4D Cities
Health Innovation as a growth driver

4D Cities Baseline Study

Economic growth through local health & innovation strategies

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European Union
European Regional Development Fund

Connecting cities
Building successes

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INTRODUCTION

Health care has a high value, not only as key input for a healthy work force and a high living quality for our citizens, but also as driver of economic growth. A global analysis of what makes urban dynamics work show a strong positive correlation (87%) between intellectual capital and innovation on the one side, and health, safety and security on the other side[1]. The benefit in embracing innovation in the health care sector at local level is manifold:

- ◊ As driver for enhancing social and technological innovation in the area, as many bio-clusters, bio-valleys and similar territorial innovation strategies already showcase at global level, triggering innovation demand at all levels (product, process, service and business models);
- ◊ It is an employment hub for skilled workers who can embrace a wide range of creativity and innovation opportunities, in-house as well as in cooperation with companies, citizens and NGOs;
- ◊ Healthier living and working conditions enhance local productivity, attract new enterprises;
- ◊ Healthier ageing is increasingly recognized as income source rather than expense (among others, as it should be compared to expenses and problems linked to non-healthy ageing threats, such as undertreated dementia).

Through local leadership, governments can play a significant role in creating the preconditions for economic growth, the health sector being an intensively knowledge-based sector. This is the starting point for the 4D Cities project's contribution to URBACT's thematic priority 'Cities, engines of growth and jobs'. Ideas and innovative ways in delivering healthcare services can be shared more effectively. In addition, by innovating in our healthcare sector, territorial leaders can provide better value to their citizens and territories.

A wide range of strategic opportunities have already presented to those cities that recognized the economic power of the health sector rather than glancing passively at an increase of expenses. Only in Germany, the health sector and its related businesses (such as sport facilities, functional food or tenant services for senior residents) accounts for 16% of its GDP[2]. Local strategies supporting the creation and establishment of innovative health projects and integrated care processes are required, not only for and by local residents, but also as regards the attraction and retention of external talent and businesses.

[1] PWC, 2011. Cities of Opportunity 2011.
[2] German Economy Ministry BMWi, 2011. Innovation impulses from healthcare economy.

The current economic crisis is putting an important pressure on the sustainability of the healthcare sector in many countries in the EU, both for governments and for companies. However, the point of trying to increase efficiency in the health sector given the scenario of economic pitfalls is to maximise outcomes for a given level of public resources devoted to health care and to identify innovative business models. It is hence an opportunity for those products and services which increase the efficiency. As the Economist's recent report states[3], '*The overriding concern of Europe's healthcare sector is to find ways to balance budgets and restrain spending'*. With a projected 45% increase in the number of people aged 65 and over in the next 20 years, financing rising healthcare costs and access to a dignified and independent life for the aging population will be central to the political debate.

Cities, health and innovation

Any City cares for the provision of strategies towards healthier living conditions at urban level as well as the reduction of health inequalities. A vast number of urban networks and associations (such as the WHO's European Healthy Cities Network or the Green Cities Europe Network) cover this common aim and share best practices. URBACT's project 'Building Healthy Communities' has assessed methodologies to evaluate health components and impact in urban regeneration projects. The European Regional and Local Health Authorities Network's (EUREGHA) main concern is to empower the regional and local health authority level to receive the best information required for the policy development in the health matters that are within the remit of their competence.

A healthy workforce is another goal for any territory, as many studies have proven that for every Euro spent on medical prevention and treatment medical and absenteeism costs fall by about 2-3 times[4].

At public management level, in many EU countries local governments are co-owners and co-managers of healthcare facilities and services as well as key promoters of innovation strategies. In such role, many local governments are facing regularly decisions related to health and innovation, including the procurement of new diagnostic equipment or the construction of new nursing homes.

Additionally, in those territories where Innovation and/or Business stakeholders related to the health sector have settled, local networks and projects have emerged with the aim to render economic growth at local level, such as Bio-

[3] Economist Intelligence Unit, 2012. The future of healthcare in Europe.
[4] Harvard Business Review, January 2011

incubators and technology transfer networks linked to teaching hospitals and biomedicine faculties; Bio-fairs and brokerage events (held on a regular basis); Biomedical clusters and Living Labs; Health science cities and Health Innovation Hubs; Special facilities such as Simulation or Design centers.

The healthcare sector constituting one of the most significant sectors in the EU economy, its high employment potential and its purchasing power are further aspects attractive to any city striving for economic growth.

Potential economic restrictions or lack of investments in the sector raise concerns over the quality of care and the impacts on patients. Given such shortfalls, the EU Conference 'Innovation in healthcare 2011' identified in its report a need to 'improve the system at all levels via a multi-stakeholder approach with active participation, e.g. of patients[5]. This is where 4D Cities provides added value.

Aims and added value of the 4D Cities network

Innovation strategies in the health sector should not just be limited to input factors for a healthy workforce or a higher quality of life but also for new innovation and business opportunities at local and regional level.

Through 4D Cities, local practices and actions plans are put together in order to learn from each other in how far can cities promote those innovative health services and products that increase the competitiveness of their territories, benefiting not only from local stakeholders' knowledge but from the Cities' strategic role within the healthcare and innovation system. 4D Cities has a double scope: on the one hand, it has as mission to show the potential which local governments have in promoting the uptake of those innovation practices by the healthcare sector which foster employment and economic growth. On the other hand, 4D Cities will define methods and tools for local governments to better integrate EU policies on health and innovation through local action plans and enhance the competitiveness of the sector at local level, integrating all actors related to innovation, health and social care at local level.

At policy level, the current project throws a key challenge, as most EU policies related to health and innovation are not yet targeting the participation of local governments. 4D Cities wants to reverse this trend and wants to identify those local strategies that best match possible income sources for local governments, such as local taxation schemes or cost-effective integrated care schemes. Moreover, if innovation-based economies are to render more economic growth

[5] http://ec.europa.eu/research/health/pdf/healthcare-report-on-the-outcome-conference-2011_en.pdf

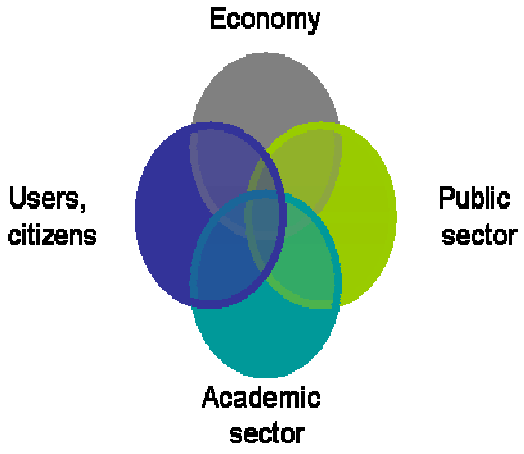
from a sector with (mostly) public coverage such as the health and social care, the institutional participation from local governments is indispensable. This is even more pressing as Europe is facing the challenge of an ageing society.

Common methodology

During the kick-off meeting (held in Igualada in June 2012), the five participating cities assessed their local economic and competitive development strategies with the aim to define a common methodology for the 4D Cities network, bearing in mind the variety of national and local realities and regulations, but also common interests and challenges. After reviewing some of the local interests and challenges, such as the development of technologies to respond to the Ageing society or how to improve our city environment to increase innovative health services & economic growth, the five cities analysed a common vision, agreeing upon the following common objective:

Identify and showcase local health innovation strategies which promote economic growth for territories while enhancing the role of citizens as co-producers of their health.

All 4D Cities partners are aware of its role as crucial interface along the governance system levels (national, regional and local) as well as along the healthcare system value chain. Based on this crucial interface, the 4D Cities common methodology strives for the delivery of innovative health services and products for its citizens and patients, through the cooperation among R&D and Innovation actors, the business and entrepreneur sector and services, the healthcare sector (public and private, local and supra-local facilities) and representatives from social communities, embracing the **quadruple helix**' levels of interaction:



- ◊ Healthcare-related economy and services (high-tech companies, hospitals, social care, primary care, healthcare foundations and associations
- ◊ Innovation skills and regional smart specialization (Universities and academies, medical societies, incubators, etc.).
- ◊ Users (citizens, territories);
- ◊ Public governance.-

Based on this quadruple helix as initial innovation platform, 4D Cities will place cities in the centre of the quadruple helix, in order to become a unique platform to share experiences and know-how on how key drivers such as Innovation support instruments, regional and local networking as well as policies to retain talent and skills on health and innovation enhance economic growth at local level.

Such products and services shall render smart economic growth as well as a better quality of life to its territory and citizens (see Fig. 1).

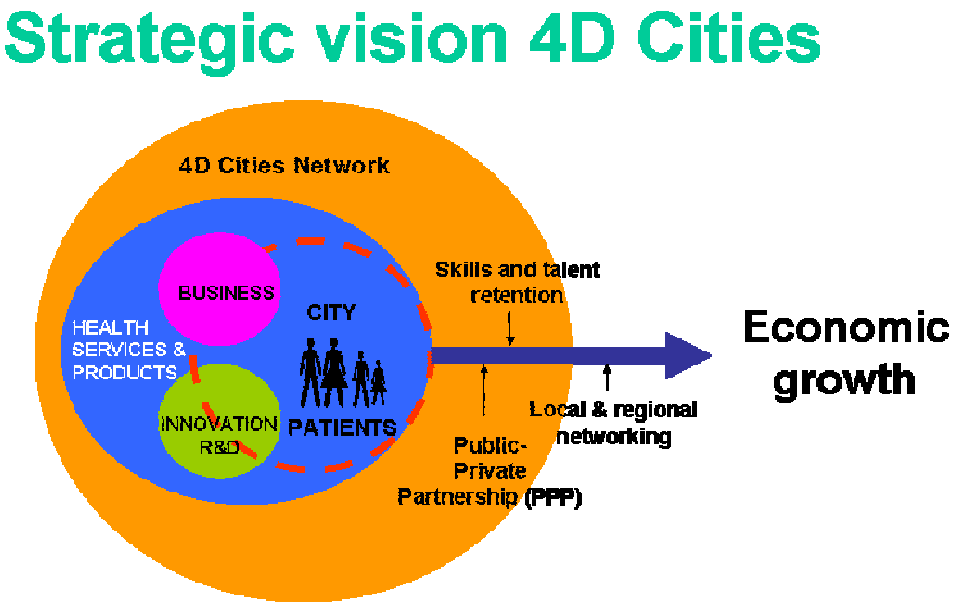
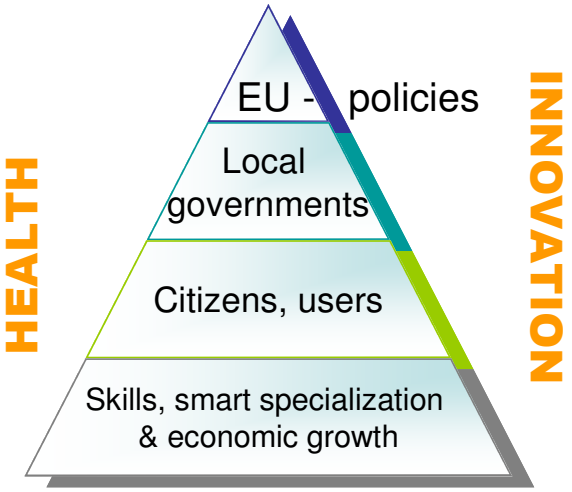


FIGURE 1: STRATEGIC VISION 4D CITIES (OWN SOURCE)

STATE OF THE ART

The State of the Art is structured in four sections:

- EU Policies on smart health;
- Local governments and health;
- Involving citizens as co-producers of their health;
- Skills, smart specialization and economic growth.



1. EU policies on smart health

High-quality health services are a priority issue for European citizens, companies and public administrations. All the systems and models are trying to balance limited resources with increasing quality objectives and various productivity factors that put pressure on the healthcare systems, including the following ones:

- Citizens' expectations for high-quality care,
- Demographic changes,
- Increased prevalence of chronic diseases & Ageing societies,
- Increased mobility of citizens and patients,
- Rising healthcare costs.

This Chapter describes key EU policies to foster the uptake of innovation policies in the public and private healthcare sector with a focus on its local impact and the role of local authorities. Yet, the globalization trend of the sector is an unstoppable trend.

The unique character of health care as a social and personal good reinforces the importance of the regulatory role in the health sector. New devices and new drugs have to undergo strict safety controls before entering the market. Each country has own procedures that review each of the applications according to specific examination processes. Its successful process leads to the authorization of marketing the product in line with the required prescription and use conditions.

Any device, including smart mobile applications, may require the authorization of the regulatory agencies before entering the market; medical web pages are subject to quality control standards and codes such as the HON Code. Some experts[6] warn that regulation can become an obstacle to innovation.

The product development lifecycle for pharmaceutical and other medical devices requires many quality and safety control steps, both in the United States through the FDA (see Figure 2) as well as in the EU.

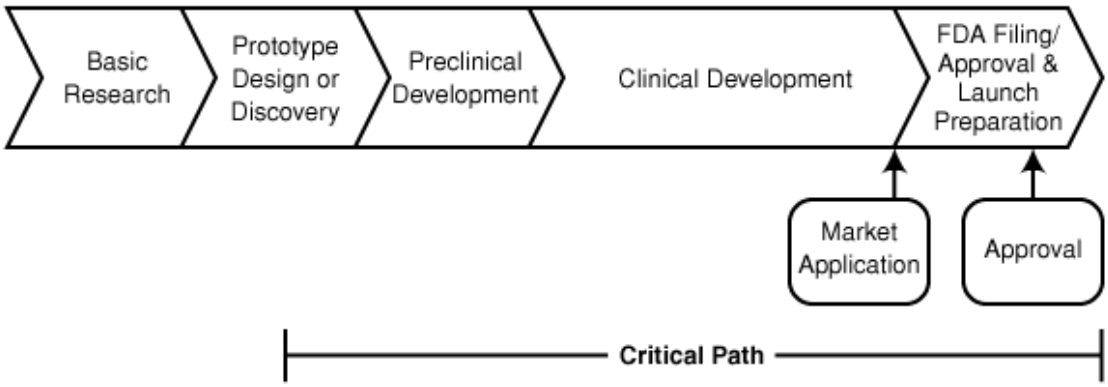


FIGURE 2: CRITICAL PATH FOR MEDICAL PRODUCT DEVELOPMENT
SOURCE: FDA, CHALLENGES AND OPPORTUNITIES REPORT, 2004

Due to the cost-intensive procedures, biomedical research has accommodated many new players globally, has distributed its knowledge-intensive resources widely, is awash in information, and has become increasingly costly to maintain[7]. In 2010, health spending in the EU as a share of GDP remained the highest in the Netherlands (12%), followed by France and Germany (11.6%), the cause being partly demographic but partly linked to innovations (source: OECD health data 2012).

[6] Regulating entrepreneurial behaviour in European health care systems / edited by Richard B. Saltman, Reinhard Busse, and Elias Mossialos, European Observatory on Health Care Systems series, 2002
[7] OECD Synthesis report, 2011. 'Biomedicine and Health innovation'

In health care, the ability to manage complex communications with partners, providers, members and customers while adhering to governmental regulations and policy guidelines—all with pinpoint accuracy and good speed—is critical to ongoing success and competitive advantage. It is at this crossroads where local governments can take up the lead and promote those health and innovation strategies which render a positive economic and social impact in their territories.

The following sections describe policy initiatives and strategies addressed to any innovation actor at EU level ready to promote health innovation, including local governments and public healthcare centres, while being aware of the regulatory obligations intrinsic to medical research and innovation.

1.1. 'Health for Growth' programme

As the EU stated in its recent proposal 'EU Health for Growth Programme (2014-2020)'[8], a new programme is required to help EU countries respond effectively to economic and demographic challenges facing their health systems and enable their citizens to stay healthy for longer. Its general objectives are to '*work with the Member States to encourage innovation in healthcare and increase the sustainability of health systems, to improve the health of the EU citizens and protect them from cross-border health threats'*. This way, the EU recognizes the need for a specific growth programme on health as well as the relevance of innovation support policies to such aim. The **Health for Growth Programme** aims to support and complement the work of Member States to achieve the following four objectives:

- Developing innovative and sustainable health systems;
- Increasing access to better and safer health care for citizens;
- Promoting health and preventing disease; and
- Protecting citizens from cross-border health threats.

