DigiBEST
Interreg Europe

DIGIBEST REGIONAL ANALYSIS
TRØNDELAG COUNTY COUNCIL NORWAY

Structure of the Analysis

1. Introduction to Trøndelag County, Norway[1]

The Trøndelag region's early history circles around the Viking king Olav the Holy, who in 1030 AC fought the peasant army, and forced Christianity upon Norway. However, he was wounded and died in the battle. He was buried in the Nidaros Cathedral in Trondheim and declared as a Saint afterwards. Some says that his mission was not completely successful enforcing Christianity on the Trøndelag population. But thanks to him, the Nidaros Cathedral became a destination for pilgrims from the whole Europe. In modern time Trøndelag was constituted as two Counties, North and South Trøndelag. Then in 2018 the two counties were merged into the Trøndelag County (after vote in 2016).
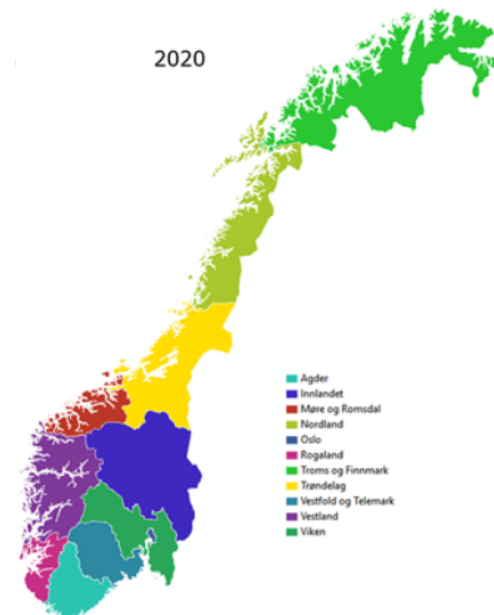

Fig 1. *Map over Norway with Trøndelag in yellow colour* (map supplied by Trøndelag County Council)

Trøndelag County is now the second largest county in Norway (population almost 466 000, as of 2019[2]), also referred to as Mid-Norway because of its location. The area of the county is equal to that of Switzerland, and it takes seven hours by car to drive the 500 km from the northern part to the southern. In the timespan 2010-2019, the county had a population growth of 11,1%[3]. Trøndelag is primarily a rural region with a rich and diverse natural resource base. Forestry, aquaculture and agriculture are the dominant sectors in many of Trøndelag' s district municipalities. The region has a leading role in innovative fish-farming. Although fish farming brings the majority of export

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[1] The Regional Analysis is based on a limited <u>formal</u> knowledgebase, but a <u>broad experience</u> base (business gardens/incubators with these kind of businesses as clients, and County Councils own knowledge about them). The County Council is currently working on an regional analysis covering the small-/micro businesses, because there is relatively limited factual knowledge about the small- and micro SMEs.

[2] *Trøndelag in Numbers, Trøndelag County Council,* 2019
https://www.trondelagfylke.no/globalassets/dokumenter/plan-og-areal/trondelag-i-tall/trondelag-i-tall-2019.-18-oktober-lav_opplosning.pdf

[3] *Trøndelag in Numbers, Trøndelag County Council,* 2019
https://www.trondelagfylke.no/globalassets/dokumenter/plan-og-areal/trondelag-i-tall/trondelag-i-tall-2019.-18-oktober-lav_opplosning.pdf

income, other sectors are more important in terms of employment. The most densely populated axis between Orkanger, Trondheim and Steinkjer is the regional growth axis, dominated by the knowledge industry. Trondheim is the technological capital of Norway, with a vibrant international community. The Norwegian University of Science and Technology, (NTNU) and SINTEF (*Stiftelsen for Industriell og Teknisk Forskning*) which is Scandinavia's largest independent research institute, both are located in the heart of the city.

Trøndelag County Council (*Trøndelag fylkeskommune*)

Trøndelag County Council is a regional public body with elected representatives from political parties. There are 11 administrative regions in Norway, called counties, which have a regional development responsibility. They are in charge of the secondary schools, public transport, digital infrastructure and other development tasks, while the local Municipalities (38 in Trøndelag) has a local service and administrative function. The Government is on top of this three-tier structure. The process of developing strategies and action plans is a long process involving a multitude of actors from politics, R&D, businesses and other public bodies, as well as organisations from all over the Trøndelag County. Regarding digital regional development, the County Council largely works as an orchestrator and facilitator through the actors at the local level, such as Business Gardens, Incubators, business networks/clusters and municipalities. One of the main tasks of the County Council is to make sure that the region is able to make the most out of the primary advantages. In terms of advancing digital transformation, this means that we need to facilitate establishment of ecosystems of businesses across sectors, and R&D to make sure that the knowledge and innovation potential in our R&D institutions and our businesses enrich each other within these ecosystems.

Transport infrastructure

Transport infrastructure consist of roads, railroad, airports, ferries and costal high-speed passenger boats. Trondheim Airport Værnes is an international airport located close to Trondheim. From there, it's possible to reach also the short course net airports in Røros, Namsos, Rørvik with smaller aircrafts. The coastal region has good access to Trondheim and vice versa through the costal high-speed passenger boats. The railroad runs from Oslo, through Trondheim to Bodø, and as such provide adequate transport through the county from south to north. The Norwegian main road E6 goes through the county from north to south, and provides transport corridors for agricultural products, timber, merchandise, and of course large quantities of salmon for export. The E6 is well connected with other upgraded county roads.

Digital infrastructure

Community is digitized and access to networks, both fixed and mobile, everywhere is a basic requirement. Most of the development of networks takes place on a commercial basis, and coverage improves from year to year. The coverage for Trøndelag currently stands at 86% for 30 Mbps and 82% for 100 Mbps. Mobile coverage is increasing, and the focus is now on entire area coverage. Trøndelag has a total area coverage of 4G of 86%[4]. The areas that still lack coverage, either fixed or mobile, must be expanded with public subsidies. From 2020, the county council has an assumed responsibility to be a driver, coordinator and facilitator in collaboration with the municipalities and

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[4] Nkom https://www.nkom.no/aktuelt/86-prosent-har-tilgang-til-bredband-med-hoy-hastighet

the telecom companies. This will ensure that businesses, households and other areas where people travel should have access to a modern and stable network in terms of speed and coverage. In the national context, Trøndelag is the foremost when it comes to developing digital networks in rural areas. The county's model for development of digital infrastructure is often used as an example for other counties and municipalities *(see Good Practice 02)*.

The policy tool – *Smart Societies*

«Smart Societies» is one of the five primary strategies within the county council, and a policy tool for enabling as many as possible businesses and municipalities in the region to move towards digital transformation through enhancing digital skills, developing new collaboration (ecosystems) and digital business models. Digital skills are a precondition for utilizing digital development. Smart Societies is a broad policy tool, covering all kinds of digital development in a societal "smart" context.

Regarding DigiBEST, only the most relevant part of the policy tool will be addressed: Namely digital transformation in small- and micro businesses.

2. Economic development, entrepreneurship and digitalization in Trøndelag County

This chapter will focus on the main development characteristics of the region.

2.1 Economic development and entrepreneurship

Trøndelag has positive growth numbers regarding population development, employment, value creation and export[5]. Trøndelag has a highly educated population, and more persons than before are completing high school. The population in Trøndelag has even have higher life expectancy than the rest of the country. The county has also some challenges coming: the so-called elder wave. Population forecasts show that the number of people over 80 in Trøndelag will increase by 60% until 2030 and 113% until 2040[6]. Population growth and employment in the county are distributed unevenly. Several of the municipalities in Trøndelag, especially in the inland, has birth deficit, emigration, and a rapidly aging population. Many of the municipalities also have a decline in employment. Trøndelag have a strength in research and development activities, if comparing to the rest of the country and Europe. The region has municipalities that excel in the cultural field. The aquaculture (aquafarming) industry has contributed to adventurous employment growth for parts of the Trøndelag coast. Still, 72% of new jobs in Trøndelag have been created in Trondheim in the period from 2010 to 2018.

Trøndelag experiences a steady growth within all the main areas of economic activity. Worth mentioning is that 92% of the businesses in the region have less than 10 employees and represents

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[5] *Trøndelag in Numbers, Trøndelag County Council,* 2019
https://www.trondelagfylke.no/contentassets/ee663ed54e2c4545a5eb95df0f6f7e0f/trondelag-i-tall-2019.pdf.
[6] *Trøndelag in Numbers, Trøndelag County Council,* 2019
https://www.trondelagfylke.no/contentassets/ee663ed54e2c4545a5eb95df0f6f7e0f/trondelag-i-tall-2019.pdf

23% of the employment (public and primary sector not included). They are vulnerable in light of digital transformation.

