WP 2 Development and Re-Assessment of Services

Re-Evaluation Plan

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Contents

1   Introduction

The digital transformation of regions plays a pivotal role in shaping their economic, social, and cultural landscapes. As the world hurtles towards a digital future, rural communities face the challenge of balancing traditional values with modern technology. Rural communities face obstacles such as technological illiteracy and limited access to high-speed internet. Addressing these challenges requires a comprehensive approach that involves stakeholders in all areas of society. Collaboration between government, industry, academia, and civil society is essential to develop tailored solutions that meet the unique needs of rural areas and enable them to thrive in the digital age.

This study aims to figure out the challenges and opportunities of the region's digital transformation and how these change over the project period to gain important information on the status of the region and its digital maturity. In addition, it aims to understand how the services of DInO help customers on their journey towards more digital maturity. The findings are used for re-assessing which services DInO should provide, or which are missing.

To comprehensively understand the dynamics of the Digital Transformation in Eastern Bavaria, the methodological framework comprises a desk-based study, literature review, and analysis of secondary data from the region, while qualitative methods such as surveys are used for the initial analysis of the services delivered by DInO. The initial findings suggest that especially Lower Bavaria faces challenges in the digital skills of its population and public transport but Eastern Bavaria as a whole also bears strengths in knowledge-intensive industries with potential for digital innovation.

At the beginning of this report, the methodology is described in section 2. Afterward, an interdisciplinary investigation of the region is conducted in section 3, the needs of Eastern Bavaria about the digital transformation are determined in section 4. In the following section, regional efforts to increase digitization & innovation are presented, with the regional digital policy analyzed in subsection 5.1 and the funding environment described in subsection 5.2. The next section 6 provides comparisons on regional, national, and European levels concerning the digital maturity of the region. Through first service provisions, better insights on the status quo can be collected in section 7. Finally, in conclusion, section 8, we reflect on the outlook for the region and draw key takeaways from our analysis to shape the future of DInO.

2   Methodology

Our research aims to provide a thorough analysis of the digital landscape in Eastern Bavaria. The focus is on understanding the region's digitization needs and its digital

maturity. The findings from this analysis will be used for improvement and adjustment of the services provided by DInO.

The analysis is divided into three parts, following a mixed methods approach, integrating desk-based study, a small literature review, and analysis of secondary data, as well as qualitative methods such as a survey to evaluate the services of DInO. By utilizing both quantitative and qualitative methods, the study can address the complexity of the topic and provide first insights into the Digital Transformation in Eastern Bavaria.

Conducting a systematic search of academic databases, government reports, and relevant publications, the existing literature on the Digital Transformation of Eastern Bavaria is reviewed. Quantitative datasets on the regional state of the economy are regularly published by federal agencies and institutes in Bavaria. Such surveys and statistical analysis are essential for assessing the current state of the economy and comparing digitization levels and trends across Eastern Bavaria and its neighboring regions.

The analysis of secondary data obtained through the desktop study aims to extract relevant insights, based on regional data, for adjusting DInO services.

With INKAR, an open data database by the German Federal Institute for Building, Urban Affairs and Spatial Development, regional statistical information on living conditions in Germany and Europe could be obtained (Bundesinstitut für Bau-, Stadt- und Raumforschung , 2024). Topics include: Education, demographics, labor market, or the environment and enable urban-rural comparisons as well as evaluations over the last few decades. Data is available with status end of 2022. The database is utilized to create maps, illustrating key regional characteristics and disparities in digital skills of the workforce.

The indicators used for mapping are the share of employees in IT and natural scientific service occupations in percent of the total workforce, the proportion of employees at the place of work in knowledge and research-intensive industries in percent of the total workforce, the share of employees at the place of work with an academic professional qualification in percent of the total workforce.

Additionally, the Regional Innovation Scoreboard (RIS) is employed, with evaluation occurring at the European NUTS2 level. This enables the analysis of data on the level of administrative districts. It utilizes the Summary Innovation Index (SII), a composite indicator derived from 27 individual indicators. Furthermore, the Regional Innovation Index (RII) from 2023 is analyzed for European comparisons (Hollanders, 2023).

The Digital Administration Dashboard is utilized for assessing the digitization of public services (Bundesministerium des Innern und für Heimat, 2024).

Finally, personal experiences of the project members and survey data are also incorporated to enhance the understanding of DInO services and facilitate improvements based on customer feedback.

As a desktop study based on secondary data analysis, the research is limited to the

variables and indicators covered by the selected datasets. Certain contextual factors or localized phenomena may not be adequately captured through this approach. To comply with those limitations and to find out the exact needs of the SMEs in Eastern Bavaria and how well the DinO services provided aid in their digitization efforts, further data has to be collected on the matter of causality of the service offering with the degree of digitization of regional companies and PSEs.

In summary, our methodology lays the groundwork for a thorough analysis of the digital landscape in Eastern Bavaria and the refinement of DInO services to better meet the region's digitization needs. By integrating more diverse data sources and empirical methods, we aim to provide valuable insights that drive digital transformation efforts in the region.

3 Eastern Bavaria

In this section, an interdisciplinary investigation of the region is conducted which aims to give a comprehensive understanding of the region and to deliver scientific findings for its sustainable development. The focus is set on geographic, economic, social, and infrastructural aspects. Eastern Bavaria mainly consists of the administrative districts Lower Bavaria and Upper Palatinate, which will therefore be the focus of this study.

3.1 Geography

The regions of Lower Bavaria and Upper Palatinate are characterized by their diverse geography, which ranges from river landscapes to low mountain ranges and urban centers.

Lower Bavaria stretches across the south-east of Bavaria and borders Austria and the Czech Republic to the east. The landscape is characterized by the rivers Danube, Isar, and Inn, which meander through the region and create fertile floodplain landscapes. The Danube runs through Lower Bavaria from northwest to southeast and is an important route for the transportation of goods. The Isar rises in the Bavarian Alps and flows through the district of Landshut before flowing into the Danube at Deggendorf. The river valleys are popular recreational areas for cyclists and hikers. The eastern districts of Lower Bavaria are characterized by the elevations of the Bavarian Forest, while the western districts tend to have flatter landscapes. The Bavarian Forest National Park covers part of this area and offers protection for a variety of animal and plant species. This eastern region is also home to the highest elevations in Lower Bavaria, such as the Großer Arber with a height of 1455m (Regierung von Niederbayern, 2023).

Upper Palatinate is located in the north-east of Bavaria and borders the Czech Republic. The landscape is characterized by the low mountain ranges of the Bavarian Forest, which

stretch from north to south along the border. Upper Palatinate is also rich in historic towns and castles, which bear witness to the region's eventful history. The city of Regensburg, with its well-preserved medieval city center, is a UNESCO World Heritage Site and a popular destination for tourists from all over the world (Regierung der Oberpfalz, 2024).

The regions of Lower Bavaria and Upper Palatinate have a rich variety of natural and cultural landscapes that have a lot to offer to locals and visitors. The diverse geography is not only an essential part of the regional identity but also a driving force for the economy and tourism in the region.

3.2 Economy

The economic structure in Lower Bavaria and the Upper Palatinate is characterized by a diverse mix of different industries and economic sectors.

