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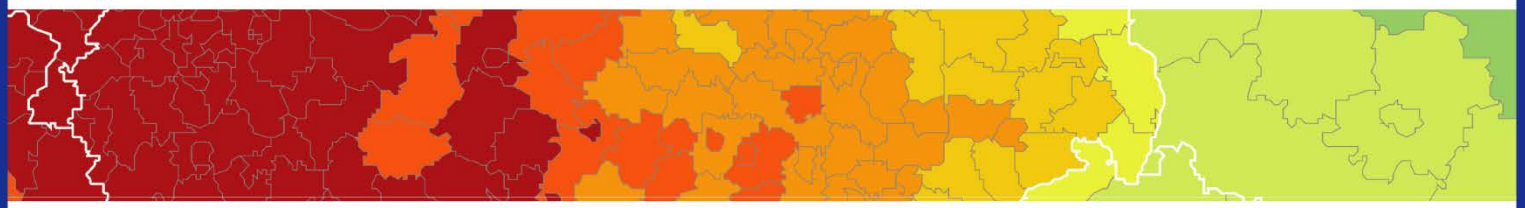

MISTA
Metropolitan Industrial Spatial Strategies & Economic Sprawl

Targeted Analysis

Annex 3.6
Case study report: Vienna (AT)

Annex 3.6 – Case study report: Vienna (AT)

This targeted analysis activity is conducted within the framework of the ESPON 2020 Cooperation Programme.

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Annex 3.6 – Case study report: Vienna (AT)

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Executive summary

Vienna has been faced with high population growth and massive structural change since the 1990's in part due to its geographical location and on account of increased globalisation. The city has recently experienced a substantial increase in unemployment, a decline of the share of manufacturing in employment (to around 5%) and increased issues related to skill-mismatch on the labour market. Regardless, the city has maintained its extremely high quality of life and regularly scores among one of the top locations in standard international rankings of life quality. The city is also an example of a very powerful economic actor that has traditionally taken a very active role in the housing market and its economy.

Given the rapid population growth of the city in recent years, the public focus has been on providing affordable housing and living space rather than securing and developing space for economic uses. The housing sector's intensive construction activities of have led to new challenges related to the activation of land and led to a considerable amount of the land being rezoned to residential uses. Policy in the city has recently reacted to this by defining strategies that put a strong emphasis on securing land for productive uses and also rolling out new instruments to mobilise the use of land. However, these instruments have so far rarely been used and it is yet too early to judge how the policy measures will work out in the future. Regardless, the lack of existing systems to monitor land use patterns, irrespective of whether they pertain to the Vienna metropolitan region or the city's administrative area, is clearly a limiting factor in implementing existing policies.

One challenge specific to the Vienna metropolitan region is the lack of a clear co-operative strategy within the larger Vienna metropolitan area, which includes territories in the Austrian federal states of Burgenland and Lower Austria as well as the neighbouring countries. Strategies to co-ordinate with the neighbouring countries have recently received less political attention. By contrast, co-operation with the Vienna environs is more intense. It mainly focuses on practical issues, such as joint infrastructure development. Many actors state that these co-operations are hampered in their effectiveness by the lacking strategic and political framework for co-operation and the complex institutional framework within which such operation occurs in Austria. Devising instruments that allow for co-operation, without excessively impinging on the autonomy of municipalities in Austria is thus a major challenge for the political actors in the Vienna region.

According to the empirical analysis conducted in the MISTA project, both the city of Vienna and its environs are limited in terms of their employment structure in the productive activities. Even the branches with the highest employment shares account for less than 2% of total employment. Many of the most localised branches are niche activities operating in high or medium-high technology industries. Very often the localisation of these branches hinges on a single firm or only a few firms operating in these branches.

Nonetheless, among the activities analysed in the MISTA project, logistics and wholesale trade belong to the most important sectors in terms of employment shares and localisation in the

Vienna region. The structure of these production activities, however, differs substantially between the city of Vienna and its environs. The city of Vienna is characterised by a relatively large ICT services sector, while the environs combine a larger share of manufacturing and construction activities.

In terms of employment growth over the period 2012 to 2017, in particular the highly localised niche producers in the high- and medium high-technology sectors have shown good growth performance in the whole as have logistics related activities. Furthermore, some utilities in the city have expanded their employment substantially, while in the environs the same applies to a larger number of manufacturing activities.

Overall, the number of strongly embedded and localised activities that may be considered the current strongholds of the Viennese economy is low. Only seven branches fulfil the double requirement of being both localised and highly embedded. These branches are often related to logistics (passenger air transport, transport via pipeline, passenger rail transport and freight rail transport) and ICT production, maintenance and trade (wholesale of information and communication equipment, repair of computers and communication equipment and manufacture of communication equipment).

The same applies to as not localised but embedded branches, that may present a high potential for future economic development. For the Vienna metropolitan region these are mostly high technology manufacturing branches such as the manufacture of irradiation, electromedical and electrotherapeutic equipment, manufacture of motor vehicles, manufacture of basic pharmaceutical products.

The existing strengths and opportunities of the metropolitan region are therefore closely associated with logistics, while the manufacturing strengths in the city are related to high-technology industries, such as the production of ICT equipment and the manufacture of pharmaceuticals and motor vehicles, as well as creative industries such as printing and the production of apparel. In particular the high localisation and the strong embeddedness of Vienna in ICT services and KIBS suggests some potential for the exploitation of agglomeration advantages for productive activities related to ICT.

By contrast localised but weakly embedded (limited connection to other businesses) and not localised and also weakly embedded branches make up the majority of branches in the Vienna metropolitan region, as well as in the two sub-regions studied. This is related to a high degree of specialisation of the metropolitan region of Vienna in knowledge intensive (business) services, KI(B)S, that are outside the range of productive activities the current project is devoted to. From an economic policy perspective this suggest that fostering the growth of productive activities in the city may require strengthening inter-industrial ties through either newly founded enterprises or attraction of investments from existing firms. In addition, increasing efforts in cooperation across the border of the federal states (Länder) of Vienna, Lower Austria and Burgenland in terms of industrial development strategies would help to exploit agglomeration advantages in particular in ICT related activities.

Results of the SWOT analysis

Constraints	Strengths
▪ A growing city with high demand for housing. ▪ Expensive real estate. ▪ Limited examples of new mixed used and industrial intensification projects.	▪ A strong vision, that is clearly articulated and well embedded in both planning and policy. ▪ Confident communications campaigns in order to align institutional perspectives and private investment. ▪ A range of different sites that can showcase how activities are occurring in highly mixed areas, to science parks and industrial areas. ▪ A well-researched role of productive activities within the larger economy. ▪ The capacity to access a pool of international talent due to location and identity.
Weaknesses	**Opportunities**
▪ NIMBYism from more rural parts of the region, inside and outside the city. ▪ A freeriding mentality: everyone in general welcomes and demands industrial functions, but not locally. ▪ Tensions between the visions for the City and the surrounding areas. ▪ Everybody competes for the same "trophy-businesses" creating unnecessary competition and wasted public resources. ▪ Urban public transport stops at the city borders. ▪ Disadvantages of development outweigh locally perceived benefits.	▪ Explore 'soft' solutions to define opportunities that municipalities outside of Vienna could contribute to metropolitan economic planning, without creating resistance or counteracting development. ▪ Ensure production becomes a central topic for the city and not simply a peripheral one, showing how production facilitates other activities.

At the occasion of a 'futures workshop' held in October 2020, the results of the interviews and statistical analysis were presented back to stakeholders, in order to gauge their feedback of the portrait that emerged through the MISTA project research and to also contribute feedback on development opportunities. In particular based on their experience and the results of the project the stakeholders contributed to developing a SWOT analysis (see table below) and discussed future policy options. The workshop participants (or their respective organisations) have working relationships and some participants assumed that the workshop would only confirm existing positions on the topic of industrial land and productive activities. But this opinion changed when participants were asked to reflect on four scenarios regarding the role of the public sector and the scale of action. Two different perspectives emerged from this conversation relating to the capacity for metropolitan scale collaboration and the determination of the public sector on agenda setting.

Abbreviations

AA	Agglomeration Areas
ARDECO	Annual Regional Database of the European Commission
COVID-19	Coronavirus disease 2019
DG REGIO	Directorate General for Regional and Urban Policy
EC	European Commission
ELFS	European Labour Force Survey
ESPON	European Territorial Observatory Network
ESPON EGTC	ESPON European Grouping of Territorial Cooperation
EU	European Union
EU 15	European Union countries that were member states prior to 2004 (incl. UK)
EU 13	European Union countries that joined after 2004
FDI	Foreign Direct Investment
FUA	Functional Urban Area
GDP	Gross Domestic Product
GVA	Gross Value Added
HR	Human Resources
IAB	Institut für Arbeitsmarkt- und Berufsforschung, Die Forschungseinrichtung der Deutschen Bundesagentur für Arbeit (Institute for Employment Research, The Research Institute of the German Federal Employment Agency)
ICT	Information and communication technologies
ISTAT	Istituto Nazionale di Statistica (Italian National Institute of Statistics)
JRC/EC	Joint Research Centre of the European Commission
LAU	Local administrative units
KIBS	Knowledge intensive business services
LQ	Location quotient
MISTA	Metropolitan Industrial Spatial Strategies & Economic Sprawl
MR	Metropolitan Regions
NACE	Nomenclature of Economic Activities for Statistics
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
POLIMI	Politecnico di Milano
R&D	Research and Development
SME	Small and medium-sized enterprises
SBS	Structural Business Statistics
SWOT	Strengthens, Weaknesses, Opportunities and Threats
US	United States
WIFO	Austrian Institute of Economic Research
WIOD	World Input Output Database

1 Introduction

The MISTA project aimed to develop an understanding of the current contrasted and complex relationship between the city and industrial land, manufacturing and productive activities. The project does so through producing an updated and critical understanding of how the sector has evolved over the last decades across Europe and in particular in large urban areas.

The project intends to support (re-)developing a strategic relationship with manufacturing and production systems within the contemporary urban economy and life. In this perspective, the project aims at considering critically the complex debate on the consequences of deindustrialization and changing of the urban economic base. In doing so it heavily builds on the experiences of the seven stakeholder cities/urban areas (Berlin, Oslo, Riga, Stuttgart, Turin, Vienna and Warsaw).

In Vienne intensive research and consultation activities were conducted between October 2019 and December 2020. Firstly, a questionnaire was prepared by the research team and filled in by the local stakeholders in November 2019. This was followed by an online interview with the main representatives of the city and urban area in December. On the basis of the desk research, data analysis, the results from the questionnaires and interviews, a summary paper has been elaborated. This served as a starting point for the extensive, 3-day long mission in February 2020, where MISTA researchers visited Vienna and conducted a series of on-site discussions with the local stakeholders. As a result, the first draft of the Vienna case study report has been prepared by May.

According to the original plans this report should have been validated by an on-site futures workshop in Vienna in the course of May-June 2020. However, COVID-19 made this impossible, thus the workshop had to be postponed to October and even then, could only be organised online. Despite this difficulty, the 2-day long workshop gave a good opportunity to critically revise the statements of the report and also gave the possibility to further develop it in a co-creative way, using inspirational cases as the basis for creative, future-oriented thinking.

The final results of the city case studies are used in the MISTA project in two major ways. Firstly, a comparative analysis has been included in the main text of the final report. Secondly, city case study reports are annexed to the final report as self-standing descriptions and critical discussions of the case of the given city/metropolitan area.

The Vienna case study report on the following pages summarises all the knowledge gathered in the different activities during the one year of the research. The report does not intend to provide ready-made suggestions for the city, as the local stakeholders are very well aware of the local situation – even if different local actors have different viewpoints in some issues. MISTA rather aims to investigate the transferability of the major statements distilled from the comparative analysis, and the potential validity of inspiring practices of innovative metropolitan areas of the EU, considering the particular local conditions of the Vienna metropolitan area.

As mentioned, the MISTA research has been conducted under very special circumstances, dominated for more than half of the time by the restrictions caused by the pandemic. The spread of COVID-19 has impacted not only the workflow and organisation of the project, but also in a more fundamental and challenging way the relevance of the results when the socio-economic fallout becomes more apparent. The empirical data, the interviews and also the site visits reflect the situation before the pandemic. Moreover, the longer-term effects of the pandemic, the changing context for industrial areas and manufacturing, are not fully known yet, there are only different hypotheses raised which are partly contradicting each other. From all these it follows that the MISTA report cannot address the most recent challenges and opportunities presented to the urban areas and to the local manufacturing and production activities.

The Vienna case study report begins with the description of the state of manufacturing in the city region. This is followed by the evaluation of the potential of productive sectors, based on sub-sectoral data analysis. The next section summarises the outcomes of the futures workshops. The main body of the report is followed by an annex, including further details of the data driven SWOT analysis.

2 State of manufacturing in the city-region

2.1 Main demographic/social and spatial development trends

Spatial planning as well as economic and social policies in the city of Vienna have traditionally been based on a firm belief in an important role of public authorities in accompanying, monitoring and, where necessary, correcting the results of market processes. This tradition continues until today. The city has a large share of social housing[1] that is rather evenly spread around the city and is owner of a number of enterprises in public transport, utilities, culture and event management and in the housing sector. The city has also been repeatedly ranked as one of the top locations in terms of quality of life in recent international rankings.