Table 1: *General information, 2014-2019*

Indicators	2014	2015	2016	2017	2018	2019
Size of territory *square kilometres[7]*	59 668,18					
Population per 01.01[8]	444 966	449 386	453 352	458 221	462 354	465 634
Real GDP per capita (EUR) *Regional (Trøndelag) - mainland GDP - base value measurement at current prices, per capita[9].*	389 00	408 00	423 00	443 00		455 00
Real GDP growth *% change Regional (Trøndelag) - mainland GDP - base value measurement -volume growth at constant prices[10]*	1.8	4.0	1.6	3.7	1.5	-
Population of active enterprises (from 1 to 9 employees) *number[11]*	8 540	8 888	8 087	8 350	8 448	8 575
Population of active enterprises (10 employees and more) *number[12]*	2 193	2 221	2 561	2 503	2 258	2 582
Net business population growth[13] *%*	3.0	0.2	2.9	0.9	1.2	1.8
Unemployment rate *% of labour force Registered unemployed[14] per 31.01 - county*	3.0	2.9	3.0	2.5	2.2	2.2

Source: Norwegian Mapping Authority; Statistics Norway; Trøndelag in Numbers, Trøndelag County Council, 2019

Table 1 shows that Trøndelag County has an upwards trend regarding increased number of inhabitants, and low unemployment. The overall GDP pr capita is growing. The number of small- and micro companies is growing slowly. This points to a generally positive development.

Trøndelag's world-leading competence environment in technology and science has the NTNU university and Scandinavia's largest R&D organisation SINTEF at the forefront (Lien, 2019[15]). The region has a strong industrial culture and expertise in both the process-, mechanical and food producing industries.

Trøndelag has good prerequisites to continue to generate growth in the private sector. Many of the companies in Trøndelag, or their suppliers, are players in the global market. The aquaculture

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[7] *Source; Norwegian Mapping Authority*
[8] *Source; Statistics Norway tabell: 07459*
[9] *Source; Statistics Norway tabell: 07459, 11713 and 09391*
[10] *Source; Statistics Norway tabell: 11713 and 09391*
[11] *Source; Statistics Norway tabell: 07195*
[12] *Source; Statistics Norway tabell: 07195*
[13] *Source; Statistics Norway tabell: 07195*
[14] *Source: Trøndelag in Numbers, Trøndelag County Council,* 2019
https://www.trondelagfylke.no/contentassets/ee663ed54e2c4545a5eb95df0f6f7e0f/trondelag-i-tall-2019.pdf.
[15] T. Lien, 2019 NHO-Trøndelag https://www.nho.no/regionkontor/nho-trondelag/naringslivet-i-trondelag/)

industry is large and still growing strongly. Practically all salmon is exported to Europe and Asia. About half of the direct export from Trøndelag is a seafood. Trøndelag has many competitive advantages within aquaculture; not least strong competence environments in both companies and academia, which provides good conditions for creating profitable jobs based on salmon fish farming.

In the Oil and Gas industry, the region has strong research and business environments. Kvaerner Verdal is a large offshore shipyard that has been through the ups and downs for decades. In Orkanger (industrial hub), the Technip FMC completes pipelines to be used for the production and export of our petroleum resources, while Trondheim has both mechanical engineering industry and engineering environments that supply the oil industry nationally and globally. Trondheim-based SINTEF's importance for profitability in these workplaces is probably as important as for the aquaculture industry.

The region has also strong process industry environments. The world is demanding more industrial products and less emissions. Therefore, investments are made to operate as energy and climate efficiently as possible, which also in the long term affects the profitability of the works. Here, not only the customers, but also the ownership show Trøndelags importance at the global level, e.g., companies from Austria, Germany and China conduct industrial operations from here.

Also, the tourism industry in Trøndelag is a business with a global perspective and is growing rapidly. There are many small businesses in this sector. Great interest in local food and beer has made it possible to develop an offer of good genuine experiences for tourists from all over the world (Lien, 2019).

Regarding the value creation in different lines of business[16], 75.3% of the value creation in Trøndelag in 2018 came from the service industries. Industry, extraction, water and electricity supply accounted for 12.5% of value creation, the construction industry accounted for 8.2%, while primary industries accounted for 3.7%. Per employed person, there is finance and insurance (EUR 0.38 million) and electricity supply, etc. (EUR 0.36 million), which is the most productive industry in Trøndelag. These are two industries having high capital (physical capital in the form of power plants and financial capital, respectively) compared to the estimated employees in the industries makes value creation per employee very high.

Furthermore, fishing and aquaculture (EUR 0.31 million) is also one of the most productive industries in Trøndelag. The aquaculture industry has been a major driver of value creation in the county in recent years. Value creation in fishing and aquaculture in Trøndelag in 2018 totalled EUR 0.50 billion. From 2008 to 2018, fishing trapping and aquaculture have seen a growth in value of approx. 9 times faster than the general growth in the county. In addition to the value creation that takes place at the primary level, the processing activities associated with the aquaculture industry contributes significantly to the value creation in the food industry. Trøndelag's food and beverage industry had a gross product of EUR 0.56 billion in 2018. This is one third of the value added in the industry in Trøndelag (EUR 1.65 billion). In addition, private sector industries with the highest

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[16] *Trøndelag in Numbers, Trøndelag County Council,* 2019
https://www.trondelagfylke.no/contentassets/ee663ed54e2c4545a5eb95df0f6f7e0f/trondelag-i-tall-2019.pdf).

value creation in Trøndelag are construction (EUR 1.73 billion), retail trade (EUR 1.55 billion) and professional, scientific and technical services (EUR 1.45 billion).

2.2. Digital economy and society

The tables below show Desi Index and Eurostat numbers on the state of digitalisation and general competence in Norway. Norway is among the most digital countries in Europe, and scores very well in broadband connectivity, internet use, business digitisation and digital public services. Norway is also above average on digital skills.

Table 2: *DESI index and DESI areas[17], Norway, 2014-2019*[18]

Indicators	2014	2015	2016	2017	2018	2019
DESI Index	n/a	n/a	n/a	61.8	64.0	66.0
DESI: connectivity	n/a	n/a	n/a	63.3	63.9	66.1
DESI: human capital/digital skills	n/a	n/a	n/a	58.5	61.5	63.0
DESI: use of internet services by citizens	n/a	n/a	n/a	70.8	72.8	73.9
DESI: integration of digital technology by business	n/a	n/a	n/a	50.0	52.2	54.7
DESI: digital public services	n/a	n/a	n/a	71.5	75.1	78.0
DESI: research and development ICT	n/a	n/a	n/a	n/a	n/a	n/a

Source: https://ec.europa.eu/digital-single-market/en/desi

Table 2 shows an upwards trend in the digitalization and build-up of skills in the Norwegian society, but that businesses are a bit behind in implementing digital tools, while the municipalities, public sector, is developing digital services fast.

Table 3: *General regional digital economy and society statistics, Trøndelag, 2014-2019*

Indicators	2014	2015	2016	2017	2018	2019
Households that have internet access at home[19] (% of households with at least one member aged 16 to 74) *The access of households to internet is measured as percentage of households where any member of the household has the possibility to access the internet from home.*	86	91	100	89	94	96
Households that have broadband access by NUTS 2 regions[20] (% of households with at least one member aged 16 to 74) *The availability of broadband is measured by the percentage of households that are connectable to an exchange that has been converted to support xDSL-technology, to a cable network upgraded for internet traffic, or to other broadband technologies.*	86	91	100	89	94	95

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[17] National level data

[18] Note: Only available years in DESI index. Look -up from 2019 Country profile with recalculations.

[19] https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tgs00047&plugin=1

[20] https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tgs00047&plugin=1

Individuals regularly using the internet by NUTS 2 regions[21] (% of individuals 16-74) *Regular users of the internet are persons who use the internet on average at least once a week, every day or almost every day.*	88	98	99	93	95	95
Individuals who have never used a computer by NUTS 2 regions[22] *(% of individuals 16-74)* *Persons who have never used a computer (at home, at work or any other place).*	5	1	2	:	:	:
Individuals who accessed the internet away from home or work[23] *(% of individuals)*	74	82	84	77	93	90
Individuals who ordered goods or services over the internet for private use in the last year by NUTS 2 regions[24] *(% of individuals 16-74)* *Persons who bought or ordered goods or services (e.g., food, groceries, household goods, films, music, books, magazines, newspapers, clothes, sports goods, computer software or hardware, electronic equipment, shares, financial services, insurances, travel or holiday accommodation, tickets, lotteries or betting and other) over the internet during the last year.*	77	75	81	77	78	76
Individuals, who used the internet.[25] (% of individuals) *Frequency of internet access: once a week (including every day)*	88	98	99	93	95	95
Individuals who used the internet, frequency of use and activities [26] (% of individuals) *Internet use: selling goods or services*	21	22	33	26	33	29
Individuals who used the internet, frequency of use and activities[27] *(% of individuals)* *Internet use: civic or political participation.*	:	:	:	16	:	:
Individuals who used the internet, frequency of use and activities[28] *(% of individuals)* *Internet use: Internet banking*	88	88	91	90	91	94
Individuals who used the internet for interaction with public authorities[29] *(% of individuals)* *Internet use: interaction with public authorities (last 12 months)*	73	77	88	83	86	85
Individuals who used the internet for interaction with public authorities[30] *(% of individuals)* *Internet use: submitting completed forms (last 12 months)*	49	56	67	60	62	57

[21] https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tgs00050&plugin=1
[22] https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tgs00051&plugin=1
[23] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_r_iumd_i&lang=en
[24] https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tgs00052&plugin=1
[25] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_r_iuse_i&lang=en
[26] https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do
[27] https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do
[28] https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do
[29] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_r_gov_i&lang=en
[30] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_r_gov_i&lang=en

Individuals who used the internet, frequency of use and activities[31] *% of individuals* *Internet use: participating in social networks (creating user profile, posting messages or other contributions to Facebook, Twitter, etc.), percentage of individuals.*	64	78	85	79	85	84

Table 3 shows that a high percent of people on average have access and uses internet frequently. Services like internet banking stands out. Social media use is high, and interaction with public authorities is also high. There's a relatively low frequency for buying and selling goods on the internet.

