



Trento: Building on past achievements





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Although Trento covers a relatively small area of c. 20,000 km², with a total population of about 0.5 million inhabitants, its performance in innovation is remarkable. With 2.19% of its GDP invested in R&D, the city is for example well above the European average. Recently, Trento has even been ranked as the “world best practice” in the implementation of the concept of smart cities. Such outstanding track records would certainly not have been possible without the many reforms and programmes developed and implemented in Trento over the years. Clearly much work remains to be done. Yet, Trento's leaders early efforts to trigger the digital transformation of their territory has certainly given the city a head start.

1

Problem statement

A city focusing on innovation

Although Trento covers a relatively small area of c. 20,000 km², with a total population of around 0.5 million, its performances in terms of “innovation” are remarkable. 2.19% of its GDP is invested in R&D activities (Italy: 1.27; EU27: 2.02). 6.1 of every 1,000 inhabitants are employed in R&D (Italy: 3.8; EU27: 5.1). It includes one University, 12 public research centres and six industrial research centres.

More than 800 world-class researchers work in Trento and leading businesses such as Telecom, IBM, Nokia and Siemens are involved in ICT research in the region.

A recognised top Italian city

Illustrating these remarkable performances, Trento was ranked as the top Italian city by the Italian iCity Lab Rate in 2013 for social inclusiveness and quality of life (evaluation process based on six core parameters: Economy, Governance, People, Mobility Environment, Living). It was the second best Italian city in the “Sole 24 Ore” quality of life 2014 ranking.¹

One of the top ten smart city models worldwide thanks to the

In 2014, Trento was also ranked as the “world best practice” for the implementation of the smart city concept as part of the IEEE (Institute of Electrical and Electronic Engineers) Smart Cities Initiatives framework, with the IEEE choosing Trento as one of the top 10 smart city models worldwide.

However, this is the result of many reforms and programmes that have been developed and implemented in Trento over the years, also aiming to establish it as a Smart and Digital City.²

In particular, unlike many other Italian cities, in 2000 Trento had already embarked on a strategic planning path set out in the Trento Smart City strategy guidelines adopted by the City Council in 2014. Since then, Trento has had a clear vision of what “it wanted to become” and this has facilitated the transition from the past to the future of the city.

Vision embedded in the Trento Smart City strategy guidelines

According to its vision, it was crucial to start from the planning that was already in place, focusing in particular on the elements that make a city smart and digital in each of the plans implemented (e.g. city mobility plan, local strategic plan, social plan, etc.).

As embedded in its strategy guidelines, Trento's vision is built around three main goals:

- Environmental and social sustainability;
- Ambition to transform itself into an “immaterial factory”;
- Challenge of developing and promoting its territory and cultural heritage.

Trento and the “immaterial factory”

To fully understand Trento's smart city strategy, it is crucial to acknowledge that Trento embodies the “immaterial factory” concept. This concept is a district of knowledge, where ideas, projects, solutions, technologies and start-ups come together, enhancing the quality of life of the entire city.³

In Trento, this concerns not only productive activities, but also the introduction of a series of technological innovations with positive impacts on local businesses, the city's GDP and the overall enhancement of quality of life for all.

As envisioned in its strategy guidelines, this is strictly linked to another crucial pillar from Trento's development plan: social inclusion. The city has continuously stressed that innovation should not only be as inclusive as possible, but should also aim to reduce economic and social gaps.

2

Realised benefits and new opportunities

Over recent decades, some big companies (e.g. Whirlpool) have moved their production elsewhere, leaving the city with high potential in terms of infrastructure and human capital to be capitalised on in the transition to become a smart and digital city.

Trento has many well-known research centres, institutes and foundations, as well as a university, and is therefore home to large numbers of researchers from all over Italy and abroad. Thanks to these two elements, Trento has extensive scope to develop technological solutions, making Trento a real model for a Smart and Digital City.

To focus further on its smart dimension, social innovation plays a crucial role in the city's overall innovation plan.

Public sector attentive to its people

An innovative relationship was developed between the local public sector on the one hand and its citizens and businesses on the other. The aim was to simplify the knowledge and functioning of available services that could be of interest to both citizens and businesses working in the region.

Mapping of processes and data

The city of Trento, integrated several databases, in order to be able to simulate policies, find new solutions and carry out detailed analyses of all aspects of the city and consequently make wise choices.