1.2 EIP on Active and Healthy Ageing (EIP-AHA)

The European Innovation Partnership (EIP) on Active and Healthy Ageing, a pilot project under Europe 2020 flagship initiative Innovation Union[9], aims at enhancing competitiveness in the EU and tackling societal challenges by fostering innovation and research. The 'Active and Health Ageing Partnership' recognises Ageing as an innovation opportunity and it targets three major areas:

[8] EC 2012, http://ec.europa.eu/health/programme/docs/prop_prog2014_en.pdf
[9] http://ec.europa.eu/active-healthy-ageing

- ◊ Addressing major age-prevalent chronic diseases;
- ◊ Innovation in integrated care delivery systems;
- ◊ Innovation in independent living and social inclusion.

Participation in its Strategic implementation plan (Figure 3) can occur via four different ways: Invitation for Commitment, Invitation for Expression of Intent for candidate Reference Site, Marketplace for innovative ideas and Innovation support. One of the seven flagships of the Europe 2020 Strategy is the **Digital Agenda for Europe**.

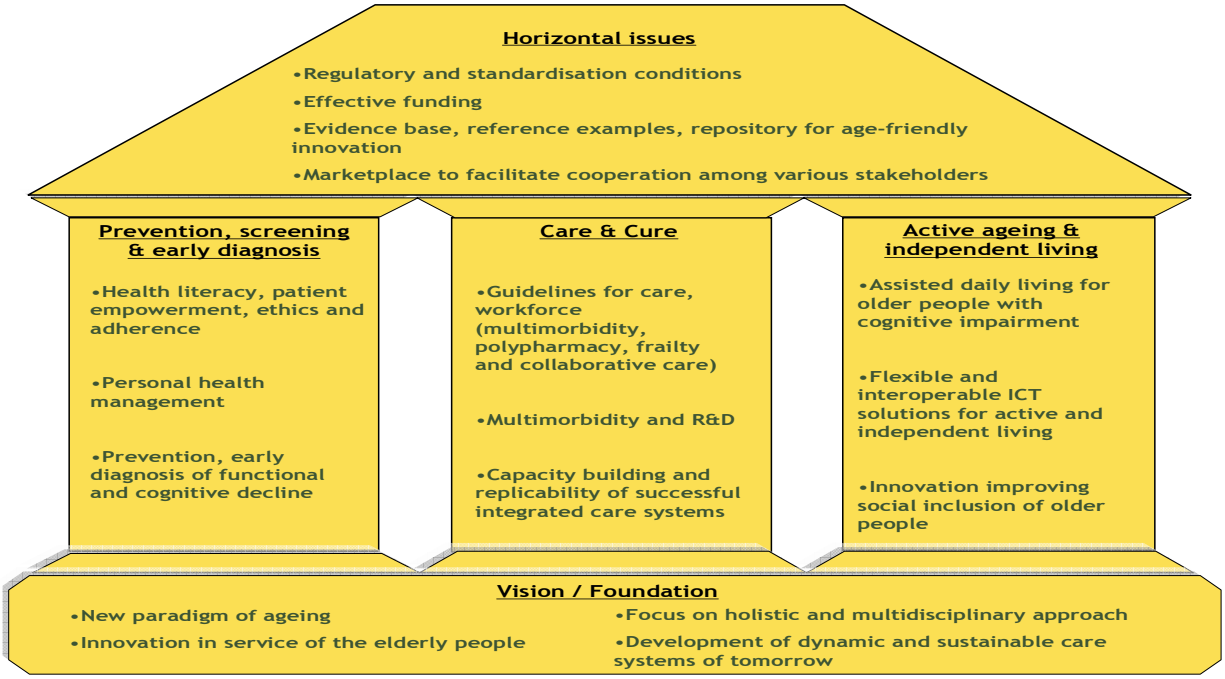


FIGURE 3: STRATEGIC FRAMEWORK OF THE EIP ON AHA
SOURCE: WWW.ECHALLIANCE.COM (2012)

Various local and regional governments are already participating in the various vertical and horizontal strands of EIP-AHA.

1.3 Redesigning e-health in Europe for 2020

e-Health holds the potential to enhance quality of health care and to support patient-centered healthcare to the benefit of European citizens and economies. National e-health governance and service structures are another catalyst for innovation, as they offer attractive business opportunities to the IT service sector, share infrastructures, and facilitate access to validated information for patients. Many countries have established advisory bodies involving e.g. professional associations, patient representatives, third party payers or care

providers in their e-governance structures for the e-health strategy deployment[10].

At the 10th High Level e-Health Conference (Copenhagen, May 2012), whose theme was *'Smart Health - Better Lives', the Task Force presented their report 'Redesigning health in Europe for 2020'*[11]. The report states that *'Europeans find themselves today on the threshold of a new era with many opportunities for radical improvements in the way healthcare is managed and received. In order to ensure the sustainability of European health care systems, there is a need to tackle considerable challenges'*

Through the provision of e-health within their territories, local authorities embrace an opportunity to increase health literacy, prevent unnecessary visits, and foster health prevention in a cost-effective way, among other benefits.

1.4 Other R&D trends at EU level

The Ageing society is a prime driver of innovation, especially as regards the following trends:

Innovative services

- **Telemedicine** and new e-health applications and services. The successful development of **tele-health services** necessitates a high level of trust among clinicians, health care and support practitioners, service users and caregivers (such as the Dreaming tele-assistance[12] project). This is the origin for the first draft of the *European Code of Practice for Telehealth Services*[13].
- **Co-morbidities**: detection, holistic treatment.
- **Business and growth opportunities** for pharmaceutical, medical devices and products sectors.

Patient empowerment:

- **E-health** services and platforms, such as the personal health record**.**
- **Learning** and communication platforms.

[10] http://www.ehealth-strategies.eu/report/eHealth_Strategies_Final_Report_Web.pdf
[11] http://ec.europa.eu/information_society/activities/health/policy/ehtask_force
[12] http://www.dreaming-project.org/
[13] http://www.scribd.com/doc/91202674/Telescope-Code-Draft-Apr-2012

- **Open data:** access for patients to data such as clinical trial results and evaluations.
- **New devices and application**, such as 'mhealth' (mobile health) applications, applicable for prevention, treatment and diagnosis.

Personalised medicine, new screening and therapy methods:

- **Novel treatments**. Innovation in material sciences, genetics, bio-technology,
- Innovative drugs (supported among others by the IMI (www.imi.europa.eu) platform
- Treatments and drugs for **rare and orphan diseases** (coordinated by ORPHANET consortium www.orpha.net)..
- **Expansion of innovative treatments** (novel medical interventions) enhance match of demand and supply, off-label and off-patent uses.

Global emerging health threats & patient safety:

- **Vaccines** and bio-similars.
- **Infectious diseases**.
- **Biobanks and open data**.

Virtual physiological human:

- **Human enhancement technologies.**
- **Modelling & simulating**

2. Local governments and health

Fostering a culture of innovation in current healthcare systems can create cost-efficient solutions that promote economic growth for European municipalities. This section of the State of the art describes examples and tools at local level to promote smart specialization strategies by and for our citizens, **based on networking at local level among citizens, cities, regions and stakeholders**. Local governments are relevant innovation actors as they are also a model to their citizens and established enterprises and organizations. In its assessment on innovation in cities[14], EUROCITIES distinguishes three different types of innovation at municipal level:

- ◊ 'Market innovation' refers to the development of products and services to improve economic performance – be it productivity, profit, employment or GDP growth;
- ◊ Public innovation, comprising public sector efficiency and cost effectiveness;
- ◊ Social innovation, understood as the development and implementation of new ideas to meet social needs.

[14] EUROCITIES, 2010. Cities and Innovation in Europe. Discussion Paper.

2.1. Tax-based revenue schemes

It would reach beyond the purpose of the current state of the art to describe in detail existing healthcare systems with its specific costing policies and reimbursement ratios (such as Diagnostic Related Groups - DRG), ownership provisions and liabilities, among others. Overall, the role of local administrations in EU healthcare systems varies quite significantly: in many EU countries, local administrations co-own health facilities, offering the required liability to employment and works provisions at local level[15]. Regional or local taxes are the main source of revenue for health care in Bulgaria, Denmark, Finland, Norway, Sweden, Spain and Italy[16]. In those EU countries in which taxes for health and social care spending are managed directly by municipalities or via local trusts (such as England or Finland), local authorities can more easily increase revenues by means of personal income taxation.

Recently, however, the discussion has evolved from questions about capital ownership of provider institutions into a more pragmatic consideration of what model can best meet the day-to-day healthcare needs of the citizenry while promoting economic growth at local level. Non-tax revenue strategies such as pay for lease schemes or public-private partnerships (PPP) are other tools to increase the revenues at local level.

2.2. Public-private partnerships (PPP)

A number of non-tax revenue schemes, mainly through PPPs, are evolving as potential innovation and revenue source for cities in the healthcare sector at global level, ranging from the co-ownership in companies and facilities, through seeking capital risk and foreign investment. Local governments are taking benefit from its regional specialization efforts and needs, to support capital attraction projects. Various regions and cities work already work on enhancing the local tax levied on economic activity through capitalizing such local knowledge; examples are the 'Health Capital' region of Berlin-Brandenburg (www.healthcapital.de) or the City of Leeds' 'Innovation Capital Programme' (see Partner Profile).

The challenge for the 4D Cities project is to validate local strategies that best match possible income sources for local governments within their national health system needs and challenges, based on a consensus among public stakeholders from those territorial levels involved in the healthcare services of their territories.

[15] Dormont & Milcent, 2012. Ownership and Hospital Productivity.
[16] Council of Europe, 2010. The Impact of the Economic Downturn on Local Government in Europe.

2.3. Hospitals and local authorities

Many players at local level can be mobilised towards promoting economic growth at local level through health innovation. The WHO's study 'Investing in Hospitals of the future'[17] recognises the relevant role of hospitals as innovation poles and the role of local and regional authorities in supporting such innovation strategies. The study identifies the need to invest into health workforce, enhance the interconnection of hospitals and better interaction with patients. To illustrate this linkage, the Swedish consultancy PIEP has developed an innovation process which starts from assessing the healthcare centre's daily processes (Fig. 4), reaching out to the municipality and the county administrations.

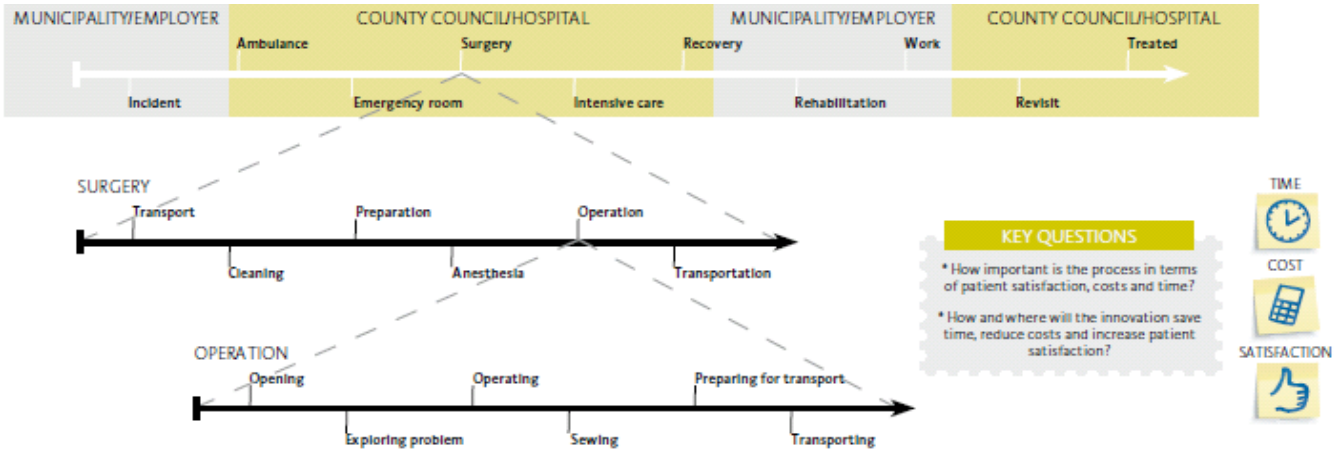


FIGURE 4: INNOVATION PROCESS PLANNING IN HOSPITALS
(SOURCE: WWW.PIEP.SE)

2.4. Innovative procurement

Once a local competitiveness strategy on health is set up, one important instrument for fostering innovation is innovative procurement. The procurement market can reach approximately 15% of EU's GDP and account up to 20% of developing countries' GDP[18]. Such considerable percentage determines a strong purchasing power that can be driven towards innovation and the creation of value[19].

[17] www.euro.who.int/document/e92354.pdf
[18] Racca, G., 2011. The challenges of collaborative procurement in the healthcare sector. World Hospitals and Health Services Vol. 47
[19] Figueras, J. Et al (Ed), 2006. Purchasing to improve Health Systems performance. WHO. http://www.euro.who.int/__data/assets/pdf_file/0004/98428/E86300.pdf

A recent example of a municipal tendering process which included a wide participation of stakeholders is London's collaborative procurement methodology, tried out for antiretroviral drug treatment[20]: as part of the Quality Innovation Productivity and Prevention agenda, HIV clinicians, commissioners and patient representatives reviewed the submitted tenders in the context of evidence and existing treatment guidelines, taking account of toxicity, tolerability and convenience. The tender resulted in guidelines for use of preferred antiretroviral drugs that deliver considerable cost reduction without negatively impacting on the likely efficacy or tolerability of treatment, as long as the guidelines were followed. For many patients, the newer guidelines represented potential improvements over their previous care, often with reduced pill burden.

Various methods such as joint procurement among various local hospitals, mini-Health Technology Assessments (mini-HTA) and similar procedures are already amply used to this aim throughout Europe.

2.5. Clusters and research infrastructures

The general goal of any cluster is to create a competitive strategy at regional level, based on Michael Porter's theorem of economies of scale and competitiveness, such as the case of the Medicon cluster which links Southern Sweden and East Danish regions (www.mva.org) or the ScanBalt Health region. In such biomedical clusters, research facilities and innovation services are aggregated, improving its economies of scale. Many companies also settle in such spaces, since they find the necessary innovation environment that promotes creativity and growth. The URBACT project REDIS has elaborated on this tendency of creating knowledge hubs at city level. This is how biovalleys are emerging throughout Europe: by now, there are more than 60 bioincubators and biovalleys distributed in Europe[21], coordinated at EU level through networks such as ESFRI. An example are the clusters developed in the framework of the EU project 'Renewing Health', including a cluster on Short-term follow up after hospital discharge in COPD[22].Various cities participating in the 4D Cities project already account for a health and/or biomedical cluster in their area or collaborate with a cluster nearby.

[20] Foreman, C. et al. 2012. Sex Transm Infect. March; 88(2): 112–115.
[21] European catalogue of incubators and biovalleys, 2012. www.smesgolifesciencesorg
[22] http://www.renewinghealth.eu/cluster-4

3. Involving citizens as co-producers of their health

Social innovation improves the quality of life and the performance of society. The health sector having a high social impact, the early and continuous involvement of citizens and patients in the development process of many of the health innovations has proven to be of benefit to all actors (business, public sector and academic sector). Local authorities can play a major role in bringing together citizens' representatives and making them participative of local health innovation strategies.