Table 4: *Size of Businesses (except public and primary sector)*

Businesses, except public administration and primary sector, in Trøndelag in 2016				
	Businesses	Employees	Businesses	Employees
Total number	31 199	116 027	100%	100%
No employees	20 551	N/A	66%	N/A
1-4 employees	5 892	11 586	19%	10%
5-9 employees	2 195	14 497	7%	12%
10-19 employees	1 416	19 005	5%	16%
20-49 employees	826	24 109	3%	21%
50-99 employees	182	12 202	1%	11%
100 + employees	137	34 628	0%	30%

Table 4 shows that 92% of the businesses in the region have less than 10 employees but represents 23% of the total employed persons (Trøndelag County Council, 2018[32]).
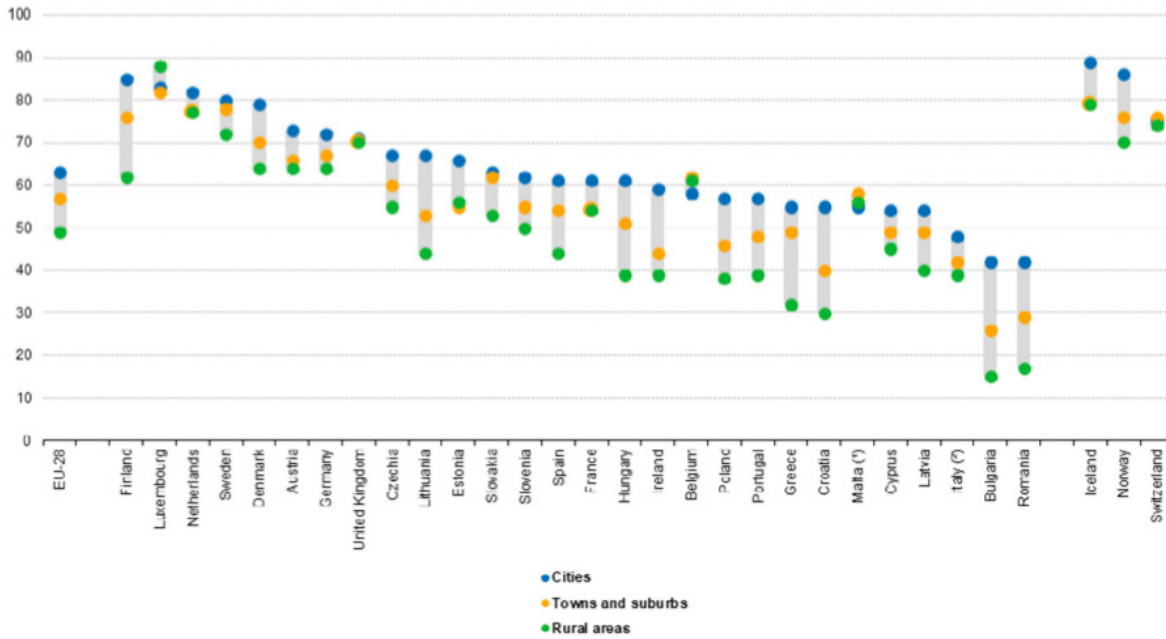
Figure 5: *People with basic or above basic digital skills, 2017*

People with basic or above basic digital skills, 2017
(%, share of people aged 16-74; during the 12 months preceding the survey, by degree of urbanisation)

- Cities
- Towns and suburbs
- Rural areas

Note: ranked on cities. Basic and above basic digital skills are the two highest levels of skills (compared with low skills or no skills). The indicator presented is a composite indicator covering four different skills domains: information, communication, problem solving and software skills. Individuals with basic and above basic digital skills have at least a basic level of skills for one of these four domains and do not have no skills across all four domains.
(¹) Rural areas: low reliability.
(²) 2016
Source: Eurostat (online data code: isoc_sk_dskl_i)

eurostat

Figure 5 shows, that although Norway is among the best performers regarding basic or above basic digital skills in Europe, the divide among the rural parts and the larger cities in Norway is quite large. It is a sign of centralisation, and that most high skilled jobs are found in the cities. The gap between "small towns/suburbs" and "Cities" is also an indicator that there are not much suburbs, but rather a lot of small towns spread out in the rural part of Norway. Oslo, Bergen, Stavanger and Trondheim have some suburbs, but they are all rather small cities. In Trøndelag this is also the case. The axis from Orkanger through Trondheim and to Steinkjer is characterized by Trondheim as a city (200 000 inhabitants), and the rest as small towns.

3. Barrier and solution analysis of the digital transformation of SMEs

The research centre Nordregio (2020)[33] elaborated a baseline study in 2019/2020, reviewing the relevant literature on digital development, innovation and transformation in SMEs in rural areas. The report is one of the most comprehensive studies that has been done on regional level, including Trøndelag. In 2009, the Trøndelag County Council participated in a workshop for Trøndelag in this project.

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[33] **Nordregio 2020** (Randall, Ormstrup Vestergård & Wøien Meijer): NORDREGIO REPORT 2020:4, *Rural perspectives on digital innovation: Experiences from small enterprises in the Nordic countries and Latvia* https://nordregio.org/publications/rural-perspectives-on-digital-innovation-experiences-from-small-enterprises-in-the-nordic-countries-and-latvia/

As any other relevant external literature related to Digital Transformation focused on SMEs in the region were not identified (the literature of Norwegian government focuses rather on the public sector and larger industries than SMEs), the Nordregio (2020) study has been chosen as the main source for this analysis.

In their review, the most prominent barriers are listed:

> "According to the Digital Economy and Society Index (European Commission, 2019f), SMEs fall behind large companies on all key indicators used to track digital performance. Several explanations for this have been suggested in the literature, including: lack of knowledge about digital opportunities and their benefits, low level of ICT skills, limited ability to adapt to rapidly developing technologies and know-how, limited access to capital and finance, lack of appropriately tailored support structures, lack of engagement with support structures and limited capacity to employ ICT specialists or professionals to direct digital strategy or drive organisational change (European Commission, 2018, 2017d; European Investment Bank, 2019; OECD, 2017; Interreg Europe, 2018). Although these findings are not specific to rural areas, the tendency for digital competence to be concentrated in urban areas may result in SMEs in rural areas experiencing a double digital divide. Challenges that have been highlighted in the literature as particularly relevant to SMEs in rural areas include: lack of access to information about support instruments and funding possibilities, brain drain, and insufficient innovation potential of SMEs (Interreg Europe, 2018)". (Nordregio 2020:24).

This largely confirms the county councils' experiences and views on the challenges. Complemented by the strategies and plans for Trøndelag county council, which has identified many of those challenges, and pointed to solutions (see Chapter 6), we can make an overview here. It is useful to separate general challenges and particular rural challenges. The list of barriers generated by both external and internal literature review will look like this:

General barriers:
- Low digital maturity, lack of knowledge about digital opportunities and their benefits, and limited ability to adapt to rapidly developing technologies and know-how.
- Limited access to capital and finance for the businesses.
- Lack of appropriately tailored support structures, and lack of engagement with existing support structures.
- Limited capacity to employ ICT specialists or professionals to lead digital strategy or drive organisational change.
- The tendency for digital competence to be concentrated in urban areas may result in SMEs in rural areas experiencing a double digital divide.
- Lack of cooperation btw suppliers of skills and support structures towards digital transformation.
- Lack of coordinated efforts from support structure.

Barriers particularly relevant to SMEs in rural areas include:
- Double digital divide (gap) - urban-rural.
- Brain-drain.
- Insufficient innovation potential of SMEs.
- Lack of access to information about support instruments and public funding possibilities.
- Lack of rural ecosystems where businesses can cooperate to overcome lack of skills and specialists/ personnel.

- Lack of coordinated public support funding of development projects.