Economically the city has, however, been strongly affected by the massive internationalisation of the Austrian economy in the last 3 decades (which included the opening of Central and Eastern Europe, the accession of Austria to the EU, and the increased openness of the country to world trade). On the one hand this led to a substantial restructuring of the economy that was still strongly oriented towards less productive and in some instances sheltered industries and production up until the late 1980's. This has led to a de-industrialisation in which the share of manufacturing in employment decreased to around 5.5% in 2019.

On the other hand, this internationalisation also led to a substantial immigration of people both from within the country and abroad. As a consequence, the share of foreign born in the population aged 15 or older has increased from 22.9% in 2004 to over 39.9% in 2019. Thereby, the city evolved from a shrinking to a significantly growing metropolis and transformed from being the demographically oldest Austrian federal state to the demographically youngest in the same period. This ongoing immigration was fuelled inter alia by repeated refugee waves (e.g., from former Yugoslavia in the 1990s and more recently from Afghanistan and Syria), labour and educational migration (from the CEE countries in the 1990s and again since 2004 and 2011, and Germany in the late 1990's and early 2000's) and family reunion (primarily from former Yugoslavia and Turkey). The integration of these new arrivals into the Viennese economy – in particular of the low skilled among them[2] - is seen as one of the major economic challenges for the city by many.

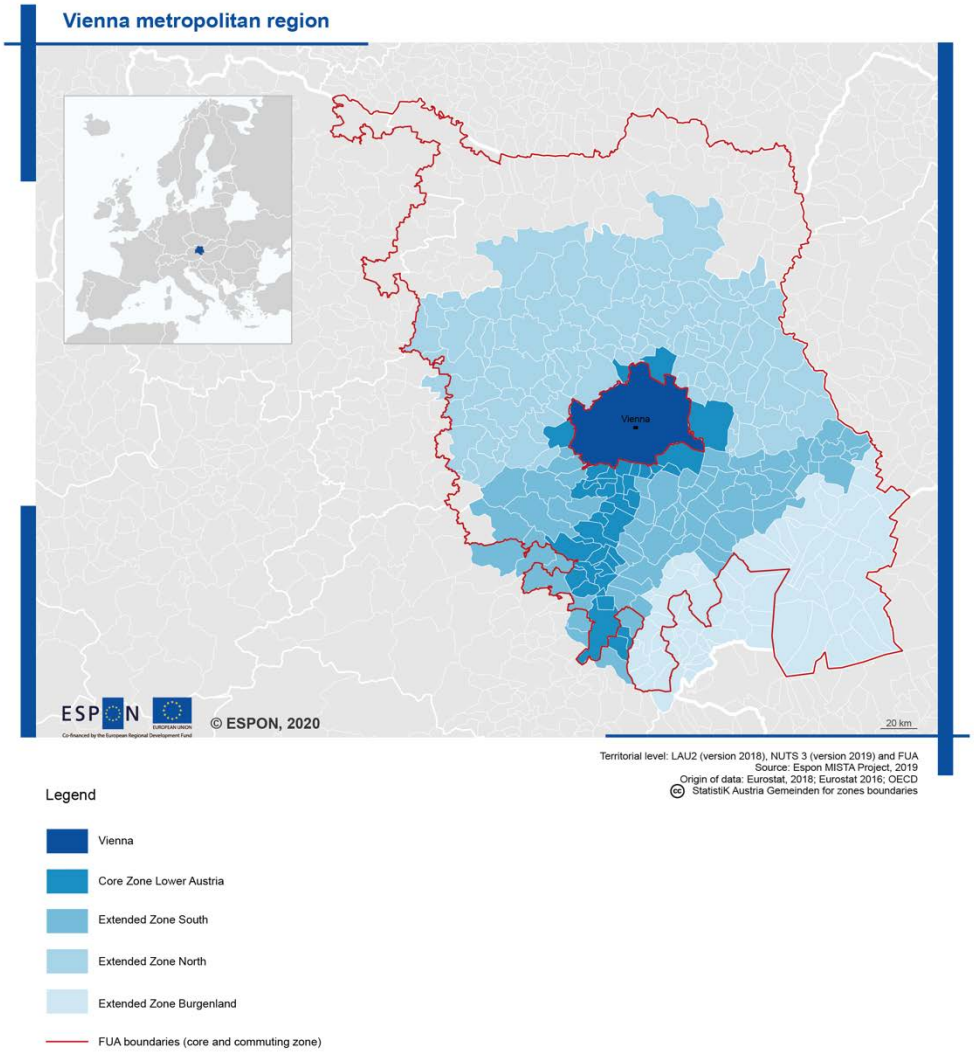
Today thus Vienna is a highly internationalised and diversified location both in terms of population and economic structure. It is also an important location for research and knowledge-intensive business services as well as for headquarters to serve the neighbouring Eastern

[1] Estimates indicate that 45% of the homes in the city are state supported housing and 22% of the apartments are owned by the city.

[2] Low skilled foreign-born workers usually work in the construction sector and in tourism. On account of this, the share of manufacturing in total employment of foreign born is lower than among the natives.

markets. In addition, Vienna is the city with the largest number of university students in the German speaking countries.[3]

Map 1: The larger Vienna region (Stadtregion+) and its subregions.



**Source: ESPON MISTA (2020).*

***Source: Planungsgemeinschaft Ost (Hrsg.), "stadtregion+ Zwischenbericht. Planungskooperation zur räumlichen Entwicklung der Stadtregion Wien Niederösterreich Burgenland", PGO, Wien, 2011.; Statistik Austria; WIFO.*

Vienna is also economically deeply integrated with its environs. According to recent estimates 260.000 workers and 36.000 students commute to the city from other locations in Austria on a daily basis and 90.000 workers and 5.000 students commute out of the city for work every day. Further, a recent study suggests a strong complementarity of production in the city with that located in the larger Vienna region and further potentials from economic cooperation: According

[3] According to recent estimates around 190.000 students are currently studying in the 23 private and state-owned universities and universities of applied sciences.

to this study enterprises with around 220.000 employees (16% of employment) work in sectors that profit from strong knowledge linkages to sectors mainly located in the larger Vienna region. These employees could thus substantially profit from increased co-ordination of industrial policy between the regions.

The concept of the larger Vienna region has been defined in different ways by different actors at different times and – since there are no formal requirements for the co-ordination of spatial planning or economic strategy across federal states, - the concept has remained vague. The generally most accepted definition is that of the Stadtregion+.[4] This definition is mainly based on travel to work areas and divides the larger Vienna region into an inner core and an outer zone. The former encompasses Vienna and municipalities contingent to Vienna as well as municipalities located directly at the main transport lines connecting Vienna to the South. The outer zone covers areas in two Austrian federal states outside Vienna (Burgenland, Lower Austria). For many analyses – due to marked differences in economic structure and accessibility – this outer zone is divided into a northern and southern part and a part located in Burgenland.

The federal states that are part of the larger Vienna Region differ markedly in terms of their geographic features. Lower Austria is the largest Austrian federal state in terms of territory and is marked by a rather heterogeneous internal structure. The area around Vienna is a typical suburban region, which hosts important industrial enterprises, but also a fair amount of services (e.g., retail trade) that supply the city. The central parts of Lower Austria to the west of Vienna are locations of manufacturing and (next to many larger enterprises) also host a number of highly specialised SMEs in the machinery and metal working sector, that have been considered the backbone of Austria's economic competitiveness in many analyses. In the north and the south, the region is more peripheral. Burgenland is the smallest federal state of Austria (both in term of population and territory) and was considered a periphery until the 1990s. Since then – as Austria's only objective 1 region – it has profited from EU funds and the fall of the iron curtain and has been the fastest growing federal state of Austria for most of this period.

Next to linkages to other Austrian regions also linkages to the neighbouring countries are of relevance for Vienna as it is located only 60 kilometres from Bratislava (the Slovak capital city), 90km from the Czech and 80km from the Hungarian border. This vicinity has led to an estimated 90.000 cross-border commuters (mainly from Slovakia and Hungary) mainly working in eastern Austria and thus the Vienna region. It has also led to repeated attempts to organize closer co-operation with the regions in neighbouring countries either between the two "twin" capital cities

[4] This is an analytical concept that was introduced in a number of studies commissioned by the Planungsgemeinschaft Ost (PGO), which is an institution to discuss and informally co-ordinate spatial development in the Eastern region of Austria (i.e., the federal states of Burgenland, Lower Austria and Vienna). As such there is no political organisation responsible for the economic development strategies or spatial planning of that region

of Vienna and Bratislava or between all regions bordering on Austria (in the so called CENTROPE initiative[5]).

Despite being mentioned in all strategic and planning documents the issue of cross-border policy co-operation has lost in political priority in recent years, however. In part this is due to a normalisation of relationships, where the feeling is that economic co-operation across borders is functioning without problems and requires less policy attention. In part this is due to a lack of concrete results and therefore a certain disillusionment of the partners involved. Thus, currently the main form of concrete joint cross-border co-operation is mainly done in projects provided in the various INTERREG programmes, in which Vienna has repeatedly and forcefully lobbied to be included, despite its lack of a direct border with the Czech Republic, Hungary, or Slovakia.

2.2 Main trends in the development of the economy and manufacturing

Economically the ongoing structural change in Vienna paired with high population growth has resulted in increased problems to match the qualifications of the growing labour force with the structure of labour demand. Thus, the unemployment rate is the highest among the Austrian federal states (11.7% in 2019 according to the national method of estimation compared to a national average of 7.4%). This high unemployment is related to the rapid structural change of the city and is caused by a mismatch between the qualifications of the labour force and the qualification needs of the enterprises, to a large degree. Consequently, despite high unemployment, enterprises in the city and even more strongly in the metropolitan region have repeatedly complained about a lack of qualified labour. This mismatch is also related to the loss of in particular low-skilled and manufacturing jobs in the city in the past.

For most of the last two decades GDP has been growing at par with most other capital cities in the EU, but below the Austrian average and has also not been able to keep pace with the speed of population growth. Consequently since 2016, the GDP per capita of Vienna – that was traditionally the highest among all Austrian federal states – has fallen to the second place behind Salzburg. Before the current crisis induced by the Corona virus, which has led to a massive increase in unemployment and an almost complete standstill of the economy, there have been signs of a slight improvement in economic performance of the city as GDP and employment growth reached the Austrian average in the last two years.[6] In addition, there have also been signs of a slight reduction in demographic growth, from between 25.000 to over 30.000 persons per year for most of the last decade to around 15.000 last year.

[5] The territory of the CENTROPE region is defined as the Czech and Slovak regions of Vysocina, Southern Moravia, Bratislava and Trnava, the Hungarian regions of Györ-Sopron, Zala and Vas as well as the Austrian states of Burgenland, Lower Austria and Vienna.

[6] Recent estimates suggest that Vienna on account of a high share of industries that are heavily affected by the corona virus has also been disproportionately affected from the current crises and will also feel its long-term effects even more strongly than many other Austrian regions.

Current forecasts expect that the more moderate recent population growth will continue in the next decade such that Vienna's population will grow by 100.000 inhabitants until 2030. At that point in time Vienna will host over 2 million residents. Economically the current medium term employment forecasts, that were, however, published before the current crisis, predicts an average employment growth of 1,4% annually until 2025 for Vienna. This is slightly higher than the national average (1.3%). According to this forecast employment in manufacturing should continue to decline slightly also in that time period, while the fastest growing sectors are expected to be publicly financed services, information and communication as well as professional, scientific and technical activities.

The demographic growth – despite slight moderation in the last few years – and the resulting substantial increase in housing prices has led to an increased importance of the topic of affordability of housing in the political and public debate and (in part as a consequence) a substantial increase in investments in public housing. These major investments have resulted in the completion of an average of 10.000 apartments in new housing units annually since 2015 (compared to 5.000 on average per year in the decade before). They have also resulted in the development of completely new residential areas (e.g., around the newly constructed main railway station or the Seestadt Aspern) that have been the "headline topics" of urban development in the city in the last decade.

These increased construction activities have also led to public debates related to the provision of infrastructure in the new residential areas. Despite these controversies, however, the feeling expressed by many actors is that on the one hand planning processes for residential quarters have been substantially improved in the last decade[7] and that on the other hand the infrastructure challenges posed by rapid residential development may be slightly smaller in Vienna than in other cities, on account of the city already having numbered 2 million inhabitants in the 19th century. This implies that at least some of the infrastructure of the city is already geared to such population sizes, although current infrastructure and mobility requirements differ markedly from those in the 19th century, of course.

2.3 Main factors affecting locational choices of manufacturing

From a sectoral point of view one of the main drivers of GDP and employment growth in recent years have been the knowledge intensive business services, which have profited substantially from the demand in the nearby more industrial region. Next to this tourism has been booming, due to the many touristic attractions in the city and the international trend of growth in city tourism.[8] Manufacturing employment, by contrast, has slightly declined in the 2010's.

[7] One example of this is that the newly developed residential area in Aspern was served by the underground system already at a time when construction was still ongoing.

[8] This has also led to policy debates related to „over-tourism" in the city on occasions.

This negative trend has been caused by continued restructuring within manufacturing to more city affine, knowledge-intensive and wage cost resistant activities (higher-tech-manufacturing, knowledge-intensive services). The rate of this decline was, however, more moderate than in the 1990s and 2000's, when issues such as the closure of large firms and the relocation of manufacturing to the outskirts of the city were quantitatively more important. The reason for this is that there are only few low-skilled manufacturing jobs – as prototype jobs for such relocation – that are still located in the city and because there is also an increasing reluctance in the municipalities outside Vienna to attract productive activities, as these have already attracted many sites and have increasingly shifted to "not in my backyard" type policies.