3.1. Social innovation

Social innovation in health systems is a groundbreaking trend in this direction, making citizens co-producers of their health. To respond to this challenge, the EU has launched the Social Innovation Initiative (http://www.socialinnovationeurope.eu/) and offers research funds on social innovation in health. Various tools and methods exist to promote social innovation and participatory health care plans at City level, such as the following examples show:

- **Informal care** is a key tool cities can promote to solve current health threats such as alcoholism or mental illnesses. Examples include the *Expert Patient Programme* promoted by the UK NHS[23] or the Dutch 'Alzheimer Café', developed at City level that brings together business people, doctors, family caregivers and volunteers.
- **Volunteers** are another cornerstone of a municipal health prevention strategy, as Italian cities have recognized, many of them coordinating local volunteer networks (e.g. Torino project BenEssere).
- Another element which links up social innovation at community level with the business community are **Corporate Social Responsibility** (CSR) policies. Companies certified with CSR programmes should be promoted at City level, e.g. through the preparatory training for persons to be inserted into special employment programmes for disabled and or impaired people.
- **Mentoring**, linking 'PUNs' (Patient's Unmet Needs) with 'DENs' (Doctor's Educational Needs), offering upskilling and tracking the improvements.
- **Crowdfunding**, whereby private people invest into a project and in lieu of equity, funders get gifts, incentive deals, rewards and early access to products. There are not yet many examples of crowdfunding platforms promoted by Cities in European countries, as legal issues remain to be clarified, but this example from the US shows the potential: Health Rally, created by Zack Lynch, is developing a site where someone's friends and

[23] http://www.expertpatients.co.uk/

family can make contributions designed to motivate that person to make healthy changes in lifestyle (http://www.healthrally.com/).

◊ **User-led innovation**: Examples such as the Paris-based '*Pôle de compétitivité mondial des technologies innovantes pour la santé et les nouvelles thérapies'* (http://www.medicen.org/), show that the triple helix is moving towards the quadruple helix, a new tendency in the cluster development for health being the creation of disease-related clusters, more focused on the patient's needs and concerns than of eventual infrastructure and human capital assets in the territory.

Social innovation and community mobilization is a fundamental pillar for innovative health promotion and prevention, as various projects and networks at EU level[24], including the URBACT project A.G.E. The STEPS project aimed at assessing the impact of health research on civil society organisations (http://www.steps-ph.eu). Through the ERFD fund, various Local Action Plans have been funded, with a focus on social cohesion and access to health, and social innovation is also a special category of the Regiostars 2013.

O4O : Older People for Older People
independent living · active communities · flexible services

Cities in Scandinavia have fostered the creation of active communities where older people help each other to enhance active and healthy ageing ('O4O' project, www.o4os.eu).

Another example of citizens' empowerment is this application which gets teenagers moving. After teenagers download the Lekkerbek-app and play the game, the game data are automatically shared with an online high-score system. There, users can compare their scores and compete for awards.
http://www.youtube.com/watch?v=ZH3y3qjy-EI

The Dutch Ministry of Health, Welfare and Sport has launched this year the 'Social Innovation Prize', awarded to the most innovative executable plan on medical (technical) innovations involving the patient and the healthcare facility board (www.simsible.nl). In the 'Dementia Experience' people without dementia can experience how those with dementia perceive the world. This training instrument aimed at volunteer caregivers and care professionals has been developed by Tilburg University and several partners[25].

[24] http://www.eurocities-nlao.eu/ - http://urbact.eu/en/results/results/?resultid=23
[25] http://www.tilburguniversity.edu/topic/innovation/socialinnovation/

3.2. Open data

The development of 'open data platforms' in the biomedical sector constitutes a paradigm shift which is underway in most countries: informed and active citizens have a greater potential in tackling health-care challenges, enabling them to care for their own health status (see Figure 5).

2) 'Liberate the data'

Stakeholder group	Preconditions	Benefits
Citizens and patients	Ability to give informed consent for data collection and update their consent as and when desired.	Improved health, new products and services to match their needs and interests, health becomes more 'user' focused rather than technology focused, faster development of new drugs and treatments.
Regulators and policy makers	Require institutions within the health and care systems to publish their data, require data management tools to be integrated with provision of care services	Business opportunities (act as consultant for less eHealth thinking countries), greater trust in the healthcare system (reputation of health services based on quality not name), greater flexibility and options for decisions based on accurate data, transparency leading to better strategic planning and resource allocation.
Clinicians and care professionals	Health data collected needs to be robust, gathered in a standard way.	Standardised protocol to follow, access to better tools, better and more complete information from patients, simplification and standardisation of medical record systems, lower administrative burden on busy healthcare workers.
Payers and insurers	Have an interest in benchmarking, commitment to better value for moment for their clients and measuring return on investment.	Cost savings for healthcare, cost savings for employment, greater integration of health and care services, larger range of service providers.
Service providers and managers	Ensure health data is robust, gathered in a standard way, ensure data management tools are integrated with provision of care services.	More innovation, less monopoly, market and opportunity for increasing profits e.g. innovative apps and IT solutions, cost savings for employment, managers can focus on where improvements are needed and opportunities to deliver more efficiently
Researchers	Opportunities to access large databases, tools to analyse large data sets, ability to disseminate their research results with stakeholders.	Rich data flows – with proper protection – for research, analysis and policy making, increased availability of relevant data, innovation, faster development of new drugs and treatments through greater access to larget data sets from across Europe.

FIGURE 5: MAIN PRECONDITIONS AND BENEFITS FOR THE LEVERS. OF CHANGE
SOURCE: ANNEX OF TASK FORCE REPORT

Mass datasets have the potential to deepen our understanding of the biggest challenges, including health care. Through the policy initiative 'Redesigning e-Health', it is being proposed to focus on e-health and personalized care

strategies. Such integration of data facilitates access for researchers and developers of medical applications for smart phone. Semantic web applications for using data more effectively or the development of health applications based on the leverage of health data and processes are only two examples of potential innovations deriving from such strategies. An example of such innovation co-developed by a City is the '*Distretto2facile'* application, developed by the company Tonic Mind and co-developed by the City of Torino (Italy), allowing patients to find their way more easily to medical centres in the Torino area[26].

Mobile health ('mHealth') is another irreversible and incredibly fast-developing trend with lots of innovative business opportunities and models in place (see Fig. 6). A recent PwC survey found that 59% of the consumers who use some form of mobile health technology say it has replaced visits to doctors and nurses, although the report also states that doctors and healthcare centres are not that enthusiastic about such trend.

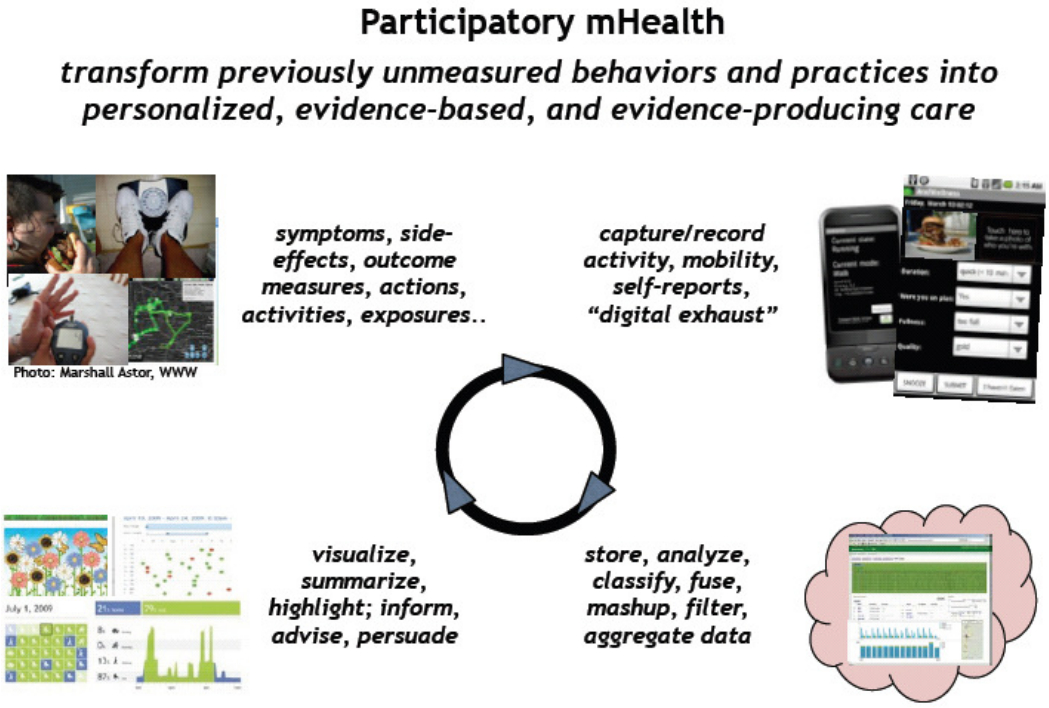


FIGURE 6: PARTICIPATORY MOBILE HEALTH
SOURCE: EMERGING MHEALTH: PATHS FOR GROWTH*, 2012*

All programmes involving citizens (patients, caregivers, friends, family, tutors, etc.) have a stronger impact if the necessary health skills, knows as health literacy, are present in our communities.

[26] http://www.tonicminds.com/it/asl/index.html

4. Smart specialization, skills and economic growth

The previous section includes case studies which require new skills and talent, both in the healthcare sector and at patient level. The relationship between higher educational attainment and living longer with improved health has been established in many countries. As the URBACT publication 'Cities and the crisis'[27] states, most European cities are 'trying to position themselves to grow and attract in as many knowledge-intensive and green "emerging" sectors as possible… …given the ageing of the EU population and growing expenditure on health care this has also included interest in medical and healthcare companies'. Policies and reflection processes such as the 'Cities of tomorrow' reflection process[28] underpin such focus: '*Innovation will have to be fostered to support a transition towards Cities of Tomorrow… they should be diverse, cohesive and attractive cities, they should be green and healthy, and they should be places for a resilient and inclusive economy'*.

4.1 Jobs Rich Recovery

Given the recent economic downturn, countries are looking for ways to improve the efficiency of health spending, which ground to a halt in OECD countries in 2010, accounting for 9.5% of GDP on average (OECD Health data 2012). The EU has adopted various strategies that aim at making a halt on job destruction and company decentralization towards non-EU countries. Job creation is one of the EU's most pressing concerns as unemployment continues rising. This scenario has motivated the EU Commission to define recommendations for its Member States for coordinated action on job creation, skills and employment policies[29]. Health is recognised in the Communication as one of the promising employment sectors, due to ageing population and an increasing demand in innovative services (i.e. higher quality requirements, rising demand for personalised care, and professional social services).

4.2 Skill development and talent retention

As it employs 1 in 10 of the most qualified workers in the EU, is highly labour intensive and one of the largest sectors in the EU, accounting for about 17 million or 8% of all jobs in the EU, despite the economic crisis the sector

[27] URBACT, 2010. 'URBACT Cities and the crisis: Impact and responses'.
[28] European Commission, DG Regio, 2011. Cities of Tomorrow - Challenges, visions, ways forward
[29] European Commission, COM(2012) 173 final

continues to grow and, with an ageing population and the rising demand for healthcare, will remain a key driver for jobs with an estimated 8 million job openings between 2010-2020. Notwithstanding this potential increase, the Commission also refers to the challenges in the sector, linked to a shortage of specialised professionals in many regions, an ageing workforce and, last but not least, the increasing demand for integrating modern technologies[30]. The OECD's Local Economic and Employment Development (LEED) programme has assessed in various territories the success of the local approach to economic development, identifying factors such as local production systems, social balance, development plans for skill creation and retention, and the achievement of a critical mass, among others. One of the areas with the biggest job potential for the future are health services.

4.3 Regional competitiveness and health

In 2009, DG Health & Consumers assessed the linkages between structural funds and health[31], making a distinction between three areas of investments:

- ◊ Direct health sector investment,
- ◊ Indirect health sector investment,
- ◊ Non-health sector investment with potential health gain (see Fig. 7), an area supported by almost all ERDF, CF and ESF investment funds.

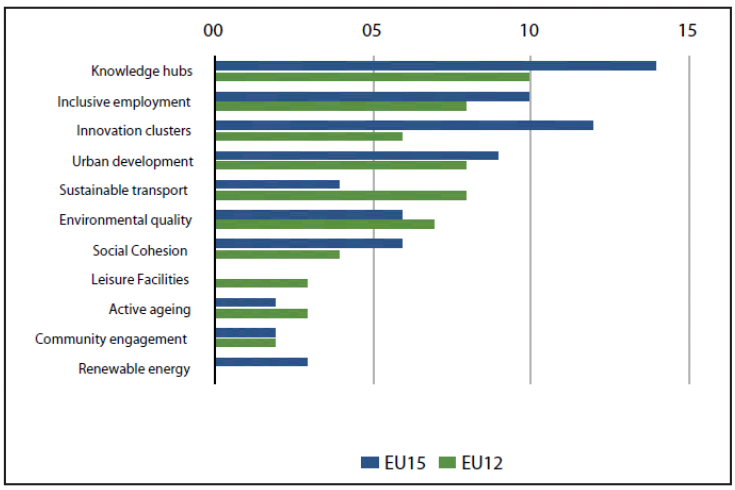


FIGURE 7: NON-HEALTH SECTOR INVESTMENT WITH POTENTIAL HEALTH GAINS
SOURCE: DG HEALTH & CONSUMERS, HEALTH AND STRUCT. FUNDS IN 2007-2013 (2009)

On 4-5th June 2012 a two day conference was held in Krakow as part of the third "Week of Innovation in Europe" (www.wire2012.eu). One of the main sessions concerned the role of cities as "innovation hubs". Innovation is given a central place in the EU 2020 strategy: two key strands are emerging which are

[30] UE.Action Plan for the *EU health workforce* - SWD(2012) 93 final
[31] http://ec.europa.eu/health/health_structural_funds/docs/watson_report.pdf

highly relevant for cities, the Horizon 2020 Framework Programme for Research and Innovation (including societal challenges) and, as second strand, the structural funds – offering support for regions in building up their research and innovation capacity through the Cohesion policy which will take forward the concept of **smart specialization** and include measures to allow researchers across Europe to grow into excellence.

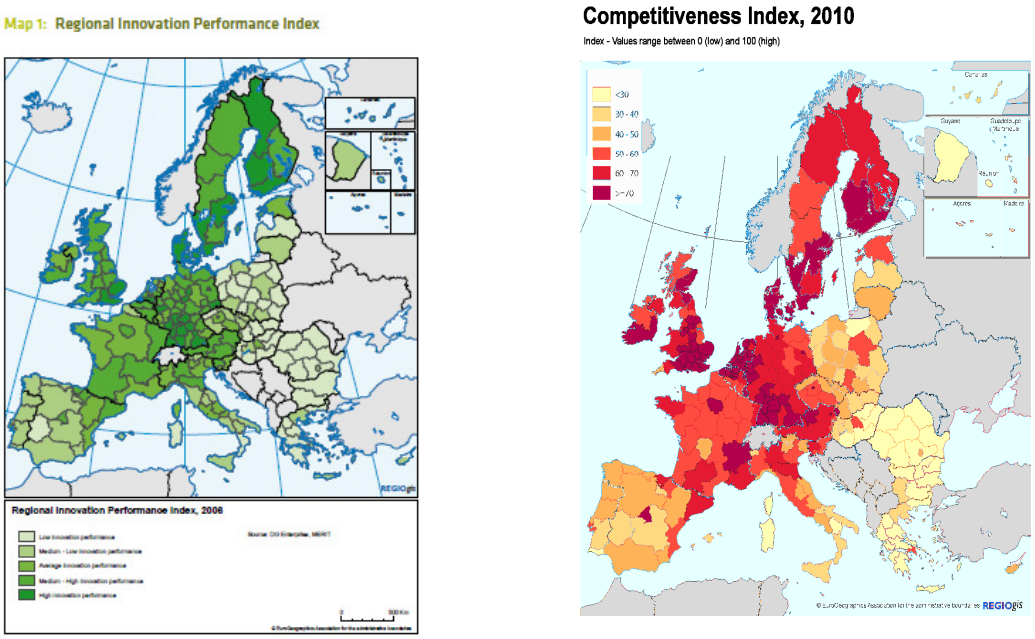


FIGURE 8A AND 8B: REGIONAL INNOVATION PERFORMANCE (2006) AND COMPETITIVENESS INDEX (2010) - SOURCE: REGIO 2020, 2011

Figures 8a and 8b illustrate this linkage between territory and competitiveness.