Table 6: *Barrier & Solution Matrix*

Title of barrier	Brief barrier description *(up to 25 words per each barrier)*	Identified solutions, if any *(up to 40 words per each solution)*	Where to find it in a particular document or publication *(e.g. page No., or Table No.)*
Awareness Rising & Collaboration			
Low digital maturity.	Lack of knowledge about digital opportunities and their benefits, and a result of this is limited ability to adapt to rapidly developing technologies and know-how. Don't plan ahead, occupied with today's work (see SWOT analysis). Prefer old methods.	The Industry 4.0 Trøndelag project (underway) aim to increase awareness and knowledge ab. digital tools and possibilities. New business models, cooperation, pilot projects.	Nordregio (2020:24). Trøndelag fylkeskommune (2017) *Strategy for innovation and value creation in Trondelag, (p 2,7,8-12)* Trøndelag County Council (2019) *Plan for Economy 2020-2023 (pp 50)* Trøndelag fylkeskommune (2020) The Action program for Strategy for innovation and value creation in Trondelag 2020-2021(p 6)
Lack of cooperation btw suppliers of skills and support structure towards digital transformation.	There are many separate initiatives within the field (at the national, regional and local levels). No coordinated regional efforts	Digital transformation needs to be coordinated. Large degree of cooperation needed. The legitimate coordinator (no financial interests) should be county council together with regional business gardens/ incubators and R&D environment.	Trøndelag fylkeskommune (2017) *Strategy for innovation and value creation in Trondelag (p 2,7,8-12)*. Trøndelag fylkeskommune (2020) The Action program for Strategy for innovation and value creation in Trondelag 2020-2021(p 6)
Enabling Corporate Environment & Capacity Building			
Lack of appropriately tailored support structures, and lack of engagement with existing support structures.	SMEs are to some extent detached from the urban competence institutions (universities etc) and environments. Urban-rural divide (gap)	a) The Industry 4.0 Trøndelag project b) building ecosystem – county council orchestrating regional ecosystems with R&D, other actors.	Nordregio 2020:24). Trøndelag fylkeskommune (2017) *Strategy for innovation and value creation in Trondelag (p 2,7,8-12)*. Trøndelag fylkeskommune (2020) The Action program for Strategy for innovation and value creation in Trondelag 2020-2021(p 6) Trøndelag County Council (2019) *Plan for Economy 2020-2023 (pp 65)*
Limited capacity to employ ICT specialists or professionals to lead digital	Small and micro companies can't afford to hire ICT specialists/ professionals, especially difficult to recruit them in rural areas. Also, often unclear for SMEs what kind of specialists they need.	To establish pool of competent professionals – sharing service. Several businesses can hire professionals together.	Nordregio (2020:24). Trøndelag fylkeskommune (2017) *Strategy for innovation and value creation in Trondelag (p 2,7,8-12)*. Trøndelag fylkeskommune

strategy or drive organisational change.			(20... program for Strategy for innovation and value creation in Trondelag 2020-2021(p 6)
Insufficient innovation potential of SMEs.	Insufficient innovation capacity is a result of several factors – urban-rural divide, brain drain, lack of financing, lack of visions for business, etc.		Nordregio (2020:24).
Lack of rural ecosystems.	Lack of rural ecosystems where businesses can cooperate to overcome lack of skills and specialist personnel	The Industry 4.0 Trøndelag project can be a first step for creating this.	Trøndelag fylkeskommune (2017) *Strategy for innovation and value creation in Trondelag (p 2,7,8-12).* Trøndelag fylkeskommune (2020) The Action program for Strategy for innovation and value creation in Trondelag 2020-2021(p 6)
Administrative & Technical & Legal			
n/a			
Financial & Economic			
Limited access to capital and finance.	Not sufficient funding available for SMEs. Few investors in the region.		Nordregio (2020:24).
Lack of access to information about support instruments and public funding possibilities.	Due to the "lack of coordinated public support funding for development projects" it can be difficult to find out what exactly a SME can be entitled to get regarding public support.	This will be a challenge on national level.	Nordregio (2020:24).
Policy & Security			
Centralised digital competence.	The tendency that digital competence and skills are centralized to urban areas may be a reason for SMEs in rural areas experiencing a double digital divide.	National level policies need to be changed.	Nordregio (2020:24).
Brain-drain.	Structural challenge. People want to live in urban areas. Double digital divide (urban-rural).	Global level trend. Not possible to reverse. Need to find mechanisms to compensate. Maybe some online presence of workers.	Nordregio (2020:24).
Lack of coordinated public support funding for development projects.	Inflexible and rigid structures/guidelines for (cross) financing large projects where participates public bodies like County Council, Innovation Norway, SIVA, SMEs and R&D structures. Time consuming and	It is difficult to improve/change the national level policy for county level authorities	General experience /impressions from rigging projects. Especially shown "Industry 4.0 Trøndelag"

Sources:

Nordregio 2020 (Randall, Ormstrup Vestergård & Wøien Meijer): NORDREGIO REPORT 2020:4, *Rural perspectives on digital innovation: Experiences from small enterprises in the Nordic countries and Latvia* https://nordregio.org/publications/rural-perspectives-on-digital-innovation-experiences-from-small-enterprises-in-the-nordic-countries-and-latvia/

Trøndelag County Council (2019) *Økonomiplan 2020-2023* https://www.trondelagfylke.no/globalassets/dokumenter/okonomiplan/okonomiplan-2020-2023/okonomiplan-2020-2023.pdf

Trøndelag County Council (2017) *Strategy for innovation and value creation in Trondelag* https://www.trondelagfylke.no/contentassets/b91afe6250b342e9b2d73dc270993796/strategy-for-innovation-and-value-creation-in-trondelag.pdf

Trøndelag County Council (2019) *The Action program for Strategy for innovation and value creation in Trondelag 2020-2021* https://www.trondelagfylke.no/contentassets/b91afe6250b342e9b2d73dc270993796/handlingsprogram-politisk-vedtatt-en-final-13.02.20.pdf

Trøndelag County Council (2019) *Trøndelag in Numbers* https://www.trondelagfylke.no/contentassets/ee663ed54e2c4545a5eb95df0f6f7e0f/trondelag-i-tall-2019.pdf).

4. Main stakeholders

The stakeholders are selected considering their possibility to act and cooperate actively in projects and being active in ecosystems that is needed to achieve digital transformation in the region. The county council do not engage directly with SME's. Most of the contacts are taking place through the business gardens and incubators – their implementation of the projects and public funding. Therefore, the main stakeholders are business gardens and Incubators. They are in close/daily contact with the regional SMEs, which are paying members. As such, a lot of SMEs will then indirectly become stakeholders through the business gardens and incubators. For now, the task of enhancing digital competence involves the business gardens/incubators, both in local and regional projects.

In order to bring in high-level advisors on digital-, organizational development and business modelling, the two universities in the region and Scandinavia's largest R&D private org. SINTEF are involved as stakeholders. This is also because we aim to create a closer contact between them and their R&D environment and the business gardens/ incubators, something that ultimately will benefit the SME's and thus the region. Another aim is to involve the R&D sector in the creation of regional ecosystems for digital transformation. Innovation Norway is not directly involved in the project, but supply funding to other projects related to digital transformation in the region and handles financial support to SME's on both regional and national basis.
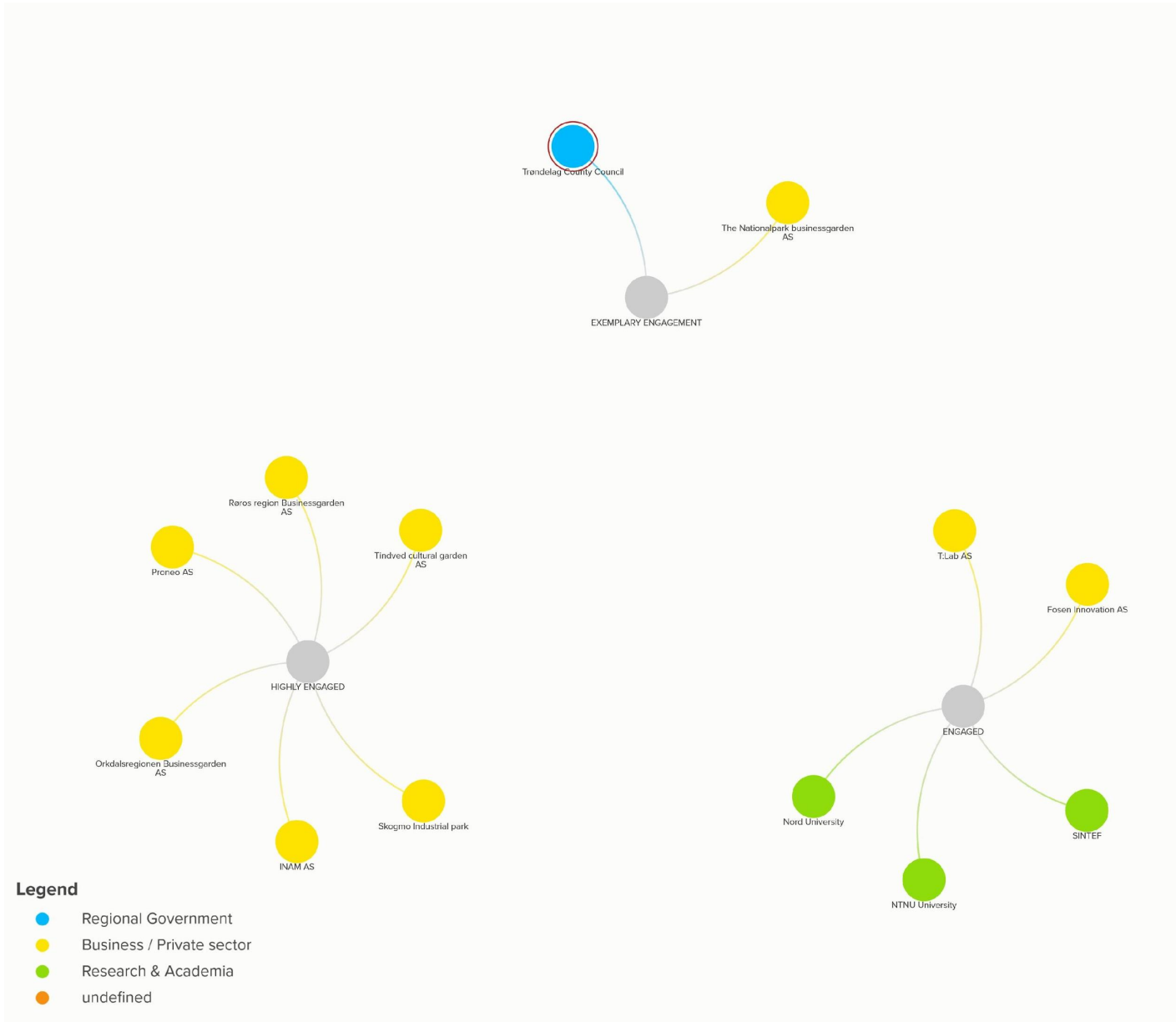
Table 7: *List of stakeholders*[34]

