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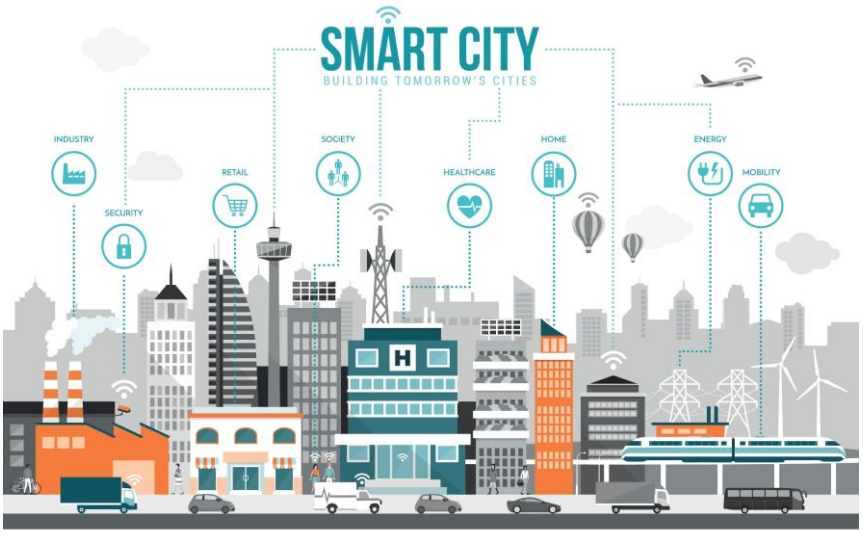
Smart cities in Finland

- an introduction



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Mari Laakso
Flanders Investment & Trade
c/o Embassy of Belgium in Helsinki
Aleksanterinkatu 17
00100 Helsinki
helsinki@flanderstrade.com

FLANDERS INVESTMENT & TRADE

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Introduction

Today 78% of the European citizens live in cities, where 85% of the EU's GDP and 90% of all innovations are generated. Accordingly, 70% of all CO2 emissions are of city-origin. As cities are being developed in order to cope with increasing demands and challenges created by urbanization, smart solutions are required.

Finland is one of the leading European countries in developing smart cities. The overall purpose of transition towards smarter city platforms is to save inhabitants' time in a sustainable way, improve their quality of life and create new business models, know-how and jobs. Efficient city planning and development have been in focus for many years in Finland. Even, some of the technological structures are unique on world scale. For example, Helsinki produces electricity, district heating and cooling by a combined heat and power generator in a single process which requires significantly less fuel than separate productions would do. Both electricity and heat are distributed to 90% of the city's houses, making it a rare solution.

Finnish cities are especially smart in terms of taking inhabitants and users into account. High level of interaction is emphasized and people are encouraged to participate actively in the development of smarter and sustainable city platforms. In addition, an increasing number of start-ups and other companies are involved in transformation process of smarter environment, mobility, governance, economy and living.

Smart cities are globally a strongly growing market and it is estimated that it will be worth 1.3 trillion EUR by 2020. As the progress is ongoing and the market is extremely fragmented, it is impossible to give detailed numbers in terms of economic impact and number of jobs it creates in Finland. However, it is estimated that smart cities will have a remarkable impact in Finnish economy and the market will grow to billions of euro.

The Six City Strategy

The six largest cities of Finland (Helsinki, Espoo, Vantaa, Tampere, Oulu and Turku) together have facilitated an open innovation platform called 'The Six City Strategy', which consists of common development of smart solutions and implementation of experimental projects intending to tackle challenges related to urban environment. These cities cover 30% of the Finnish population and the whole urban community participates in developing and testing of innovative concepts. The Strategy was launched in 2014. 26 projects with a total budget of 45 million EUR have been executed ever since. The strategy plays an essential role in boosting Finland's economy and competitiveness and implements the EU-level territorial development instrument ITI-Integrated Territorial Investment in Finland. The managing authority of the instrument is the Ministry of Economic Affairs and Employment. As Finland aims to be carbon neutral by 2050, these cities act as pilots in the transition.