4.4 Key enabling technologies

In order to focus EU policy and adapt their instruments in the next multi-annual financial framework on research and innovation, cohesion policy, and prioritise EIB lending activities, the EU has just released the *European strategy for Key Enabling Technologies – A bridge to growth and jobs*[32] which sets out an integrating approach towards research and product development, defining KETs as '*a key source of innovation. They provide indispensable technology bricks that enable a wide range of product applications'*. Five priority areas are defined as *KETs*, among them biotechnology. The strategy aims to keep pace with the EU's main international competitors, restore growth in Europe and create jobs in industry, at the same time addressing today's burning societal challenges. Public-private partnerships, specific funds under Horizon 2020 and linkages to structural funds are some of the foreseen actions.

[32] http://ec.europa.eu/enterprise/sectors/ict/key_technologies/index_en.htm

PARTNER PROFILES

The PARTNER PROFILES describe the cities' background related to the health sector and innovation services, existing assets and future needs, the partners' initiatives and initial expectations about their participation in the 4D Cities partnership, stakeholder involvement plans and actions, strategic plans in this field of activity and a SWOT analysis. Various cities filled in a questionnaire which served as a basis for a first insight and assessment which, in conjunction with a study visit to the cities, allowed for assessing the scope of implementation as well as the gaps and assets regarding the implementation of the *4D Cities common methodology* (see Introduction).

During the visits, meetings were held with the project local representatives (coordinator and other city representatives), experts from both the health service sector and the business sector, Universities and research organizations dealing with health and the biomedical sector and, where applicable, to NGO's and community groups supporting social innovation projects; in few cases, the Managing Authority representative also joined the meeting. In some cases, experts from other governmental levels attended the meetings as well, which is a very useful contribution in sectors such as health and social welfare, highly dependent on a fruitful interrelation among various governmental levels. In some visits, the future Local Support Group already joined the meeting and a debate / short workshop was held, identifying their motivations and potential contributions, based on the URBACT ULSG toolkit templates.

Next to information about each municipality and its relation to the 4D Cities common methodology, each partner profile includes a brief section on the national health system provision, offering both innovation opportunities but also potential obstacles as regards the uptake of health and innovation strategies at local level.

Many of the USLG groups proposed in the subsequent profiles draw upon existing groups, which is an asset as these groups bring along cohesion, strategic alignment and mutual trust expertise. The ULSG groups include actors from all three spheres: social stakeholders (patients or patients' organisations, NGOs, foundations and cooperatives), economic and public stakeholders (including healthcare stakeholders).

Igualada

Introduction

Igualada is a municipality located 67 km west of Barcelona with 39.191 inhabitants (2011). Like other European territories with strong industrial tradition, Igualada also suffered the industrial decline. Globalisation and relocation caused a progressive reduction of the leader industries (textile, tanning and paper) which have not been replaced by new emergent sectors and which caused structural unemployment. Even though construction and the rise of the property market contributed to certain economic growth in the last decade, the global economic and financial recession has strongly affected the unemployment rate (Igualada was an umployment rate of 22%, above the average of the province -16%- and one of the highest of Catalonia). In the current situation of economic crisis and a strongly globalized and competitive world, diversification of the economic activity, linked to innovation as a competitiveness driver, and specialization are key elements to promote development at the territory. Since 2009, Igualada has initiated the 4D Health Project, a simulation centre for health issues, will provide technological stimulation of Igualada and the region of Anoia's economies.

- Health sector relevance and facilities

  The main service provider is the Hospital d'Igualada, which works in partnership with neighboring healthcare facilities, such as the Residencia Vilaseca, St. Jordi's Alzheimer Hospital, and apartments with facilities for elderly people, to provide efficient and effective clinical, nonclinical, and outreach services.

- Social aspects

  In order to offer a closer and more efficient network among all health and social welfare stakeholders, the hospital has connected them within a single information and communications infrastructure, defining future best practices for healthcare in the region and beyond. This system is also offering access to patients for an increasing range of services.

- Innovation actors

  Various stakeholders, among which the Academy of Medical Sciences of Catalonia and Balearics as well as the Catalonian Agency for Innovation ACC10, support the design of programs and activities related to the Health & Innovation strategy of Igualada.

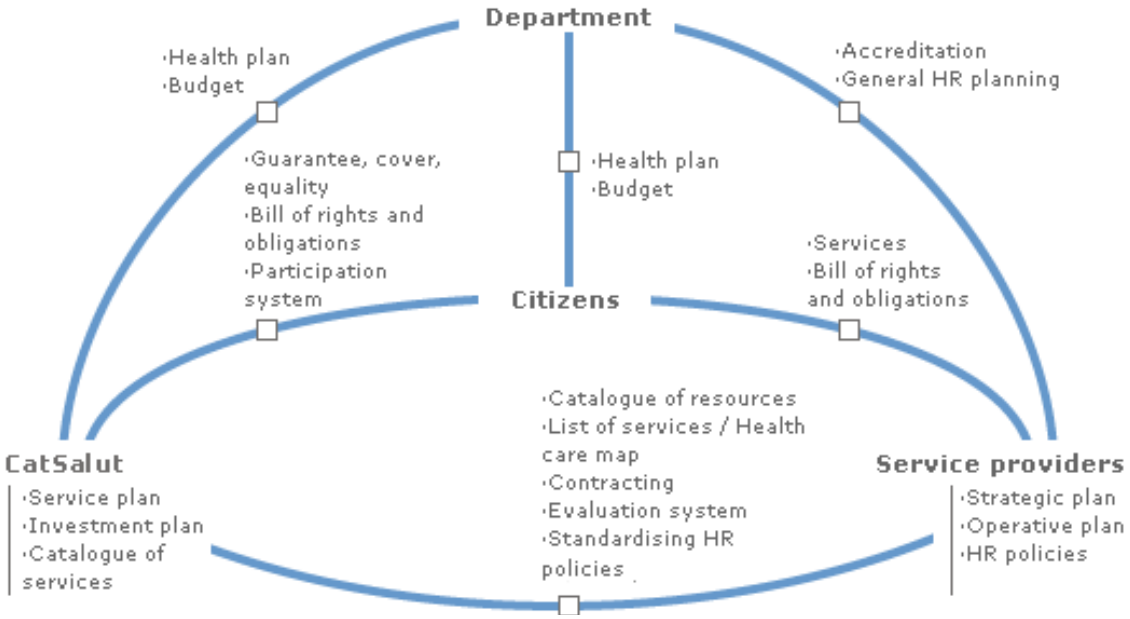
Regional health policy context

Catalonia has its own health model that is integrated into Spain's national health system. A Parliamentary Act created the Catalan Health Service (SCS), an organization which is responsible for providing a public health service and controls all public health resources.

The model is based on the separation of two functions: first, the planning and purchasing of health services and second, the management of the resources available. Purchasing is based on the population's defined needs in the Health Plan, and the public resources available.

Catalonia relies on a mixed health care system, where the main emphasis lies not in the nature of the ownership of facilities, but rather on public financing to meet the population's needs. The ownership of health centres and entities may lie within the public sector (the Catalonian Health Institute, municipal governments, or autonomous governments), with charitable institutions (religious orders, the Red Cross and foundations) or private institutions (private foundations and corporations). The formula of diverse ownership allows fast and flexible adaptation to innovations in the health care sector.

Catalan health care model:



Sources: EuroHealth Observatory http://data.euro.who.int/hfadb/., Catalan Department for Health, other web sites

The position of Igualada in the 4D Cities project

Igualada's position is interconnected with the Innovation Simulation Health Centre '4D Health' which is being developed in the building of the old hospital and where the city is exploring partnerships related to Health Innovation. 4D Health, to become operational as of mid 2013, aims to be a high technological centre allowing access to other hospitals, universities, technological centres and private companies.

Who will be involved in the initial URBACT Local Support Group?

Igualada's ULSG was launched through an introductory meeting in September 2012. Various stakeholders from a broad range of areas participate in the group and expressed their interest in an active collaboration related to health and innovation, with an international level remit.

Stakeholders include representatives from the following entities, classified in expertise groups:

Knowledge:

High School and Professional Training Milà i Fontanals: on the one hand, it imparts studies related with health care such as dietary, pharmacy and pharmacy and nursing assistant treatments. On the other hand, it imparts professional education studies in ICT.

Health

- Healthcare Consortium of Anoia (CSA). It includes the Hospital of Igualada and the Primary Care (formed by ABS Igualada Nord and Mental Health Services)
- College of Pharmacists of Barcelona (Anoia delegation). It represents more than 7.800 pharmacists practicioners in their various areas: hospitals, dispensaries, primary health care, public health, clinical laboratories, etc…

Healthcare and welfare

1. Igualada Consortium for Social Health (CSSI), which includes:
   a) Alzheimer: Day Hospital Sant Jordi which gives personalized attention for people with problems of cognitive deterioration.
   b) Ageing, which includes:
      - Ageing Residence Pare Vilaseca
      - Day Center Arian
      - Residential Viure B: rental of flats for "low dependence" people with healthcare attention and common services.

2. Psychic Disabilities:
   a) Association for Kinds and Young (APINAS). Fostering the assistance, recuperation and formation for the kids and young people with disabilities
   b) Workshop Auria (TAC): cooperative work (Special work centre) which integrates 230 people with physical, psychical, and with mental disorders.
   c) Private Foundation Auria (FAP): promotion, social participation and equal opportunities for people with disabilities. It integrates 323 people with disabilities and has more than 100 employees.
3. Patients & "Rare" diseases
   Mucopolisacaridosis and Related Syndromes Association. Born in 2005, its objectives are fostering investigation in causes and development of mps, assessment, support and information for families, seminars and conferences and promotion of preventive action, among others.

Companies

- Business Association of the Anoia (UEA). Business association which has more than 2.500 associated members.
- TIC Anoia. Its objectives are to create a space for reflection and proposals, at local level, on the issues related to the introduction and use of the Information and Communication Technologies. It intends to work from three different perspectives: the own TIC of the territory, boosting both companies and professionals in this field and boosting the business community in general.
- Chamber of Commerce of Barcelona (Anoia delegation). Its objective are to promote the economic activity, to protect the general interests of companies, help the internationalization of companies, etc.

What is the potential contribution of the partner city to the 4D Cities network?

Through 4D Cities, Igualada wants to focus the innovation projects on the patient involvement and patient safety, as well as on non-technological innovation.

Contact Persons in the City

Angels Chacón i Feixas Deputy Mayor for Economic promotion Igualada City Council	Enric Macarulla i Sanz 4D Health Director Thematic expert 4D Cities

Tartu

Introduction

Tartu is the centre of southern Estonia and is situated ca 190 km southeast of Tallinn, has almost 100,000 inhabitants and its unemployment reaches 10,6%. It is the second largest city of Estonia and is an important commercial centre and an increasingly popular tourist destination. Although recent economic recession has caused some impact in Tartu (for example increase in unemployment), the growth has been stable, thanks to Tartu's pivotal role in the region.

- Health sector facilities

  Although the private health sector is not yet among the most important sectors in Tartu as regards turnover or employment opportunities, the potential of its main public infrastructure, the **Tartu University Hospital** (http://www.kliinikum.ee/eng/) has already attracted many science and innovation hubs as well as high-tech companies. The relevance of the health sector is important for the City given that more than 4,500 people are employed in public healthcare facilities in the City, and approximately 6,000 jobs (including the mental illnesses sector, private hospitals and biomedical companies).

Dr Mart Einasto, Laura Buguñá - at the hospital premises

- Social aspects

  Tartu is often considered the intellectual and cultural hub of Estonia as it is the cradle of the Estonian Song Festival, Estonian theatre and the Estonian state.

- Innovation actors

Tartu is the most important scientific and academic centre of Estonia since it holds many higher education and research institutions including Estonia's oldest and most renowned university (University of Tartu).

Tartu has a great potential concerning innovation and health as it holds the following R&D facilities related to the sector:

- University of Tartu (http://www.ut.ee/en), organizes each year a business day
- Estonian University of Life Sciences (https://www.emu.ee/en/)
- Tartu Science Park (http://www.teaduspark.ee/en)
- Tartu Biotechnology Park (http://www.biopark.ee/en/)
- Estonian Biocentre (http://vvv.ebc.ee/)
- Estonian Biotechnology Association (http://www.biotech.ee/index.php?lang_id=en)
- Estonian Genome Centre (http://www.geenivaramu.ee/en/)
- Tartu Health Care College (www.nooruse.ee/eng/)
- Foundation Mental Health Care Centre (http://www.tartuvthk.ee/keel_inglise)
- Bio-Competence Centre of Healthy Dairy Products (http://www.tptak.ee/english/)
- several biotechnology companies (Icosagen Group, Asper Biotech Ltd, Solis BioDyne Ltd, TBD Biodiscovery, etc)
- several companies (metal and machinery, ICT, etc) involved in health-related initiatives

National health policy context

In Estonia, there have been two significant health system changes since its independence in 1991. The first was shifting to a decentralised model and the second was replacing the state healthcare budget and financing model with social insurance contributions. Life expectancy at birth is about 71. Cardiovascular diseases are the main cause of death. Infant mortality is steadily declining. Estonia's healthcare system is largely publicly financed through an earmarked tax on wages (the social tax). Local governments have no major role in healthcare coverage in Estonia, a stronger role is granted to cities as regards social welfare.

A highly prestigious investment has been the Estonian National Health Information System (ENHIS), which profits from an ample free WIFI connection all over the country and includes the EHR, documents archive, demographic

and booking services. It links to the Prescription Centre, and the surveillance, statistics, decision support and ambulance modules. Citizens in Estonia have had online access to their medical data in the EHR since the beginning of 2009. The Estonian Development Fund revealed in October 2010 a study "Healthcare services 2018" which is part of a wider foresight project on Estonia's service economy initiated in 2008. The study analyses opportunities for Estonia's export of health and wellness services in the next decade, outlines choices for strategy, and makes recommendations for action. The other side of the coin however is that technological innovation has been the primary driver of health spending in the country. Health tourism has been recognised by the country as a major opportunity to increase Estonia's export of health services, and an Estonian health tourism cluster has since been initiated by the Estonian Spa Association.

Further plans and strategies:

- ◊ Estonian Research and Development and Innovation Strategy 2007-2013
- ◊ Competitiveness strategy "Estonia 2020"
- ◊ Baltic Living Labs – Analytical report Health in Estonia, 2012

Sources: EuroHealth Observatory http://data.euro.who.int/hfadb/., Europe 2020 country profile, Estonian Development Fund report "Healthcare Services 2018, visit, other web sites

The position of Tartu in the 4D Cities project

In the development strategy 2013-2020 of the city of Tartu, the evolution of the entrepreneurship, cluster development and knowledge-based economy in the field of health industries has been recognised as one of the important challenges of the city. Furthermore, the strategic vision envisaged Tartu as a "city of knowledge" and a "city of entrepreneurship" and also as a "city with modern environment", defining priorities and goals to achieve such aims. The University hospital (employing 3,800 staff) renders another strong contribution of the City to the 4D Cities project. All interviewed stakeholders have emphasised the need to define together a strategy which enhances economic growth at local level based on innovation in the health sector.

Tartu, together with Tartu Science Park (TSP), have been involved in several initiatives related to the health sector during the recent years, such as the Interreg project "Innovation for Welfare". One of the eight Estonian Competence Centres is Tartu's Bio-Competence Centre of Healthy Dairy Products, who co-developed in collaboration with the University of Tartu a patented bacteria, Lactobacillus plantarum TENSIA™, which affects blood pressure and is also used by a dairy to produce a healthy cheese brand called Südamejuust (Heart-Friendly Cheese). These examples show that Estonia is a good test bed for new products in the sector.

