

Summary:

With local slogans like: “*Knowledge for a better world*”, “*Technology for a better world*” and “The living, innovative society strategy”, it may come as no surprise that Trondheim is dedicated to co-shaping the city and surrounding region as a *living, breathing, and engaging test-arena*. With the help of Trondheim’s citizens, knowledge sector partners, the business sector and the municipality the region has fine-tuned Trondheim Nordic City Lab --- a model that has quietly grown out of 1,000 years of innovative culture, though has recently been moving into centre stage through collaborations spanning from Denmark to China.

In under two years, the Trondheim Nordic City Lab action plan has provided exportable learning examples of how a quadruple-helix working relationship between citizens, academia, the business sector and public sector, can yield results that include better education, an increase in fun and vibrant public activities, growth and viability of startups, advanced commercialisation of innovation-based ideas, and improved livability in the city and surrounding region. Municipal strategy that supports the ambitious plans of Norway’s largest University, has inspired local citizens to be proud of their knowledge sector, while they take part in improving local services and products that eventually aid in commercialising research and innovation seeking to mitigate global challenges. In this respect, Trondheim is well involved in setting the Nordic agenda. Through these efforts, Trondheim has been identified by McKinsey Global Institute as the third richest city by 2025 due its innovation and technology sectors, and ranked extremely high on Global Quality of Life indexes.

About Trondheim

Since its earliest origins Trondheim has been a international city that fostered a culture for innovation and exploration, tightly woven into the city’s population, resulting in a knowledge sector that works hand-in-hand with the municipality.

Trondheim is Norway’s historical capital city, having transformed over the past one thousand years into a vibrant knowledge hub that is today known as Norway’s Technology Capital. In the late 900s the region’s Åfjord boat was the world’s first green long-voyage seafaring boat to be sold internationally, to customers in Portugal, Scandinavia and they believe, the Middle-East. In 950 explorer Leif Erikson voyaged from the region onwards to Greenland, later to discover the Indigenous communities living in Eastern Canada. At the turn of the century, Trondheim built what is still considered one of the most significant cathedrals outside of the Vatican, hosting a significant pilgrimage that still. In the 1100s Trondheim built its first innovative school connected to the cathedral, which later became the city’s alternative and explorative highschool, Cathedral skole, still active to this day.

Now, with a small but steadily increasing population of under 400,000 within the region, Trondheim is home to Norway's largest university, the Norwegian University of Science and Technology and Scandinavia's largest private research organisation, Sintef. This translates into a dynamic citizen population where one in five inhabitants are registered students and one in seven inhabitants work within the knowledge and innovation sectors, heavily focussed on green technology. The city itself is nestled in nature, adjacent to a large forest and beside a largest fjord. It goes without saying that Trondheim is a dynamic, unique innovation ecosystem in close research and development with the knowledge sector, with citizens that have an above-average interest in societal well-being, with altruistic motives that knowledge and commercialisation should meet global challenges. Norwegians generally are recognised for their early technology adoption rate, and Trondheim, having developed the GSM network, touch technology and semiconductors for mobile technology, is no exception. With a public sector that incorporates new innovative services from the cradle to the grave and augments democracy by partnering with the private sector, academia and civil society, making it an effective quadruple-helix model city. The city is sprinkled with activities and meeting places. Trondheim's largest innovation hubs, DIGS, Work-Work, NTNU Accel and NTNU FRAM arranged nearly 1,000 multi-purpose co-creation events in 2017 together with the private, public and citizen sectors. These considerations, along with a driven provincial and municipal government whom have signed Europe's most comprehensive University-City collaboration agreement (University-City 3.0 Agreement), provides the ultimate premise for an interactive living lab. Students, researchers and citizens alike are encouraged and willing to test their ideas out and co-create methodology to mitigate global challenges, using Trondheim as a starting arena.