In Lower Bavaria, an area with a long agricultural tradition, agriculture continues to play an important role. Particularly in the west, such as in the districts of Dingolfing-Landau and Landshut, large farms characterize the landscape. However, the industry has also firmly established itself here. Mechanical engineering and the automotive industry are important economic sectors here. The proximity to Munich also favors the establishment of high-tech companies and innovative start-ups, which make an important contribution to regional value creation. In eastern Lower Bavaria, however, such as in the districts of Passau and Freyung-Grafenau, the focus is more on the service sector. Tourism plays an important role here, especially along the Danube and in the Bavarian Forest. The idyllic landscape and the numerous historic towns attract tourists from all over Bavaria and Germany. In addition, there are service companies in the healthcare, education, and retail sectors that stimulate the local economy(IHK Niederbayern, 2023).

Upper Palatinate has similar economic structures but with some striking differences. In the western part, especially in the city of Regensburg, the economy is dominated by technology companies and the university. Regensburg is considered one of the leading locations for the IT and biotech sector in Bavaria. The proximity to highly qualified employees and research facilities promotes the region's innovative strength. Regensburg is also an important logistics location that benefits from its favorable location at important transport hubs. In contrast, the eastern part of Upper Palatinate, such as the district of Cham, is dominated by traditional economic sectors such as wood processing, the glass industry, and mechanical engineering (IHK Oberpfalz, 2022).

The different developments in the eastern and western districts of Lower Bavaria and Upper Palatinate are also reflected in the corporate structure. The industrial presence in Dingolfing-Landau and Landshut is characterized on the one hand by large companies from the automotive industry, but there are also numerous medium-sized companies operating

in the fields of mechanical engineering, the automotive industry, electrical engineering, plastics processing, and the food and animal feed industry. The companies often benefit from the proximity to important transportation routes such as freeways and airports as well as the good connections to the greater Munich area. In the eastern districts of Lower Bavaria, such as Passau and Freyung-Grafenau, the corporate structure is more strongly characterized by smaller and medium-sized companies, which are primarily active in the skilled trades, services, and tourism sectors(IHK Niederbayern, 2023).

The picture is similar in Upper Palatinate, with the city of Regensburg playing a special role as an important economic and cultural center, as already mentioned. In the more rural areas of the Upper Palatinate, such as the district of Schwandorf or Tirschenreuth, traditional sectors such as agriculture, crafts, and medium-sized industrial companies dominate (IHK Oberpfalz, 2022).

Numerous family-run businesses have often been passed down through generations within the family. These companies are therefore often characterized by very close ties between the owners and employees. They are often particularly present in traditional sectors such as construction, agriculture, hospitality, and retail. These companies play an important role in the regional economy as they are often deeply rooted in the community and contribute to job creation, strengthening local value chains, and promoting regional identity. They are flexible and can respond quickly to change, which can make them more resilient in times of economic turbulence. The distinctive feature of family-run companies often lies in their long-term orientation, their strong entrepreneurial spirit, and their ability to preserve traditions and values across generations. Many of these companies have a strong corporate culture that was shaped by their founders and continues to exist even after their departure (Miller, D & Le Breton-Miller, I, 2005).

As already mentioned, several industries play a very important role in the Lower Bavaria and Upper Palatinate regions. These include mechanical engineering and metal processing. These are traditionally very strong sectors in the region. They have seen stable development in recent years and have often been able to benefit from the strong demand for machinery and equipment. The proportion of employees in this sector for 2022 was around 41,000 people who were working for 263 companies (IHK Niederbayern, 2023). In Upper Palatinate, the figures according to the IHK Oberpfalz for 2022 are 45,400 employees and 280 companies (IHK Oberpfalz, 2022).

The automotive industry plays a particularly important role in Lower Bavaria, as major production sites of large companies are located here. Despite some challenges, such as the structural change in the automotive industry and the effects of the COVID-19 pandemic, the automotive industry continues to be an important driver of the regional economy. In total, around 35,000 people were employed in 40 companies in this sector in Lower Bavaria (IHK Niederbayern, 2023). This industry does not play such an important role in Upper

Palatinate, where a total of 15,900 people were employed in 33 companies (IHK Oberpfalz, 2022).

Plastic processing and the chemical industry are also important sectors in Lower Bavaria and Upper Palatinate, with many companies specializing in the production of chemicals, plastics, and pharmaceutical products. Despite a certain amount of volatility due to market fluctuations and regulatory challenges, the chemical industry in the region has seen stable development overall. There were around 83 companies in the chemical industry and plastics processing in Lower Bavaria in 2022 with around 11,500 employees (IHK Niederbayern, 2023). In Upper Palatinate, there were around 89 companies with a total of around 3,000 employees in 2021(IHK Oberpfalz, 2022).

Tourism plays a particularly important role in the eastern districts of the region and in the city of Regensburg. Despite the challenges posed by the COVID-19 pandemic and the associated travel restrictions, the tourism sector has seen positive development overall in recent years. However, the number of overnight stays has not yet reached the same level everywhere as in the pre-corona years. The eastern districts of Lower Bavaria, such as Freyung-Grafenau and Passau, are still recording significantly lower figures. Nevertheless, tourism continues to be an important economic sector, which is closely linked to the health sector in the region. For example, the thermal spas in the eastern district of Rottal-Inn play an important role in tourism (IHK Niederbayern, 2023).

The development of the labor market in Lower Bavaria and Upper Palatinate since 2012 has been characterized by an overall positive trend, albeit with regional differences and specific challenges in the various districts. In 2015 and 2019, the administrative districts of Lower Bavaria and Upper Palatinate also followed the general trend of decreasing unemployment rates in Bavaria. The figures in Lower Bavaria fell from 3.4% to 2.9% and in Upper Palatinate from 3.3% to 2.7%. Due to the Covid-19 pandemic, however, unemployment rates reversed throughout Bavaria. This also affected the two administrative districts, with the rate in Lower Bavaria rising to 3.6% in 2020 and to 3.3% in the Upper Palatinate. It is striking that the highest increase in the unemployment rate during this period was recorded in the city of Passau at 1.4%. This also reflects the trend that urban regions were more affected by the rise in the unemployment rate due to the Covid-19 pandemic than the more rural areas(StMAS, 2022; IHK Niederbayern, 2023).

The demographic situation in these regions was also an important factor in the positive development of the labor market. Despite demographic change and the decline in population in some rural areas, many companies were able to retain skilled workers and create new jobs. In addition, targeted measures were implemented to secure the supply of skilled workers and to integrate unemployed people into the labor market. However, challenges remain particularly in the area of securing skilled workers and integrating long-term unemployed persons into the labor market. Particularly in structurally weak

areas with a less diversified economy, there were still regions with high unemployment rates and a shortage of qualified workers(StMAS, 2022).

3.3 Social Structure

The social structure in Lower Bavaria and Upper Palatinate is characterized by a mixture of rural and urban lifestyles as well as traditional and modern values. Despite certain similarities, there are also significant regional differences between the two areas.