The negative trend has also been associated with substantial internal restructuring of the productive sector. On the one hand this has resulted in an increased share of high-tech and high-skilled manufacturing in the city of Vienna. This trend continues to this day and is amongst others driven by the still sizeable wage cost differential to neighbouring countries. It also implies that a substantial part of the manufacturing sector enterprises in the city have specialised in the dispositive function of the division of labour within enterprises (i.e., headquarters, research and development and other strategic functions), while activities related to actual production and assembly are conducted elsewhere (either abroad or in other parts of Austria). It has also led to an increasing demand for representative office space in locations close to the city centre and/or close to research facilities. Also, these trends are continuing to date.

Within manufacturing in particular the Biotech and Pharmaceutical industry has experienced substantial investments in recent years. This is mainly due to the investments of large firms (in particular Boehringer-Ingelheim) that has expanded its operations in Vienna substantially. Aside from this a number of smaller firms in this sector have also grown, but their contribution to overall growth was lower due to a smaller size. Next to this, further specialisations of the manufacturing sector are in the manufacture of transport equipment and (to a lesser degree) in machine building. These have experienced more modest growth or decline in employment in the medium term as have the electrotechnical and electronics industry. In the former industries this seems to be mainly due to the (relative to the Biotech industry) slower market growth. In the electronics and electrotechnical industry, by contrast, also structural change has played a crucial role, as here the production structure in the city has increasingly shifted away from hardware components to software.

2.4 Development preferences of the city (region) leadership

The city of Vienna is an important actor in economic policy, inter alia because it is also owner of a large share of the housing stock and of most main public facilities serving the city as well as of the main urban infrastructure enterprises and many cultural facilities. Further, the city has own lines of funding and specialised institutions in most policy areas (e.g., the support of enterprises, support of unemployed and R&D). Although this support has a more limited impact compared to the (very differentiated) system of national and supra-national funding, these are of relevance for the funding of certain subsystems of the city (e.g., the funding of the Universities

for Applied Sciences or certain cultural institutions and events). Finally, the city has also taken a very active stance in macro-economic policies in the cases of the financial crises of 2009 and also the current Corona crisis.[9]

Next to the city administration also the local social partner organisations (i.e., Trade Unions, chamber of labour, chamber of commerce, Federation of Austrian Industries, Chamber of Agriculture) are important policy actors. Their staff serves as experts in many of the policy initiatives of the city, in addition they initiate certain policies and in parts jointly implement specific programmes.[10]

The central strategic document for spatial planning is the spatial development plan of the city (STEP 2025). This contains separate strategic concepts for open and public spaces, mobility, energy, high-rise buildings, polycentric development and for production (see below for details). In terms of economic strategy, it is augmented by a smart city strategy as the framework strategy for economic development of the city. This is a strategy on which all further strategy documents are based was originally designed in 2014 (and updated in 2019). It sets the main objectives and strategies for development of the city, with respect to (1) quality of life (2) resource efficiency and (3) innovation and sets quantified objectives[11] in a total of 12 topical areas until 2050 and provides the framework within which all detailed sectoral strategies of the city operate.

At an analytical level below this, the most relevant strategy in the current context is the recently presented economic strategy “Wien 2030: Wirtschaft und Innovation” (“Vienna 2030: Economy & Innovation”).[12] This together with sector plan for production (Fachkonzept Produktive Stadt), which predates this document and is more strongly focused on spatial development, summarizes the current economic strategy of Vienna. It organizes the main economic objectives of the city around five central topics (smart solutions for urban spaces, health metropolis, digitisation, smart production, city of international meeting and cultural and creative metropolis) and 10 fields of action (education, labour market, universities and research, climate change and adaptions to climate change, infrastructure, innovative administration, innovative milieu, regulation, support institutions and location marketing).

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[9] A recent example of this is the current Corona crisis where the city rapidly issued a € 50 Million package to support enterprises of special importance for Vienna, through becoming a stakeholder.

[10] Recent examples for this include the plan for qualification (Qualifikationsplan für Wien) and the pact for a growing Vienna (Bündnis für das wachsende Wien) as two central strategic documents in which the social partner organisations are signees and partners in implementation.

[11] As headline objectives these include making Vienna the city with the highest quality of life and life satisfaction worldwide, reducing energy consumption and the environmental footprint by 50% each as well as making Vienna an innovation leader.

[12] The city also has many further sectoral strategies that refer to this framework strategy and are of relevance for economic development. These include (but are not limited to) strategies for the implementation of smart solutions for urban spaces of the 21st century, the development of the health metropolis, digitalisation, smart production, energy security for the support of international meetings, and the development culture and creativity.

2.5 Tools through which the municipality is able to control the development processes

According to the Austrian constitution the implementation of spatial plans is a joint task of the federal states and the municipalities, with the federal state responsible for the (macro-)regional aspects but the municipalities responsible for local planning. The federal states, however, have few instruments to enforce a spatial plan against the interest of municipalities. In practice therefore the federal state can prevent the municipality to set certain activities, but it cannot trigger new local developments.

Further, each federal state has a spatial planning agency, as well as an own agency for enterprise and innovation support and an own economic development plan, which are all instrumental in influencing the development of the region. The institutions governing this system are also regulated by laws of the federal state. In consequence each state has slightly different procedures and institutions responsible for spatial planning. This system is usually argued for on historic grounds, the strong regional identities of the population of the federal states and the extremely varied geographic structure of Austria. It has also inter alia allowed for instance the city of Vienna to follow a markedly different route with respect to housing policies than most of the other Austrian federal states. It does, however, also lead to a rather fragmented and varied institutional landscape in the areas of economic policy and spatial planning, which increase the co-ordination costs across federal states.

In addition, institutions that have the task to co-ordinate spatial planning across federal states (such as the Austrian Conference on Spatial Planning – ÖROK[13] – for all federal states in Austria and the Planungsgemeinschaft Ost – PGO[14] - for eastern Austria) have no regulatory powers, such that their effectiveness relies to a large degree on the goodwill of the federal states.

The situation is slightly less complicated in Vienna, as it is both a city and a federal state. This implies that both the framework plans and implementation of spatial planning are in a single hand, which according to some observers has been an asset in the phase of increased demographic growth.

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[13] This is an organisation established by the federal government, the Länder and municipalities to coordinate spatial development at the national level. It is chaired by the Federal Chancellor and its members include all federal ministers and heads of the Länder, the presidents of the Austrian Association of Cities and Towns and the Austrian Association of Municipalities as well as the heads of the social and economic partners with a consulting vote. One of the central areas of work comprises the preparation and publication of the Austrian Spatial Development Concept the latest of which dates from 2011 and reaches over a decade. It is also an important co-ordinating body between the internal and the European level as it drafted the partnership agreement (STRAT.AT 2020) for the European Structural and Investment Funds.

[14] This is a joint organization of the federal states of Burgenland, Lower Austria and Vienna for the coordination, and preparation of questions relevant to spatial planning in the Austrian "Eastern Region". Its aims are to provide analyses for the eastern regions and to use these to formulate common spatial development aims of the three federal states of the eastern region of Austria.

Financially, according to the system of fiscal federalism in Austria municipalities receive taxes that are closely related to wage bills but also profit from increasing per capita funds for each resident through the fiscal transfer system if they exceed a population size of certain thresholds. The costs of new enterprises as well as additional residents, by contrast, are mainly related to infrastructure (water, transport, parking, electricity...) costs. It is thus not clear whether increasing population size or attracting new enterprises is fiscally more lucrative for municipalities. In general, however, increasing population is very attractive close to population thresholds. By contrast, whether settling a firm is profitable or not hinges critically on its costs and multiplier effects. Thus, in general firms are of profit for municipal finances if: wages are high in the firm, there are low infrastructure costs and if there are close linkages to other firms in the region.

Next to these general considerations, planning documents provide guidance for the way how the city wants influence land use. In this respect the central objective of the sector strategy for production (Fachkonzept Produktive Stadt), which is the central concept for economic uses, is to secure sufficient spaces for economic uses, by on the one hand designating special areas for economic development and on the other hand increasing the land available for economic use by increasing the mixed-use areas. According to this document there are currently land reserves of 2.100 hectares dedicated to productive uses in the city.

The plan therefore concludes that in general there is sufficient space available for economic purposes in Vienna. In practice not all of this space, however, is available on the market as it belongs to private actors that are unwilling to develop the land, potentially in the hope of future rezoning. To improve the mobilisation of this land a recent reform in zoning regulation allows for conditional zoning. Under this regulation a granted zoning change from industrial or other uses to residential uses) can be withdrawn if the applicant does not develop the respective area within a certain time period.[15] In this case the land will be rededicated to its regional use (e.g., industrial or other).

This regulation is, however, rather new and its effectiveness is heavily debated. Thus, while the largest part of the observers considers the instrument as an improvement over the previous situation some voice concern that implementing this regulation may be difficult politically. The reason for this is that withdrawing a granted zoning change has a huge impact on the land value which may be difficult to impose against the interests of landowners for those responsible for the withdrawal (who are the mayors). Irrespective of whether this is the case or not, instances where this regulation has been implemented are extremely rare and it is probably still too early to know how this regulation will work in practice.

A further important asset through which the city can influence development is the sizeable land ownership of the city and its organisations. Thus, alone the Vienna Business Agency owns

[15] Another recent change to zoning regulations has been to introduce an own zoning category for subsidized housing. The hope is that this will improve the availability of affordable housing in the city.

around 300 hectares of land (13approx. or 1% of the territory of the city) that is earmarked for economic uses.[16] As in many areas with this land too one issue is to ensure that it is used according to plan, as incentives for enterprises to use this land for residential development if this is allowed are high.

2.6 Potentials for metropolitan area cooperation

Despite the existence of some co-ordination mechanisms for spatial planning at a strategic level and the availability of platforms for such co-ordination, joint spatial planning and/or joint economic development at the strategic level is little developed in the Vienna metropolitan region. There currently is no binding joint planning and there are also no binding joint strategic plans with respect to economic development. The reason for this lack of strategic co-ordination is, usually seen in the combination of (1) a complex institutional framework conditions (described above), (2) a lack of common interest – as the Vienna environs until recently had access to ample land reserves and could thus automatically profit from the vicinity to Vienna without such co-ordination, (3) a lacking structural fit and many involved partners – as the municipalities in the Vienna environs are often small (the smallest of them has just 100 inhabitants) and numerous[17] and (4) a lack of national support for such co-operation.[18]

With respect to the different interests of neighbouring municipalities and the city there has, however, been a slight change in recent years, as some municipalities have recently also run into land restraints and have announced that they are not particularly interested in further demographic (or economic) growth. This applies in particular to municipalities located in the south of Vienna that has traditionally been privileged over the north in terms of population growth and economic development. In this respect a number of observers note the increasing prevalence of not in my backyard type policies on the outskirts of Vienna.

Co-operation at the more operative level is much better developed. This for instance applies to the area of public transport, where a joint transport association (the Verkehrsverbund Ostregion) serves the complete territory of the eastern part of Austria. Although this too has not gone uncriticised by some actors, as investments plans for individual means of transport systems remain in the responsibility of the individual federal sates, which inter alia implies that

[16] A large part of this land is located in the Seestadt Aspern, where there are numerous development projects ongoing at the moment.

[17] Next to the city of Vienna, there are over 270 municipalities in the larger Vienna area, many of these have less than 200 inhabitants and the smallest numbers 98. Co-operation thus would often imply co-ordination between partners with rather different population size, political weight and also factual competence, which increases concerns on the side of smaller municipalities about negotiations. Also, a co-operation including all these partners would be very difficult to organise.

[18] In addition, different actors, while almost unanimously in favour of increased co-operation name a plethora of further reasons reaching from cultural to political reasons.

the part of the public transport system owned by Vienna (i.e. subways, trams and busses[19]) ends at the city borders, and a lacking co-ordination in the design of support infrastructure (e.g. park and ride systems) this has led to integrated time schedules and ticket prices and also rising demand for public transport in the region.

Similar observations apply to the Vienna airport, which is jointly owned by the federal states of Vienna and Lower Austria as well as the central state. Here too there have been long-standing issues related to the public transport accessibility of the airport from Vienna that have only been solved recently. Nonetheless the development of the airport has been successfully managed to the most part.

A further example is location marketing, where the Vienna region (defined as Vienna and Lower Austria (and sometimes Burgenland)) aim to jointly market the Vienna city region as a location for production. This co-operation is not conflict free, as the involved Länder (and indeed even municipalities) regularly become competitors for the settlement of investments once projects are sufficiently concrete. The strategy here has, however, been to co-operate in phases of settlement that precede this concreteness of plans and to communicate strategies more openly in the more concrete phases.[20]

Finally, Vienna has also established an institution to manage connections with and among its environs at a more local level (so called Stadt-Umland management). This aims to foster contacts and information flows between and amongst the mayors of the Lower Austrian municipalities and the districts of Vienna and has two parts: one responsible for the north of Vienna and one for the south. While this management has no formal powers, it holds regular information meetings, have developed joint project data bases and in general aim to provide networking services for the involved municipalities.[21] The institution is, however, rather small in terms of staff and has limited capacity only.

In general actors involved in co-ordination activities make a strong distinction between the strategic, “political” level and the more pragmatic operational level. In the former they often perceive an increased disinterest in co-operative policies and a reversion to “my place first” policies.[22] Concerning the latter they, by contrast, describe relationships as much more pragmatic – although not frictionless – and also often state that the joint actions at this level are built on the understanding that politicians need their space of action too. Almost all of them,

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[19] As a consequence, the transport systems serving both Vienna and its surroundings is predominantly owned by the central state (i.e., railways and buses) or private owners, whereby the latter, however, have only a low share in the total market.