The overarching Strategies

Trondheim was an early actor in innovation research, leading the city to create a new 'Living, innovative Society Strategy' in 2009, that recognises its knowledge sector and the thousands of international researchers and students, as its greatest comparative advantage. This thorough municipal strategy highlighted new measures from the City Council that sought out to identify Trondheim as Norway's Technology Capital, increase interactive education with the University, display results from the knowledge sector within the region's geography, increase multiculturalism, increase the quality and accessibility of health services and digitalise municipal services. Moreover, the city aimed to shape a green city that involve its citizens in increasing local livability. From this strategy spawned a number of different initiatives, such as 'Knowledge Axis' in xxxx that sought out to involve citizens in new, smart, urban planning; 'University-City 3.0' 2017 that looks to test out the innovation from its knowledge sector, a thorough collaboration between the city and the university, and a regional strategy for Entrepreneurship and Innovation executed in 2017, identifying 'Trondheim Nordic City Labs' as a major focal point.

Trondheim Nordic City Labs

City Labs is an initiative commenced by the Trondheim Municipality to further support the inclusion of the city's inhabitants in idea-creation and the testing out of new ideas, services, technology, and products. While the University and research organisations have their own strategies for 'Nordic test beds', City Labs differentiates itself by providing and paying for public spaces, equipment and work hours so that individuals and new companies can better connect with the local citizen population. City Labs also creates a risk-assessment model for the public sector, in order to test out ideas prior to commercialisation, paving the way for smoother and more effective public procurement down the line. Furthermore, in collaboration with the city's participation in 'Open, Agile and Smart Communities' the program utilises public spaces to gather data for Internet of things (Iot), as well as opens up public data so that students, startups, researches and private companies can better understand public needs and trends in order to create better services.

The purpose of the City Lab is to be a test facility for Smart City solutions and a showroom for new innovative initiatives. The Trondheim Nordic City Lab functions as a playground for partners, a test facility for current and future EU initiatives, and a place where Trondheim can develop its digital citizenship, all the while creating a fun and exciting urban arena.

Trondheim region's strategy for innovation and entrepreneurship has a budget of 300,000 euros and focuses on providing meeting places for citizens and technologists to meet, as well as assist promising startups to connect with the private and public sectors to test out their ideas and prototypes with potential users within the city. Approximately 50,000 euros are dedicated to funding startups so that they may purchase equipment and services that will allow them to for example install new technology in the city's test hospital, St. Olavs, or at the city's top-sports centre, Granåsen. Approximately 10,000 euros has been dedicated to the city's first public interface, Trondheim:Only, a platform that strengthens the region's innovation culture by connecting products and services in their earliest phases of production, with enthusiastic residents.

Experimenting

Please describe how your city offers increased opportunities to citizens to innovate and ensures the uptake of their ideas. Be precise in terms of municipal support and implementation of citizen-driven innovation.

Trondheim Nordic City Labs blends the urban planning, industry, sociological and academic definitions of living lab: whereby citizens and users gain experience experimenting with new products, services, labs for social innovation and brainstorming new solutions, while testing new approaches. This provides an opportunity to float new ideas and discuss potential solutions that can be applied locally, and internationally. This includes arenas dedicated to augmenting democracy, planning, and innovation-based research development. Trondheim Municipality has expanded this definition by including activities that supports

startups to install their prototypes in public spaces, and test out their ideas within schools, health facilities, libraries and science centres, and employee-base administered by the municipality. The intention is to foster partnerships for innovation projects and increase the number of events in the city.

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Some of the earliest results of Trondheim Nordic City Labs included an interactive Science Camp for children and youth connected to Stephen Hawking's Starmus Festival, where 1,500 grade school students, 800 high-schools students and upwards of 5,000 public attendees of all ages visited interactive events using technology built in the city. Additionally, TNCL partially funded the annual Trondheim Maker Faire, with 20,000 annual visitors, where kids aged 0 - 90 visit interactive booths, test out new solutions and play. City Labs for urban planning initiative used just under 100,000 euros in user-driven, visioning and planning projects for one of the city's industrial areas, Nyhavna. The City Labs initiative for startups distributed 50,000 euros to support local research-based companies to improve their products through Hackathons, testing in the health technology apartment for seniors, top-sport centre and schools. One example is Smart 113, that received funding to test out their GPS system for identifying your location for emergency services. They have since received national financing and expanded their service to other cities, including the capital.