In Lower Bavaria, especially in the western districts such as Dingolfing-Landau or Landshut, there is, as already mentioned, a comparatively strong industrial presence. As a result, these regions have a comparatively higher economic dynamism and therefore also offer a higher number of jobs. The population density is often higher here, and there is a greater variety of social services and infrastructure. In the eastern districts such as Passau, on the other hand, the landscape is more characterized by agriculture and tourism. The population density here is often lower and there are more rural communities with a more traditional lifestyle. Similar trends can be seen in Upper Palatinate, although the differences between the western and eastern districts are less pronounced. The city of Regensburg acts as an important economic and cultural center and has a comparatively higher population density. In the more rural areas such as the district of Cham, on the other hand, population density is lower and there is a stronger attachment to traditional values and lifestyles(StMAS, 2022).

The population development in Lower Bavaria and the Upper Palatinate generally shows a demographic change with different characteristics in the individual districts. The demographic changes are particularly noticeable in rural areas, which will be illustrated using the example of the district of Freyung-Grafenau. In recent decades, the district of Freyung-Grafenau has had a relatively stable population. However, the population has fallen from around 82,500 to 79,300 since 2001, with a negative record in 2013, when only around 77,600 people were registered in the district. This long-term decline is mainly due to a negative birth rate and emigration trends, particularly among young people. The consequences are an aging population and a shortage of young workers. The reason for the exodus is the structural situation in rural areas such as Freyung-Grafenau. Job opportunities are limited, particularly in industry and the service sector. Many young people therefore see better prospects in urban centers or move away from the region to pursue higher education or to find better job opportunities. Another factor in population development is the age structure. As in many other rural areas, older people are disproportionately represented in the district of Freyung-Grafenau. This leads to a challenge in terms of healthcare and securing care services. The population forecast for 2039 shows a further increase in the elderly population, which will account for more than

30% of the total population of the region (Statistisches Bundesamt, 2023).

The aging population may lead to a variety of problems and challenges that affect different areas of society. Some of the most important problems will be summarized below:

Labor market: With an aging population in the labor market, the potential workforce is decreasing in many regions, which can lead to a shortage of skilled workers. This can affect the competitiveness of companies and slow down economic growth.

Healthcare: Older people often have a greater need for medical care and nursing. The increasing number of older people can put a strain on the healthcare system and lead to bottlenecks in care, particularly in rural areas.

Social security systems: An increasingly older population poses financial challenges for social security systems such as pension and long-term care insurance. The ratio of pensioners to working people can deteriorate, which jeopardizes the financing of pensions and the long-term stability of social security systems.

Economic growth: An aging population can hurt economic growth, as older people tend to consume and invest less. This can lead to a slowdown in demand and affect the productivity of the labor market.

Social equality: An aging population can also lead to a demographic imbalance, as the number of older people increases with the number of younger people. This can increase social tensions and inequalities and impair social cohesion.

Despite these challenges, there are also positive approaches to overcoming demographic change. These include, for example, targeted measures to strengthen the regional economy and create new jobs to keep young people in the region. Promoting education and further training measures and improving the infrastructure can also help to increase the attractiveness of the district and reduce emigration (StMAS, 2022).

3.4 Infrastructure

Overall, Lower Bavaria and Upper Palatinate offer a diverse infrastructure, which presents different challenges depending on the location and municipality. Both regions are well connected to the national and international transport network. Lower Bavaria is served by highways such as the A3, A92 and A94 as well as major federal highways. Upper Palatinate also benefits from highways such as the A6 and A93 as well as a well-developed rail network. Nevertheless, there are challenges in rural areas of both regions in terms of public transport connections and accessibility to remote locations. In eastern Bavaria, many rural areas are sparsely populated and distances are often long. This makes it difficult to establish a reasonably profitable local transport service. In addition, numerous rail connections have been discontinued in recent decades (Süddeutsche Zeitung, 2021). In a survey, presented by the "Allianz pro Schiene" in the year 2023, the proportion of

the population living within a radius of 600 meters from the nearest bus stop or within 1200 meters from the nearest train station was calculated. The eastern Bavarian district of Straubing-Bogen was ranked last of all German districts, here only 18,54% of people live close enough to the nearest public transportation stop. The district of Cham, which is also part of Eastern Bavaria, was ranked second to last with 20,28% (Allianz pro Schiene , 2023).

Another distinct factor of Eastern Bavaria's infrastructure is its long border with the Czech Republic. There are a total of 13 border-crossing roadways and four border-crossing railway connections between Bavaria and the Czech Republic. Since 2007, the Czech Republic has been part of the European Schengen area. This has eliminated border controls and the border nowadays can also be crossed outside the former official border crossings and without time limits(Czech-Tourist, 2024).

The tourist infrastructure in Lower Bavaria and Upper Palatinate includes a wide range of accommodations, leisure facilities, and cultural attractions. In the Bavarian Forest and along the Danube in particular, there are numerous hiking and cycling trails, campsites, and adventure parks (Tourismusverband Ostbayern e.V., 2024). The challenges in this area often lie in the preservation and maintenance of the natural environment and the creation of sustainable tourism concepts.

Eastern Bavaria has a large number of business locations and industrial areas that offer companies an attractive base. Industrial and commercial areas are particularly well developed in the western districts of Lower Bavaria, such as Landshut and Straubing-Bogen, as well as in the city of Regensburg and the surrounding districts in Upper Palatinate. In more rural areas, however, the availability of commercial space and infrastructure can pose a challenge for companies.

Both regions have a large number of educational institutions, including schools, vocational schools, universities, and research institutes. The University of Regensburg, the Eastern Bavarian Technical University of Regensburg, the Deggendorf Institute of Technology, and the Landshut University of Applied Sciences are important educational institutions that contribute to the development of skilled workers in the region. The Deggendorf Institute of Technology vastly expanded during the last decades, the number of enrolled students elevated from just around 1000 Students in the year 2000 to over 8500 in the year 2024, from whom are 35% international students. This makes it Bavaria's fastest-growing and most international university (PnP, 2023). The University of Regensburg currently employs around 3400 persons and has over 20.000 students enrolled. Nevertheless, access to educational institutions and the availability of skilled workers can be a challenge in rural areas.

In many places in Eastern Bavaria, the expansion of the digital Infrastructure is progressing more slowly than desired, and there are still areas that are affected by an

inadequate internet connection. The main problem is the rural structure of many areas in Lower Bavaria and Upper Palatinate, which makes it difficult to provide comprehensive broadband internet coverage. Expansion is particularly difficult in remote rural regions due to the low population density and high infrastructure costs. Telecommunications companies are often reluctant to invest in these areas as profitability is questionable. Another hurdle is the topographical nature of some areas. Mountainous landscapes and dense forests can make it difficult to lay cables and erect transmission masts, which can lead to signal interference and inadequate coverage. Various measures have been taken to address these challenges. Funding programs at the federal and state levels that provide financial support for broadband expansion in rural regions play an important role. These subsidies are intended to make expansion more profitable and increase the incentive for telecommunications companies (IW-Consult, 2023).

Municipal initiatives have also played an important role. Many municipalities in Lower Bavaria and Upper Palatinate have joined forces to build their broadband networks or convince local providers to invest in the expansion. These bottom-up approaches have helped to ensure that even remote areas can be supplied with fast internet. These measures have enabled broadband coverage to be introduced almost in the whole of Eastern Bavaria and now ranges from 98.5% in the Regen district to over 99.5%, for example in the Schwandorf district with 99.64%, as well as full coverage in the independent cities of Landshut and Regensburg. In terms of private households, however, availability is lower, with only 97.8% of households in the district of Freyung-Grafenau having access to the broadband network and only just over 98% of companies (Bundesnetzagentur , 2024).