Problems and scope of LAP

Problem	Short description
Shortage of engineers and high-skilled workers and specialists	Tartu's hospital suffers from the emigration of skilled workers, attracted by better employment conditions in other countries. Special talent attraction policies are required to attract and retain medical staff as well as biomedical companies.
Lack of commercialization of ideas and TT agreements	Specific support measures are required to enhance linkages and public-private partnerships between the public health sector and the private sector. As procurement bids are often granted to foreign companies, local incentive strategies are required.
Develop niche products, e.g. for ageing people.	The trend in Tartu being an ageing society, the development of niche products for this group should be fostered, based on their needs, e.g. through open innovation strategies.
Enhance cooperation between companies, health care institutions, public sector and universities	Although various biomedical clusters are already in the area and foster such cooperation, there is a need for debate as regards the potential to co-develop products and services versus the identification of innovation needs in the area among all stakeholders. The social sector so far has benefited less from entrepreneurship initiatives and needs to be more strongly integrated, e.g. via user-based innovation strategies.

Who will be involved in the initial URBACT Local Support?

The Tartu City Government has created in 2010 a health and innovation cluster[33], a small support group (ca 15-20 people) that deals with issues related with health, innovation and entrepreneurship. The city together with Tartu Science Park has organised several events (round tables, seminars, etc) to bring together hospitals, health care institutions, universities, businesses and public sector and has initiated a mailing list that brings together the people and institutions that are interested in this subject.

Its main institutions, most of them also visited by the Lead expert during her visit to Tartu, are as follows:

Business Development Department of Tartu City Government
Welfare and social care Department, Tartu City Government
Ministry of Science and Education,
Tartu University Hospital
Tartu Science Park

[33] Web reference: http://ettevotlus.tartu.ee/ettev%C3%B5tluskeskkond/klastriarendus/terviseklaster

Tartu University Institute of Technology
Tartu Biotechnology Park
IdeaLab of Tartu University
Estonian University of Life Sciences, Department of R&D
MediCap Holding OÜ
Metec Valduse OÜ
Equa OÜ
Baltic Innovation Agency
Estonian Chamber of Commerce and Industry

Stakeholders from the social sector, NGOs, youth associations and sectors such as the creative industries are currently not in an active role in the cluster but will be invited to join the activities of the cluster as well.

SWOT Analysis - Tartu -4D Cities project

STRENGTHS	WEAKNESSES
Good communications (including free WiFi in the city centre), well-developed infrastructure, relatively low labour costs, competent and young people, industrial parks, good level of vocational education, low taxes and stable tax system, professional business development system, University of Tartu, strong ICT sector, availability of renowned biotech and health specialists, international airport	Shortage of engineers and highly skilled workers and specialists, time-consuming and few transport connections with international centres, weak commercialization of ideas from research institutions, too few contacts and not enough cooperation between companies and universities, modest cluster development
OPPORTUNITIES	THREATS
Tartu-Tallinn highway (autobahn), cross-border cooperation with Russia, immigration of qualified work force, structural assistance	emigration, increasing labor costs, political problems, inflation, structural unemployment

What is the potential contribution of the partner city to the 4D Cities network?

As Tartu is a scientific and academic centre whose actors are well entangled with numerous innovation actors as well as with the teaching hospital, Tartu's experience will be helpful for cities looking for strategies and tools for developing innovative solutions for the health sector. In its *Tartu 2030 Development Strategy*[34], the City defines various challenges for which 4D Cities offers valuable expertise, such as strategies to foster entrepreneurship through

[34] http://info.raad.tartu.ee/teated.nsf/0/C26E6D2D24CF3ADAC22571F6003D800F/$FILE/tartu2030uus.PDF

open competitions. Its Tartu University Institute of Technology is already paving the way in this direction, together with other stakeholders which will partake in the ULSG.

Tartu is also an example on how to foster economic growth in the health sector for those cities based in countries where the healthcare sector is highly centralised. In return, Tartu is offering many cities a very advanced model as regards e-health deployment and its cost-effectiveness at City level, e.g. when finding solutions for the ageing population which requires a certain health literacy.

Elements that require inputs from the partners and exchange activities of 4D Cities

Tartu's social challenges include aging population, emigration and structural unemployment. The city is eager to learn about innovative solutions for coping with such challenges, e.g. via social innovation, to continue attracting more companies and retain young and skilled people in Tartu.

Tartu is eager to share and get new ideas how to develop and monitor the health innovation sector in Tartu region, in order to integrate into the Local Action Plan concrete actions for achieving better results in the health sector regarding entrepreneurship and commercialization of ideas, and means to monitor and, where required, revise them. Tartu will also benefit from experiences gained in cities where the potential of integrating the private insurance and private medical assistance sector into public health coverage programmes and social welfare programmes is more advanced. While such programmes tend to be regulated by regional and national administrations, the mobilisation of local stakeholders and successful private-public partnerships may be interesting learning experiences for Tartu's health and welfare responsible staff. Additionally, Tartu's strong base of cultural industries requires innovative solutions to offer health insurance at more affordable rates for freelancers. Despite the presence of a high concentration of research and development centres, Tartu is also characterized by traditional economic enterprises. The development of innovative solutions to increase economic growth by better linking healthcare facilities with companies through instruments such as technology transfer and innovative procurement is another input which will be useful for Tartu's LAP.

Contact Person in the City

Siim Espenberg
Chief Specialist in Business Development
Tartu City Government

Plungê

Introduction

Plungê district is a rural area of the western part of Lithuania with various attractive tourism sites and natural parks nearby. With 41.161 inhabitants in the district and 22.031 in town, emigration is a serious threat for the economic development of the area as highly skilled labour flees abroad. The unemployment rate in Plungê is 11,7%. The largest business companies work in food processing, fish products production, construction, road building and maintenance, metallurgy fields.

- Health sector facilities
  Plunge district hospital is a public institution whose primary function is Level II outpatient and inpatient health care services to district residents. Surgery, gynecology, traumatology, ENT, anesthesia, intensive care, internal medicine, neurology, pediatric diseases, rehabilitation, nursing and supportive care, urgent care and Level II outpatient health care services are provided. Plungê hospital employs 377 staff, has 182 beds and more than 5.500 patients/a. About 2700 CT studies and 1505 operations are performed each year. The Health Council of the district coordinates the public health plans and policies. Various private and public polyclinics, ambulatory daycare centres and practices complement the healthcare facilities in the area.
- Social aspects
  The ageing population, alcoholism and the increase of mental diseases are major social challenges. The Health Bureau employs staff in schools and at the hospital premises, to increase health literacy and foster health prevention. The Community Health Council includes participation from NGOs and from schools and other entities.
- Innovation actors
  No University facilities are based in Plungê so skilled medical workers need to be attracted and retained in the area, but hospital staff participates in national research studies and the City cooperates with the Telšiai incubation centre (capital of the County).

National health policy context

In Lithuania, the municipalities are responsible for providing primary health care to their local populations. They have been granted property rights for outpatient facilities and nursing homes. Municipalities are engaged in running small and medium sized hospitals within their localities, in accordance with legislation

which has delegated this function to them. Municipalities are responsible for the provision of about 60% of public health care services. This includes all ambulatories, the majority of polyclinics and small and medium-sized hospitals. Municipalities decide on investments for municipal institutions within limits of municipal budgets. Currently, various outpatient models are in use in municipalities: primary health care centres, polyclinics (which provide both primary and secondary outpatient services), and ambulance services. No hospitals have been privatized. The impact of financial and economic crisis so far had small impact on health care sector, but the plans for restructuring the health care sector might affect it in the future. Innovation challenges recognised at national level include the continuation of the alcohol prevention policy, the management of mental health centres, the increasing ageing of the population, high suicide rates and the lack of palliative care centres (nursing hospitals).

To increase the efficiency in the public health care sector, the Ministry of Health has introduced performance-based payment schemes as well as efficiency indicators, which resulted in an increase of out-patient care (in-patient treatment services reduced in 2011 by 2.6% compared to 2009). The Ministry also plans an expansion of nursing hospitals. The private sector does not play a significant role in public health coverage but covers most of the dental care, cosmetic surgery, and psychotherapy and gynaecology services.
Further plans and strategies:

- ◊ Lithuanian Innovation Strategy for 2010–2020
- ◊ Strategy of the Development and Improvement of the Lithuanian Public Procurement System for 2009-2013
- ◊ Programme on stage III of the restructuring of health care institutions and services. 2009–2012
- ◊ Lithuanian Health System Development Framework 2011–2020
- ◊ Social Card project

Sources: EuroHealth Observatory http://data.euro.who.int/hfadb/., Europe 2020 country profile, Lithuania Convergence Programme 2012, visit, other web sites

The position of Plungê in the 4D Cities project

Plungê is one of the smaller towns in the network, hosting a tertiary district hospital and no University facilities in the district. The small local environment facilitates good interaction of key stakeholders in health and innovation as well as willingness to develop public-private partnerships. In such rural environment, a stable and innovative health sector is a crucial element to the stability of a fragile economy and skilled workforce which needs to be motivated through innovation projects.

Problems and scope of LAP

Problem	Short description
Implementation of an Electronic Heath record (EHR) and e-appointment	In Lithuania, e-health policies are being introduced at regional and local level, no rural area in Lithuania has implemented by now any EHR nor e-appointment system. Such system is beneficial for doctors, patients, the government and companies.
Lack of skilled workers and companies	The lack of R&D facilities and companies in the biomedical sector, together with low salaries, require special talent attraction policies to attract and retain medical staff as well as companies eager to innovate and foster PPP.
Health as production factor	There is a high prevalence of alcoholism and mental illnesses in the area (mental diseases in 2826,43 cases per 100.000 population- compared with Lithuania 2221,36/100.000, morbidity of alcoholism 87.22/100.000 (54,34), mortality from suicide 21,51/100.000 (28,52). Specific prevention and treatment programmes are required, as well as sustainable use of treatment and rehabilitation resources. The use of sport and nature infrastructures should be better exploited.
Cooperation with private sector poorly organised	Specific support measures are required to enhance linkages and public-private partnerships between the public health sector and the private sector.

Who will be involved in the initial URBACT Local Support?

The City Health Committee as well as the Community Health Council (which includes people from the City, from NGOs and from schools and other entities) are key entities to be involved in the Local Action Plan, through the identified stakeholders.

The ULSG is not yet formerly constituted but the study commissioned by the City, "Preparation of Health Care and Social Care services Feasibility study of Plungê district", serves as basis for the creation of the ULSG as well as the LAP development. Below is a list of key stakeholder institutions, some are still missing and will join the ULSG as well, such as the business association.

Preliminary list of institutions, to be potentially increased

Plungê district Municipality Administration, Mayor
The specialist of the Regional Policy Department of Ministry of the Interior; Representative of the Managing Authority of URBACT
Strategic planning and investments department, Plungê district Municipality
Health Care Ministry of Lithuania; Plungê Councillor; Member of Health and Social Care Committee
Municipality doctor of Plungê district
Chairman of The Health and Social Care Committee
Plungê Open Youth Center
JSC National Medicine Assistance Office
Telšiai business incubator
Plungê district municipality Hospital
Plungê_Social Services Centre
Plungê Public Health Bureau
JSC ,,Sauslaukio statyba"
JSC ,,Palska"; Councillor; Member of Health and Social Care Committee

SWOT Analysis - Plungê -4D Cities project

STRENGTHS Plungê is working to provide specific guidelines on how to turn into a smarter town, by fostering knowledge-based economic and social activities and research- driven initiatives focused on target and innovative sectors. Very close to important nature and recreation facilities.	WEAKNESSES There is decreasing population, because of migration and natural citizen's turnover, attracting less investors. Increasing emigration of young and educated people. Tourism infrastructure is still not very well developed (information in foreign language, resting-places, etc.).
OPPORTUNITIES Development of wellness business, encourage healthy style of living, leisure activities, bicycling, etc. Development of cooperation with universities for health care specialists practice, cooperation with foreign institutions. Strengthening of cooperation with young people, NGOs in culture, sport, social and other fields.	THREATS Emigration of Health care specialist and young people with university education. Increasing number of elderly people. Insufficient attitude to youth policies, youth work, activities.

What is the potential contribution of the partner city to the 4D Cities network?

The City is an example for other cities in rural areas on how to promote health and innovation focused on primary care needs (healthy living lifestyles, more cost-effective processes, focus on prevention programmes related to key health threats at local level). Plungê is working to provide specific guidelines on how to turn into a smarter town, by fostering knowledge-based economic and social activities and research- driven initiatives focused on target and innovative sectors.

Aware of its budgetary limitations and the current crises, Plungê is identifying small and realistic innovation projects. The participation of the private sector needs to be fostered by specific strategies. The City accounts for a strong cooperation with young people, NGOs in culture, sport, social and other fields. Next to integrate local natural assets such as walking trails and spas, the City is eager to enhance the participation of NGOs and businesses into the proposed Local Action Plan. The regular cooperation between local and supra-local stakeholders is another strength other cities can benefit from.

Elements that require inputs from the partners and exchange activities of 4D Cities

The City is eager to enhance the participation of NGOs and businesses into the proposed Local Action Plan and can gain a lot of benefit from learning about business and talent attraction from other cities. Based on the identified priorities for its LAP, Plungê can learn from other partner's experiences and strategies in this field. In particular, the City is interested in public-private partnership models and projects as well as successful social innovation projects at local level. The City is also eager to facilitate the knowledge exchange for its key stakeholders.

The prevention of emigration of skilled workers as well as the attraction of new skilled staff and new companies is another input which will be useful for Plungê's LAP.

Contact Persons in the City

Zaneta Piepaliene Head of Strategic planning and investments department Plungê district	Oresta Gerulskiene Municipality doctor Plungê district

Leeds

Introduction

Leeds is the third-largest city in the UK and is home to approximately 800,000 people. Leeds City Region is a dynamic, £50bn City Region with a diverse business base. Its economy combines major strengths in manufacturing and finance with its sight set firmly on the growth industries of the future, such as digital design and biotechnology. Despite recent job losses, the diversity of the local economy remains its major strength, with employment growth expected across a number of key sectors, including health and social care. Alongside this, manufacturing remains an important part of the city's economy and will continue to present employment and skills opportunities for young people as the current highly-skilled engineering workforce comes to the end of its working life. Although unemployment in the city rose to 8.9% (almost 38,000 people) in June 2010, Leeds still had the second highest employment rate of (70.4%) of all major UK cities.

- Health sector relevance and facilities

  Out of a workforce of 450.000 citizens, 33.000 work in the health sector and related companies (such as medical technologies and IT-based technologies for health). Health already contributing considerably to the city's economy, the City is aware of its potential to make a much larger impact. More than 100 health and medical businesses employ over 3000 staff, the Teaching Hospitals Trust employs approximately 13,000 staff, and the City will take over additional public health competencies from the NHS as of April 2013.
- Social aspects

  Whilst the health of Leeds' people has improved in some areas, deprived communities still suffer from significant problems. The gap in life expectancy between the most disadvantaged parts of Leeds and the rest of the city remains at around ten years. Funding for primary care and public health activities is scarce, which entails that not enough resources can be dedicated to public health prevention initiatives, in detriment of communities with less health literacy.
- Innovation actors

  With more than 60,000 students, Leeds is one of the major University cities at global level. In health, the set-up of the Leeds innovation Health Hub aims at bringing together major innovation players throughout the value chain,

from research to deployment and job creation, until an improved provision of health and social care services at the community level, this way balancing global innovation needs with local demand.

National health policy context

Health services in England are largely free at the point of use. The NHS provides preventive medicine, primary care and hospital services. Over 12% of the population is covered by voluntary health insurance schemes, known in the United Kingdom as private medical insurance (PMI), which mainly provides access to acute elective care in the private sector. The English healthcare system is funded through taxes. Still, expenditure on health care per capita in cash terms (including private spending) increased from £231 in 1980 to £1852 in 2008. Since 2010, the NHS has made large-scale efficiency savings to put this trend to a halt. In addition to the unprecedented level of financial resources allocated to the NHS since 2000, the most important reform measures included the introduction of the "payment by results" (PbR) hospital payment system; the expanded use of private sector provision; the introduction of more autonomous management of NHS hospitals through foundation trusts (FTs); the introduction of patient choice of hospital for elective care; new general practitioner (GP), consultant and dental services contracts; the establishment of the National Institute for Health and Clinical Excellence (NICE); and the establishment of the Care Quality Commission (CQC) to regulate providers and monitor quality of services.