[20] Interaction in this area seems to be rather frequent, as the relevant actors meet on a quarterly basis.

[21] One important result of these activities was the development of a joint enterprise zone of 8 municipalities in Lower Austria (Kommunalverband Marchegg), with the aim of jointly developing land for enterprises and sharing the resulting tax revenues. This joint enterprise zone, however, does not include Vienna.

[22] At the time of the interviews this perception was fuelled by public statements of the mayor of Vienna that residents of Vienna should receive precedence over other applicants, for jobs in the Vienna city administration and ongoing debates about the introduction of a city toll in Vienna.

however, emphasize the increased complexity of their job that is caused by the missing strategic and explicitly political level in the co-operation.

Further many also stress that at a more local level co-operation between municipalities and Vienna is somewhat problematic, due to the large number of actors and the small size of many of the municipalities outside Vienna. Additionally, this co-operation is hampered by the much lower autonomy of the Viennese districts, relative to the often much smaller municipalities in Lower Austria.

2.7 Potential inspirational cases from the stakeholder city-region

To achieve its policy objectives the city has a number of specialized support agencies at its disposal that address different aspects of economic policy. These agencies include the:

- Vienna business agency – a specialized city run agency to support local and international companies in all phases of their business development, and to provide advice on all corporate issues as well as helping expats. It provides city funded funding opportunities, support to newly founded companies and start-ups, advice in finding business premises for expanding and newly founded enterprises and services related to networking of enterprises.
- The waff (Wiener ArbeitnehmerInnenförderungsfonds) – a specialized fund that co-ordinates, implements and develops city financed adult training and active labour market policy measures and thus directly addresses the labour market mismatch issues in the city. Its activities amongst others include, the administration of long term training program for employees in firms reducing their staffing levels, the administration of major adult training initiatives of the city of Vienna and/or the local social partner organisations (e.g. the recent so called digi-winner initiative according to which employed citizen of Vienna can receive a € 5000,-- subsidy for vocational trainings in digitalisation), subsidies for enterprise start-ups, subsidies for completing vocational training exit exams and many others.
- The Vienna Science and Technology Fund (WWTF) - a non-profit organisation that promotes science and research in Vienna. Funded by a private foundation in the financial sector which was set up as a consequence of the privatisation of the city owned savings and loan association and supports scientific projects that have a medium to long-term economic and/or social exploitation perspective with up to € 1 million per project.

In conjunction with other city run initiatives and a number of further smaller organization these initiatives provide for a rather unique and very dense policy support network for firms in the city.

In addition, given the already dense actor networks the city has recently also developed a number of more small-scale local initiatives that aim to address its central economic policy challenges. One example for this are the Vienna business districts, which is a network of district managements founded by the city of Vienna-(district planning and land use-MA21, the Viennese Chamber of Commerce (Wirtschaftskammer Wien) and the Vienna Business Development Agency. These district managements support companies operating in the enterprise zones defined by the Vienna spatial development plan in establishing themselves locally. In addition, they offer a platform for networking between companies and are also tasked with networking the companies with one another and with the political decision makers at the district level and/or with the city administration.

Another similar institution is a newly founded system of intuitions aiming to better co-ordinate development in the city and its environs called Stadt-Umland Managements. These are responsible for improving the co-ordination of housing and location development policies, traffic planning as well as the planning of recreational areas between the city of Vienna and its environs, through networking activities and a number of local initiatives (such as conducting joint conferences, regular meetings of local decision maker and providing support to municipalities and the districts of Vienna in their co-operation activities.

In sum therefore, next to the historically given densely knit actor network in all aspects of economic policy, more recently the city has increasingly focused on “softer” policy measures directed at creating actor networks at a more local level.

3 A data-driven SWOT analysis for Vienna

3.1 Introduction and methodology

The following chapter provides an analysis of the employment structure of Vienna metropolitan area based on the analysis of shares and number of employees being employed in different sectors of productive economy (measured at NACE 3-digit level).

The detailed analysis has three main parts: 1) displaying and analysing the productive sectors that provide the biggest employment in the region – compared to the national average – 2) displaying and analysing the sectors that resulted in the fastest growth – compared to the national average – between 2012-2017 and 3) highlighting the sectors that represent the biggest potentials and the highest threats for the local economy.

There is a well-established methodological background behind Point 3 that follows the approach to the analysis of the regional network of branches pioneered by Otto et al. (2014) and Neffke et al (2017A, 2017B). The basis for this approach is the common recognition that innovation (and thus growth) is driven by the exchange of knowledge between firms, having a complementary knowledge base, in the form of labour flow between branches (labelled as “embeddedness”). In addition, the development potential is also based on the existence of a “critical mass” of employees in the metropolitan area being metered by the share of employees exceeding the national average (labelled as “specialisation”).

Table 1: Categories of the empirical SWOT analysis.
Development potentials according to degree of specialisation and embeddedness

	Regional embeddedness of a branch	
Regional degree of specialisation	High localisation and well embedded (Strength S)	High localisation but weakly embedded (Threat T)
	Low localisation but well embedded (Opportunity O)	Not localized and weakly embedded (Weakness W)

Source: Otto et al. (2014), ESPON MISTA (2020).

Overall, both the degree of specialisation and the embeddedness in the regional sectoral structure are decisive for an assessment of the development potential of a branch. According to Otto et al. (2014) economic branches in a region can be classified into four different categories, by differentiating, according to the values of their localisation quotient and their embeddedness indicator (Table 1):

1. If the branch under consideration is heavily localized in the region and if this branch is also well embedded in "related" branches, the branch is large relative to the regional economy and it is likely that it will also strongly profit from localised knowledge transfers across industries in the region. As a consequence, its future development prospects should be favourable, and the branch can be considered to be a "strength" of the regional economy.

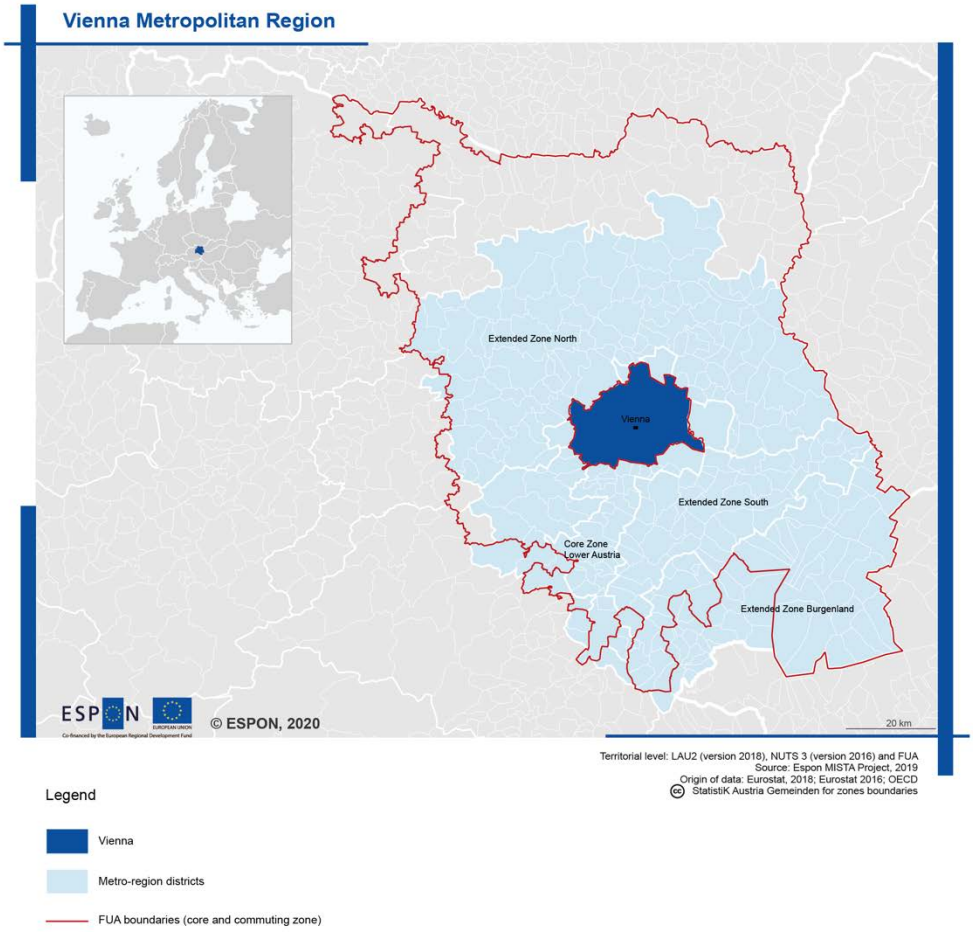
2. By contrast, a branch with a low degree of specialisation and embeddedness is unlikely to profit substantially from localized knowledge transfers but is also small in terms of the regional economy. Despite the fact that such branches may be of importance for the other reasons (e.g., the presence of natural resources or the satisfaction of local demand) such branches have therefore been regarded as a regional "weakness" in previous analysis from a technological development perspective.
3. Branches that are lowly localised but well embedded are faced by a favourable regional environment of technologically or cognitively "close" branches (and thus diverse opportunities to use a common knowledge base) but are still relatively small. Such branches could thus offer special "opportunities" to develop new strengths through structural policy initiatives in the future.
4. Finally, branches which are highly localized, but only weakly embedded in complementary in the region, tend to be seen at risk which could be reduced by strengthening complementary branches through structural policy initiatives. This is because they are relatively large but are unlikely to profit substantially from their regional knowledge base.

3.2 Spatial scope of data analysis

Since, as already highlighted in the background report to task 1 of the MISTA project, urban regions are open systems and may thus also profit from knowledge spillovers from nearby regions, we present results for three different regions: The city of Vienna, the environs of the city of Vienna and the Vienna metropolitan region, which is the sum of the city of Vienna and its environs. While the city is defined from a purely administrative perspective, as the territory covered by the Vienna city administration, the Vienna environs were defined in the course of the project in co-operation with the respective city administration. In defining this region three criteria were applied:

1. The most important was an administrative criterium according to which the chosen definition should to some degree reflect the administrative boundaries of existing institutions (or mechanisms) for inter – regional co-operation in the city. This criterium was chosen to ensure to the best possible degree that the analytic results are useful for existing urban planning processes.
2. The second criterium was based on data availability. Since the analysis conducted below requires detailed information on the development of employment at a NACE 3-digit level at a highly granular regional disaggregation level, this criterium prove to be the most constraining in the analysis
3. Finally, the third criterium was based on analytical consideration and was derived from the fact that knowledge spillovers as the central analytical concept guiding the current analysis in all likelihood exceed the regional scope of travel to work areas, which speaks in favour of using larger regions rather than smaller ones for the current analysis.

Map 2: Definition of the metropolitan region of Vienna.



Source: ESPON MISTA (2020).

Note: As there is no official statistical definition of Vienna the map is based on a definition of the Vienna region by the Planungsgemeinschaft Ost (called Stadtregion+) that has been used in various studies on the Vienna region. See Planungsgemeinschaft Ost (Hrsg.), "Stadtregion+ Zwischenbericht. Planungskooperation zur räumlichen Entwicklung der Stadtregion Wien Niederösterreich Burgenland", PGO, Wien, 2011.; Statistics Austria; WIFO.

For the case of the metropolitan area of Vienna, the “Stadtregion+” definition is adopted. This region has no own planning competencies and is also not defined in official economic strategies. Its definition was developed by Planungsgemeinschaft Ost (2011) and has been used, as a generally accepted definition of the Vienna metropolitan region in various studies. Furthermore, this definition can also be implemented by using data (from the regional labour market statistics – abgestimmte Erwerbstatistik) at the NACE 3-digit industry level at the level of municipalities for the years 20212 and 2017. It therefore allows for a very detailed analysis of the region. As illustrated in Map 1, the definition distinguishes the city of Vienna and a functionally strongly integrated corridor of municipalities around the city. This extended zone is located in the state of Lower Austria, but also includes northern parts of the state of Burgenland in the southeast. The red line in Map 1 further illustrates the Eurostat definition of the Vienna functional urban area. This definition extends the Vienna metropolitan area all the way to the Czech-Austrian border in the north and is typically considered too broad among local policy makers and stakeholders.

3.3 Size and growth of individual productive activities

3.3.1 Sector shares

Considering the shares of employment in different industries (see table 2) the economic structure of productive activities in the Vienna metropolitan region is substantially more diverse and more service oriented than in most of the other case study cities considered in the MISTA project. Many of the 10 largest branches in the metropolitan belong to construction, the wholesale trade or the logistics sector. Thus, the largest productive branches in the total metropolitan area in construction are the "construction of residential and non-residential buildings" as well as parts of the specialised construction activities, such as "electrical, plumbing and other construction installation activities" and "building completion and finishing". Within logistics, the largest branch is "support activities for transportation". This includes activities related to the transport of passengers or goods, such as the operation of transport infrastructure or cargo-handling activities immediately related to transport. The largest branches in wholesale trade are that of household goods", "other machinery, equipment and supplies" and "other specialized wholesale". But even the largest of these branches held an employment share of less than 2% of the total in 2017, Interestingly also none of the 10 largest branches belongs to manufacturing or to the utilities that are important in many of the other case study regions of the MISTA project (see Table 2).

Table 2: Top 10 branches in terms of size (2017).