Companies can freely experiment their innovative solutions in these six cities. All data, experiences and standards are shared between stakeholders. In fact, Helsinki was chosen as the best Open-Data City in the World owing to the platform called 'Helsinki Region Infoshare'. It publishes all of its data on traffic, city planning and real estate, construction, culture, economy and taxation, education and training, environment and nature, health, housing, information technology, jobs and industries and

law in formats that make it easy for software developers, researchers, journalists and others to analyse, combine or turn it into web-based or mobile applications.
More info: https://6aika.fi/in-english/

Helsinki

Kalasatama is the smartest district of Helsinki at the moment. The vision of Kalasatama is that smart services save one hour of residents' time every day. Developing and building Kalasatama will continue to 2030, and by then there will be 20,000 inhabitants and 8000 jobs – currently 3000 people live in the area. It is a place to experiment smart urban living and services and is created together with residents, companies, city officials, researchers and other stakeholders. 70 companies are taking part at the moment, presenting all size of groups: there are 31 micro-sized, 17 small, 5 medium-sized and 17 large entities. In addition, agile piloting is run for start-ups. As for funding, 5 billion EUR is already invested by private sector and 600 M EUR by the City of Helsinki.

Examples of smart solutions present in Kalasatama:

- Floating, customized apartments and smart houses with adaptive and scalable technology related to heating and lighting
- Digital health services
- Shared electric cars
- Co-created senior house with 500m² of shared spaces
- Future school (new ways of teaching, no class rooms, latest learning technologies)
- HIMA Smart Metering, home appliances controlled by mobile devices
- Smart Waste Collection System (waste is sucked by a vacuum into underground pipelines at a speed of 70 km/h into and whizzed into the local waste management facility)
- Smart lighting in outdoor route and open garden with berries and mushrooms
- Carbon neutral zoo
- Smart campus
- Old power plant facilities "produce culture" as the spaces are available for events
- Solar park for which the residents crowdfunded the panels – it balances the electricity supply
- Surf park with Finnish technology innovation that creates waves in natural waters
- Smart Grid, IoT solutions testing, personal data usage for customized services.

More info: https://fiksukalasatama.fi/en/

Tampere

Smart Tampere brings together local and international companies, universities, organizations, citizens and the city government to enable digital solutions for a smarter Tampere and to develop these solutions into exportable products. In addition to the traditional role of procuress, the city can act as a testing ground. So far, Tampere has been able to ensure city development investments of over

6 Billion for the next 10 to 15 years. The key goal of the Smart Tampere program is to make sure these investments are used to build a smarter city and to secure economic growth.

Tampere hosts two living labs, Koklaamo and Demola.

Demola is an international network producing innovation projects co-created by university students and project partners. Demola was established in 2008 and is growing rapidly, nowadays operating internationally in almost 20 different locations. Demola launches annually three campaigns including 70 Demola projects with 50 project partner companies and 400 students. Projects start from existing need or problem and result to tangible concepts, demos and prototypes.
More info: https://tampere.demola.net/

Koklaamo aims to find new solutions to challenges dealing with residents' everyday life and the district's renewal process by bringing together businesses, inhabitants, communities and experts and interested in urban development. Koklaamo focuses on one specific theme at a time for a period of 6 to 8 weeks. Solutions for the challenges are planned and developed in workshops, which utilize the Lean Service Creation -method. During experimentation period, which lasts about 1 to 3 weeks, the solutions go through agile experimentation in a real urban environment with real users.
More info: https://koklaamo.fi/

Turku

The City of Turku aims to be carbon-neutral by 2040 and strongly promotes sustainable energy transition, circular economy and smart mobility.
More info: www.turku.fi/en/housing-and-environment

Turku is a pioneer city in integrating public transport in Mobility as a Service (MaaS) solutions. MaaS combines different transport modes into user-friendly mobility service packages. Regional bus tickets will be included in the local MaaS package (cooperating company: Tuup Oy - FI). 'Last-mile-by-taxi' pilot cooperation project between regional bus traffic and local taxi operators started in September 2016 (IQ Payments Oy - FI, INIT Gmbh - DE and Western Systems Oy - FI). A new international MaaS project was launched this autumn together with Madrid, München, Stockholm and Ruse. The fully integrated mobile ticketing system of regional bus traffic has over 20,000 registered users, and has tickets, monthly passes and reload functionalities to account based products (IQ Payments Oy). The regional bus traffic has an ID based multimodal and integrated ticketing system (INIT Gmbh and Western Systems Oy).