Main health problems in England are chronic diseases, alcohol consumption and obesity. Inequalities in health across socioeconomic groups have been increasing since the 1970s. Local authorities in England make decisions about local services and play an important role in the organization and provision of social services and education. From 1 April 2013 onwards, primary care health services, as well as some nationally-based functions currently undertaken by the Department of Health – will be coordinated through the NHS Commissioning Services, with participation from local governments.

Sources: EuroHealth Observatory http://data.euro.who.int/hfadb/., visit, other web sites

The position of Leeds in the 4D Cities project

Leeds has worked through the Leeds Initiative on a Vision for the City, with the aim to enhance economic growth. The key priorities of the Vision include:

- Building a strong international reputation for Leeds as a centre of excellence for innovation in health and medical technology,
- Attracting investment to drive innovation in health and medical technology in the city,

- Fostering enterprise and new business opportunities through innovation in health and medical technology,
- Creating jobs and training through innovation in health and medical technology.

Numerous strategies are underway to implement the Vision and its mandate for the healthcare sector, such as the Leeds City-Region Enterprise Partnership, the Innovation Capital Programme.

Revision of stage of Project City Workshop

- Leeds City Council
- Lead partner
- Lead expert

Problems and scope of LAP

Problem	Short description
Patient-centered focus	Although the NHS has already started to foster strategies involving patients (such as the experience-based design approach), such method still needs to be translated into healthcare innovation both in public and private spheres. Leeds' Local Action Plan can trigger such translation at the local level.
Stronger linkage between social care and health care	Many communities and groups are usually not involved in health innovation strategies. Cities can play a key role in linking innovation from health to the adult services, offering also innovative business models such as involving patients in sharing results and finding new users.
Digitalized health and local involvement	The e-health policy currently being revised, local authorities have an opportunity to set the scene and design digital health tools based on local needs and opportunities.
Local Innovation	Opportunities to use local facilities as test beds are often underused due to lack of trust and bureaucracy. The LAP is a valuable tool to assess opportunities and barriers how local products and services can best meet local needs.

Who will be involved in the initial URBACT Local Support Group?

Leeds has strong partnership arrangements for health and wellbeing with strategic commitment to improve health jointly between the council, NHS Leeds and the voluntary, community and faith sectors. The economic growth strategy includes among its priorities health, and five stakeholder levels are involved: City council, Teaching Hospitals trust, Community health, Leeds University, Manufacturing companies.

University of Leeds –
IKC Medical technologies

Leeds has not yet decided the final structure of the ULSG but a preliminary list of institutions to be convened is as follows:

- City Council, Leeds Initiative
- City Council, Economic development
- City Council, Adult Social Care
- Leeds Teaching Hospitals Trust
- Community Health representative
- Patient and/or caregiver association
- Companies leading the participation in the creation of the Advanced Medical Manufacturing park
- University of Leeds – Centre for Health Management
- University of Leeds – IKC Medical technologies

In addition, Leeds wants to involve more strongly stakeholders from the social sector, e.g. third sector entities involved in public health and social welfare tasks.

SWOT Analysis - Leeds / 4D Cities project

STRENGTHS	**WEAKNESSES**
New employment ratio relatively high Health recognized as key growth sector High business engagement Highly innovative health and medical companies Good interconnection between public, private and academic sectors	Economy highly public-driven Purchasing power and innovation demand from the local health sector little connected to technology offer from private sector at local level Little interrelation between welfare and adult services, and economic development and innovation strategies
OPPORTUNITIES	**THREATS**
Digitalisation of health records promoted by EU policies Co-production of health services is a major global trend	Public health and innovation resources diminished Insufficient resources for the ageing society and adult services delivery

What is the potential contribution of the partner city to the 4D Cities network?

The effective coordination and involvement of the private and public stakeholders linked both to innovation offer and demand constitutes a high-value asset as regards Leeds' contribution to the 4D Cities network, and output indicators such as export sales, net employment and patents in the sector underline this valuable expertise.

Another relevant contribution of the City is its extensive volunteer and caregivers network, and how caregivers can be trained to best bridge the gap between clinicians and citizens, not only in primary and secondary care, but also as regards domiciliary services and palliative care.

Elements that require inputs from the partners and exchange activities of 4D Cities

Leeds can certainly benefit from experiences in other cities, in particular as regards the digitalization of health services at local level as well as the role of the hospital and local healthcare facilities as users of technological and non-technological innovation services and products.

The City will also benefit from the expertise of 4D Cities partners as regards a major role of local authorities in public health as this competency is currently being shifted to local authorities.

Contact Persons in the City

Colin Mawhinney Head of Economic Policy and Programmes Leeds City Council, Development Directorate	Susan Tuck Senior Policy Officer Leeds City Council, Development Directorate

Novara

Introduction

With circa 105.000 inhabitants, Novara is actually the second most populous city in the Piedmont Region, after Turin. It is an important crossroad for commercial traffic along the routes from Milan to Turin and from Genoa to Switzerland. The local economic system is characterised by a strong industrial vocation, born and grown around national and international leader manufacturing industries (such as ENI Group in chemical sector, De Agostini in publishing sector, Pavesi in food sector, Novamont in biodegradable plastics, etc.) and around excellent district systems (tap district, textile district and clothes district). Novara agriculture is strongly characterized by rice production. Novara's local offer in big and small distribution sector is strong and qualified. The city has a strong tradition in fashion sector, especially in sport clothes and bathing-suits (in the West Ticin region), and in the chemical sector, with productions ranging from base chemistry to paintings and solvents, from cosmetics to drugs, with a marked attention to new and innovative materials research. Thanks to its active entrepreneurship activity and to its high competitiveness, exportations are rather high; however, many local companies also delocalised due to the high global competition. This is why Novara's current economy consists mainly of small-medium firms with a great incidence of micro-firms (with less than 10 employees). The current crisis is having an impact in particular in those areas of the city which are more socially-deprived, which Novara wants to tackle by developing a territorial pole on health and innovation.

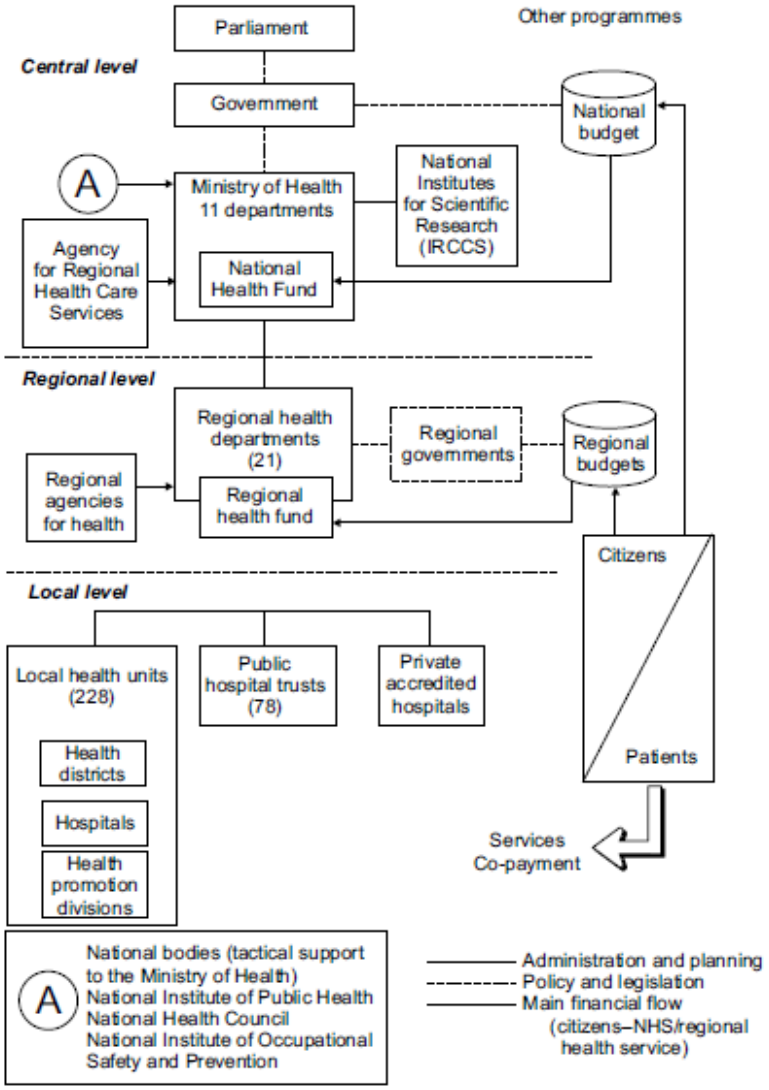
- Health sector relevance and facilities
  Novara's hospital, the second biggest hospital in the Piedmont region after Turin, is a teaching hospital with more than 800 beds and more than 300 doctors. Health-related companies include companies from the food and chemistry sectors.
- Social aspects
  Novara population's average of older-aged citizens is higher than national average value: 27,61% of the population are over 60 years old. The senile dependence index has increased from 22,1 to 35, causing an increase of healthcare costs and of healthcare services demand, particularly for chronic care.

- Innovation actors

  In spite of its short lifetime, the University Piemonte Orientale (UPO)'s medical faculty is already placed fifth in the national quality ranking. Hosting 10,000 students, health-related studies are a key element of UPO. TERA Foundation, an international scientific research non-profit foundation recognized by the Health Ministry, works on paediatric tumour care. Novara accounts for an incubator which will be amplified in the frame of the city's LAP.

National health policy context

Italy's healthcare system is a regionally-based national health service that provides universal coverage free of charge at the point of service. Regional governments are responsible for delivering the services through population-based local health units, private and public accredited hospitals.



Sources: EuroHealth Observatory http://data.euro.who.int/hfadb/., visit, other web sites

The position of Novara in the 4D Cities project

In order to attract and retain qualified staff and offer new employment opportunities, Novara is going to start in 2013 two development projects aimed at local participation and urban regeneration:

- PISU programme: various actions throughout the city, among which public works related to the creation of a new R&D centre on autoimmune diseases as well as the amplifying of the incubator;
- SpeDD programme: aims at implementing and experimenting models of open democracy and government.

As of 2014 onwards, Novara aims at creating a territorial pole on health and innovation, the City of Health and Science, which will locate in one campus the University, the Hospital and the Innovation facilities (i.e. incubator), in order to offer to all users, including citizens, one sole space for their needs and requirements. Novara's expertise in industrial innovation, linked to a young but already high-ranking University, offers a unique location for creating a territorial pole on Health and Science.

Problems and scope of LAP

Problem	Short description
Attract and retain high-tech companies and start-ups	High-tech companies need to have their knowledge source nearby and easily accessible. Projects such as the City of Science and Health as well as the PISU programme engage public and private stakeholders.
Shortage of qualified staff both for health and innovation	Linked to the need to attract business is the need to attract and retain qualified personnel in such knowledge-intensive area. The amplification of the incubator and the engagement of the youth through the SpeDD programme respond to these problems.
Social deprivation of industrial districts due to delocalisation	Many of the activities proposed in the LAP are focused on a deprived industrial area where the University Campus and the incubator are already based. The SpeDD programme will work specifically on open democracy models to involve citizens.
Better uptake of innovation in the healthcare sector	The creation of a research centre of autoimmune diseases is one cornerstone in the City's strategy to support the engagement and facilitation among stakeholders, with the aim to enhance competitiveness and differentiation at global level.

Who will be involved in the initial URBACT Local Support Group?

The ULSG will be lead by the director of the incubator and is currently being set up. Its members are current signatories of agreements related to the three aforementioned urban development projects:

Novara incubator

- Novara incubator
- Chamber of Commerce
- Industrial Entrepreneurs Association
- ARESS: healthcare services agency (Piedmont Region)
- Patients associations: "Associazione di volontariato per I diritti del malato" (association promoting patients rights)
- Università del Piemonte Orientale (University of Western Piedmont), which includes not only Medicine Faculty, but also Professional Training (nurses, physiotherapists etc)
- Novara Province
- Representatives of the third sector:

  Le Ali della Vita" association (which helps woman affected by breast cancer and their families); AVO association (hospital volunteers association); CSV (Centro Servizi per il Volontariato) Association representing and supporting almost 100% of the volunteers associations, IDEAINSIEME Onlus (oncologic patients), associazione NEO-N (risky newborns in Intensive Care Unit), UGI Unione Genitori Italiani contro il tumore dei bambini (associations of parents with children with cancers), ABIO Associazione per il bambino in ospedale (association supporting children at Hospital), Associazione "Volontari della Notte" (association of volunteers offering free assistance at night to people at the hospital),
- Finpiemonte Ltd.
- Healthcare organisations: ASL13 (Local Healthcare Agency)
- Representatives of key private companies in the field of pharmacology, biotechnology and healthcare R&D including Isagro Research, Promau Engineering.

The participation of further stakeholders such as private healthcare providers or promoters of the project for the realization of "The City of Health", and possible associations of Medicine students, is currently being assessed and may be done on a case-by-case basis.

SWOT Analysis Novara - / 4D Cities project

STRENGTHS	**WEAKNESSES**
- prominent industrial districts, - university pole, close cooperation between University, research activities and productive system, - good interaction with healthcare and University stakeholders in the region. - planning & development expertise	**-** high small and middle firms mortality rate, - limited foreign capitals attraction, - inadequacy of infrastructures dimensions, - lack of qualified experts, - services sector little connected to

based on public-private partnership	innovative trends and clusters
OPPORTUNITIES - research activity revamping, - local cultural and naturalistic heritage exploitation, including new cultural and touristic development - needs on health innovation linked to high-tech areas, such as auto-immune diseases	**THREATS** - reconversion and weakening of special sectors (fashion, mechanics, rice), - employees reconversion difficulties, - imbalance in infrastructure development versus stronger territorial poles

What is the potential contribution of the partner city to the 4D Cities network?

Novara's key contribution is the district-level planning and development of health innovation based on public-private partnership, both through small scale and concrete initiatives as well as via the planning of the *City of Health and Science*, in order to attain objectives such as the following ones:

- development of innovation in the provision of health services and products,
- fitting with the pharmaceutical industry in the field of multidisciplinary research,
- enhancing the relations among urban government, University and production system, to offer a user-led knowledge-intensive pole,
- support the creation of centres/laboratories in the biomedical sector, intensifying chemical experimentation and specialized research.

Titanium-based crunch, developed in the incubator

Elements that require inputs from the partners and exchange activities of 4D Cities

Although the City of Novara is not directly responsible neither regarding health skill provision nor the uptake of innovation in healthcare centres, the lack of such elements affects the territory, hence its city, in an indirect way. This is why Novara looks for new and successful solutions and how the City can facilitate these processes.

Contact Persons in the City

Mr. Paolo Sironi General Manager Comune of Novara	Mrs. Paola Garofalo Local Government Officer, General Management Department, Comune of Novara

Eindhoven

Introduction

The region of Eindhoven, situated in the South of the Netherlands, presents a position of prosperity. The Eindhoven Region has long been the industrial center of Holland, with 730,000 inhabitants and a workforce of 400,000. The region managed to convert successfully from a traditional industrial area into a hub based on high-value, technology-based products, currently generating €24 billion of GDP and €55 billion in exports, one-quarter of the Dutch total.

One of Eindhoven's driving forces to these achievements is the public-private partnership called Brainport Development, the agency coordinating the projects and knowledge transfer in the city's tech region, known as "Brainport." More than 100 companies and institutes, and 8,000 researchers, developers and entrepreneurs work in this area. Almost half of all Dutch patent applications originate there. Brainport Development's members include employers, research institutes, the Chamber of Commerce, leading universities and the governments of the region's three largest cities. Its range of projects includes broadband deployment and applications, workforce development, digital inclusion, marketing and advocacy for the region – and especially innovation.