4 Digital Transformation of the Region

The Digital Transformation of Lower Bavaria and Upper Palatinate advanced over the last decade but there are still a lot of obstacles in the way for a sustainable digital development of the region. As described above, the geography of the region inherits difficulties and opportunities for a successful digitalization of the region. The geography of Lower Bavaria as well as the cultural sites of Upper Palatinate provide an excellent environment for sustainable tourism but also inherit difficulties in the construction and maintenance of digital infrastructure (Tourismusverband Ostbayern e.V., 2024; IW-Consult, 2023).

The economy of Lower Bavaria relies on agriculture, mechanical engineering, and the automotive industry. In eastern Lower Bavaria tourism is also a significant part of the economy. The economy of Upper Palatinate is characterized by the IT and biotech sectors in the west and traditional economic sectors in the east. The different focuses and developments in the eastern and western districts reflect the diversity and dynamism of these regions, which are constantly under pressure to evolve and adapt to meet the

challenges of the changing economy. The combination of high technology sectors on the one hand and traditional sectors on the other, offers opportunities for spillover effects between the different sectors(IHK Niederbayern, 2023; IHK Oberpfalz, 2022; Wuth, 2022).

For example, the existence of manufacturing and automotive sectors can lead to an increase in startups in rural regions. Firms in both sectors usually require lots of space to be able to build factories and produce or sell their products. They also often need good access to the transportation system. Such assets are scarce in cities and explain why businesses in these sectors move to less urbanized regions. Digital startups usually do not need space for production or well-developed transportation routes, which shows that startup founders probably care mostly about the available infrastructure and network potential, which are offered by companies in these sectors (Wuth, 2022).

The corporate structure of the Region is reflected by large and medium-sized companies in the more urbanized western parts as well as smaller and medium-sized companies in the eastern districts. The traditionally vast existence of family-run businesses fosters the development of the region's economy, too. The labor market of Eastern Bavaria is characterized by a stable development in the long run, while challenges to secure skilled workers remain. The availability of highly qualified specialists and the region's attraction to skilled workers as a place to work and live is crucial for Eastern Bavaria. In addition to economic growth, there are other positive effects, for example on social structure and public life of the region. The recent pandemic has changed the labor market and the way people work. Many businesses have shifted to remote or hybrid work models to comply with social distancing measures and ensure employee safety. This shift has accelerated the acceptance and integration of remote work technologies and practices across various industries (vbw, 2023).

The social structure differs from east to west in Lower Bavaria and Upper Palatinate. In both administrative districts, the western parts tend to be more urbanized than the eastern parts. In the rural parts of the region, the demographic structure is changing faster as job opportunities are limited and there is an aging population. This leads to challenges for the region, particularly in the fields of labor market, healthcare, social security systems, economic growth, and social equality. Approaches to counter the demographic change in the region include measures to strengthen the regional economy, create new jobs, promote education, and improve the infrastructure (StMAS, 2022).

The region benefits from a solid infrastructure and transport capacities, while in contrast to metropolitan regions and conurbations, there is still a considerable under-supply of smart mobility solutions. In cities, public and private transport services in conjunction with sharing offers, smart mobility solutions are increasingly offered and used, while in rural regions there is a strongly propagated and subsidized public transport offering, which nevertheless usually falls short. As a result, individual motorized transport

remains the most common way to travel in Eastern Bavaria. Isolated model projects, such as the autonomous bus Bad Birnbach, which has connected the train station with the town center since October 2019. The autonomous line is closing an important transport gap in town and tries to solve the problem of the last mile, (Gröll, 2023) or the sharing offer of minibusses from FreyFahrt Freyung(door2door GmbH, 2024), show that there are possible solutions towards smarter greener mobility in the region. On the other hand, however, these model projects also highlight the administrative and legal deficits and obstacles that stand in the way of new solutions(Dorner, Wuth, & Lemberger, 2023).

The educational environment in Eastern Bavaria is home to several renowned universities and higher education institutions, including the University of Passau and the University of Regensburg. The educational environment of Eastern Bavaria is also enriched by its strong ties to the industry of the region. This enables the region of Eastern Bavaria to attract digital companies and start-ups. Many startup founders prioritize the presence of entities generating knowledge spillover effects when determining where to relocate their companies. Cultivating a robust network with research and higher education institutions is essential for boosting startup growth potential. This collaboration not only expands the regional knowledge base but also fosters opportunities for the emergence of new ventures(Wuth, 2022).

The development of the digital infrastructure in Lower Bavaria and Upper Palatinate has made great progress in recent years, but there are still areas with inadequate broadband coverage and slow internet connections, particularly in remote rural areas. Further improving the digital infrastructure is an important challenge for Eastern Bavaria to strengthen the competitiveness of companies and improve the quality of life of residents. The recently achieved advancements in broadband coverage are a chance for Eastern Bavaria to attract digital businesses and smart region initiatives. Many advanced technologies rely on digital infrastructure like 5G and broadband. In fact, broadband coverage can even compensate for the location disadvantages of rural areas. The higher the Internet access speed, the greater the competitiveness of companies in rural areas compared to companies in metropolitan areas. Another important advantage of a reliable digital infrastructure is that cooperation between companies and educational institutions as well as research facilities can be intensified and simplified (Fornefeld, Spiegel, & Ludwigs, 2018).

4.1 Smart City

Several municipalities in Eastern Bavaria are already implementing smart city/smart region initiatives to improve infrastructure, enhance public services, and promote sustainability. These initiatives leverage digital technologies such as IoT, data analytics, and smart mobility solutions to address challenges and improve the quality of life for residents. An

extensive network of different players in the context of Smart Region has already developed in the region. These include start-up centers, colleges and universities, associations, and numerous municipalities and municipal associations. These are particularly active in model and lighthouse projects from various funding bodies and with different technical orientations.(Dorner et al., 2023)

Relevant Smart Region projects in eastern Bavaria include the Smart Cities model projects of Regensburg, Hof, and Wunsiedl as well as the model project of the integrated rural development cooperation "ILE Ilzerland". These model projects are founded by the German Federal Ministry of Housing, Urban Development, and Building and develop digital solutions for dealing with climate change or use digitalization to improve municipal processes and services (BMWSB, 2024).

Three Integrated Digital Development Concepts have been developed in eastern Bavaria by Regensburg, Deggendorf-Plattling and the integrated rural development cooperation "ILE Nationalparkgemeinden". The development of these concepts has been a part of the model project: "Smart Cities Smart Regions - Municipal Digitalization Strategies for Urban Development and Mobility of the Future", funded by the Bavarian State Ministry of Housing, Building and Transport. In these concepts, digitalization is integrated into urban and regional development concepts as a cross-cutting issue. In contrast to traditional smart city strategies, urban planning, and spatial aspects make up the focus of these concepts (Bayerisches Staatsministerium für Wohnen, Bau und Verkehr, 2024).