Turku introduced electric buses in public transport in September 2016. The bus line from the city centre to the port and to the airport will be operated with electric buses. Six buses and two opportunity charging stations will serve the 12 km route with over one million passengers annually (Linkker Oy - FI, Heliox B.V. - NL, Schunk Bahn- und Industrietechnik GmbH - DE, Turun kaupunkiliikenne Oy - FI, Oy Turku Energia – Åbo Energi Ab - FI).

An autonomous passenger ferry is planned for the river Aura with possible connection to Ruissalo Island. The electric ferry functions without crew and is operated from a remote control centre. The project is developed in cooperation with Finnish maritime industry, universities and research

institutions. An electric funicular railway will connect Aura riverside to Kakola, the 19th century prison area that will be converted into a residential use.
More info: http://civitas.eu/eccentric/turku

Oulu

Oulu is the fastest growing region in the Nordics and the home base for over 600 high technology companies and a unique 5G test network.

For 15 years the City of Oulu has developed the quality of buildings and constructions by Proactive Quality Management of Building Supervision. The focus has been on issues like moisture management, energy efficiency, renewable energies, renovations, and healthy built environment. Proactive Quality Management has been targeted to contractors, building companies, designers and single-family home owners. During the years of development of this proactive work model, Building Supervision has organized hundreds of education sessions and completed several national and international projects funded by the city, Tekes, EU and the Ministry of Environment.
More info: www.businessoulu.com/en/frontpage/en/businessoulu-2/programs-and-projects.html

At the moment the area of Hiukkavaara, old military area, works as a large scale living lab for both development of city planning and construction. Over 20,000 people will live and work in the area.
There is a focused piloting area of energy efficiency, renewable energies and new technologies. This area was built during two projects RESCA Oulu and Future Buildings and Renewable Energy (www.tulevaisuudentalot.fi/english/). Goal of these projects was to develop and utilize the latest IoT technology with various kinds of renewable energy sources and many new solutions for the hybrid forms of heating. Part of the challenge also was to build safe structures and healthy houses. The area continues to be of great interest to international guests and more piloting platforms are being built in Hiukkavaara.
More info: www.ouka.fi/oulu/hiukkavaara/english

Oulu hosts MAPGETS, an open visual 3D application platform. MAPGETS includes locational information – such as maps, routes, buildings, plans, streets and services – from all around the world. It can be used as the platform for a wide range of applications, such as those designed for urban planning, asset management and process management. Typical users of such applications include cities and municipalities, industrial companies and their customers. The City of Oulu uses it as platform for its SmartOulu application.

Lahti

Hennala is a district in Lahti that is being built into an innovative pioneer area of technologies, services and operation models related to electric transportation. This area will be connected also to city centre of Lahti using new solutions of future mobility. The area will minimise the life cycle costs of mobility and environmental stress by combining the best technologies in the industry with crowd-sourcing of traffic. The area focuses on various solutions and services to combine traffic and the utilisation of renewable energy sources to fuel electric transportation.
More info: www.lahti.fi/en

Important players and stakeholders

Forum Virium is an innovation unit within the Helsinki City Group, which develops new digital services and urban innovations in cooperation with companies, the City of Helsinki, other public sector organizations and Helsinki residents. https://forumvirium.fi/en/

City Business is Finland's biggest cities collaboration [1], where they open their infrastructures and processes to companies, to aid them to innovate and where they can develop and test new products. https://citybusiness.fi/en/

Finnvera is a Finnish state-owned specialised financing company. It provides its clients with loans, guarantees, venture capital investments and export credit guarantees. www.finnvera.fi/eng/

Helen Ltd's energy production is awarded as the most efficient in the world. Helen has almost 400,000 customers throughout Finland and it's district heat covers over 90% of Helsinki's heating needs. Helen Ltd's energy production is awarded as the most efficient in the world. www.helen.fi/en