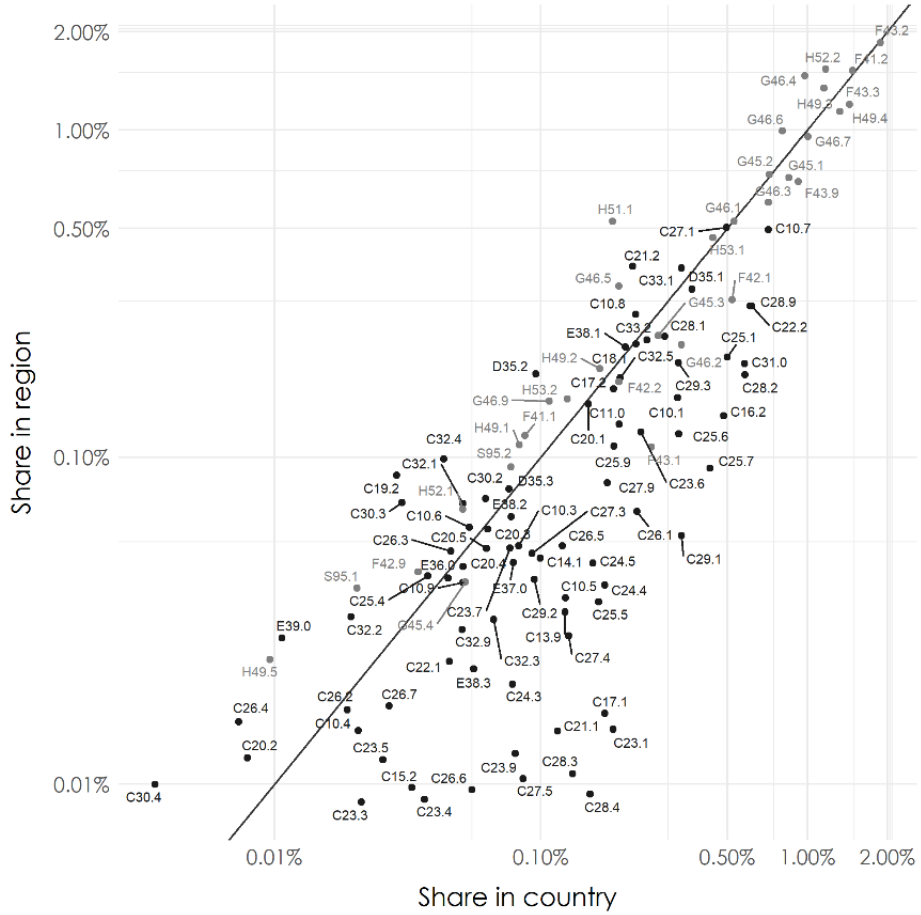
NACE	Name	Empl.	Share in %
Total metropolitan region			
F43.2	Electrical, plumbing and other construction installation activities	25995	1.85
H52.2	Support activities for transportation	21571	1.53
F41.2	Construction of residential and non-residential buildings	21381	1.52
G46.4	Wholesale of household goods	20637	1.47
H49.3	Other passenger land transport	18910	1.34
F43.3	Building completion and finishing	16831	1.20
H49.4	Freight transport by road and removal services	16050	1.14
G46.6	Wholesale of other machinery, equipment and supplies	13981	0.99
G46.7	Other specialised wholesale	13434	0.96
G45.2	Maintenance and repair of motor vehicles	10285	0.73

Source: Statistics Austria, ESPON MISTA (2020) team calculations. Separate illustrations for the city and its environs are provided in Table A1 in the annex.

This diversity of production activities is even more pronounced in the city of Vienna than in its environs. In the city of Vienna, the largest NACE 3-digit branch ("wholesale of household goods") accounts for only 1.7% of total employment. Nonetheless. even though also in the city the top 10 branches are found in construction, wholesale trade and in parts of the logistics sector, at least one top ten branch ("Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus") belongs to manufacturing. The share of this branch in total employment is, however, only 0.6% that are in their vast majority accounted for by one large producer located in Vienna (see Table A1 in the annex).

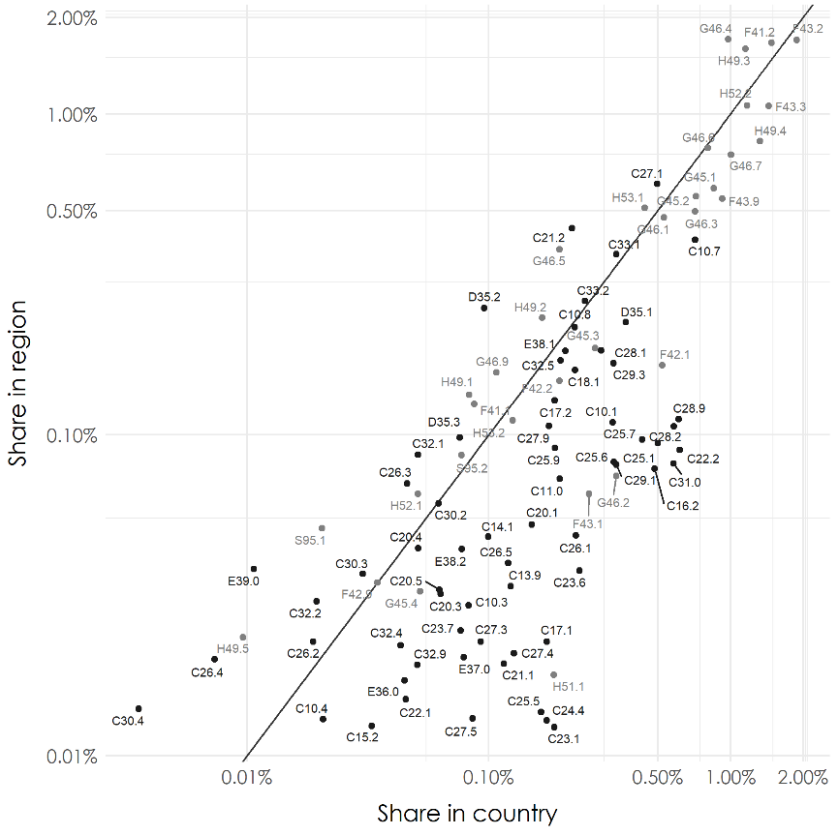
In the environs, by contrast, very much the same branches are listed in the top 10 in terms of employment – albeit in a slightly different order - as in the overall metropolitan region. Once more here logistics (i.e. “support activities for transportation”, “freight transport by road and removal services”, “passenger air transport”), wholesale trade (“wholesale of other machinery”, equipment and supplies”, “maintenance and repair of motor vehicles” and “other specialised wholesale”) and construction activities (“electrical, plumbing and other construction installation activities”, “building completion and finishing”, “construction of residential and non-residential buildings, “other specialised construction activities”) dominate. None of these branches, however, achieve an employment share in excess of 3%.

Figure 1: Sector shares of productive activities (total Vienna metropolitan area).



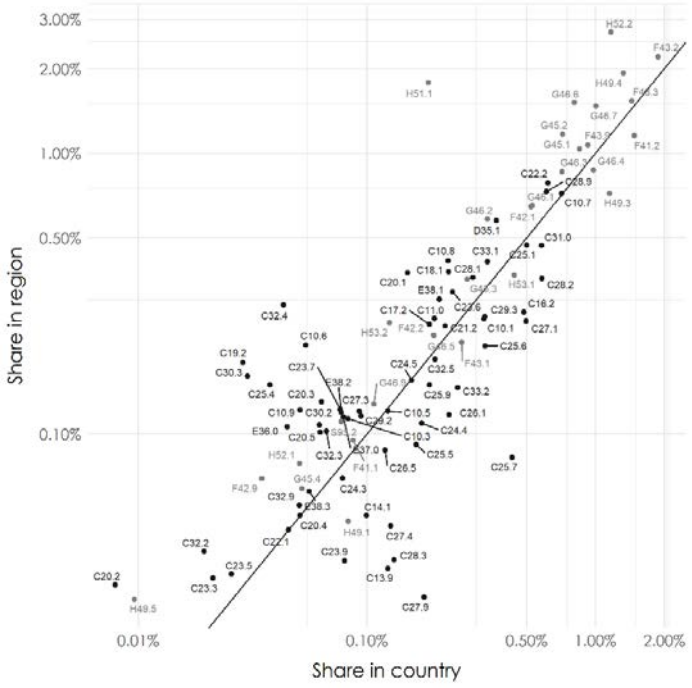
Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Figure 2: Sector shares of productive activities (city of Vienna).



Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Figure 3 Sector shares of productive activities (environs)



Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

These data, however, refer only to absolute employment shares and are therefore also influenced by the specifics of the ustrina employment structure in general.[23] To highlight the specifics of the city of Vienna relative to the remainder of Austria, therefore the location quotient (i.e., the share of employment of a branch in Vienna relative to the employment share of the same branch in Austria) as shown in table 3 is a more relevant indicator of regional specialisation.

Table 3: Top 10 branches in terms of localisation (location quotient, 2017).

NACE	Name	Empl.	LQ
Total metropolitan region			
C19.2	Manufacture of refined petroleum products	1236	3.06
H51.1	Passenger air transport	7394	2.83
C30.4	Manufacture of military fighting vehicles	140	2.80
E39.0	Remediation activities and other waste management services	393	2.62
H49.5	Transport via pipeline	338	2.50
C30.3	Manufacture of air and spacecraft and related machinery	1019	2.42
C32.4	Manufacture of games and toys	1387	2.28
C26.4	Manufacture of consumer electronics	218	2.11
S95.1	Repair of computers and communication equipment	559	1.95
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2526	1.88

Source: Statistics Austria, ESPON MISTA (2020) team calculations. Only industries with at least 100 employees are considered. Separate illustrations for the city and its environs are provided in Table A3 in the annex.

According to this indicator the productive activities with the highest degrees of localisation in the metropolitan region differ substantially from the branches with the highest employment shares. In particular this list next to including logistics branches also includes a number of manufacturing branches and utilities, that however often have a very low total employment of only a few hundred employees. This thus indicates that next to its diversity the Vienna metropolitan region is also a location for a number of smaller “niches” produces (in e.g., the “manufacture of military fighting vehicles”, or the “manufacture of consumer electronics”) within Austria.

In addition, in many of the localised branches that have employment levels in excess of 1000 workers, this localisation can often be traced to the presence of only one or very few enterprises in the region. Thus, for instance the high localisation of the “manufacture of refined petroleum products” in the region is due to a refinery located outside Vienna and the high localisation of “passenger air transport” to the function of Vienna and the Vienna airport as a headquarter for most Austrian airlines. Finally, the high localisation of “manufacture of gas; distribution of gaseous fuels through mains” is mainly owed to the high importance of gas heating in the city of Vienna.

[23] One case in point is the construction sector, where international comparisons regularly show a high share of employment in Austria relative to other EU countries.

This focus on niche production also applies to the subregions of the Vienna metropolitan region. Nonetheless the analysis, somewhat surprisingly, also suggests that even in the city of Vienna, some of the top branches in terms of localisation include a number of manufacturing industries (see Table A3 in the annex). On the one hand, these once more reflect niche industries, such as the “manufacture of military fighting vehicles” or “the manufacture of consumer electronics”. On the other hand, this list also includes some of the larger branches that have been a major focus of industrial policy in the city such as the “manufacture of pharmaceutical preparations”.

In the environs of Vienna most of the most highly localised branches are also small and employ around 1000 or less workers and the few larger branches such as e.g., “passenger air transport” are due to the specifics of the region (such as e.g., the country’s largest airport located Vienna environs).

In sum therefore these data identify both the city of Vienna as well as its environs as a rather diverse location where among the production activities analysed in the MISTA project construction activities, logistics and wholesale trade belong to the most important sectors in terms of employment and where in addition a large number of niche producers, who mainly operate in high or medium-high technology industries, are localized.

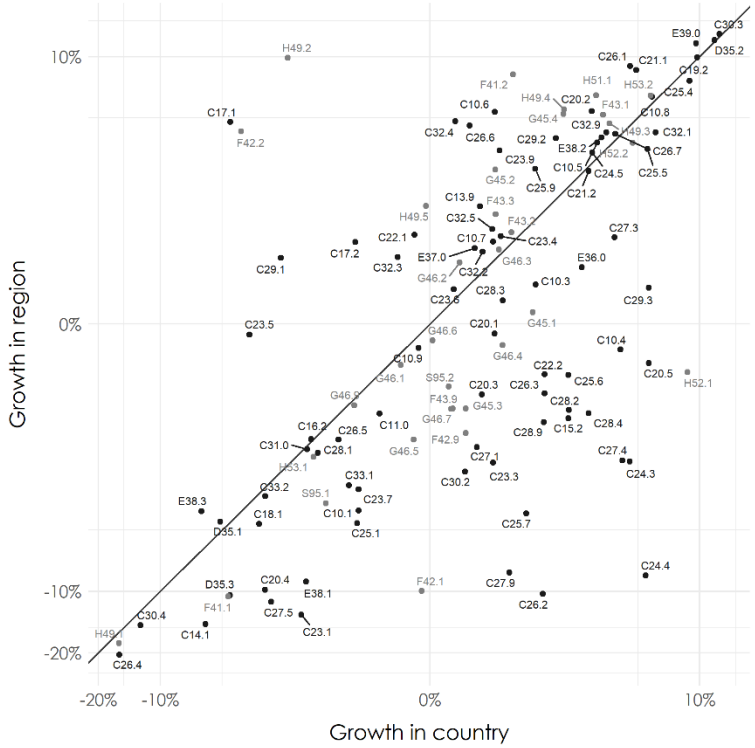
3.3.2 Growth

While the lack of a dominant industry in the Vienna region has been considered a weakness of the region in some policy debates, many of the niche producers identified above and also many of high-technology and medium high-technology manufacturing branches with a high employment share in the production sector have also been growing rather rapidly in the Vienna metropolitan region in recent years. This applies in particular to activities such as the “manufacture of air and spacecraft and related machinery”, “manufacture of refined petroleum products”, “manufacture of electronical components and boards”, “manufacture of basic pharmaceutical products” and “manufacture of weapons and ammunition”.