Simplified bureaucracy

The bureaucracy of the local public sector was limited to the minimum to foster the level of services offered, making them more efficient.

To achieve this result, Trento has adopted a new services strategy, which is one of the macro-objectives from the city's strategy guidelines and is based on an infrastructural idea of open data. This has been possible thanks to the creation of databases used for managing processes covered by the city's local public sector, and such databases are expected to become the core of the city's public sector over the coming years.

Four open data flagship projects

In Trentino, there are four flagship projects, carried out in collaboration with public and private partners, focused on open data. These are:

1. Open Data project in Trentino, aimed at publishing data collected by all departments for the province of Trento in order to generate accountability, promote transparency and foster economic growth;
2. Big Data project, focused on developing a platform based on state-of-the-art technologies and techniques for delivering advanced services to a wide range of users and applications;
3. Smart Campus, which aims to empower citizens with a more active role in designing, developing and delivering the services they want and like; and
4. Smart Crowds Territorial Lab, consisting of large groups of citizens living in the province of Trento who participate in R&D and innovation projects. Citizens who participate usually own Android smartphones and are trained to install and test mobile applications provided by Trento RISE and partners. Users are able to participate in user-experience research activities, as well as participatory design activities.

"OpenMove did not ask Trento's Public Administration for public funding, but for data" – Francesca Gleria, Autonomous Province of Trento

The most mature of these initiatives is the Open Data Project in Trentino, which created a catalogue containing 650 datasets from around 60 provincial departments in April 2014.

The city's strong commitment to creating databases and sharing them with local businesses has led to many tangible results. One of the most important results concerns an integrated smart city solution, named OpenMove, detailed in the next page.

Leading e-Government services

The main aim in this area concerns innovations for the relationship between the city's local sector, citizens and businesses. This objective also includes the development of an online helpdesk, supporting citizens and businesses to access the services offered by the municipality.

This approach is based on the innovative concept of a "one-stop shop" for interactive online services, which the municipality wants to define and implement with help from Trento's innovation ecosystem.

With this initiative, Trento wants to deliver a single access point for online services that is "simple, trusted, complete, connected and open" in order to better serve a smart city's innovation needs.

Energy efficiency and smart building

The city of Trento aims to achieve:

1. a new certified database of the city's real estate assets,
2. a database with live information on energy consumption,
3. a dashboard to manage and analyse energy efficiency data and consumption for both private and public stakeholders,
4. high-efficiency technologies for the construction of new public real estate, while making existing properties more energy efficient.

Integrated tourism

The aim is to build a digital ecosystem for an integrated framework to capitalise on and showcase tourism and cultural offers, providing tourists with innovative services and operators with the instruments needed to enhance the region's competitiveness.

Proximity marketing

The objective in this area is to localise the wireless distribution of advertising content associated with a particular area. A clear example of proximity marketing that has already been implemented in Trento is OpenMove.

In terms of public transport mobility, the location of public transport stops and their timetables, as well as parking facilities, where people gather, OpenMove acts as a facilitator to reconcile supply (public transport and parking) with demand (people looking for public transport and parking).

Health and wellbeing

The aim in this area is to further assist people in need. For the city's local public sector, the transformation of health data into a more integrated format is thus crucial.

"In the context of big data, the public sector is a mine and data are becoming the oil of a new economy, which highlights the importance of gaining knowledge at that particular moment and place" –

Lorenzo Modena, OpenMove

3

Drivers and obstacles

Key infrastructures (e.g. TasLab and Jol Skil) and easy access to financial incentives, coupled with the presence of a rich panorama of stakeholders and initiatives (e.g. TechPeaks and OpenMove), have been the main drivers for the digital entrepreneurship process in Trento.

On the other hand, Trento's main obstacle in achieving its digital city vision concerns the inclusion of a wide range of stakeholders.

A

Drivers

Key infrastructures

The willingness of Trento's public sector to provide local businesses with open data is reflected in the decision taken in 2012 by the Municipality of Trento, together with Trento Rise, to be part of the EIT ICT Labs, the European network for excellence in innovation for ICT. Through this participation, Trento aims to become the heart of TasLab (Trentino as a Lab), with its activities focused on open and big data.

Jol Skil – Telecom research and innovation laboratory

Telecom Italia decided to set up one of its research and innovation laboratories, Jol Skil, in Trento as a result of its partnerships and agreements with Trento University (today five universities are part of the Telecom network Joint open lab).