Furthermore, the Steinwald-Allianz municipal association in Upper Palatinate and Spiegelau-Frauenau in Lower Bavaria were the first two "Digital Villages" in Bavaria. The "Digital Village" projects aim at mastering the everyday challenges of life in the countryside through digitalization (BayernDigital, 2024).

The region is characterized in particular by a creative climate that includes traditional elements, but also innovation in the areas of culture, technology, and digitalization(Dorner et al., 2023). With the help of public funding programs and through the establishment of technology campuses and business incubators, a culture of innovation is developing in the region and hidden champions as well as innovative start-ups continue to emerge in various economic sectors. However, to remain competitive, the manufacturing industry and SMEs, in general, must gradually move towards sustainable Digitalization, transform internal processes into digital and more efficient applications, and generate innovative solutions for customers, especially in rural areas.

5 Regional Efforts to increase Digitization & Innovation

The Digitalization Strategy of Bavaria focuses on the following elements: Autonomous driving, Cybersecurity, Robotics, microsystems technology, 3D printing, and e-health. Also, the funding of collaborative research projects and the Establishment of competence centers, research-related test environments, and Platforms to support cooperation between business and science, strengthen research and development, and accelerate technology transfer from science to business (StMWi, 2021). Bavaria supports research and innovation through various funding programs and incentives, including grants for research projects, technology transfer initiatives, and collaboration between academia and industry.

5.1 Digital Policy

Bavaria was the first federal state in Germany to invest intensively in promoting technology and innovation starting in 1994. With the special program Offensive Future Bavaria (German Offensive Zukunft Bayern (OZB)), Bavaria began to invest DM 3.5 billion (approx. EUR 1.75 billion) in the establishment of new universities of applied sciences, new faculties at existing Bavarian universities and the establishment of technology centers and network institutes. For the first time, the promotion of young high-tech companies has become one focus of governmental funding. The locations of the new technology and start-up incubators were specifically selected based on their proximity to research institutions and universities (Berger, 2002). In 1996, the second phase of the OZB was launched. In this phase, further investments were made to support specific programs and technologies, to increase the size of research institutions and universities, and to develop specific technology competence centers. In 1999, the final phase of the OZB, also known as the High-Tech Offensive (HTO), was launched (Berger, 2002). This program ran until 2004 and was primarily designed to support high-tech projects throughout Bavaria that focused on the five technology fields of life sciences, information and communication technologies, new materials, environmental technology and mechatronics (Falck & Kipar, 2010). Since 2004, the Allianz Bayern Innovativ has taken over the established thematic clusters to promote a broad-based cluster policy and regional development activities. The previously developed five core technologies were expanded and resulted in 19 thematic clusters to support knowledge generation and technology transfer (Falck & Kipar, 2010).

Bayern.FIT - Research, Innovation, Technology built on the previous programs from 2008 to 2011 to continue supporting cluster initiatives as well as technology-driven entrepreneurship and high-tech research in universities and research institutions. The funded projects covered the range of initiated cluster initiatives and research fields from the previ-

ous programs. Of the almost 1.5 billion euros invested in the program, 30 million euros were earmarked for high-risk investments in new technology start-ups (Bayerische_Staatskanzlei, 2008). In addition, the Bavarian State Ministry of Economic Affairs, Infrastructure, and Transport has been investing more heavily in the development of incubators geared towards digital entrepreneurship since 2015 (Bayerisches Staatsministerium for Economic Affairs, Energy and Technology, 2020). Since then, the Gründerland.Bayern campaign has been supporting the promotion of entrepreneurship through state-wide marketing and networking activities (Gründerland.Bayern, 2022). The funding rate for business incubators in areas with a particular need for action, for example in the Bavarian border region with the Czech Republic, is up to 15 percent higher than in other regions. The structure of the business incubators is always linked to a state sponsor and economic sponsors for network and strategy development(Dorner et al., 2023). The business incubators are additionally supported by BayStartup, an initiative based in Munich and Nuremberg that coordinates the Bavarian Business Angel Network, advises founders, and helps them grow to investment maturity. In 2019 the Hightech Agenda Bavaria with a volume of €2 billion, and in 2020 the Hightech Agenda Plus with a budget of €1.5 billion was introduced to build on the previous programs. The programs were designed to run for the current legislative period and were implemented until the end of 2023. Large sums were invested into financing venture start-ups, expanding and developing research facilities, and reforming universities with a focus on artificial intelligence, quantum technology, aerospace, and clean tech. The High-Tech Agenda has appointed over 100 AI professors to establish a unique network of experts on current AI topics at universities and research centers throughout Bavaria.(StMWi, 2021; Bayerische_Staatsregierung, 2020).

On a regional scale, the Bavarian Ministry of Economic Affairs, Regional Development, and Energy offers several funding opportunities for SMEs in the context of digital transformation. More than 80 % of the approved total funding from the Regional Economic Development Agency goes to rural areas. For example, within the framework of commercial regional development, individual company investments are aimed at creating and safeguarding local jobs, strengthening overall economic growth, and counteracting demographic change and the emigration of workers. For startups and small companies with up to 10 employees, investment projects are specifically promoted as pilot projects with the program "Schwelleninvestitionen in Kleinstbetrieben". Another special program that supports investment projects by SMEs is „Transformation@Bayern". In small and medium-sized enterprises in particular, support is provided for investments in new digitalization measures as well as in new innovative process, production, and communication processes.(StMWi, 2024)

5.2   Funding Environment

In recent years, an extensive network of digital business incubators has developed in eastern Bavaria, which is already internationally connected. It includes the Digital Start-up Initiative Upper Palatinate with locations in Regensburg, Cham, Weiden, and Parsberg. As well as the Digitalization Start-up Center Lower Bavaria with locations in Deggendorf, Passau, Freyung, Hof, Pfarrkirchen and Bayreuth. Incubators have also been set up at the university locations of the region. These include the colleges and universities of Passau, Deggendorf, Regensburg, Amberg/Weiden, Bayreuth and Hof. (Dorner et al., 2023)

The AI Campus Eastern Bavaria serves as a cooperation platform for eastern Bavarian Universities to pool their competencies on the subject of artificial intelligence. It consists of six universities and industry partners ranging from established corporations to dynamic startups from various sectors including automotive engineering, manufacturing, healthcare, and finance. It is part of the INDIGO network of those universities (INDIGO Netzwerk, 2024).

As a part of the nationwide program "Netzwerk Mittelstand-Digital" from the German Federal Ministry of Economic Affairs and Energy, the "Mittelstand-Digital Zentrum Augsburg" operates a side center in Regensburg. With regional and thematic centers, "Mittelstand-Digital" offers points for information, awareness-raising, and qualification where small and medium-sized enterprises and craft businesses can experience the advantages of digitization through practical examples, demonstrators, information events, and mutual exchange. The center at the University of Regensburg focuses on the digitization of communication, networked value chains, customer relationships, and digital education (BMWK, 2024).