Organization	Contact data
Trøndelag County Council	Address: Erling Skakkesgt. 14, 7013 Trondheim, NORWAY Tel +47 741 740 00 Contact: Eistein Guldseth Tel +47 414 748 26 e-mail: eisgu@trondelagfylke.no
Orkdalsregionen Businessgarden AS	
Røros region Businessgarden AS	
Tindved Cultural garden AS	
The Nationalpark businessgarden AS	
Fosen Innovasjon	(not involved directly)
Proneo AS	
INAM AS	
T:Lab AS	
Nord University	
NTNU University	

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[34] Note: As the listed entities are related to the project, we would like all contact and communication to go through the Trøndelag County Council's project manager to avoid misunderstandings. Thereof, the contact information is not displayed on a personal level beyond their websites, which shows general contact information.

Skogmo Industrial park	
SINTEF	
(Innovation Norway)	
(SIVA)	

Table 8: *Stakeholder groups*

5. SWOT analysis

The SWOT analysis is focused on the SMEs

Table 9: *SWOT analysis*

Internal Factors	
Strengths	**Weaknesses**
Well-developed ICT-infrastructure in general	SME lacking competence about possibilities of the digital economy
Education and R&D- institutions with high technology knowledge in the region	Small markets, and long distance to bigger markets
Well-educated population in general	Distance to education- and R&D- institutions (mainly present in Trondheim)
High ICT-skills in the population in general	Urban-Rural digital divide
Strong and diversified business environment based on natural resources	No coordinated approach for digital transformation in the region
Political acknowledgement of needs for increasing digital skills in SMEs	Limited cooperation between SME's and the R&D environment in general
Regional cooperation between the Business gardens/Incubators and the County Council	Challenges for smaller companies and companies within specific industries: a) Lack of vision / digital strategy; b) Not technology savvy - lack of sufficient digital skills; c) Little or no cooperation with R&D environment; d) Difficulties planning for the future e) Limited marketing skills; f) Lack of planning for recruitment of staff and for future development; g) Lack of cooperation with other businesses; h) Lack of time and money to invest in digital development;
External Factors	
Opportunities	**Threats**
Cooperation on regional scale to create environment for digital transformation	Lack of incentives to develop mobile/ broadband access to remote areas
Easier and cheaper access to necessary technology in general	Increased demand from authorities for digital documentation-small businesses not digitally prepared: a) product documentation (green shift) b) traceability of raw materials (green shift)
Access to necessary competence within the region	Lack of digital competence threatens existence of many SME's
Well-developed public support system for business development	Rigid system for financing – no flexibility
New digital business models	Difficulties in recruiting specialists with relevant competence to develop company

Source: Trøndelag County Council internal documents, plans and strategies and experiences from projects.

6. Policy on and support instruments for digitalization of SMEs

6.1. Main features of the national, regional & local policies towards the digitalization of SMEs

Regarding the available literature and the process of gathering knowledge, it is necessary to have in mind that Trøndelag County Council is a public organisation governed by the elected political representatives. As such, the organisation develops regional plans, strategies and action plans based on input from both regional stakeholders and national strategies. The analysis of statistics and background knowledge is combined with directions given in the political platform (document where politicians decide the overarching direction and priorities) which can be found in the preparatory works before a draft of strategy or action plan is presented for the politicians. In order to create the County Councils Action Program for Trøndelag, most of the external stakeholders have given an input through formal democratic processes (meetings, formal statements, etc.). The strategies and action program are the basis for this analysis/assessment regarding the digital transformation, although incomplete regarding concrete strategies for Digital Transformation, it touches the basic issues in play.

The financial tools for development are the Regional Development Funds about EUR 10 mill each year. From that, EUR 5 million are delegated to the regional department of Innovation Norway to support business development and innovation. They also have national funds for that purpose. So, the County Council has roughly EUR 5 mill for supporting most kinds of businesses and organisations. These funds are spent accordingly to the strategies and action plans described next (spending is also based on directions/conditions attached to the transfer of the funds from the Government). Then only businesses in rural parts of the region are eligible for receiving funds based on application for project financing.

In the current official strategies/plans and action program below, we can find the basis for regional development towards digital transformation:

Trøndelag County Council (2019) *Plan for Economy 2020-2023*[35] states on the matter of strategy for competence enhancement and business development, that:

> The county council's statutory role as a community developer involves taking the initiative, mobilizing and stimulating actors to come together towards common goals. Competence policy is one of the most central areas where the county government has been given a role as a community developer and coordinator of regional efforts. (Trøndelag County Council, 2019, p 50).

> The county council has a leading role in many different areas of society. This also applies to the business area. However, this does not mean that we have to fill all the different roles related to business development. Our primary tasks are to lead the strategic work, work with mobilizing (including the use of financial instruments) and giving assignments to other actors. It is therefore crucial that we can establish a good business partnership and build a well-functioning regional innovation system. In such a perspective, coordination with the national policy actors Innovation Norway, SIVA and the Research Council will be important. Furthermore, it is

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[35] Trøndelag County Council (2019) *Plan for Economy 2020-2023*
https://www.trondelagfylke.no/globalassets/dokumenter/okonomiplan/okonomiplan-2020-2023/okonomiplan-2020-2023.pdf

essential to have good dialogue with municipalities, industrial gardens, inc⋯⋯⋯⋯⋯
operational work (Trøndelag County Council, 2019, p 65).

Strategy for innovation and value creation in Trondelag[36] have five main areas of strategic priority: ‑ Bioeconomy ‑ Circular economy ‑ Ocean space ‑ **Smart societies** ‑ Tourism and event business. The tools for strengthening these areas are competence enhancement, R&D, and internationalisation. *The business sector in Trøndelag comprises of many small businesses throughout the county's many municipalities. This Strategy for innovation and value creation is designed with precisely this business structure in mind* (Trøndelag County Council, 2017, p. 2). Focus in this analysis is **Smart Societies:**

> An ongoing digitalisation of society results in challenges and opportunities described in Industry 4.0. The combination of strong industrial traditions and close collaboration with the universities and research institutes gives Trøndelag an opportunity for re-industrialisation. [..] Utilisation of Trøndelag's potential for further economic growth depends on more efficient and purposeful interaction between the business sector, technology suppliers and R&D organisations, as well as through continuous development of these R&D communities (Trøndelag County Council, 2017, p7).

> When it comes to employment, business and industry, digitalisation also deals with automation, the streamlining of production, and creating and developing new business models and products. Getting more of the region's small businesses to use digital technology for innovation and product development is an important goal. Ways of achieving this include skills development initiatives and creating good physical and digital meeting places for the business sector and helpers. (Trøndelag County Council, 2017, p8).

> A key task is mobilizing actors throughout the entire region to participate in various initiatives focusing on development. Many actors play a central role in this context: Trøndelag County Council, Innovation Norway, the innovation companies, the municipalities through their frontline services and actors in the agricultural sector» (Trøndelag County Council, 2017, p 10).