Jol skil lab is focused on developing technologies for the automatic analysis of major volumes of data. One of its core initiatives is the CitySensing Project, which aims to automatically process anonymised data flows from the Telecom Italia network and external sources (big data). These data will be used to identify evidence and trends in urban areas regarding personal mobility, the distribution of tourists in artistic cities, etc.⁴



Trentino as a Lab (TasLab)

TasLab is a cooperation cluster that aims to create an advanced innovation infrastructure capable of meeting users' current and future needs, not only from an ICT perspective, but also from a cultural and social point of view.

The plan is to reduce the digital divide, and at the same time to test out new ICT solutions, with deep involvement of all citizens, throughout the Trentino region.

This initiative is supported by the local government. Informatica Trentina acts as a catalyst and coordinator for the TasLab Living Lab.



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Taslab's main activities include:

- Developing a user-centric environment where innovation is the way of being, thinking and evolving for citizens in Trentino;
- Creating an environment where the full innovation cycle, from basic research through to market products, is taken on board;
- Setting up partnerships with other territories in Europe and worldwide, building on existing national and international cooperation initiatives and partnerships with stakeholders in Trentino;
- Launching awareness campaigns on sustainability issues in the Trentino region.

TasLab involves all the three main innovation stakeholders, namely research centres, enterprises and citizens. The research centres involved are:

- University of Trento (Department of ICT),
- Bruno Kessler foundation,
- GraphiTech, CREATE-NET,
- ISTC- CNR;
- Laboratorio di Interoperabilità ed e-Government (LEGO).

The research centres involved are:

- I&S Informatica e Servizi Srl,
- COGITO Srl, Sinergis Srl,
- Trentino Network Srl, GPI Spa,
- DeltaDator Spa,
- ALGORAB Srl, HEIDI Spa,
- Centro Ricerche Fiat (CRF),
- Siemens Spa.

The end-user organisations include:

- Autonomous Province of Trento,
- Public health agency,
- Consortium of the Municipalities of Trentino;
- Trentino Riscossioni Spa.

Institutional autonomy facilitating local access to funding

An additional driver in the pursuit of Trento's digital strategy is the presence of easy access to financial incentives, mainly thanks to the institutional autonomy granted to the Autonomous Province of Trento after the Second World War (1946).

Trento, unlike most of the cities in Italy, takes all its most important political and economic decisions at local level, rather than referring to the central government.

For instance, the Italian Unified Business Law (n. 6/1999) provides the Autonomous Province of Trento with a specific package of funding opportunities to attract businesses and investors to the region. Businesses funding innovative R&D projects can benefit from grants ranging from 20% to 80% of the capital invested, with a maximum of EUR 3 million per project.

Thanks to this investor- and business-friendly environment, economic decisions are made rapidly, based on the region's specific characteristics and with the objective of promoting excellence.

Moreover, the financial resources and wealth produced remain within the Trentino region and are managed by the provincial government. The Autonomous Province of Trento has developed the Investintrentino.it website with a view to presenting and promoting internationally the many opportunities for investors and partners offered by the economic, scientific and technological environment in Trentino.

Key stakeholders

Bruno Kessler Foundation

The Bruno Kessler Foundation (FBK) aims to keep the province of Trento in the mainstream of European and international research. It does so by attracting human capital and resources at the forefront of technological development and social studies.⁵

The foundation is also involved in bringing together natural and human sciences, recognising the challenges faced by the knowledge society. To contribute to growth, FBK enhances the results of its research through technology transfer processes for innovation and technology-based products to the market and through support for entrepreneurship and the creation of spin-offs and start-ups.

Edmund Mach Foundation

The Edmund Mach Foundation is a prestigious institution which, over the years, has achieved many important goals at international level, delivering a range of education, training and technology transfer programmes in the fields of agriculture, food processing and sustainable development.⁶

Department of Information Engineering and Computer Science

The Department of Information Engineering and Computer Science (DISI) was founded in January 2002 and represents a world-class assembly of researchers and institutions.

The Department provides a dynamic and qualified response to the ever-increasing, leading-edge competency demands in the field of ICT, drawing from a productive fabric at local, national and international levels.

The Department covers two primary areas of information and communication technology: Computer Science and Telecommunications.