The "Zukunftszentrum Süd" is an organization that operates in the regions of Baden-Württemberg and Bavaria to support small and medium-sized enterprises (SMEs) in their digital transformation and the utilization of artificial intelligence (AI). Its main goal is to assist SMEs in optimizing the opportunities of digitization through free offers. They provide individual consultation, tailored support, high-quality training programs, and a strong network to empower companies to prepare for future challenges. The services are cross-sectoral and aim to support companies in developing their skills and knowledge in the areas of digitization and AI. The Zukunftszentrum Süd also offers an AI business simulation game to introduce companies to the world of AI technologies. Another focus is on networking companies through events and providing resources on their website(ARBEIT UND LEBEN Sachsen, 2024).

DInO-Hub is one of the three European Digital Innovation hubs in Bavaria alongside "Bayern Innovativ" in Nuremberg and the Medical Valley's "DigiHealthHub" in Erlangen. The European Digital Innovation Hub, DInO, is dedicated to advancing digital innovation in the East Bavarian region, serving as a bridge between research and business as well

as public sectors. Comprising a consortium of two higher education institutions and three network and cluster organizations, the initiative aims to provide stakeholders with an extensive amount of knowledge transfer options, positioning itself as the "one-stop digitalization hub" within the region (Technische Hochschule Deggendorf, 2024).

6 Digitization of Eastern Bavaria in Regional, National and European Comparison

This section aims to measure the effects of digitalization in the region and to compare them on a regional, national, and international scale. For a first overview of the digital potential of Eastern Bavaria, different Indicators, focusing on innovation are analyzed and presented.

To highlight regional disparities in digital skills and workforce qualifications in digital industries between the two regions and for a comparison with other German administrative districts, data from INKAR (Bundesinstitut für Bau-, Stadt- und Raumforschung , 2024) of the German Federal Institute for Building, Urban Affairs and Spatial Development is used.

Figure 1: Employees in IT and scientific services
Source: `www.inkar.de`

Figure 1 displays the share of employees in IT and natural scientific service occupations in percent of the total workforce. On a national average, 3,7% work in these sectors.

Lower Bavaria has only 2,2% of its workforce in IT and scientific service occupations, while Upper Palatinate has 3%. Both regions fall below the national average in terms of workforce engagement in these digital sectors, which is 3,7%. In contrast, the figures are much higher for the neighboring Bavarian districts of Upper Bavaria and Middle Franconia. Upper Bavaria has 6,3% of its total workforce employed in IT and natural scientific service occupations and Middle Franconia has 5,1% employed in these digital branches, indicating a notably higher level of involvement in digital branches compared to Lower Bavaria and Upper Palatinate.

Figure 2: Employees in knowledge-intensive industries
Source: www.inkar.de

Figure 2 shows the proportion of employees at the place of work in knowledge and research-intensive industries in percent of the total workforce. Knowledge and research-intensive industries at INKAR are defined as the manufacture of chemical products, manufacture of pharmaceutic products, manufacture of computers, electronic and optical products, mechanical engineering, manufacture of motor vehicles and parts, and other vehicle construction. It is an indication of technological performance and these industries usually have a high proportion of academics among their employees. Lower Bavaria has 14,6% of its workforce in knowledge-intensive industries and Upper Palatinate 17,5%. The national average in Germany is 9,8%. In general, the numbers tend to decrease from the south towards the north of Germany. Surprisingly, the eastern Bavarian districts show a relatively high proportion of employees in knowledge and research-intensive industries. This can partly be explained by the high share of mechanical engineering and metal

processing as well as by the strong automotive industry in Eastern Bavaria, as mentioned in chapter 3.2.

Figure 3 shows the share of employees at the place of work with an academic professional qualification in percent of the total workforce. Considering the shortage of skilled workers and managers, a high proportion of highly qualified people is beneficial to economic performance and especially the ability to innovate. Lower Bavaria is ranked last among the administrative districts of Germany with only 9,1% of employees having an academic professional qualification. In Upper Palatinate 12,2% of employees do so, placing it 29th among the 31 administrative districts of Germany, which has a national average of 16,1%.

Figure 3: Employees with an academic professional qualification
Source: www.inkar.de

These findings underscore significant regional disparities in digital skills and workforce qualifications across Eastern Bavaria. Upper Palatinate has higher figures than Lower Bavaria in all of these indicators. In summary, while Eastern Bavaria faces challenges in digital skills compared to some neighboring regions, it also bears strengths in knowledge-intensive industries with potential for digital innovation (Bundesinstitut für Bau-, Stadt- und Raumforschung , 2024).

To provide more insights into the innovation performance of Lower Bavaria and Upper Palatinate within Bavaria, the Regional Innovation Scoreboard (RIS) is used. In the RIS, the evaluation takes place at the European NUTS2 level, which makes it possible to analyze data on a regional scale. The administrative districts are grouped into: Innovation leaders, strong innovators, moderate innovators, and emerging innovators. The basis for

dividing the groups in the Regional Innovation Scoreboard is the Summary Innovation Index (SII). The SII is a summary indicator that is formed from 27 individual indicators. It provides a comprehensive overview of a region's innovation performance, allowing for comparisons between regions and over time. A higher SII score indicates a higher level of innovation performance, suggesting that the region is more successful in generating and implementing innovative ideas and technologies. According to the SII from mid-2021, Lower Bavaria was ranked last among the seven Bavarian administrative districts, with a score of only 116,77. It was considered as a moderate innovator. Upper Palatinate was ranked fourth with a score of 143,24 and was considered a strong innovator.(StMWi, 2021)

The Regional Innovation Scoreboard from 2023 shows similar results. Lower Bavaria is considered a moderate innovator, between 2016 and 2023 its innovation performance has increased compared to Germany about 2.3% and to the EU about 9.1%. Again, the data highlights the structural characteristics of Lower Bavaria as discussed previously, employment in Manufacturing is above EU and German average, while urbanization is below EU and German average. Figure 4 visually represents the relative strengths and weaknesses of Lower Bavaria compared to Germany and the EU. The blue line resembles the EU, while the orange line shows the RII relative to the other German governmental districts. Strengths are indicated by higher positions on the graph, while weaknesses are represented by lower positions. It illustrates that Lower Bavaria has relative strengths for example in employment knowledge-intensive activities, and relative weaknesses in international scientific co-publications as well as in the indicators of innovative SMEs collaborating and R&D expenditures from the public sector. The radar graph also confirms the findings of relatively few employed ICT specialists in the region. (Hollanders, 2023).
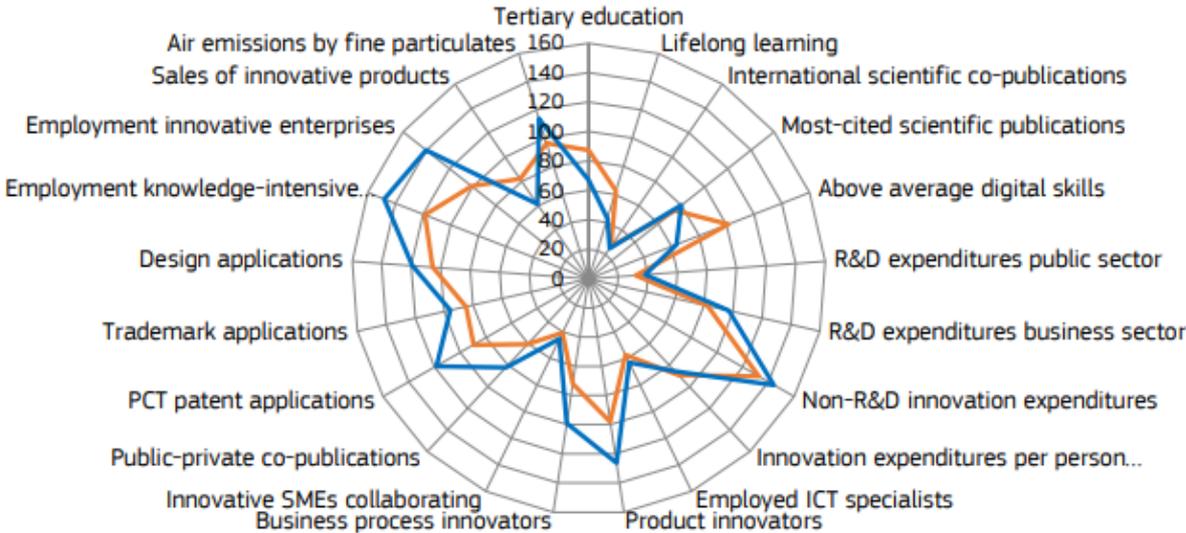