Building hosting Brainport Development

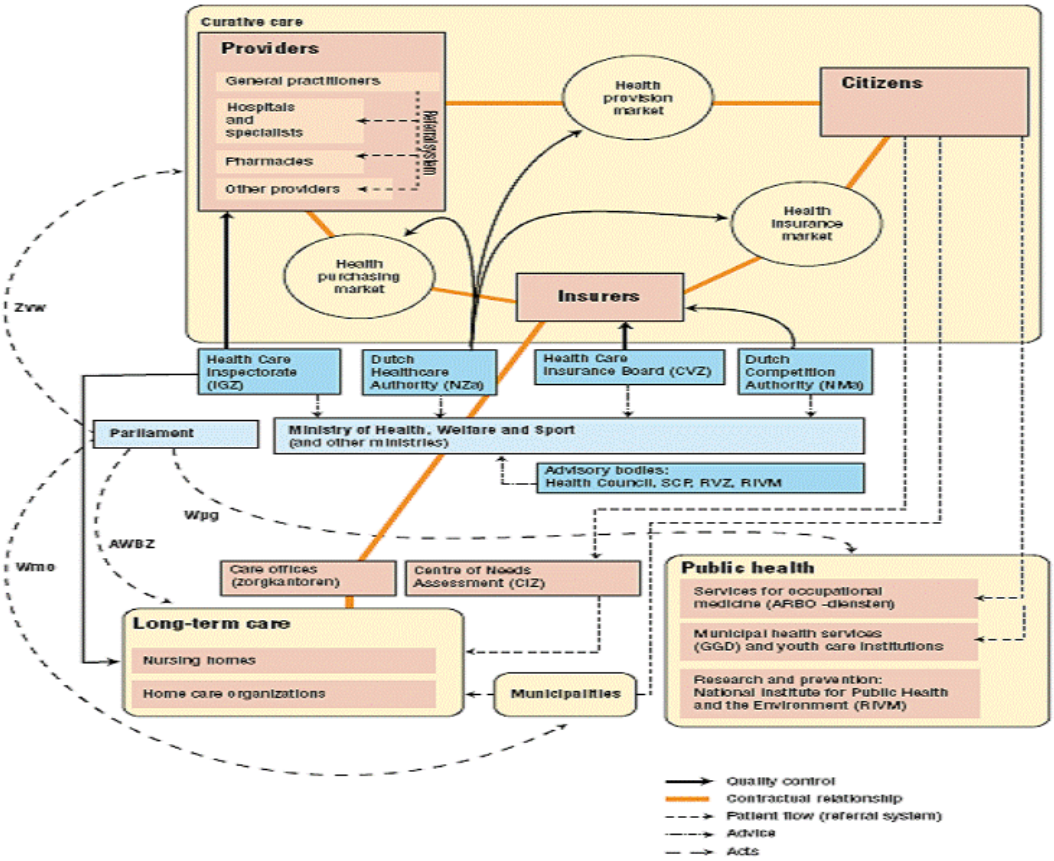
- Health sector relevance and facilities
  The Agency's Health Innovation strategy addresses the healthcare technology sector, an extensive network of globally operating companies, including developers and manufacturers such as Frencken, Sioux, Cisco, and Philips Medical Systems.
- Social aspects
  The major societal themes at global level have also considerable impact on the competitiveness of this region: growing need for energy and food, ageing population, climate change, strong international competition. The Brainport

2020 Strategy aims at finding innovative solutions for these societal challenges.

- Innovation actors
  The main innovation actor in the region is the Eindhoven University of Technology (TUE), hosting more than 7000 students. Besides, the region accounts for one the biggest private research hubs on healthcare at world level, the Philips Design and Philips Research centres, along with the company's incubator.

National health policy context

The Dutch healthcare system involves a high amount of institutions and stakeholders; cities, local authorities and regions have little impact on these strategies and processes:



Dutch healthcare system
(source: Wymenga, B. , Ministry of health, welfare and sports, 2011).

Brainport's Health Innovation strategy addresses many challenges the previous graph on priorities for the healthcare system describes, such as the empowerment of people (through e-health and m-health solutions, or web 2.0

platforms), or the integration of basic care at home, through ambient assisted living technologies. Brainport Health Innovation brings all those activities together in the "Cooperative Slimme Leven 2020".

The cooperative is an organised partnership within Southeast Netherlands, with Brainport Eindhoven Region at its core. The participants clustered within this partnership share the same ambition: to create significant breakthroughs in the fields of care, living and wellbeing that will, in the long term, be cost-efficient for society and generate added economic value. The **Innovation Network for Active and Healthy Ageing (Slimmer Leven 2020)** is a statement of intent by the partners to retain and boost the high quality of life for people through the development and broad application of technological and innovative concepts that add value to citizens.

The position of Eindhoven in the 4D Cities project

"Cooperation Slimmer Leven 2020" has an extensive expertise related to EU projects on health and innovation, involving a broad range of stakeholders, and focused upon the living lab philosophy which is based on user-driven innovation and co-creation. This expertise, in addition with expertise related to innovation management instruments such as IPR schemes, technology transfer schemes or pre-commercial procurement, is offering high added value to the 4D Cities network.

Problems and scope of LAP

Problem	Short description
More efficient healthcare services, including shared services	Current healthcare services often convey waiting queues, complicated decision-making processes, the involvement of many entities and spontaneous services. Shared services, one-stop window and co-creation of new services are required to make the system more effective while not losing its quality and safety.
Shortage of healthcare staff is increasing	The region currently has a shortage of manpower in the health sector and this shortage will grow substantially in the next 10 years. New solutions need to be resource-efficient.
Identify smart solutions which are cost-effective	As healthcare budgets are getting increasingly reduced, new solutions need to focus specifically the cost-effectiveness. As an example, traditionally expensive solutions such as ITC usage needs to be deployed and commercialised in such way that it supports the reduction of costs.

Who will be involved in the initial URBACT Local Support Group?

According to the Brainport 2020 Vision, in 2020 Southeast Netherlands wants to be among the top 3 of Europe's top technology regions and in the top ten on a global scale. The ULSG will draw most of the initial members from the cooperative Slimmer Leven 2020, a cooperative in which in total 70 organisations representing governmental entities, hospitals, care institutions, social housing associations, economic development agencies, large and small companies cooperate to formulate a joint strategic vision and agenda on smarter quality of life and healthcare. The ULSG group will also include some additional members such as patient organisations.

SWOT Analysis Brainport / 4D Cities project

STRENGTHS Innovative SME sector Good interaction at triple helix level Expertise on Open innovation, pre-commercial procurement and co-creation Slimmer leven 2020 platform	**WEAKNESSES** Healthcare centres and patients as key demand-drivers to be fostered Processes and work-flows are complex and slow Integration of user requirements do not include non-technological aspects
OPPORTUNITIES Smart specialisation at regional level, including health and life-tech Regional 2020 Strategy orientated towards talent creation and retention High proportion of knowledge-intensive companies	**THREATS** Budgets related to healthcare and social care getting reduced Reduction of employment opportunities for talented people

What is the potential contribution of the partner city to the 4D Cities network?

Slimmer Leven 2020 has an outstanding expertise as regards not only innovative EU projects but also projects related to co-creation and innovation management, such as the Interreg project 'Making knowledge work' or the pre-commercial procurement project SILVER.

This expertise, along with the established Brainport strategy on Health innovation (BHI), constitute highly valuable assets, for the network and beyond.

Elements that require inputs from the partners and exchange activities of 4D Cities

The Slimmer Leven 2020 Eindhoven scope of action envisages the acquisition of new methods and processes regarding the stimulation of local care- and wellbeing institutions, SME's and public entities to integrate innovation in such way that new market opportunities are created and sustained. While the triple helix is very much advanced and supported by a wide number of public-private partnership initiatives, Brainport has not yet many experiences assessing non-technological innovation projects, such as involving psychological experts in the processes.

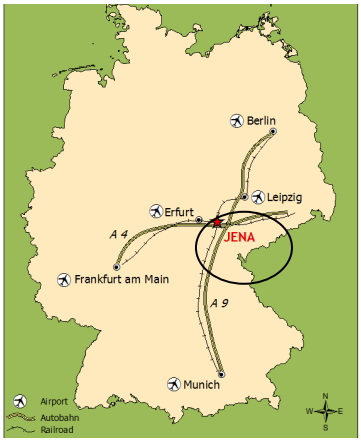
Contact Persons in the City

Anne Landstra Project Manager Brainport Development	Marcel de Pender Project Manager Brainport Development

Jena

Introduction

Jena is one of the most relevant high-tech locations in central Europe, bringing together companies and research institutions in promising specialisation branches such as medical and optical technologies, material sciences and equipment design and manufacturing. Jena has more than 105,000 inhabitants and hosts approximately 25,000 students. The close cooperation between science and economy is one of Jena's strategic success factors. Result indicators of this strategy include 25% of employees holding a university degree, a growing immigration of skilled people and a family-friendly environment both at public and private level. In this sense, Jena is also exceeding the national average of 8,1 with 10.6 births per 1,000 inhabitants (2011).



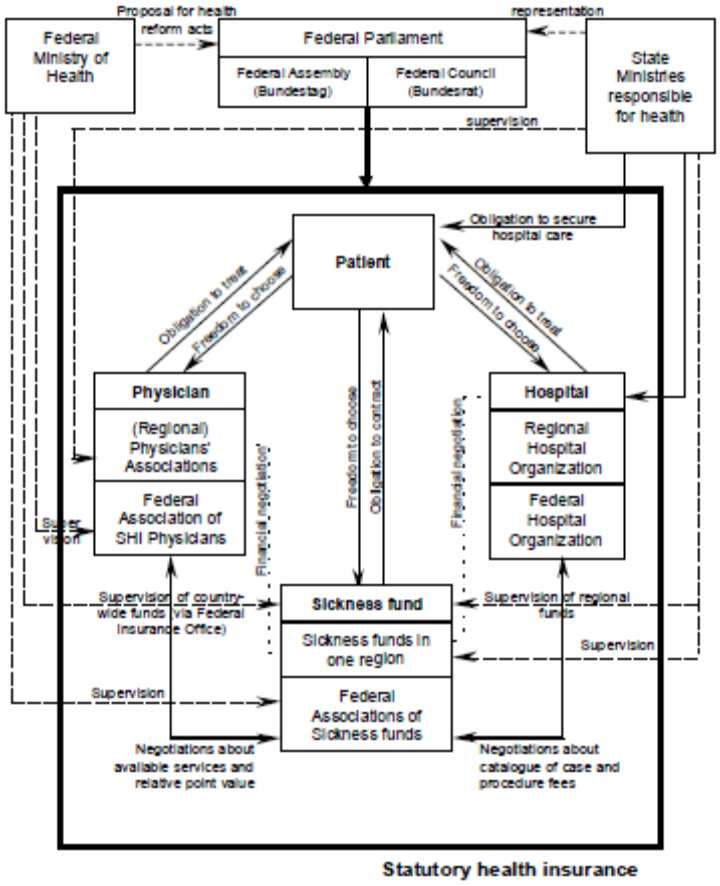
As other cities whose economy and specialisation has been linked since long to health and medical sciences, the attraction and retention of skilled staff is a continuous challenge.

- Health sector relevance and facilities
  The exact relevance of the health and medical sector in the city has not been precisely mapped but may account for more than 50% in terms of GDP and employment contribution at local level. The biggest employer is the teaching hospital with more than 5,000 staff.
- Social aspects
  As most European cities, Jena is aware of the increasing demand in services linked to the Ageing society. As the birth rate fortunately is relatively high, the city is working on initiatives such as the 'House of generation', which aims at hosting in one building various generations and foster the mutual learning experience. Jena's University Social Sciences department also holds the chairmanship of a national competence network on healthcare management and social impact assessment.
- Innovation actors
  Next to the business development company Jena Wirtschaft, Jena hosts 2 universities which also provide support on TT and IPR, the technology and innovation park (TIP) Jena, three Max-Planck Institutes, a medical

technology cluster 'medways', various R&D based global companies with a strong relation to the medical sector, such as Zeiss, Jenoptik and Schott, a Bio-instrumentation centre (focused on medical equipment, instrumentation and laboratory equipment), among others.

National health policy context

Germany's health care system provides its residents with nearly universal access comprehensive high-quality medical care and a choice of physicians. Over 90 percent of the population receives health care through the country's statutory health care insurance program. Membership in this program is compulsory for all those earning less than a periodically revised income ceiling. Nearly all of the remainder of the population receives health care via private for-profit insurance companies.



Sources: EuroHealth Observatory http://data.euro.who.int/hfadb/., visit, other web sites

The position of Jena in the 4D Cities project

Jena's technology-based economy is linked to the municipal strategy to be family-friendly city. The city does not only offer a better living quality to its

citizens but also helps to attract and retain skilled people. A range of services (full day care services for children from 3-6 years, support to elderly people for people that are working and cannot take care of their parents) are being offered to this aim, bringing along a higher local competitiveness as regards other competing locations.

Problems and scope of LAP

Problem	Short description
Attract and retain skilled people	There is an increasing shortage of skilled people for a highly competitive business sector, exporting approximately 50%. Jena has adopted the vision on education in 2010 and Jena Wirtschaft is promoting an alliance to attract and retain skilled people.
Lack of coordination among stakeholders related to sight	Further Development the "House of Vision", an application centre focused on eye care, attracting more citizens, in order to add up to the City of Light the *City of Sight*, bringing together optics, ophthalmology citizens, and technical schools and training centres.
Enhance the role of the social care service to support interaction	Current services related to working opportunities for people in need of care for their elder relatives is not enough linked to health services at public level, specific company-based support measures, and the need of citizens.
Showcase the relevance of the healthcare sector relevance in the city	The City is aware of the growing opportunity in terms of economic, social and knowledge growth opportunities linked to the health sector; yet, no knowledge and innovation map exists that brings together stakeholders, needs and offers, ultimately showcasing the impact of the health-related sector at City level.

Out of these ideas it is planned to choose 1- 2 main topics and work on these topics. Probably one point will be to show the importance of the healthcare sector in the area, by collecting numbers and figures, names of institutions and companies.

Jenoptik & University premises

Who will be involved in the initial URBACT Local Support Group?

The City is eager to create the ULSG, aware that such network does not yet exist and that it has a high potential to assess and respond to the aforementioned problems.

In this sense, the proposed ULSG will draw upon existing alliances as well as key stakeholders in the health sector, such as the following ones:

- Jena Alliance for promotion of skilled people
- Jena Alliance for families
- Fr. Schiller University, various departments, including social sciences
- Applied Sciences University
- Technical Schools
- Beutenberg network of research institutes
- Teaching hospital Jena (Universitätsklinikum Jena)
- Medways cluster (representing companies such as Schott and Carl Zeiss)
- Jena City Hall and Jena Wirtschaft

Specific companies, associations or networks may join the ULSG as well, if their participation is regarded as useful for the LAP implementation.

SWOT Analysis Jena- / 4D Cities project

STRENGTHS	**WEAKNESSES**
Family-friendly policies Very interlinked innovation environment, based on the triple helix Private sector keen to innovate and work together on specialisation and innovation strategies and processes	Healthcare sector's stakeholders partly organised as cluster, but economic relevance not fully recognised Certain networks do not see the global networking environment Citizens are passive users and not used to actively participate in the City's strategies on health and/or economic development
OPPORTUNITIES	**THREATS**
Lead of the national competence centre on healthcare management High potential of growth linked to the establishment of globally renowned companies belonging to growth sectors	Lack of and or change in regulations in the sector Risk of delocalization of part of the manufacturing and processing of industrial processes

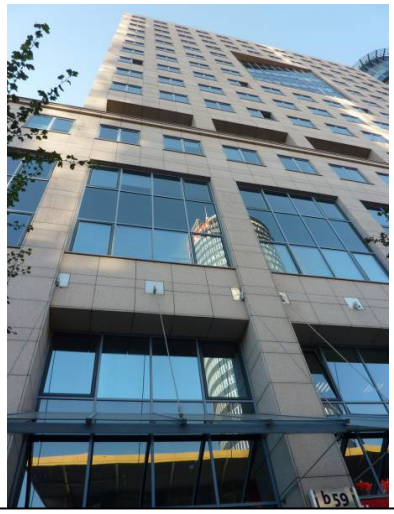
What is the potential contribution of the partner city to the 4D Cities network?