Engaging

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Trondheim Nordic City Labs engages local citizens through 1. Physical meetings spaces 2. Physical arenas for testbeds and access to publicly-owned test beds for industry members and startups 3. Digital services 4. Startup mentoring and public interaction

Meeting Places: Like many cities in Europe, Trondheim has a long traditional of hosting events in the form of hackathons, startup weekends, student festivals, science fairs and research days. The

oldest annual festival in Trondheim, Olavsfestdagene, celebrated its 1,000 year and has rejoices in merging history, with the new. Since the implementation of Trondheim Nordic City Labs over 200,000 euros have been allocated to Technoport Conference, a private-public non-profit organisation with an aim to strengthen the local culture for innovation and entrepreneurship, all the while mainstreaming its synergy. By creating meeting places throughout the year Technoport offers pop-up 'playgrounds' attempting to break down the barriers between tech, art and play, including a bi-annual event entitled Tech, Hugs, Rock n' Roll, their annual conference that acts as a test arena for the newest innovation with 1,100 attendees and innovation breakfasts held bi-monthly in otherwise 'locked innovation offices'. These events merge various fields and disciplines together, connecting researchers, planners, business angels, startups and students. The region's citizens are invited to join and be part of sparking innovation, furthering awareness-building. As a partner in Climate-KIC, the municipality collaborated with citizens, students, and researchers in 2017 for two 24-hour Climathons focussed on rejuvenating public and outdoor space with an intention of addressing climate goals.

Physical arenas: Trondheim Municipality, NTNU and the local daily newspaper Adresseavisen collaborated and won SXSW's honoured Best Place by Design Prize 2017 for their City Lab project 'Adressaparken' a 2,000 m² outdoor plug and play arena with sensors intended for the use of the city's artists. Their aim is to create a dialogue with the local citizens and passer-byers, such as they may engage in dialogue on local societal challenges. In May 2018 NTNU, the municipality and four other European cities applied for a Horizon2020 call in order to gain funding to improve this model and export it to the rest of Europe. The city's Olympic sport centre is also in the midst of establishing a physical test centre for new e-sport and health technology, where athletes, amateurs and the curious can participate in prototyping and piloting new solutions.

Digitalisation: The Municipality's Digital First Choice program was launched a number of years ago, but through the Trondheim Nordic City Labs initiative, has been able to connect with new vendors, often startups in their earliest phases, who have fresh views on how to work with GovernmentTech. Through Digital First Choice, all of the city's inhabitants can access their personal information, from the cradle to the grave, and complete necessary functions in a simplistic way, such as find and register their children in kindergarten. These services are in constant improvement with the help of citizen feedback and focus groups.

Expanding

Please describe how your city is attracting new talents, resources, funding, investments through innovative practices, and how this helps your city to become a role model for other cities. You may

include references to relevant innovation programmes and networks your city is participating in. Trondheim has been quietly innovating and exporting its innovation since prior to the technological revolution. Its close proximity to the knowledge sector and accessibility to resources whether citizens intend to come in contact with top leaders, or Nobel-prize winning researchers. There are 4,000 hotel rooms being rented for a total 18 million euros in guest visits, with a large percentage of international visitors. Each year 5,000 international students attend the university and participate in over 1,000 student lead events including the world's largest student peace festival ISFiT. Trondheim Municipality expands the arena for these activities by providing pop-up spaces through Trondheim Nordic City Labs. Additionally, through supporting a cyber-space with 20,000 euros for testing out new ideas through Trondheim:Only, a platform in the pipeline for connecting new technology with users and citizens for development. Each year hundreds of investors and business angels attend events supported in part by Trondheim Municipality, who act as brokers to showcase new talent and up-and-coming consumer solutions. Delegations from around the world visit Trondheim through many of the events organised with financial support from Trondheim Nordic City Labs, looking to learn from the local model and reinvigorate their innovation ecosystems. The initiative also supports the city's largest innovation hubs, DIGS, Work-Work and NTNU Accel, with 130,000 euros to continue providing industry and grassroots activities and bring life to the city.