Figure 4: Radar Graph for Lower Bavaria

Upper Palatinate is grouped as a strong innovator, between 2016 and 2023, its innovation performance has increased compared to Germany by about 2,1% and to the EU by about 9,9%. The data highlights the same possible structural differences compared to Germany and the EU as for Lower Bavaria, namely employment in Manufacturing is above average and urbanization is below average. The radar graph (Figure 5) shows relative strengths for example in PCT patent applications and weaknesses for example in lifelong learning, as well as, similar to Lower Bavaria, Employed ICT specialists in the region. The neighboring governmental district of Upper Bavaria, which includes the Munich metropolitan area, is ranked as the most innovative German region and third most innovative region in Europe(Hollanders, 2023).
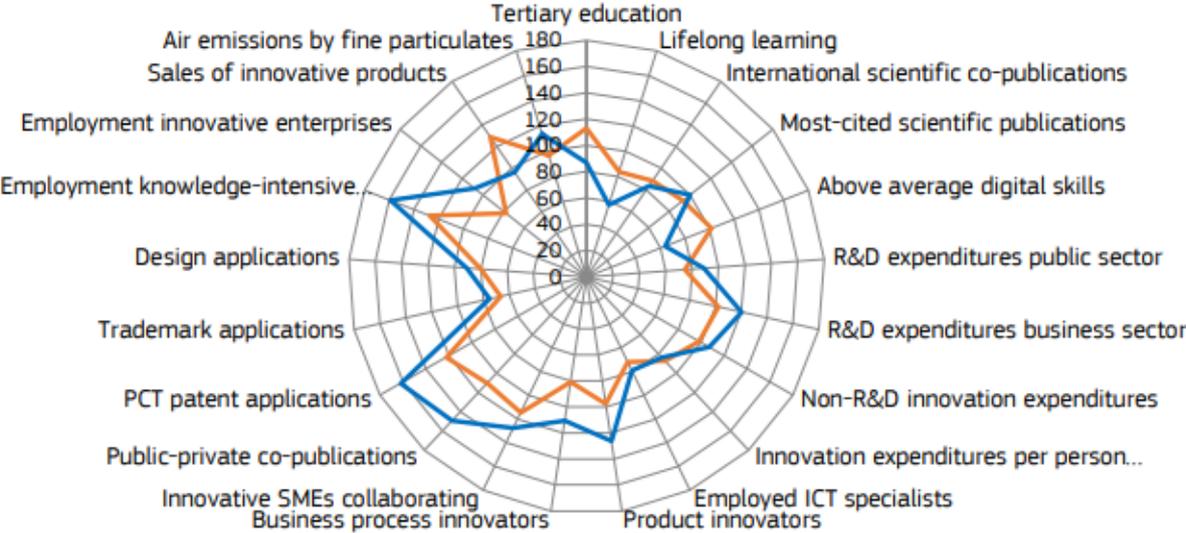

Figure 5: Radar Graph for Upper Palatinate

To show the level of digitalization of public services in Eastern Bavaria, the Digital Administration Dashboard (https://dashboard.digitale-verwaltung.de/ provides an overview of the status of important public administrative digitization projects in Germany. The Digital Administration Dashboard visualizes monthly updated data-based information on the areas: Availability and usage of digital services, digital infrastructure, online authentication, and digital identities. The availability and usage of digital services are summarized by the total number of Online Access Act (OZG)- services for which online services are available for an associated administrative service. An OZG- service is considered to be available online if at least one local authority offers an online service for an associated administrative service. Online availability in the Digital Administration Dashboard is counted regardless of whether the services were digitized as part of the OZG program or outside of it. The German Online Access Act aims at modernizing and digitizing

administrative services provided by federal, state, and local governments in Germany. It mandates that government services be made available online. Data for Eastern Bavaria is available on the county level. Overall Lower Bavaria and Upper Palatinate range average among Bavaria at the availability and usage of digital services. Most services (297) are area-wide and available in the county of Straubing. Germany generally lags behind other European Nations in terms of digitizing public administration. The current administrative processes still heavily rely on paper-based methods, resulting in increased personnel requirements instead of leveraging digital productivity solutions (Röhl, 2023).

Overall, Lower Bavaria has fewer employees in digital branches compared to neighboring regions, indicating disparities in digital skills. However, both Lower Bavaria and Upper Palatinate exhibit strengths in knowledge-intensive industries, with potential for digital innovation. Considering innovation performance among governmental districts, Lower Bavaria ranks as a moderate innovator and Upper Palatinate as a strong innovator. Eastern Bavaria ranks average in terms of availability and usage of digital services.

7   Offered Services by DInO

Following the general scheme of EDIHs, DInO offers services in four service pillars, namely Test before Invest, Skills & Training, Support to find Financing and Investment as well as the Innovation Ecosystem and Networking. The services are diverse in their range of technologies and application areas, their duration of delivery, and their intensity in terms of knowledge transfer from research.

Within the Test before Invest pillar, each service represents one technology field, which is located at one of the two research partner institutes, providing laboratories to test and develop prototypes. Such services are very intense in their delivery as up-to-date research is combined with a practical application that the customer wants to have solved. The goal is to support the customer on an individualized level that helps him to immediately improve his level of digitization. Simultaneously, each laboratory in the Test before Invest pillar supports a larger audience of customers through hands-on workshops and seminars.

Within the pillar of Skills & Training, only one service focuses on providing background information about the diverse technologies enabling higher digitalization levels. The other services focus on business development topics to enable efficient and logical use of digitization technologies to avoid changing non-digital processes or products to digital ones without considering that digital processes need to be implemented differently. Services focus on public sector entities or SMEs, sometimes also mixing both customer groups to enable networking and cross-fertilization between the stakeholder groups. While the primary goal of each service is to transfer knowledge and enable skill development in general, each of the services includes a networking aspect, as customers are in similar

situations and should also learn from each other.

The pillar Support for financing and investment is strongly supported by our associated Partner BayFOR, which is a partner in the EEN and supports delivering knowledge about all EU funding instruments. Joint workshops and brokerage events are planned to support local customers. Further services include the support to find the right financing instrument on the national and regional level and differentiate between startups or scale-ups and SMEs. Only in a few cases also PSEs can be supported due to the current funding scheme.