Trentino Sviluppo

Trentino Sviluppo is the agency set up by the Autonomous Province of Trento to foster the province's sustainable development by taking action and providing services aimed at supporting growth in business skills and the capacity for innovation.⁸

Originally intended to work as a technology park to provide manufacturing spaces and services for companies and research centres, Trentino sviluppo's mission today is to coherently promote the Trentino region and support the combination of its assets, from the crucial tourism sector through to innovation.

Trentino Sviluppo is a shareholder in 39 companies located in Trentino and took part in the launch of a closed-end investment fund called MC², which is devoted to the strengthening and development of small and medium enterprises.⁹

University of Trento

The University of Trento is a relatively young (founded only 50 years ago) small to mid-size university (around 16,000 students). It offers an ideal environment for research (15 research departments and centres and around 70 laboratories).

It is one of the most internationally-oriented Italian university connected with over 100 European Institutes for Innovation and Technology (EIT-ICT), and it is strongly focused on Entrepreneurship and Innovation.

Trento Rise

Trento Rise is a fully operational institution merging the ICT branch of Fondazione Bruno Kessler with the University of Trento's Department of Information Engineering and Computer Science (DISI) in a wide spectrum of scientific areas and human resources.¹⁰

It could be considered as an ICT excellence cluster, located in the Trentino Region, focused on improving life quality through ICT.

In achieving this purpose, it is supported by a network of thematic labs across the Trentino Region, interconnected by a highly sophisticated technological infrastructure, usable for widespread experimentation.

Trento Rise closed in December 2015, and a new entity, embracing similar activities, will be created under the name "Hit Consortium".

Key initiatives

OpenMove

In the mobility sector, one of the most important initiatives implemented in Trento is OpenMove, a smart mobility solution ideated by a local start-up, Lucian Srl, for optimising public transport services.

The major step forward for the development of OpenMove has been the decision by the Trentino Alto Adige region to make mobility data open to citizens. Through the Open Move App, citizens can purchase ski lift passes, parking, bus, and train tickets for both urban and extra-urban routes; they can be validated on-board by scanning their QR codes.⁷

In September 2014, the pilot phase enabled Lucian S.r.l, in partnership with the province of Trento, Trentino Public Transport company and Trenitalia (national railway company), to test the App in the city of Trento and the entire province. Citizens played a key role in this stage, since they were asked to try out and evaluate the service. The output from the testing phase was successful, and the OpenMove App was formally launched in October 2014. Concerning the business mechanism, users can download the App for free, without any subscription costs.

OpenMove has been totally thought out as an optional service that will help integrate and optimise all aspects of public mobility, while the App developer earns a profit thanks to geo-localised advertising for the city's businesses.

B

Obstacles

Inclusion of different stakeholders

Trento's main obstacle in achieving its digital city vision concerns the inclusion of a wide range of stakeholders. In this respect, the main aim is not to build peaks of excellence, which the city already has in place, but to create a favourable environment. All citizens and local entrepreneurs need to be aware of the role they can play and free to actively collaborate in such collective plans.

In this regard, Trentino Sviluppo has been very active in promoting the region in a consistent manner, by taking actions and providing services aimed at emphasising assets, skills and the capacity for innovation.

Lack of a local nurtured private financing system

Moreover, the public authorities' main role in the financing process for local digital and innovative entrepreneurship has prevented the development of a nurtured private financing system (investors, business angel communities and venture capitalists).¹²

Most of the projects and activities in Trento are publicly funded (at European or local level). In the long term, this peculiarity may represent an issue in terms of local entrepreneurship being excessively dependent on the public authorities.

TechPeaks: business idea development project

TechPeaks is an offer for six months free housing, food and office space to individuals or teams with "deep technical or design" expertise. Led by TrentoRise in collaboration with Trentino Sviluppo, the programme offers grants for EUR 25,000 and possible match-funding for private investments up to EUR 200,000.¹¹

Participants follow a dedicated track supported by coaching and mentoring services provided by highly qualified nationally and internationally renowned entrepreneurs, investors and professionals. They also have access to over 500 ICT researchers who are active in the Trentino area.

At the end of the six months, participants have to submit three to five analyses of innovative ideas in one of the following areas:

- Data collection and analysis;
- Fintech and advanced payment methods;
- Health and wellbeing;
- Internet of Things and wearable computing.

4

Lessons learnt

One of the most important lessons learnt from the city of Trento concerns the crucial role played by the local public sector. In particular, the public sector in cities looking to become smart and digital should actively support local businesses, by giving visibility for their products or services, and not only on a local scale. This has been the case with OpenMove in Trento and can easily be the case for other businesses.