> A key challenge for both the private and public sector is ensuring that research and resources for research benefit the entire Trøndelag county. At a national and regional level, we observe large differences in R&D activity between urban and rural areas, while the size of the enterprises is also significant for the R&D activity. For example, a large proportion of small businesses and municipalities in Trøndelag utilise R&D to a low extent because they lack resources and expertise. In order to remedy this, several new instruments have been established in recent years to create a better balance in this context (Trøndelag County Council, 2017, p 11).

> Industries and clusters that are relatively close from a knowledge perspective and are in the same technology or knowledge area create a good basis for cross-industry innovation and collaboration. The cooperation between offshore and aquaculture, where the purpose is experience and technology transfer, is a good example of such a "crossover". It is important to facilitate connectivity across industries, value chains, clusters, educational institutions and the R&D communities in the region. (Trøndelag County Council, 2017, p 12).

> Good interaction between the actors in the regional innovation structure is a prerequisite for succeeding in achieving the goals in this strategy. Interaction occurs in partnerships, networks, clusters, meeting places and projects, as well as in other forms of contact and communication. For interaction to function well, it is important that the actors are aware of and accept the structure and role distribution, and that the cooperation climate is based on openness and trust. One measure in this respect is establishing regional partnerships for

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[36] Trøndelag fylkeskommune (2017) *Strategy for innovation and value creation in Trondelag*
https://www.trondelagfylke.no/contentassets/b91afe6250b342e9b2d73dc270993796/strategy-for-innovation-and-value-creation-in-trondelag.pdf

business development in Trøndelag. The partnerships should have a broad con
from the various actors in the innovation system. (Trøndelag County Council, 2017, p 12).

Participation in EU projects shall contribute towards strengthening the agreed priority areas. International programmes such as Interreg, Horizon 2020 and Erasmus + are examples of important funding tools for development and knowledge projects in Trøndelag (Trøndelag County Council, 2017, p 12)."

This is reflected in the 2019 joint action program *The Action program for Strategy for innovation and value creation in Trondelag 2020-2021*[37] prepared in collaboration with business and organizations in Trøndelag.

Social and land use planning and technology arrange for sustainable and modern societies where the economic, social and environmental values are in the centre for all that we do and create. Important elements are to create new, sustainable products, services and business models as well as social functions within and across traditional industries, technologies and disciplines (Trøndelag fylkeskommune, 2020, p 6).

Goals

Be a resource efficient society with increased use of smart technology. • Have good competence in the business community and the public sector to be able to exploit new technological opportunities (Trøndelag fylkeskommune, 2020, p 6).

Strategy

- Use smart technology to obtain increased social, economic and environmental sustainability.
- Use the competence bases on digital technology to raise the digital skills in the business community and the public sector.
- Use the region as test arena

Measures

- Establish innovation partnerships between the public sector and the private business sector.
- Implement new technology through digitalization pilots and development projects.
- Strengthen and develop further digital and technological knowledge promotion in the business community and public management and to promote digitalized working processes.
- Develop and stimulate the business community as suppliers of innovative solutions for transport on road, sea and land. Test models for digital meeting and educational arenas.
- Use social and land use planning as tools for better interaction, co-localization and exploitation of resources and logistics.

Table 10: *Normative acts on national, regional and local levels regulating digitalization.*

National level
Meld. St. 27 (2015–2016) Digital agenda for Norge — IKT for en enklere hverdag og økt produktivitet: https://www.regjeringen.no/no/dokumenter/meld.-st.-27-20152016/id2483795/ (NO)
Regional level
1. Trøndelag County Council (2019) *Plan for Economy 2020-2023*

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[37] Trøndelag fylkeskommune (2020) The Action program for Strategy for innovation and value creation in Trondelag 2020-2021
https://www.trondelagfylke.no/contentassets/b91afe6250b342e9b2d73dc270993796/handlingsprogram-politisk-vedtatt-en-final-13.02.20.pdf

https://www.trondelagfylke.no/globalassets/dokumenter/okonomiplan/okonomiplan-2020-2023/okonomiplan-2020-2023.pdf (NO) 2. Trøndelag County Council (2017) *Strategy for innovation and value creation in Trondelag* https://www.trondelagfylke.no/contentassets/b91afe6250b342e9b2d73dc270993796/strategy-for-innovation-and-value-creation-in-trondelag.pdf (ENG) 3. Trøndelag County Council (2019) *The Action program for Strategy for innovation and value creation in Trondelag 2020-2021* https://www.trondelagfylke.no/contentassets/b91afe6250b342e9b2d73dc270993796/handlingsprogram-politisk-vedtatt-en-final-13.02.20.pdf (ENG)
Local level
n/a

6.2. Support instruments to promote SMEs digitalization

Policy instrument: *"Smart Societies" unit as a tool for facilitating digital transformation in small and micro businesses in Trøndelag in "A value creating Trøndelag. Strategy for innovation and wealth creation in Trøndelag[38]"*

Indicators: Number of companies, partners, and stakeholders participating in digital competence enhancing projects, courses and events.

The policy instrument has been revised on a yearly basis the last two years in order to reflect the challenges within digitalisation/digital transformation. It is well suited to be further developed through the DigiBEST project by adding further knowledge through policy studies and good practices from other partners regions

Support tool: «Industry 4.0 Trøndelag - increasing digital skills in small- and micro businesses» (2019-2023) is a support tool for SME digitalization. In a multiple step program aiming to increase the level of digital skills in 400 micro/small companies in Trøndelag, inspire them to digitally transform their businesses, cooperate with others, encourage them to develop their business models to a digital future, to recruit the right personnel, and through the project get the possibility to participate in low threshold pilot/R&D projects with highly specialized partners and the stakeholders also participating in DigiBEST. The project is developed, financed and run by the Smart Society unit in Trøndelag County Council. Knowledge derived from the DigiBest project will be implemented in the Industry 4.0 Trøndelag project: Smart Society unit uses DigiBest to gain knowledge and Industry 4.0 Trøndelag project to implement the knowledge through stakeholders and through them out to the small businesses.

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[38] Trøndelag County Council (2017) *Strategy for innovation and value creation in Trondelag* https://www.trondelagfylke.no/contentassets/b91afe6250b342e9b2d73dc270993796/strategy-for-innovation-and-value-creation-in-trondelag.pdf

6. Analysis and identification of good practices

Table 11: *Description of the Good Practice 01*

Good practice general information	
Title of the good practice	**Public-private cooperation/funding model for Business Gardens-creating ecosystems**
Category of the good practice	*Please choose one of the categories:* • *Enabling environment;*
Organisation in charge of the good practice	SIVA – https://siva.no/english/ (a governmental enterprise facilitating a national infrastructure for innovation consisting of regional/local incubators, business gardens, catapult centres, innovation enterprises, innovation centres and industrial real estate)
Description	
Short summary of the practice	*The Business Garden program* is a national/regional program established by the Norwegian Government in 1998 to enhance business development in the rural areas. The program is run by SIVA, a public enterprise, and co-owned by the County Councils in Norway (total of 50% public ownership). The Business gardens (5 in Trøndelag) is an important regional development tool for the County Councils. SIVA also organize a national Incubation Program (3 incubators in Trøndelag). The Business gardens are organized as shareholder companies with a majority of private owners (min 51%). A Business garden co-locates development-oriented companies in order to promote growth, cooperation and development. It provides access to expertise, networks and an academic and social community. Public ownership shall be min. 34% divided on national operator SIVA, regional actor County Council, and the local Municipality where they are located. Trøndelag County Council has closely worked with the Business gardens and Incubators in several projects regarding digital transformation. The coop with the Business gardens enables the County Council to reach out to the SMEs, and the SMEs to get assistance from a larger community.
Resources needed	National Program: 16,4 mln EUR of annual governmental contribution is allocated to 40 Business gardens and 35 Incubators in Norway. A local, regional Business garden have 3-15 employees, and it can be established without a national program. Public funding is critical for success.
Timescale (start/end date)	*1998 – ongoing*
Evidence of success (results achieved)	Business gardens have proven to be stabilizing environments in rural municipalities where they are located, and have contributed to reduce competence drain, and even increased inflow of people. They focus on HRD - human resource development (priority), innovation, create startups, networking and growth in established SME's in rural areas. Regional projects in Trøndelag show that workshop-based courses where County Council and business garden/Incubators cooperate engage the SME's (*Digital Visibility* in 2015-2017 – 140 businesses participated, *Industry 4.0*

	Trøndelag project initiated in 2019 with ... gardens/incubators participating). The Partnership btw. Business gardens, Incubators and County Council regarding development of Industry 4.0 Trøndelag project is proof of success at this moment, along with many other ongoing projects in for example circular economy.
Potential for learning or transfer	The established private-public model gives Business gardens more legitimacy in doing a development work with businesses. Less questions on potential upselling. The locally based Business gardens play a key role as intermediaries in the County Councils regional development program and makes it possible to also reach the smallest and most vulnerable businesses. Working with the County Council, and together with each other, Business gardens in turn, increases their competence in infrastructural, - and policy matters. To transfer and implement this practice on a national level needs substantial effort, but it can be implemented more easily on a regional level, starting with the private/public Business Gardens. The key to success lies in the large part of public funding – with funds directed to specific actions, which gives the Business Garden a legitimacy as a trusted actor – that is an actor that is not overselling it's services on a purely profit basis to the SMEs.