Finally, within the pillar of Innovation Ecosystem and Networking, the main focus is on connecting customers from different countries or stakeholder groups. Services range from events to connect startups with PSEs or SMEs (motto: The best financing is the first customer), individual international matchmaking between customers that benefit from each other as well as an early adopter test pool where customers can test new developments in their products with a large range of test persons of the region.

7.1   Experience with Service Deliveries

Most customers currently were reached through the kick-off event of DInO or networking events in the region. The second most successful strategy to acquire customers was through regional multiplicators like Chambers of Industry and Commerce or Handcrafts. The main contact person for the delivery of services at the SME or PSE is a department head or project manager. Depending on the size of the supported customer, sometimes the contact person is also part of the management or an employee without leading the function but working on the digitization project itself, thus benefiting the most from the service.

While the customers themselves mostly do not use any of the technologies that are asked for in the Digital Maturity Assessments (DMA), the people delivering the services from the DInO team rated the digitization level of SMEs, independent of their size, as medium or medium-high. Public sector institutions were rated as either medium-low or medium-digitized, even though they partly already use some of the technologies named in the DMA. The perceived level of digitization does, therefore, apparently not stand directly in relation to the technologies that are asked for in the questionnaire.

Generally, after SMEs and PSEs were acquired and interested in receiving services, especially those with intense collaboration efforts on both sides, filling out the DMA -Questionnaire was not a large inhibitor for further working together. Also sometimes the integration of the DMA is very difficult as the goal was to generally use the DMA to supplement the initial consultation process to find the right service for a customer. Finding time for this initial consultation & filling out the DMA together with the customer while justifying the benefits of such an appointment for companies when there is already a concrete interest in a service is rather tricky. Also, there are several other funded projects

as described in chapter 5.2, which offer similar support systems. It is difficult for a SME or PSE but also for the multiplicators and the advisory committee of the project to differentiate the offers and select the right support system for themselves.

DInO customers described the free and unbureaucratic personal initial contact and support for the large variety of topics and opportunities in terms of (international) matchmaking and networking as very helpful. The high level of technological know-how in the various Test before Invest application areas helped the customers to understand what they could need and increased the awareness of the importance of digitalization and innovation, especially in combination with the business development workshops that are provided. Furthermore, customers were thankful for the opportunity to have their working methods assessed by an external party including the individual, and need-specific advice that can be provided by the individual know-how of each team member.

The experiences the DInO team had while delivering the services were also twofold. The biggest challenge currently is the acquisition of enough customers, which is directly connected with the still very short project period so far. Through various communication measures and advertising, we hope this challenge vanishes with time. Furthermore, especially working with PSEs is challenged by the bureaucratic nature of the Organizations and the ongoing fear of breaking data protection laws.

7.2 Necessary Adjustments of Services

Considering the necessary adjustments of the individual services offered by DInO, there will be more time needed to clarify what has to be adjusted since the project just started in July 2023. For a first review at this time of the project, project members conducted an internal survey about their first experiences with potential and acquired customers. The results of the survey are described in the following part.

Several attempts of cold calling potential customers have generated further customers, however, this strategy does not resonate with the project consortium and will in the future only be used in case no other method of customer acquisition is working. Due to the complexity of some of the questions in the DMA, the variety of knowledge necessary to answer these questions, and the difficulty of filling them out in the DMA questionnaire, we transferred the DMA questions to our survey tool, where the process of filling out can be stopped and later on continued starting from the last question answered to be able to have the right answers to all questions.

Especially in the Skills & Training services, long-term courses of 6-9 months were planned. These were seen as an obstacle by the interested customers, which is why we decided to make the attendance of each meeting of these several months lasting services voluntary. Further obstacles in the service delivery were that sometimes the

customers do not understand the benefits of each e.g. test before invest laboratory or wish generic programming tasks to be delivered by the DInO team. To tackle these two misunderstandings of what our services entail and how to best use them, videos are being generated and published in April 2024. These videos describe the content of the services and what can be done using the offered technologies in a more comprehensive way than a text-only can do.

Another factor considering the acceptance and understanding of DInO services with regard to local customers is that to some degree the language used for describing the technologies and services is sometimes too difficult to understand, especially for customers in the more rural areas. As described above, especially in Lower Bavaria the levels of digital skills and academic professions among the populace are comparably lower than in bordering regions of Bavaria, which means that the service offers have to be adjusted to make them easier to understand for the targeted customers, meaning that easier language will be applied in advertising and describing the offered technologies.

As far as by now, in the pillar of Innovation Ecosystem and Networking, there is concern about the range of events for start-ups being extremely over-saturated. Therefore, we currently analyze whether and where there are still gaps in the event offer for start-ups and create offers for multipliers to fill their own events with DInO-related topics and speakers.

8   Outlook & Conclusion

Through our regional analysis of Eastern Bavaria and the evaluation of DInO services, we have gained valuable insights into the needs of digitization in the region and the effectiveness of support mechanisms provided by DInO to small and medium enterprises and public sector entities.

Our analysis has started with a literature review and desktop study on the Digital Transformation of Eastern Bavaria. Afterwards, the obtained data was analyzed and presented, using maps to visualize indicators referring to such factors as the innovation potential of the workforce. Furthermore, we utilized datasets regularly published by federal agencies and institutes in Bavaria, such as the Regional Innovation Scoreboard. The aim was to find crucial strengths and weaknesses of the region concerning its potential for a successful Digital Transformation. Finally, a first evaluation of DInO services was conducted, assessing the effectiveness and relevance of the services offered with regard to first customer experiences and the digital needs of businesses and public sector entities in Eastern Bavaria.

Overall, the data for Eastern Bavaria indicates disparities in digital skills but strengths in knowledge-intensive industries with potential for digital innovation, such as mechanical

engineering. The funding environment, the existence of municipalities that already incorporate smart region solutions, the well-developed education and research institutes as well as the recently improved digital infrastructure offer the potential for further cooperation of public and private entities in the region, for example, to digitize the touristic infrastructure, to produce spillover effects between industries or to profit from experiences of neighboring regions. Our findings further suggest, that at this stage of the project, the services offered do match the needs of Eastern Bavaria for improving its digital maturity but further alignments need to be done in advertising and communication of the offered services.

It remains to examine exactly how DInO helps SMEs and PSEs to improve their digital maturity and how this affects the Digital Transformation of Eastern Bavaria as a whole. For this task, new datasets have to be obtained and further econometric methods have to be applied to ensure the statistical relevance of the findings and to take into account spatial relationships within the data and across Eastern Bavaria. With the help of incorporating stakeholder feedback into service design and implementation, strategies for enhancing its effectiveness on the digitization of SMEs and PSEs as well as for further improving the Digital Transformation of the region can be developed.

As the next assignment will be delivered by the end of November 2024, DInO services will have existed for a sufficiently long time to allow for a better evaluation and therefore, for a more evidence-based review and alignment. After all, in the digital age, the collaboration between all relevant stakeholders remains essential for Eastern Bavaria to successfully thrive towards a greater digital maturity.

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