Inclusiveness driving innovation

Thanks to its reforms and initiatives, Trento is gaining more and more visibility on the global stage, so it is very important for Trento to be considered as a model to be replicated by other cities.

However, it is crucial for the city's public sector to be as inclusive as possible, considering the needs of all citizens. In this regard, Trento's process to become a digital city has stressed a crucial point: technologies should not only enhance people's lives, but also help narrow the gaps between social classes.

Coordination and the role of the innovation catalyst

Fostering social cohesion leads to another important point for digital cities: synergies between sectors are vitally important if a city aims to become digital and this is evident in the case of Trento and the role played by its public sector.

Getting rid of silos, working in different ways but towards the same goal has been a challenge and a real success for the city of Trento.

This is due to the fact that the local public sector clearly defined its role. On the one hand, it is the only actor that can launch certain initiatives. On the other, it has to guarantee that the interaction between stakeholders is correct, while enabling practices and ideas to be exchanged.

In the path towards the achievement of its digital vision, Trento's public sector has acted as the coordinator for many activities carried out by many stakeholders, while ensuring that the relationships between several stakeholders with different aims were appropriate.

In the case of Trento, the role played by Trento Rise as an "innovation catalyst" has been crucial, acting as an intermediary able to connect demand and supply and create the necessary links between research, education and businesses.

Benefits of open data

One of the most important aspects that foster digital entrepreneurship in Trento concerns the reuse of open data. The case of Trento shows how data are becoming the means through which a new kind of innovative services can be provided by governments and corporations.

For a business, asking for data and not for public funding means that public sector budgets are not affected, while these data also lead to many products / services that can have significant economic impacts.

Overall, sharing data has the potential to unlock large amounts of economic value, by improving the efficiency and effectiveness of existing processes, making new products, services and markets possible, and creating value for individual consumers and citizens.

Attractiveness over the short and long term

Trento has suffered in the past and to some extent still faces today from its lack of attractiveness. Being attractive not only in the short term, but also over the medium and long term, is crucial.

Some programmes aimed at attracting talents have already been implemented by several players operating in Trento (e.g. Bruno Kessler Foundation). However, thinking of programmes that combine the education side with the entrepreneurship culture is something that can benefit the city's entire innovation process.



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5

Key Recommendations

The main recommendations include the role that open data can play as an enabler for digital cities and digital entrepreneurship development. In short, open data is what local businesses are aiming at. Another recommendation includes the role played by local public stakeholders in raising awareness.

Open data as an enabler for digital cities' development

Firstly, open data plays a crucial role in the development of digital cities. In most cases, data is what local businesses are aiming at. Asking for data rather than public funding means that the budgets of local public sectors are not affected, while these data lead to many products and services that can have significant economic impacts.

In this framework, it is critical that datasets are continuously kept up-to-date by the public sector. Businesses need to work on recent and reliable data while developing their solutions, which are expected to be effective and have an impact on people's lives.

Local public stakeholder support in raising awareness




Secondly, in their transition to become smart and digital cities, local public sectors should support local businesses as much as possible. Raising awareness among the local business sector through several activities is highly important, if the city aims to achieve and implement smart solutions.

Moreover, the diversity of roles, responsibilities and timeframes may hamper collaboration between the stakeholders and the innovation and digitalisation ecosystem. In this respect, a key recommendation is to foster the creation of convergent interaction among different stakeholders, and the creation of bodies that act as "catalysts".

Gain the trust of the public sector and citizens

Thirdly, from a local business perspective, it is crucial to gain the trust of both the public sector and citizens. This is particularly difficult for start-ups, which are at an early stage in their business and might therefore be perceived as inexperienced.

However, if start-ups can successfully address any suspicion and scepticism in the public arena, they can provide services to all citizens in a way that does not affect public budgets and that is at the same time effective and fast-paced, as demonstrated by OpenMove.

Category	Role of the stakeholder
Local government 	<ul style="list-style-type: none"> Keep data up-to-date, as businesses need to work on recent and reliable data while developing their solutions Support local businesses as much as possible Raising awareness in the local business sector through several activities is highly important, if the city aims to achieve and implement smart solutions
Universities/ Research centres 	<ul style="list-style-type: none"> Foster the creation of convergent interaction among different stakeholders, and the creation of bodies that act as "catalysts"
Businesses 	<ul style="list-style-type: none"> Gain the trust of both the public sector and citizens

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