In addition, as in many other cities, utility activities such as “manufacture and distribution of gas(eous fuels) and remediation activities” and “other waste management” exhibited high growth, as did the construction of residential and non-residential buildings– which is among the largest of all productive branches of the region – as well as some logistics branches (“freight rail transport”, “passenger air transport”). Many of these branches are also growing more rapidly in the Vienna metropolitan region than in the Austrian average (see Figure 4).

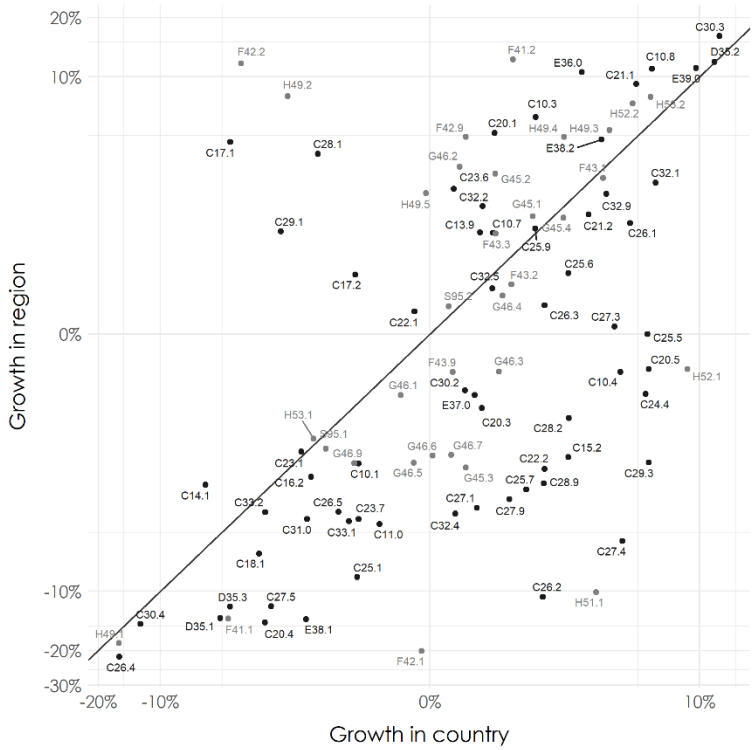
The list of the fastest growing branches also clearly differs between the city of Vienna and the environs (Figures 5 and 6; Table A2 in the annex). The fastest growing activities in the city are dominated by public utilities, construction and transport activities as well as specific niche high- and medium high-technology industries. By contrast, slightly larger manufacturing branches have a higher share among the fastest growing industries in the environs, while fast-growing branches outside manufacturing in the environs are comparable to those growing fast in the city.

Figure 4: Growth of productive activities (total Vienna metropolitan area).



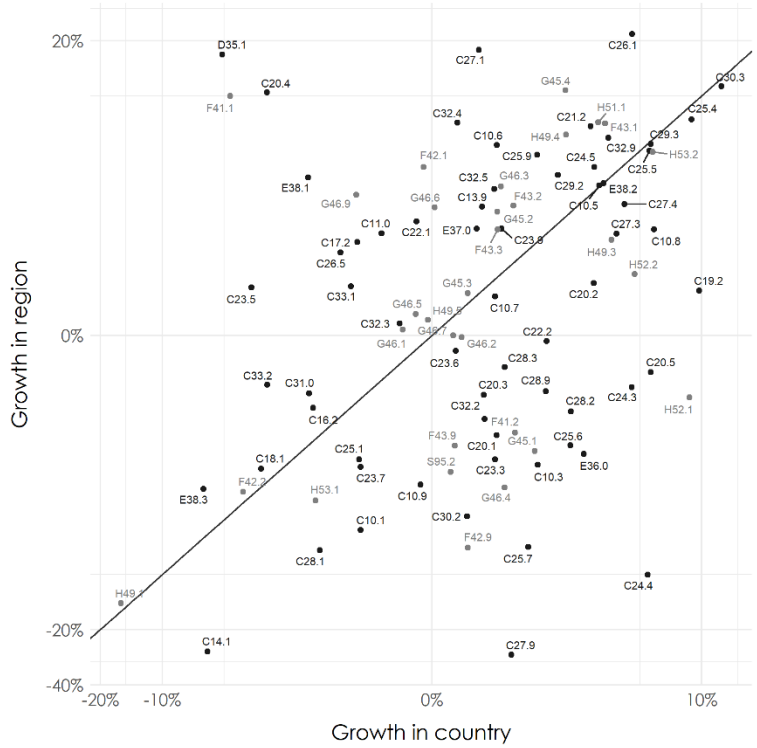
Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Figure 5: Growth of productive activities (city of Vienna).



Source: Statistics Austria, ESPON MISTA (2020) team calculations; Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Figure 6: Growth of productive activities (environs).



Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Table 4: Top 10 branches in terms of growth (2012-2017).

NACE	Name	Empl.	Growth p.a. in %
Total metropolitan region			
C30.3	Manufacture of air and spacecraft and related machinery	1019	12.88
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2526	12.05
E39.0	Remediation activities and other waste management services	393	11.60
C19.2	Manufacture of refined petroleum products	1236	9.90
H49.2	Freight rail transport	2625	9.85
C26.1	Manufacture of electronic components and boards	959	8.97
C21.1	Manufacture of basic pharmaceutical products	204	8.61
F41.2	Construction of residential and non-residential buildings	21381	8.18
C25.4	Manufacture of weapons and ammunition	609	7.61
H51.1	Passenger air transport	7394	6.45

Source: Statistics Austria, ESPON MISTA (2020) team calculations. Only industries with at least 100 employees in 2017 are considered. Separate illustrations for the city and its environs are provided in Table A2 in the annex.

A further consideration of growth rates relative to the national average (Figures 5 and 6) suggests that many of these fast-growing branches are also growing faster than the national average. The only exception are wholesale activities that tend to outperform the country in the environs, while the same these activities develop much slower than at the country level in the

city of Vienna. This thus reflects the relocation of wholesale activities from the city to its environs often also discussed in public debates.

One type of activity that is noticeably missing among the fast-growing branches in the Vienna metropolitan region but is often found among the fast-growing industries in other metropolitan regions, are differentiated consumer goods industries. Among these only the “manufacture of games and toys” has shown high employment growth in the period 2012 to 2017 in the Vienna environs. This thus suggests that within manufacturing activities employment growth in manufacturing is even more strongly focused on high technology and high skill branches than in other cities.

3.4 SWOT profiles of productive activities

This in part may also be due to the patterns of technological embeddedness in the Vienna metropolitan regions, where the most strongly embedded branches are again mostly logistics and wholesale or high-technology manufacturing branches (e.g., “manufacture of basic pharmaceutical products”, “manufacture of communication equipment”). As shown in Table 5, which lists the 10 most strongly embedded branches in the Vienna metropolitan region, manufacture and wholesale of ICT equipment are the two branches with the highest degrees of embeddedness. This is mainly due to the high embeddedness of these branches in the economic structure of the city of Vienna (see Table A4 in the annex).

Table 5: Top 10 branches in terms of embeddedness (2017).

NACE	Name	Empl.	Embed.
Total metropolitan region			
G46.5	Wholesale of information and communication equipment	4691	1.32
C26.3	Manufacture of communication equipment	724	1.28
H51.1	Passenger air transport	7394	1.28
H53.1	Postal activities under universal service obligation	6603	1.21
C14.1	Manufacture of wearing apparel, except fur apparel	689	1.19
H49.1	Passenger rail transport, interurban	1532	1.19
C18.1	Printing and service activities related to printing	3119	1.18
H49.5	Transport via pipeline	338	1.18
C21.1	Manufacture of basic pharmaceutical products	204	1.15
H49.2	Freight rail transport	2625	1.12

Source: Statistics Austria, ESPON MISTA (2020) team calculations. Only industries with at least 100 employees are considered; Separate illustrations for the city and its environs are provided in Table A4 in the annex.

Other than that, this list is, however, dominated by logistics (such as “passenger air transport“ and “interurban passenger rail transport” “postal activities under universal service obligation”, “transport via pipeline”), and some branches that are either associated with creative industries and/or consumer goods production (“printing and service activities related to printing”, “manufacture of wearing apparel, except fur apparel”)

In addition, in the environs also a large number of high-tech and medium high-tech manufacturing branches are highly embedded. This applies in particular to branches such as the “manufacture of electronic components and boards”, “manufacture of electric motors, generators, transformers and electricity distribution and control apparatus” and the “manufacture of air and spacecraft and related machinery”.

Table 6: SWOT Profiles for the total metropolitan region (2017).

NACE	Name	Employment
Strengths		
H51.1	Passenger air transport	7394
H49.5	Transport via pipeline	338
G46.5	Wholesale of information and communication equipment	4691
S95.1	Repair of computers and communication equipment	559
H49.1	Passenger rail transport, interurban	1532
C26.3	Manufacture of communication equipment	724
H49.2	Freight rail transport	2625
Opportunities		
C14.1	Manufacture of wearing apparel, except fur apparel	689
C26.6	Manufacture of irradiation, electromedical and electrotherapeutic equipment	135
C29.1	Manufacture of motor vehicles	808
C21.1	Manufacture of basic pharmaceutical products	204
Threats		
C32.4	Manufacture of games and toys	1387
F42.9	Construction of other civil engineering projects	627
G46.6	Wholesale of other machinery, equipment and supplies	13981
C10.6	Manufacture of grain mill products, starches and starch products	858
C33.1	Repair of fabricated metal products, machinery and equipment	5328
C25.4	Manufacture of weapons and ammunition	609

Source: Statistics Austria, ESPON MISTA (2020) team calculations. Only industries with at least 100 employees are considered; Separate illustrations for the city and its environs are provided in Tables A5 to A7 in the annex.

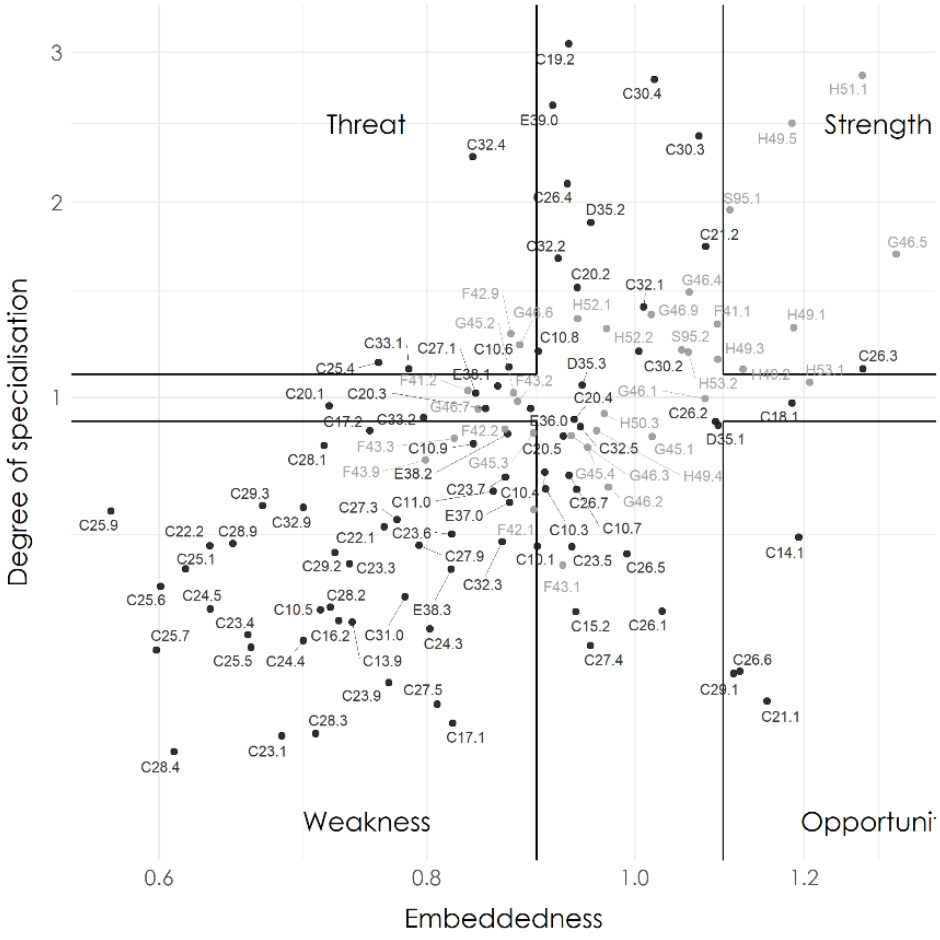
Given the strong focus on logistics and trade in the economic structure of the Vienna metropolitan region also the list of the highly embedded and localised branches, that may be considered the strongholds of the Vienna economy are mainly logistics branches. Further due to the high diversity of the productive activities this list is also rather short and also contains a number of smaller niche branches. Thus, for the whole metropolitan region, only a total of 7 productive activities exhibit both a high degree of specialisation and embeddedness. Of these four are related to logistics, with “passenger air transport” and “transport via pipeline” showing the most prominent profile in the “strength” quadrant of Figure 7. Further, “interurban passenger rail transport” and “freight rail transport” classified in this category. The remaining embedded and localised activities, by contrast” are related to the production trade and maintenance of ICT equipment (“manufacture of communication equipment”; “wholesale of information and communication equipment” and “repair of computers and communication equipment”), with the

manufacturing of communication equipment standing out as the only manufacturing branch among the localised and embedded branches.