Jena's long-lasting expertise in economic development strategies based on an intensive cooperation among companies, universities and the healthcare centres is of high added value to the 4D Cities network.

In addition, Jena accounts for various alliances involving social stakeholders to ensure a positive impact on social aspects such a as family-friendly working environment or the attraction and retention of skilled people.

Elements that require inputs from the partners and exchange activities of 4D Cities

Jena's current strategies have strongly focused on technological innovation and economic growth, leaving aside user-led innovation strategies and more participatory innovation and economic development strategies. This is why Jena is eager to benefit from the exchange of other experiences in this regard and be able to benchmark Jena's strategy in the health sector by involving citizens.



Building hosting Jena Wirtschaft

Contact Persons in the City

Wilfried Röpke Jena Wirtschaft, CEO	Angelika Stenzel Jena Wirtschaft, Project manager

Baia Sprie

Introduction

Baia Sprie has 16,000 inhabitants and is located in the Baia Mare area, one of the most important mining areas located in the NW of Romania. The total number of employees in Baia Sprie has decreased from 4,609 in 1997 to 4,004 in 2002 and under 3700 in 2007 as a result of the local mine closing or of the ones from the neighbouring Cavnic community. Traditionally, over 50% from the local population income proceeded directly or indirectly from mining. After 2007, the traditional income source (mining) being removed, the active manpower migrated to the economic activities unfolded in Baia Mare Town, the private sector supplying a weight of a majority from the population income.

- Health sector relevance and facilities
  After the recent closure of the Chronic Diseases Hospital, the City Council approved the establishment of a joint stock company of Baia Sprie with individuals and businesses from the city to continue the health services in Baia Sprie city through private means.

- Social aspects
  Baia Sprie is working on diversifying the health services, based on several innovative tools and methods, including active community involvement. The ongoing depopulation is a major social challenge for the town.

- Innovation strategies
  The Development strategy of the Baia Mare Urban System 2010-2020 strives for becoming an economic growth pole. It describes Baia Sprie as '*a locality harmoniously integrated in the partnership process of regional development, competitively showing to advantage its local resources with social benefits for all its citizens, actively involved, on the basis of cultural and traditional environmental values, in the standing application of principles of sustainable community development'.*

The position of Baia Sprie in the 4D Cities project

The Development strategy of the Baia Mare Urban System 2010-2020 includes as objective regarding health to focus on developing health infrastructure by

providing professional medical act in emergency and safety situations. Baie Sprie is member of the Urban Environmental Accords Members Alliance.

Scope of LAP

For the implementation of the aforementioned county strategy, an Action Plan was developed through joint processes (participatory - advisory) planning, with the aim of empowering the community on means to implement the local sustainable development strategy but also to define realistic possibilities for their application. As regards health, the following objectives were agreed upon:

- Rehabilitation outpatient medical service by means of diversification of care provided to citizens and tourists.

- Center for Health and Restoration. Diversify local travel medical services for maintenance, post traumatic rehabilitation, treatment.

Who will be involved in the initial URBACT Local Support Group?

Baia Sprie has not yet decided the exact composition of the ULSG, but in addition to the City, the Hospital will be actively involved.

Elements that require inputs from the partners and exchange activities of 4D Cities

Baia Sprie is eager to develop their work through learning from others how they work practically with health in all policies, how to develop coherent and responsive local strategies for urban and sustainable development related to local health policies and how to support the city in implementing the 'healthy cities' approach at a European level.

Contact Person in the City

Claudia Maria Breban
Project Manager
City of Baia Sprie

SYNTHESIS

The visits to the cities confirm the general description of the state of the art at EU level: cities all over Europe seem to face the challenge to serve an ageing society with new needs and a healthier well-being to its citizens while public healthcare services are under a high pressure due to budgetary constraints. Nonetheless, the baseline assessment has also shed light on current lack of communication and trust among various stakeholders at local level.

National differences in competences at the municipal level in health provision have been addressed and will feed into the various best practices. These national structures may also vary, such as in the case of Leeds (UK), as public health competences are currently being shifted to local authorities.

This is why the need to identify the role of cities in this area is of particular relevance, as this sector does not only have a high economic but also a high social impact all over Europe. While acting as multi-stakeholder network on health and innovation, 4D Cities wants to link better link EU policies with local smart specialization assets, while securing the cities' and citizens' involvement (see page 9).

The baseline assessment has shed light on the current situation as strengths, weaknesses, opportunities and challenges the cities identified as regards their position within the 4D Cities network.

As regards **strengths** each city is providing to the 4D Cities network, there is a rather even balance between technological and non-technological innovation assets:

Novara	urban regeneration with private participation, integration of other sectors (food, chemistry)
Tartu	entrepreneurship best practices
Leeds	public-private partnership, exportation
Igualada	patient safety & citizens, focus on non-technological innovation
Plunge	regional focus (including rural areas), schools and youth involvement
Eindhoven	user-driven innovation lab, high social involvement
Jena	skill alliance, exportation
Baia Sprie	member of international networks on health and environment

Seemingly, cities share common **needs** each city wants to get resolved through its participation in the 4D Cities network:

Novara	stronger link healthcare centres with companies
Tartu	retention of skilled people, niche product development
Leeds	link social care with health care, higher patient involvement
Igualada	retention of skilled people, higher patient involvement
Plunge	lack of specialised companies, city strategy on smart health
Eindhoven	stronger link healthcare centres with companies
Jena	stronger involvement of citizens in innovation strategies, link social care with health care
Baia Sprie	new work opportunities to prevent depopulation

To respond to these strengths and needs, the 4D Cities network will identify and showcase local best practices in identifying the following strategies and needs:

- Liaise companies and healthcare providers at local level with the aim to enhance economic growth in the area;
- Foster the involvement of citizens, in particular through the development of non-technological health innovation projects, with a strong focus on social innovation;
- Increase skills and literacy of all involved stakeholders related to health and innovation, both through better networking and strategic tools as well as through transnational mutual learning;
- Identify and reach consensus on a local strategy towards health and innovation which renders economic growth while enhancing the involvement of the citizens as co-producers of their health;
- Reinforce the research/technological activities related to healthcare implemented in the region, based on multi-stakeholder involvement;
- Diffusion of the produced knowledge and innovation achieved in the region related to healthcare and social welfare;
- Facilitate the take up and implementation of those health innovation services and products that support citizens' involvement and render economic growth to the cities.

All Urban Local Support Groups include stakeholders coming from the four drivers of health and innovation (see page 9 - Healthcare and social welfare; Companies; Citizens (and patients); Academic sector). Building up on the ULSG and subsequent LAPs, the 4D Cities network proposes to focus its implementation on these four drivers, which are directly interconnected and where local governments can play a role. As Graph 9 shows, the City

governments act as facilitators of these four drivers at local level, in order to increase patients' safety while rendering more economic growth for the area.

In order to assure that all Local Action Plans feed into the development of a transnational learning experience, each city has selected one driver as best practice, describing to the other cities how the driver is driving providing social and economic return for the area. This way, each ULSG and LAP is interconnected with the 4D Cities network.

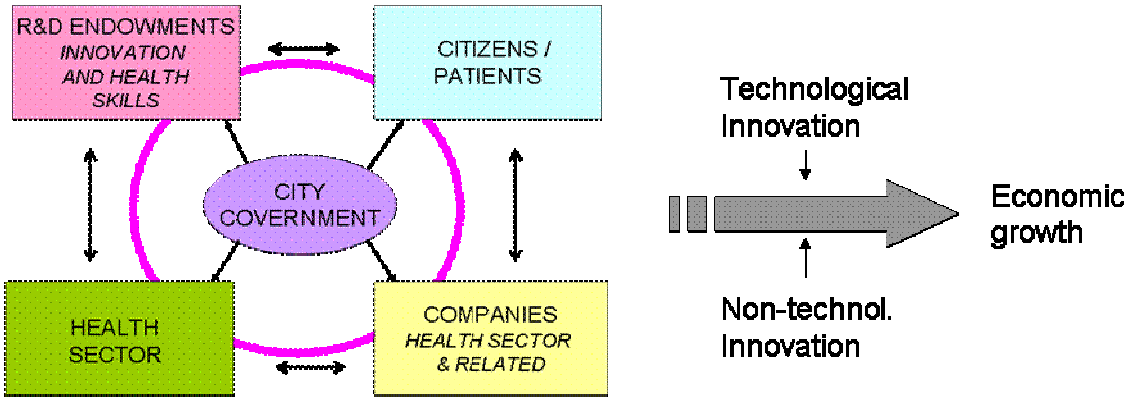


FIGURE 9: FOUR DRIVERS OF 4D CITIES & ECONOMIC GROWTH
SOURCE: OWN GRAPH

Such interlinkage of various stakeholders in the innovation process through various formal and informal networks is known as *cyclical innovation model*. The cyclical innovation model does not regard as most promising success factors for innovation exogenous forces but rather endogenous outcomes of a complex multi-actor economic system in a competitive environment, such as in the case of the 4D Cities network, in which public and private structures of various levels are called upon to cooperate and work together within a sector based on a high specialization and bond to complex regulation schemes.

Based on this cyclical innovation model, the capitalisation of such learning exchange is attained at various levels, including the following ones:

- experts from other cities will be invited to discuss and learn from such models and can more easily feed back into their own work;
- for each best practice, the transnational visits will assess what tools and strategies were used to attain the economic and social impact, and how the stakeholder involvement is being coordinated and secured;
- concrete methodologies in the healthcare sector with a particular social impact at local level will be shared and disseminated.

All these cities of health and innovation are based on critical economic and academic mass, on the introduction of participatory methodologies and on the embeddedness in an international network which will facilitate the capitalization of the results.

Supporting the role of the cities as facilitators that trigger innovation by reducing uncertainty and by inducing synergy and interaction is particularly promising for a knowledge-driven sector such as health care. No previous project on this subject with a participatory process based on practical and concrete best practices at city level is known at EU level.

ANNEX 1. Definitions

For the purpose of this Baseline study, various terms are used that need to be defined in order to clarify concepts such as the difference between a healthy city and a city that fosters innovation in the biomedical sector.

- ◊ ***Healthy city***: a City which strives towards offering its residents healthy living conditions (transport, energy, water, waste, etc) --- cities ---- health services ---- innovation and health --- entrepreneurs, new services and products, competitiveness, …

- ◊ ***Integrated care***: brings together inputs, delivery, management and organization of services related to diagnosis, treatment, care, rehabilitation and health promotion. Integrated care seeks to improve the quality and cost-effectiveness of care for people and populations by ensuring that services are well coordinated around their needs.

- ◊ ***Health Impact assessment (HIA)***: a means of assessing the health impacts of policies, plans and projects in diverse economic sectors using quantitative, qualitative and participatory techniques.

- ◊ ***Diagnostic Related Groups (DRGs):*** a patient classification scheme which provides a means of relating the type of patients a hospital treats (i.e., its case mix) to the costs incurred by the hospital.

- ◊ ***Open data:*** "a piece of content or data is open if anyone is free to use, reuse, and redistribute it — subject only, at most, to the requirement to attribute and/or share-alike"[35].

- ◊ ***Biomedical innovation***: development of products and technologies focused on new human therapeutics, including new medicines, diagnostics, screening and drug delivery systems for human use.

- ◊ ***Health innovation***: the implementation of new or altered products, services, processes, systems, policies, organizational structures, or business models that aim to improve one or more domains of healthcare quality or reduce healthcare disparities.

- ◊ ***Biomedical cluster***: a geographically-bounded group of similar and/or related firms and organizations that enhance competitive advantages for

[35] Source: www.opendefinition.org

the members and the host economy, in this case related to the biomedical sector.

◊ ***Spin-off***: new, small, technology—or knowledge-intensive firm whose Intellectual Property has origins in a public research institution.

◊ ***Living Lab***: an ICT-focused forum for research and innovation applied to the development of new products, services and processes.

◊ ***Knowledge markets***: formal mechanisms and institutions that facilitate access to and use of a wide variety of types of knowledge. Examples of such mechanisms include public private partnerships, consortia, innovation networks, brokerage facilities, prize mechanisms, and data sharing/exchange platforms. Knowledge markets make knowledge available, accessible, usable and sometimes tradable.

◊ ***Health Technology assessment***: a multidisciplinary process that summarises information about the medical, social, economic and ethical issues related to the use of a health technology in a systematic, transparent, unbiased, robust manner. Its aim is to inform the formulation of safe, effective, health policies that are patient focused and seek to achieve best value.

◊ ***Innovative organisation of care:*** the transformation of care systems from reactive and episodic to integrated and proactive, based on continuum of care – from diagnosis through treatment to rehabilitation.

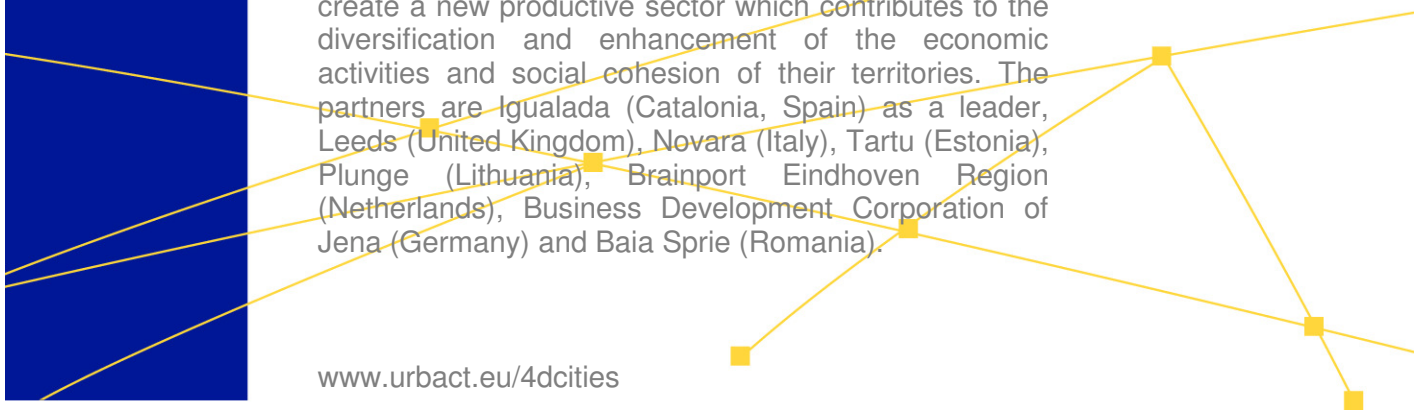
◊ ***Healthcare system:*** the complete network of agencies, facilities, and all providers of health care in a specified geographic area. Nursing services are integral to all levels and patterns of care, and nurses form the largest number of providers in a healthcare system.

◊ ***Healthcare policy innovation:*** A healthcare policy innovation is a new approach in a given organizational context for driving changes in the behavior of individuals, groups, or organizational entities that improve quality or reduce disparities in the delivery of healthcare services.

URBACT II

URBACT is a European exchange and learning programme promoting sustainable urban development. It enables cities to work together to develop solutions to major urban challenges, reaffirming the key role they play in facing increasingly complex societal challenges. It helps them to develop pragmatic solutions that are new and sustainable, and that integrate economic, social and environmental dimensions. It enables cities to share good practices and lessons learned with all professionals involved in urban policy throughout Europe. URBACT is 300 cities, 29 countries, and 5,000 active participants.

4D Cities is an URBACT project that aims to develop cities through the interaction of the actors which operate in the fields of Health and Innovation such as the university, the healthcare system, the business and the citizens. It involves 8 European cities that would like to create a new productive sector which contributes to the diversification and enhancement of the economic activities and social cohesion of their territories. The partners are Igualada (Catalonia, Spain) as a leader, Leeds (United Kingdom), Novara (Italy), Tartu (Estonia), Plunge (Lithuania), Brainport Eindhoven Region (Netherlands), Business Development Corporation of Jena (Germany) and Baia Sprie (Romania).



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URBACT