Empowering

Trondheim's move towards a happy, healthy, and regenerative smart city continues the city growth, promotes Trondheim as a Technology Capital, and drives innovation and improves quality of life.

In 2014 the city set out to help establish 20,000 new jobs in the technology sector and 500 new companies are expected until by the year 2025. 95 major global technology companies have offices in Trondheim, and 70 new technology companies are being founded in the city per year. It expects to work with 580 startups in 2018 alone that are receiving funding and test out technology using Trondheim Nordic City Labs.

Trondheim's strategy for innovation and entrepreneurship was co-created with its startup ecosystem and supports coworking, startup, incubator, and innovation hubs. Through the Trondheim Nordic City Labs and the University-City agreement TRD3.0, the city is opened up as a living lab for citizens, municipality, university, industry, and the startup ecosystem.

Trondheim supports the Technoport event and surrounding ecosystem to draw new talent and foster new solutions. It runs the Young Entrepreneurship in the schools and Innovation and Science camps, where over 20,000 children can participate in innovation activities and experiment with new technology.

Trondheim's intends to increase their budget on new innovation by 137 million euros per year until 2030 and focus on export and international investment. The University-City alone is funded with 5 million Euro for better anchoring of research-based innovation in the city.

Public participation is of high value, and Trondheim is increasingly using open and agile co-creation tools in its public consultations and workshops with stakeholders around a range of municipal and city planning tasks, ranging from better information to concrete planning tasks within a neighborhoods. This includes new citizen engagement formats and digital tools.

These initiatives have changed Trondheim's operation model, moving towards more flexible and citizen-focused modes, towards a learning city. Short-term public interventions to gauge the efficiency and effectiveness of policy are becoming more common.

Its procurement rules now allow for easier SMEs and startup access and the City Labs coach startups into being more attractive vendors for municipalities, aiming for locally-grown technology.

Examples of ongoing innovation projects include:

The Adressaparken interactive art installation, which won first place at the SXSW 2018 Place by design competition, is now being used as a model for the redevelopment of the Nyhavna harbour area.

Electric autonomous ferries are being tested in Nyhavna and the Trondheim Fjord, which has been designated a national testbed for autonomous boats, used by NTNU and more than 5 other high-tech companies.

Bylab (City Lab), Knowledge Axis, and Trondheim Playground provide testbeds for using the city as a lab and to anchor city development approaches in the city, including the university, civil society, a range of industry and property development partners, and solutions for deeper citizen engagement.

Climathons and Hackathons engage citizens and startups in finding creative solution to city issues around emission reduction, climate change, energy use reduction, and mobility.

Furthermore, Trondheim is competing for a number of European projects, including an H2020 Lighthouse project for 20 million euros, to develop its smart city, smart energy, and emission reduction goals offering more arenas for Trondheim Nordic City Labs. They have recently submitted an application to Climate-KIC with partners from Aarhus, Berlin and Edinburg for 2.5 million euros to export their City Labs model to the rest of Europe and train the public sector with new mythologies for partnering with citizens.

Miljøpakken is the award-winning Greener Trondheim pact for sustainable transport. From 2010 to 2025 it invests 1.5 billion Euro in roads, cyclist and pedestrian facilities, and improvements to public transport, including the metrobus project to reduce car trips.

Trondheim plans to use the European Capital of Innovation award to improve its visibility on the European stage, to draw more talent and companies, to commercialise more research from the knowledge sector using citizen-participation and cooperate with more European actors, and to foster innovation and knowledge exchange outside of Norway and the Nordics.

Links:

Application website: <https://teknologihovedstaden.no/>

Our application video: <https://www.youtube.com/watch?v=AfDzmSWCoIw>

University - City 3.0 Collaboration www.universitetskommunen.no