Source: adjusted by the author using the Interreg Europe Good Practice template from the Interreg Europe website: https://www.interregeurope.eu/policylearning/good-practices/

Table 12: *Description of the Good Practice 02*

Good practice general information	
Title of the good practice	**Development of digital networks (fixed and mobile) in non-commercially viable areas**
Category of the good practice	*Please choose one of the categories:* • *Enabling environment*
Organisation in charge of the good practice	*Trøndelag County Council*
Description	
Short summary of the practice	Development of digital networks, both fixed and mobile, in non-commercial areas. The projects are an example of good cooperation between the municipality, county council and suppliers. For the digitized community an access to networks everywhere, both fixed and mobile, is a basic requirement. Most of the development of networks takes place on a commercial basis, and coverage improves from year to year. The coverage for Trøndelag currently stands at 86% for 30 Mbps and 82% for 100 Mbps. 23% of all people employed work in businesses with less than 10 employees. A lot of them located in rural areas and constitutes cornerstones in the local communities. Trøndelag has a lot of remote rural areas with low population, and the small businesses are imperative to maintain the population. A prerequisite for the businesses to survive in the future is access to high-speed internet, so is the future of the local, rural

	communities. This is a regional development task that is viewed as extremely important at both local, regional and national level. It is a question on survival first, and digital transformation as second. Companies are encouraged to file requests, and there are several individual projects based on that.
Resources needed	For 2019, 60 mln NOK from national/regional funding, nearly the same amount from the municipalities were allocated There are also net contributions from suppliers. In Trøndelag county council 2 persons are employed in the projects. And we have resources for controllers and legal advisers when needed.
Timescale (start/end date)	2008 – 2025 (longer if necessary)
Evidence of success (results achieved)	In 2019, 3000 new fibre cable-based accesses to households and 15 new mobile cell towers for mobile networks (4G/5G and fixed radio) were built. For businesses in rural areas, we have a special priority focus. For 2020, the number of development projects are uncertain due to COVID 19 disruption. The success of getting these projects can be found in the cooperation-methodology model (County Council/municipalities/telecom companies), which is unique in Norway.
Potential for learning or transfer	Over a period of 15 years, Trøndelag has developed a model for cooperation that is seen as unique in the country. The national authorities often refer to Trøndelag on such issues. The model is based on the fact that there must be a fundamental trust and credibility between the actors, so that we work well together to achieve our goals. Openness, good communication and information are also key elements. And to top it off, a good portion of creativity.

Source: adjusted by the author using the Interreg Europe Good Practice template from the Interreg Europe website: https://www.interregeurope.eu/policylearning/good-practices/

Table 13: *Description of the Good Practice 03*

Good practice general information	
Title of the good practice	**Restructuring Motor – Digital competence enhancement**
Category of the good practice	*Please choose one of the categories:* • *Awareness rising and collaboration;*
Organisation in charge of the good practice	Innovation Norway – https://www.innovasjonnorge.no/en/start-page/
Description	
Short summary of the practice	National digital competence programme for SME's for increasing knowledge of success factors – digitalisation to be able to execute changes in the business. As SMEs often do not have the necessary resources to identify and execute necessary change in response to opportunities and threats posed by the digitization of society, the programme aims to increase growth and competitive power in SMEs through digitalization. The programme offers a two-day

	training/workshop for SMEs tailored to the specific needs of each participant. Participants must apply and document their drive and ambition to change and develop. Main beneficiaries are SMEs in Norway. Other stakeholders are Innovation Norge, DigitalNorway and other innovation companies such as Proneo AS.
Resources needed	To run a two-day training/workshop programme requires the participation of 2-3 facilitators and has a cost of approx. 25 000 – 30 000 EUR supporting 10-12 businesses. Participants pay fee and get refunds up to 50% from Innovation Norway.
Timescale (start/end date)	e.g. 2018 – ongoing
Evidence of success (results achieved)	The programme focuses on business opportunities, ability to change and on implementation of real change (concrete solutions). All this based on the opportunities which are provided by digitization. However, the technology is a means to an end. The SMEs' ability to carry out innovation and change/develop their digital approach is the key content. Based on the feedbacks from a recent workshop, it scored 4.4 out of 5. In 2018-2019, 36 businesses participated in the program in Trøndelag County
Potential for learning or transfer	The programme is developed by DigitalNorway with the support of Omstillingsmotor from Innovation Norway. The programme has been distributed to regions in Norway. This is done through regional partners in the planning and execution of programmes in the region together with experts from Digital Norway. The way these workshops are done, bringing many companies together, benefits cooperation and learning. After workshops, as a step 2, the SME's also have the opportunity to attend specialized sessions with leading companies in their fields.

Source: adjusted by the author using the Interreg Europe Good Practice template from the Interreg Europe website: https://www.interregeurope.eu/policylearning/good-practices/

7. Finding and conclusions of the Digital Assessment Survey

The first round of the Digital Transformation Survey in Norway took place on 9 June 2020. Eight stakeholders (business gardens/incubators) sent out an e-mail with a survey link to all their member businesses[39]. Each unit has around 50 members, providing possibility to reach 400 potential respondents. The second round was initiated on 30 June and took place through the holiday season. In this round, the survey was distributed to all trade organisations in the region and they were asked to distribute it to their members. That would potentially cover a large portion of all businesses in the region. Still relatively few businesses answered: 21 completed, 30 partially completed, which gives a total of 51 respondents. That is too few respondents to be able to draw any certain conclusions from, but it is indicative in certain areas.

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[39] There was a suggestion from PP1 that it should be a press release to announce the survey, but given that the region is covered by 8 different newspapers, none of them provides full geographical coverage, and that news about a survey would never hit the pages in other than maybe one or two smallest newspapers – which could skew the results, this was rejected.

It is reason to believe that the period for sending out the survey was less than optimal, because most of the businesses was struggling with serious challenges during this period. Also, there was some feedback from businesses on the complexity of the survey: Some did not have the necessary technical knowledge to answer the questions. One trade organisation reported that they had just sent out an extensive survey to all their affiliates/members. It is reason to believe that the challenging situation with COVID 19 pandemic combined with a too advanced level of the questionnaire could explain the low number of businesses that completed the survey, and the high drop out.

About the respondents: 84% of the respondents were businesses with 1-50 employees (where 34% with over 10 employees) representing different business areas. As the most prominent, *Industrial production* (19%), *Judicial-, financial- and business services* (19%), and *Media, advertising and education* (12%). **Attitude to digital development/transformation:** 90% of the respondents agreed that their businesses would benefit from a higher level of digitalisation / digital transformation. The 3 most anticipated areas for this to be manifested are: *Increased turnover* (16%), *Ability to provide better service to customers* (20%) and *Lower operating costs* (13%).

Access to digital Infrastructure: Most of the respondents (73%) have Cable/high speed internet access. 12% have only cellular access, and the remaining 15% use telephone line or satellite. 60% of the respondents are satisfied with the speed, while 13% think *it is too slow.* 13% find that it *could have been better, but too costly to upgrade*.

The most important applied IT in the businesses: WI-FI (19%), automation technology (18%), Cloud services 16%. Safety/encryption (10%). Only 1% of respondents stated that they haven't use any of the listed technologies. 3% use 3D printers.

Specific applied IT technology for daily use: 28% use automated electronic invoices, 20% use tools like DropBox, One Drive, Google Docs. 17% use Cloud services like Amazon EC2 – Virtual IT, Google App Engine – Applikasjonsvert, Google Apps og Microsoft Office Online – SaaS, Apple iCloud – Nettverkslagring. 16% use CRM/salgsløsninger.

The survey shows that the respondents are aware of the benefits from digitalisation/transformation, but also that they struggle with handling the challenge. Access to digital infrastructure does not seem to be a prominent challenge as for now, but it might be a future problem regarding speed. The overwhelming majority of the respondents use some kind of IT as for daily use today. This is often software for invoicing, cloud services and CRM solutions. Only 3% use 3D printers, which is worth noting, given the fact that 1/5th of the respondents work within Industrial production. As for the next three years, there is widespread plans among the respondents to utilize a broad range of new technologies.

Use of online services
Internet/mobile bank solutions are used by 92% of the respondents. 50% use public service portals like Altinn and DiFi (many businesses use external accountants that access Altinn for them), Digital signature are used by 39%. 61% have used e-commerce services for online sales and purchases. 33% says that they don't use e-commerce due to restrictions from business partners or customers, and safety reasons.

Use of Social Media. 86% of the respondents use social media, listing the business' homepage and Facebook/Linkedin as most important. **Use of Online security**

86% of the respondents use some kind of security software.

Digital strategy. 33% of the respondents have a digital strategy, mostly implemented. 24% plan to develop a strategy, and 38% don't have one, or any plan for it.