In contrast to this the number of less localised but highly embedded and highly localised but weakly embedded activities are dominated by manufacturing. The four less localised but highly embedded activities, that may represent an opportunity for future development from a technological perspective, consist of the “manufacture of wearing apparel” manufacture of irradiation, electromedical and electrotherapeutic equipment”, “manufacture of motor vehicles and the manufacture of pharmaceutical products” (see Figure 7).

Additionally, four out of six localised but weakly embedded activities, that are at risk in terms of their links to other branches in the region are manufacturing activities, with the manufacture of games and toys showing the highest degree of localisation and the manufacture of weapons and ammunition exhibiting the weakest degree of embeddedness in this group.

Figure 7: SWOT Profile (total Vienna metropolitan area).



Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

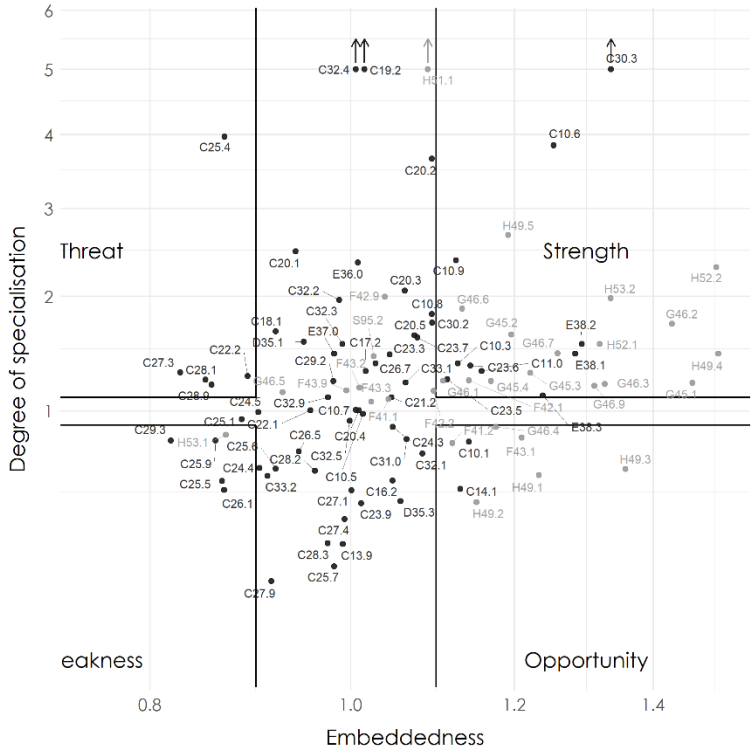
Zooming into the metropolitan region reveals rather substantial differences in SWOT profiles between the city and its environs. Compared to the total metropolitan region, in the city of

Vienna the “manufacturing of computers and peripheral equipment” sticks out as an additional ICT related activity among the embedded and localised branches. In addition, also “postal activities” and the “development of building projects” belong to this group. In contrast, in the environs a number of wholesale branches also belong to this group and thus reinforce the strong position of the wholesale sector in this region.

Figure 8: SWOT Profile (city of Vienna).

Source: Statistics Austria, ESPON MISTA (2020) team calculations; Industry (service) activities in black (grey); For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Figure 9: SWOT Profile (environs).



Source: Statistics Austria, ESPON MISTA (2020) team calculations; Industry (service) activities in black (grey); For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Further, city and environs of Vienna also differ in the embedded but not localized activities regarded as opportunities. In the city these are – somewhat surprisingly - dominated by manufacturing industries. These can be categorized as creative industries, such as “printing and printing services” and the “manufacture of wearing apparel”, or as high-technology manufacturing, such as “electromedical equipment”, “pharmaceutical products” and “motor vehicles”. In the environs, on the other hand, these activities mainly consist of logistics and construction activities, and in the production of meat and wearing apparel.

Conversely, the localised but not embedded activities are all manufacturing activities in the environs, while being a mixture of manufacturing, public utilities and wholesale activities in the city of Vienna.

3.5 Main take-aways

1. Both the city of Vienna as well as its environs are rather diverse locations in terms of their employment structure in the productive activities. Even the branches with the highest employment shares account for less than 2% of total employment. In addition, many of the most localized branches are niche branches operating in high or medium-high technology industries.
2. Among the production activities analysed in the MISTA project, logistics and wholesale trade belong to the most important sectors in terms of employment shares and localisation in the Vienna region. The structure of these production activities, however, differs substantially between the city of Vienna and its environs. In particular the city of

Vienna is characterized by a relatively large ICT services sector, while the environs combine a larger share of manufacturing and construction activities.

3. In terms of employment growth over the period 2012 to 2017, in particular the highly localized niche producers in the high and medium-high technology sectors have shown good growth performance, as have logistics branches. In the city additionally some utilities have expanded their employment substantially, while in the environs the same applies to a larger number of manufacturing branches
4. Overall, the number of strongly embedded and localized activities that may be considered the current strongholds of the Viennese economy is low. Only seven branches fulfil the double requirement of being both localized and highly embedded. The same applies to as not localized but embedded branches, that may present a high potential for future economic development.
5. By contrast localized but weakly embedded and not localized and also weakly embedded branches make up the majority of branches in the Vienna metropolitan region, as well as in the two sub-regions studied. This is related to a high degree of specialisation of the metropolitan region of Vienna in knowledge intensive (business) services, KI(B)S, that are outside the range of productive activities the current project is devoted to. It also points to the fact that fostering the growth of productive activities in the city may require strengthening inter--industrial ties through either newly founded enterprises or attraction of investments from existing firms.
6. The existing strengths of the metropolitan region are closely associated with logistics while the manufacturing strengths in the city are related to high-technology industries, such as the production of ICT equipment and the manufacture of pharmaceuticals and motor vehicles, as well as to creative industries such as printing and the production of apparel. In the environs, by contrast manufacturing and wholesale trade are the central strengths.

4 Outcomes of the future workshop

4.1 Workshop structure

Motivation

At the occasions of a “future workshop” held in October 2020 participants discussed the results of the MISTA project and potential future development perspectives. This workshop was intended as an exploratory and self-reflective process for MISTA’s seven stakeholder cities to review how their planning policy, plans, regulation and technical capacity reflect their ambitions in terms of research from the MISTA project and was conducted in each of the seven stakeholder cities with each workshop following a similar structure and containing similar ambitions, including:

- Helping to expose motivations and priorities for each of the cities.
- Seeking feedback on how research could be applied to decision making processes.
- Exploring the relevance of the Inspirational Cases, based on a shortlist of 27 cases.
- Showcasing how to facilitate stakeholder co-creation based on the outcomes of the MISTA project and to create ‘Metropolitan Industrial Spatial Strategies’ related to ‘Economic Sprawl’.

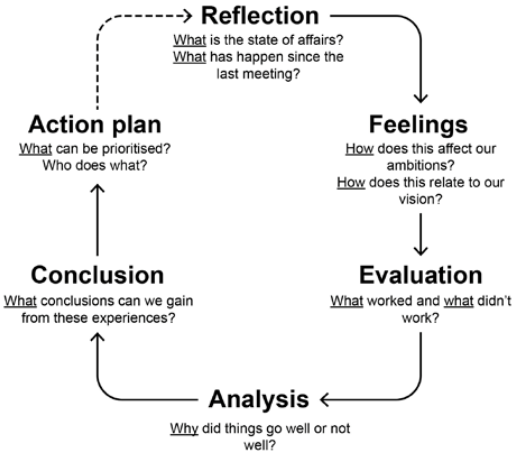
The workshops were not expected to generate exhaustive results but were designed to help create conditions for collaboration, exchange and expose what issues were most relevant to each city. The workshops also provided participants with a range of tools that could help to facilitate the use of the MISTA research for discussion and collaboration in the longer term.

Workshop program

Knowledge transfer can depend on a number of factors. This could include the technical skills of those involved, the institutional capacity to interpret and apply the knowledge to the local cultural context, the planning environment, the economic conditions, and the political landscape. As noted in the main MISTA report, the public sector at a city and metropolitan level across Europe has rarely been involved in shaping urban production networks. To be more actively involved in shaping the local (production) economy would require public authorities adopting new knowledge, developing new forms of collaboration (both inter-institutional but also outside the public sector) and in some cases new skills. Organisational change management offers a useful pathway. A development process where challenges are unclear, where shared meaning is required and where the end is poorly defined, can benefit from a reflexive approach based on co-creation and learning, what has been referred to as a ‘community of practice’.

The MISTA futures workshop was based on ‘experiential learning’ methodology developed by Graham Gibbs 1988. The program was built around a six-step process, illustrated in the diagram below. The ambition of using this methodology was to bring together local actors within a community of practice and based on experiential learning, while showcasing a methodology that could be applied after the MISTA project was completed.

Figure 10: Steps of the experiential learning methodology.



Source: MISTA adaptation, based on Graham Gibbs 1988

4.2 Workshop structure for Vienna

Due to the limitations imposed by COVID-19, the event was conducted online. This presented certain disadvantages but allowed the local stakeholders to embrace online collaboration platforms.

The Vienna workshop was hosted on the 5th of November with local actors for 5 hours. The event was hosted by Herbert Bartik, Dietlinde Oberklammer and Johannes Hofinger from Urban Innovation Vienna, under the request of Michael Rosenberger (City of Vienna). The event included attendees from the economic policy and real estate departments of the Vienna Business Agency, representatives of the Viennese Chamber of Commerce, researchers from the Technical University of Vienna, representatives of the Stadt Umland Management Vienna and the Vienna business districts as well as of the Lower Austrian Development Agency (Ecoplus GmbH).

The workshop methodology followed the six steps noted above. The first step (reflection) began with a presentation of the MISTA's analysis of the city (see the report, above). The second steps (Feelings) used a simple exercise called 'the chart of emotions' to explore participants' latent feelings and motivators related to nostalgia, traumas, hopes and fears concerning production and industrial land. The third step explored a generic SWOT analysis regarding the role of production and industrial land. The fourth step (Analysis) aimed to narrow the focus towards action and involved presenting four scenarios for the future of Vienna. The following step (Conclusion) connected the result of discussion with the presentation of 8 inspirational cases relevant to Vienna. The final step (Action plan) was left for general discussion.

Referring to the chart of emotions the revealed that production is associated with a number of feelings of nostalgia and trauma, but also with some hopes and fears: With respect to nostalgia many participants voiced the opinion that this often associated with food production (smells, taste) and crafts. By contrast, with respect to trauma previous relocations of firms that had substantial negative impacts on local economies and industrial workers were highlighted.

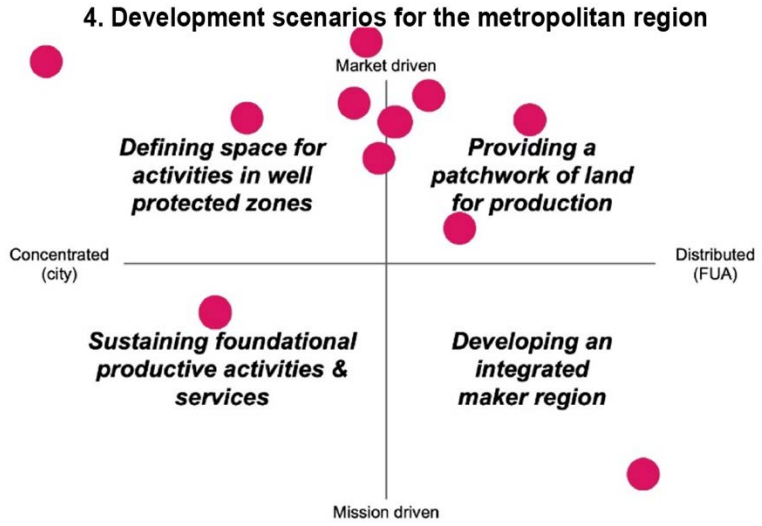
Hopes, however, revolve around revolve around the new technological possibilities (such as 3D printing, vertical and space-saving production), new business models (in particular in food production and sustainability), the development of new property types, that allow for allow mixing production with other land uses and the fact that production and industry is often also seen as an identity-creating factor in regions. Bay contrast fears mainly concern the consequences of structural change, such as the breaking away of traditional craft businesses or changes of ownership (e.g., from family business to international funds) and a (further) rise in unemployment.

4.2.1 Scenarios

In step four of the workshop (Analysis), four scenarios were presented. The scenarios are aimed to develop debate and are particularly useful to gauge how different actors view current and future ambitions. The scenarios are essentially structured around two questions:

- What is the scale of action?
- What is the role of the public sector in stimulating the local economy?

Figure 11: The two axes that define the policy scenarios.



Source: ESPON MISTA (2020).