Sitra is an independent public fund under the supervision of the Finnish Parliament. Its central task is to promote social wellbeing. www.sitra.fi

Tekes finances and promotes the R&D projects and innovation activities of the Finnish enterprises, universities, higher education institutions and research institutes. www.tekes.fi

INKA is a programme of Tekes and aims to create internationally attractive innovation clusters in Finland based on top-notch talent. www.tekes.fi/en/programmes-and-services/tekes-programmes/innovative-cities/

TIEKE, the Finnish Information Society Development Centre, promotes the development of the information society in Finland. It aims to connect the different players involved in developing the Finnish information society. www.tieke.fi/display/English/Home

Tieto provides IT, product development and consulting services in the Nordic countries. In some segments, its operations are global. www.tieto.com

Urban Mill is a space, a community and a service, situated in the heart of Aalto University campus in Espoo Innovation Garden. It brings together important actors to help solving the problems of urban life. It shows how the environment can be planned, designed and build, based on actual use. The goal of the hub is developing new digitally-enabled service concepts. Urban Mill builds long-term collaboration through new solutions that are tested rapidly and flexibly. https://urbanmill.org/

VTT is Northern Europe's largest applied research organisation. It produces a wide range of technology services and research services both for domestic and international customers in both the private and public sectors. www.vtt.fi

[1] The 6 cities are: Helsinki, Tampere, Turku, Oulu, Espoo en Vantaa

Examples of companies & solutions

IMU is a smart waste collection system by Envac group. www.kalasatamanimu.fi/en

Flextila is a smart space, sharing service platform (an 'Airbnb' of spaces). https://flextila.com/

Nappi Naapuri is a social media for neighbourhoods. https://nappinaapuri.fi/welcome

SolNet is a strongly growing company, supplying solar panels in Finland. They already expanded their business to Estonia and they are going to establish in Central- or Western Europe as well. The company was chosen as WWF's Climate Solver. http://solnet.fi/en/

LeanHeat offers a smart control and maintenance system for buildings that saves 10 to 20% in energy consumption. Municipalities are their primary customers. http://leanheat.com/en/

Tuup offers multimodal, daily traveling and 'Kyyti on demand rides' in one app. All mobility options (urban transit, intercity bus & train, car rental & sharing and city bike) are included. http://tuup.fi/en/

Fira Palvelut Oy has introduced an alliance model for bathroom renovation. As the workers had three shifts, they were able to execute the whole project in two weeks while it usually takes 12 weeks. www.fira.fi/en/palvelut/

Joukon Voima is the energy start-up of the year 2016. It is a platform that enables investing in sustainable energy projects. https://joukonvoima.fi/en/

Cozify is a wireless smart home hub and it connects smart devices from different manufacturers into one seamlessly working entity. https://en.cozify.fi/

BaseN is an industrial-grade, scalable IoT platform developed since 2001. It enables the transformation from product to service business in any industry. www.basen.net/

MaaS Global aims to be the Netflix of transportation and has launched an app named 'Whim'. The CEO of MaaS Global and his friends actually created the term MaaS, Mobility as a Service. The company has recently received a 10 million EUR investment from Toyota. http://maas.global/

Linkker produces electric buses. www.linkkerbus.com/

Lumine Lighting Solutions produces intelligent street lights that save 70% of lighting costs. www.lumine.fi/en/

A-Insinöörit provides Cityfier, a digital service that applies latest game engine technology to measure distances between the qualitative components of future neighbourhood. www.a-insinoorit.fi/en - www.ains.fi/

Citynomadi is a map based information on city areas. https://citynomadi.com/

Future Dialog enables engagement and creates dialog among communities and cities. www.futuredialog.fi/

Greenled offers sustainable lighting solutions and is a reliable platform for Smart City innovations through lighting grid (Sirius). www.greenled-lighting.com/

PayIQ provides cloud-based intelligent mobile solutions for public and private transport. https://payiq.net/en-us/

Sito improves the maintenance of the basic registers, zoning and building control, the management of infrastructure property and mobility & transport services through cloud based services. www.sito.fi/en/

Videos

'How to get an extra hour? This is Finland 25/7' - www.youtube.com/watch?v=fDfLEbW8FTc

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