Digital skills

24% have employees with basic skills (use e-mail, internet search engines, social media, etc.
29% have employees with above basic skills (can perform data exchange, accounting, digital marketing, ecommerce etc.).
10% have ICT specialists employed.
33% buy ICT services from external businesses.
5% say they do not need any employers with digital skills.

The use of online services is high, with the more or less "forced" use of internet banking and public portal Altinn. What is remarkable, is that a third of the respondents claim that they cannot use e-commerce due to restrictions from partners and customers, and safety reasons. Use of social media is also high, and they promote personnel and businesses on LinkedIn and Facebook. Over half of the respondents have a digital strategy mostly implemented, or plan to have it, but 38% don't have any plans for it. That is worrying, but a little bit better than anticipated. Nearly all respondents need ICT skilled employees, but only 10% have ICT specialists employed. A third of them buy external services. Half of the respondents have employees with basic-above basic digital skills. This shows that digital transformation will be very costly for many of them, as they have to rely on external consultants. It is a problem related to lack of a digital strategy and further recruitment, and they are aware of it: The single most important thing to do is education of leaders and training of employees through support programs, and individual consultations. Employees with digital skills is important.

8. Conclusions and recommendations

Norway ranks quite high over all in use of Internet. Although it has a broad coverage of 4G and broadband access, some small companies in the most rural areas still experience less than satisfactory internet access. This challenge is addressed by our Good Practise 02 (Table 12) *Development of digital networks (fixed and mobile) in non-commercial viable areas* and is an ongoing process. The county council is aware of the challenge regarding the needs for enhancing overall digital skills in SMEs and municipalities. The knowledge about digital transformation is not sufficiently adapted outside the team working on the topic but is growing in the administration of the county council. This Regional Analysis is a mean to extend this knowledge and must be considered as a working document in its current form.

Digital Transformation means more than just basic skills on how to utilize Internet for services. The ability to utilize a computer/software for service/product creation, etc. is something entirely different. It demands other multitude capabilities, such as organisational skills, deep knowledge of

market and its directions, ability to create new business models, access to ecosystems of professional advisors, peers, knowledge of available technology, and not least, visons and strategy for reaching the goals and understanding how to finance the process. The level of digital competence is only ONE of the parameters for digital transformation, but a basic one. In Trøndelag digital maturity is quite low in many SME's, especially in small- and micro businesses, based on the Industry 4.0 Trøndelag pre-project survey results in 2018 measuring 60 small-, and micro businesses' digital maturity (not public). The survey was also combined with interviews that the regional business gardens/incubators performed with their clients, and general impression from Business Gardens and county council's daily work. A survey conducted by *Verdal Næringsforum, Inderøy Utvikling og Næringsforeningen I Levanger* in Trøndelag in 2020 showed that to enhance their digital skills was the most important wish among the respondents, which were small businesses in the area (verdalinf.no)[40]

Urban-Rural divide and low digital maturity is related. Many of the small- and micro companies in Trøndelag are located in the rural areas. The number of large "cornerstone" companies in the rural municipalities of the Trøndelag region have gradually diminished. Now there are, to a larger extent, a multitude of small-and micro businesses that constitute the cornerstones. Therefore, for the municipalities it is vital important to keep those small companies in terms of jobs, tax income and to prevent brain drain. From a population of 466 000, nearly 200 000 lives in the city Trondheim. Considering the huge size of the County, mostly rural, except from Trondheim and some small cities, the digital urban-rural divide should be considered as a pretext, as shown in Table 5 [41]. And there's the main digital transformation challenge: lack of resources (time and money) in the small, rural SMEs, not very close cooperation with the urban R&D environment, and low digital maturity. This is a big challenge for businesses, municipalities, and the region in general. An example: When circular economy (which is a prioritized area in Trøndelag region) will become widespread, there will be only few small/micro companies ready to participate, because digital transformation and circular economy is closely interlinked. Can the small businesses handle environmental marking of products that should be traced from cradle to death without a digital framework and a new product strategy, and how will they be able to calculate environmental fees/quality on products?

One of the **internal challenges** is the lack of digital competence in the small- and microbusinesses in the region. This can be tackled by establishing strong ecosystems for digital development leading to digital transformation. The region possesses the necessary resources, but they need to be exploited and organized strategically correct and in an operative way. Public financing is possible, but there is a need for a more flexible system in order to make it understandable and accessible, and less restrictive regarding conditions related to business location geographically, and its sector. Private financing is difficult for rural small businesses. Belonging to an urban environment makes access to funds easier, but it's still limited (maybe easier for start-ups. Brain-drain and difficulties

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[40] Verdal Næringsforum https://verdalnf.no/aktivitet/kurs-dit-digital-i-trondelag-3-samlinger/

[41] **Nordregio 2020** (Randall, Ormstrup Vestergård & Mari Wøien Meijer): NORDREGIO REPORT 2020:4, *Rural perspectives on digital innovation: Experiences from small enterprises in the Nordic countries and Latvia*

finding competent/right personnel is also challenging. Most highly educated persons prefer the city life with its richer access to peers and offers.

The external challenges are mostly connected with the small companies lacking resources to digitally transform. That is; not possessing the competence and financial ability to develop and change according to the speed of the national demands, customers-, and international competition. National politics with a high degree of centralisation create further obstacles for the companies regarding access to educated personnel. Also, a possibly shrinking market, which can only be reached through a digital transformation of their business model is a threat

The possibilities lie within better utilization of resources in the region, with the regional authorities as an orchestrator with legitimacy and capacity. The necessary structures to reach the SMEs is largely focused around the business gardens and incubators in the region, as shown in Good Practice 01 (Table 11) *Public-private cooperation/funding model to reach digitally immature SMEs in rural areas through building ecosystems*. Another possibility is related to the R&D community. The national tool for enhancing digital maturity is described in Good Practice 03 the *Restructuring Motor* (Table 13). It is performed on a regional level but is more advanced and more centralized: it does not take advantage of the regional innovation structure (business gardens and incubators and R&D community) and is run by Digital Norway (national practice financed by Gov.) in Oslo with their consultants in cooperation with one incubator in Trøndelag.

Utilizing the regional structures through the *Industry 4.0 Trøndelag* project, developed and owned by the Trøndelag County Council. The project aims to provide digital skills to small- and micro companies through the business gardens and incubators, and to connect the regional innovation/R&D environment with the business gardens/incubators (also with other regional partners within ICT and org. development) in order to obtain a broader and more regional focussed approach. Digital transformation is about connecting a broad range of different disciplines – knowledge environments such as universities, cultures, and orchestrate them into joint efforts. As project owner of *Industry 4.0 Trøndelag*, Trøndelag County Council has taken the role of a neutral and legitim orchestrator with a very broad knowledge base and contacts within the most knowledge environments.

Ecosystems are essential components. In order to be efficient, digital transformation needs broad networks of actors/ecosystems: The County Council, universities, business gardens/incubators, financial resources, relevant advisors for the particular lines of businesses, and tech ecosystems. Increasing digital competence and knowledge about tech opportunities for selected lines of business is a place to start. And in Trøndelag we do that with the regional *Industry 4.0 Trøndelag*[42] project, which targets small- and micro companies. To be a part of specialised ecosystems or groups might build trust, and also make it possible for SMEs to hire highly qualified persons to serve several

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[42] «Industry 4.0 Trøndelag - increasing digital skills in small- and micro businesses» (2019-2022).
In a multiple step program, increase the level of digital competence in 400 micro/small companies, inspire them to digitally transform their businesses, cooperate with others, encourage them to develop their business models to a digital future, to recruit the right personnel, and through the project get the possibility to participate in low threshold pilot/R&D projects with highly specialized partners.

small businesses, which could meet the challenge of brain drain and high personnel costs. The costs for a specialist that is only needed 10-20% of the time in one of the businesses in an ecosystem/cluster can be split between for example 5-or 6 companies.

To orchestrate digital transformation demands a flexible system for project financing. When Industry 4.0 Trøndelag was designed, there was no doubt that financing this project with multiple public bodies was a challenge. Each public body has its own rules and priorities; some business can receive public support, others cannot, mostly based on type of industry and geographic location. In order to focus on specific lines of business, or value chains, this became a significant and very time-consuming challenge which should be addressed. There is a substantial need for a reformed and more flexible public financing system. One example: Trade; that is shops selling goods and diary for example, cannot receive public financing. That is not logic given the disruptive development going on in that field (Amazon and other global actors are a major threat to local shops).

The process of digital transformation is underway in the region. The future efforts have to largely focus on the small-, and micro businesses, because they are a very fragile and differentiated group of entities spread all over the region, mostly unorganized, and of great importance for the rural parts of the region. A "strategically smart move" for the County Council would also be to explore a closer partnership with the NTNU University in Trondheim connected to their possible status of becoming a EDIH (European Digital Innovation Hub). That would secure a European access for cooperation and development of the future ecosystems and knowledge infrastructure built through the Industry 4.0 Trøndelag project, implementing both county council, business gardens, incubators and the SMEs. The EDIH could be the operating node for the digital platform for these ecosystems.

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