provider:* Products provided by companies delivering an exclusive service that will be paid by the end user (examples: energy, connectivity, mobility)

/ *Corporate rates:* real services made available to the citizen on easy terms thanks to the agreement between the developer and the supplier/manufacturer (e.g. gyms, soccer schools, co-working services)

/ *Advertiser:* Products having a cost (even high) backed by an advertising company that sells space to its advertisers

/ *Customers:* services and products that can be optionally purchased by the end user

/ *Intellectual software:* best practices and social innovation projects that improve the quality of life in the smart district

/ *Circular economy solutions:* economic systems that regenerate, transforming waste into profitable commodities

/ *Digital services:* District app that integrates data from hardware and software solutions and makes them available to the citizen (for example: individual smart metering thanks to electronic counters, food sharing, car sharing, car pooling, exchange of small tasks)

/ *Purchasing Solutions:* Products and services for which the cost is at the expense of the buyer (e.g. video surveillance system)

Cost distribution based on business models
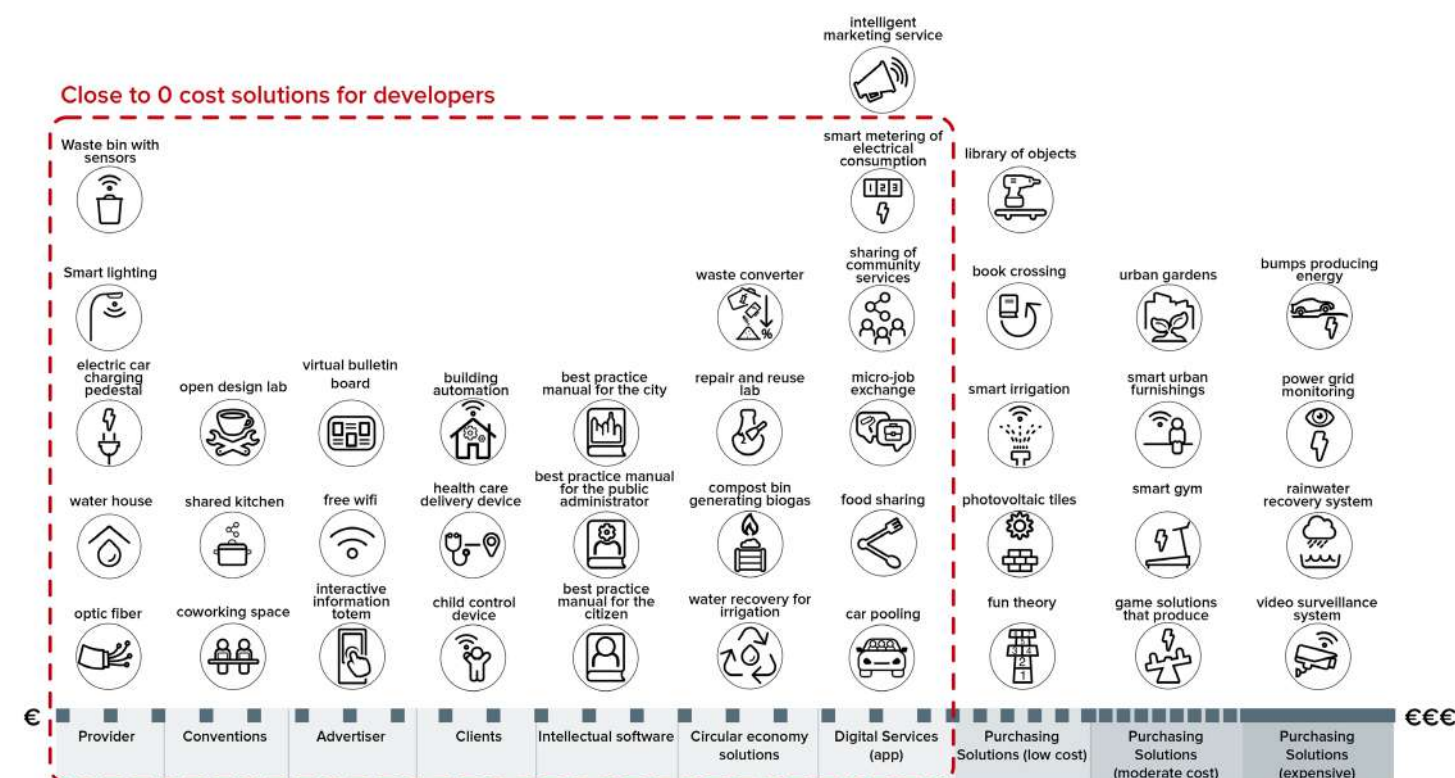
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