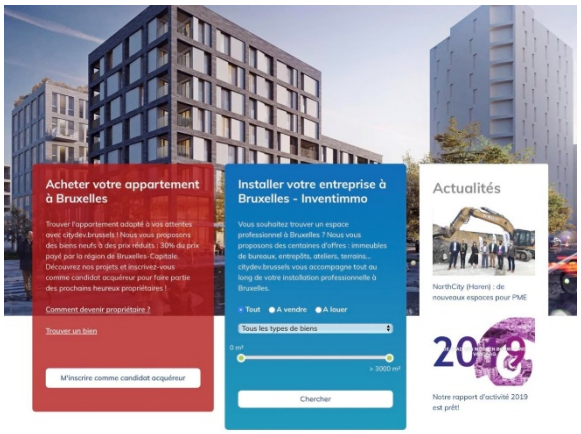
A rich discussion arose simply regarding how each participant positioned themselves and their projects within the scenario canvas (refer to Figure 13 above, the red dots indicating the location of projects on the canvas). The nuance between spatial and economic planning was clear. From the perspective of spatial planning, the focus was on the city scale and providing space for the market. The spatial planners considered metropolitan scale planning highly troubling due to troubling political relationships and very different visions. By contrast the economic planners and business-oriented organizations felt their work was focused far more on a territorial scale and was mission driven. This contrast also helped to distinguish what each mindset thought was possible and the kind of policy/action that should be prioritized. For example, urban planners in the group embraced the idea on industrial intensification while the business-oriented actors felt that metropolitan economic planning should be developed.

Participants provided a number of examples of approaches with a strong mission-oriented approach (such as the Vienna Biocenter, Seestadt Aspern Technology center, commercial yards). They, however, also predominantly held the view that a comprehensive coordination of the industrial policy of the metropolitan region as with the fourth Development scenario outlined (development of an integrated "maker region"), while potentially attractive, does not yet exist.

4.2.2 Inspirational cases selected

Eight inspirational cases were selected for the workshop which provide an indication of the kind of interventions that were considered a priority.

Figure 12: The inspirational cases presented and discussed within the workshop.



Greater Manchester Combined Authority

Vienna's economy is limited heavily by the amount of land that it has control over. Land for production is limit and expensive, while some activities would be better located outside of the city. Due to differences of vision and NIMBYism, metropolitan governance is limited. Manchester's approach offers an inspiring, slow and informal example of building up governance.

Citydev.brussels

Development, particularly industrial intensification and co-location can be showcased by a public developer that can create space that the market may not be prioritising. Citydev provides a useful model of a publicly owned private developer.

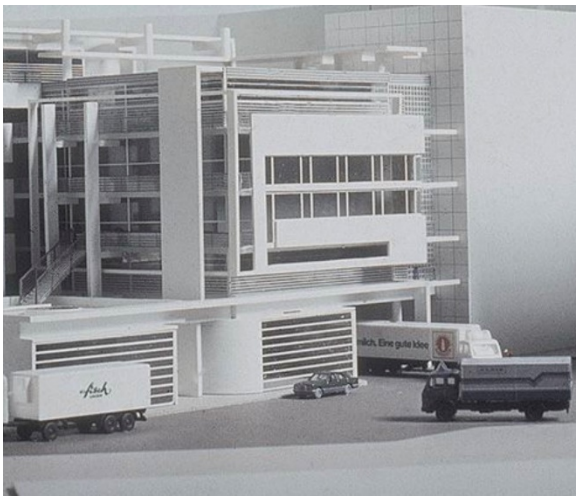
Planned Manufacturing Districts (Chicago)

Vienna may have strong policy regarding industrial land and production, but in practice the impact is limited, and land remains exposed to redevelopment. Chicago's zoning model is a useful

RDM Campus (Rotterdam)

The RDM site links education and entrepreneurship under the same roof and encourages collaboration between people with technical and theoretical expertise. This kind of space could be an appealing investment opportunity for Vienna.

reference to retain space for production and experimentation.

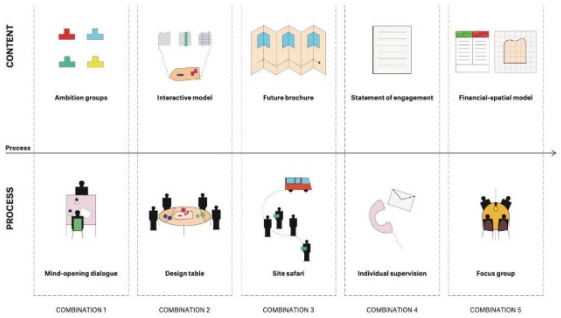


Hôtels Industriels (Paris)

Considering Vienna's limited availability of real estate and the high cost of land, industrial intensification is a strategic solution. Paris contains numerous examples of projects that have been operating since the 1980's.

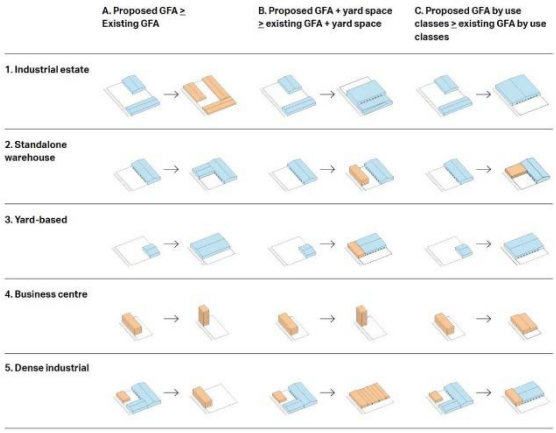
Sheffield Advanced Manufacturing Innovation District

Clusters can be important for focusing on specific skills and knowledge. Sheffield's manufacturing cluster focuses on machinery and metals, which is supported by training and incubator spaces.



Lageweg (Antwerp)

Vienna contains industrial land reserves, yet much of it remains in private hands. While this puts public authorities in a weak position it also provides conditions for co-creation and bottom-up planning. The Lageweg offers a successful example of process management.



Industrial intensification and co-location study (London)

Vienna's limited amount of space requires more effective use of land. London's intensification study provides Vienna with a good example of the kinds of guidelines and development opportunities to apply locally.

Source: ESPON MISTA (2020)

4.2.3 Outcomes and discussion

The Vienna workshop was hosted in the context of a group that has an established working relationship and where many of the participants (or their respective organisations) have very

clear attitudes to industrial land use, manufacturing and the productive sector. The discussions early in the workshop did not reveal much unknown information and the MISTA team presentation helped the participants confirm conclusions of the state of the city, the metropolitan area and the production narrative.

The most engaging part of the discussion emerged when the participants were asked to position their organisations or their work within the scenario canvas. What emerged was a much richer and complex outlook than what some of the participants had expected. While planners had considered that metropolitan scale planning and policy cohesion was a serious and unnecessary struggle, some organisations focused on economic development found the opposite to be the case.

As a result, metropolitan scale planning could take on a thematic approach that did not depend on complex policy and planning cohesion but rather could be nuanced around specific activities that need to act at a metropolitan scale against those that do not. For example, investment in industrial intensification can be expensive if the activities being located in the buildings do not benefit from being densely clustered.

Table 7: Results of the SWOT analysis.

Constraints ▪ *A growing city with high demand for housing.* ▪ *Expensive real estate.* ▪ *Limited examples of new mixed used and industrial intensification projects.*	**Strengths** ▪ *A strong vision, that is clearly articulated and well embedded in both planning and policy.* ▪ *Confident communications campaigns in order to align institutional perspectives and private investment.* ▪ *A range of different sites that can showcase how activities are occurring in highly mixed areas, to science parks and industrial areas.* ▪ *A well-researched role of productive activities within the larger economy.* ▪ *The capacity to access a pool of international talent due to location and identity.*
Weaknesses ▪ *NIMBYism from more rural parts of the region, inside and outside the city.* ▪ *A freeriding mentality: everyone in general welcomes and demands industrial functions, but not locally* ▪ *Tensions between the visions for the City and the surrounding areas. .* ▪ *Everybody competes for the same "trophy-businesses" creating unnecessary competition and wasted public resources* ▪ *Urban public transport stops at the city borders.* ▪ *Disadvantages of development outweigh locally perceived benefits*	**Opportunities** ▪ *Explore 'soft' solutions to define opportunities that municipalities outside of Vienna could contribute to metropolitan economic planning, without creating resistance or counteracting development.* ▪ *Ensure production becomes a central topic for the city and not simply a peripheral one, showing how production facilitates other activities.*

Source: ESPON MISTA (2020).

Finally based on the results of the workshops, and the analysis the MISTA team conducted a SWOT analysis for Vienna summarized in table . Again, this SWOT analysis raised a substantial debate in which participants linked the SWOT results to the future developments and mainly focused on potentially necessary adaptations for future policy developments. Among other the following aspects were mentioned in this discussion:

- A stronger focus on topics related to affordable space (for residential and production uses) and qualification of the workforce.
- The need to focus more strongly on transferring and scaling of the many innovative pilot projects and networks of competence in the region and to facilitate the transfer of knowledge from the educational system to businesses (e.g., through the strategic use of the maker movement)
- The possibility to use the development of mixed-use concepts to also establish new and innovative business models.

The participants, however, also emphasised that the substantial areas of land owned by the City and the well-developed infrastructure (e.g., with respect to various urban utilities) and the interlinking of different thematic topics in spatial development (recently for instance developed in the Seestadt Aspern) represent major assets in the city, that can be built upon in future strategies.

5 Annex: further details on the methodology of the SWOT analysis used

5.1 Detailed description of the methodology

Although a conclusive and applicable concept for an evaluation of the development potential of the individual branches in the region within the framework of an empirical SWOT analysis is available as described in section Chapter 4.1 of the interim report, its implementation requires a clear (and evidence-based) idea of the branches with which a focal branch is technologically or cognitively "related". Several approaches have been developed in the literature to identify this (cognitive) "branch proximity".[24] However, most of them are only able to identify proximity relationships within the manufacturing sector or within the service sector, which makes the unsuitable for the present project. For this reason, the present analysis relies on an approach by Neffke and Henning (2013) which attempts to derive proximity from flow data between branches of the entire spectrum of branches across economic sectors. Technological or cognitive "proximity" of branches is revealed from labour mobility between branches, which is central to knowledge spillovers, assuming that job changes occur primarily between jobs with similar skill requirements. This is because human capital of the workforce is highly job-specific, so that individuals (necessarily) lose part of their human capital when they move to a branch in which they cannot or can hardly make use of their previously accumulated (job- or branch-specific) knowledge (Neal, 1995; Parent, 2000). Such job changes between cognitively distant branches are rather unlikely. Rather, employees prefer to switch between branches that share a common knowledge base (i.e., are technologically or cognitively related to each other) and therefore need workers with similar skills, so that the employees can transfer a large part of their human capital when changing jobs between branches (and thus avoid losses of human capital and therefore income).[25]

Thus, the degree of cognitive or technological relatedness between two branches can be deduced from the probability of labour flows between these branches. Of course, this requires complete information on all job changes between branches at a very disaggregated sectoral level. Such data is provided by the results of a major research project conducted by the Institute for Employment Research (IAB) in Germany (Neffke et al., 2017A, 2017B), which examined labour flows between branches at a highly disaggregated level on the basis of the IAB dataset on employment history (BeH)[26] in order to define technologically or cognitively "close" branches

[24] For a more detailed description of these approaches and their methodological advantages and disadvantages see Firgo and Mayerhofer (2018).

25 An empirical confirmation of this hypothesis is provided by Neffke et al. (2017A) for Germany. They show that job changes between branches are restricted to a limited spectrum of target branches that are cognitively "related" to the respective branch of origin.

26 In principle, the results were calculated at the 4-digit level of economic activities, but for our purposes they were aggregated to the level 3 branches. We are very grateful to Anne Otto of IAB Nuremberg for providing the data and additional processing for the purposes of our analysis. The BeH data set (for a more detailed description see Bender et al., 2000) represents a complete survey. The employee history contains comprehensive personal information on all employees and companies in Germany subject to

for Germany (referred to here as "skill-relatedness"). The application of the labour-flows between branches obtained for Germany to regions of other countries seems justified. It can be feasibly assumed that branches (groups) that prove to be technologically or cognitively "close" or "skill-related" in Germany on the basis of inter-sectoral labour market flows at the level of NACE 3-digit branches, will be so in other highly developed parts of Europe as well: In fact, it can be rather ruled out that the same NACE 3-digit branches in Germany and regions in Austria, Norway or (Northern) Italy - that are subject to the present analysis - as regions with very similar levels of economic and technological development, differ substantially from each other in terms of production technology, qualification structure, input-output interdependencies etc., such that they would require systematically different knowledge bases.

We therefore use the matrix of branch-relatedness obtained from intersectoral job changes in Germany and the resulting sectoral connections for the analysis of the stakeholder city regions of the project. IAB distinguishes a total of 265 branch groups at the NACE 3-digit level. This means that a symmetrical matrix can be used to map a total of more than 70,000 target-source relationships between branches. For each of these bilateral relations a "Skill-Relatedness" index (*SRij*) is formed, which depicts the relative magnitude of the respective flow of labour between two branches i and j as a measure of their "skill-relatedness". The basic idea here is that comparatively "large" labour flows between two branches are an indication that workers from branch i tend to move to branch j without any problems and can reuse their knowledge or skills from the old branch i quite easily. In this case the pair of branches under consideration can be qualified as cognitively/technologically "close" (or "skill-related").

What is meant by "comparatively large": In addition to their cognitive proximity, other factors are responsible for the extent of job changes between two branches, especially their size, but also their dynamics, wage levels or similar. An observable bilateral labour flow can thus be considered "relatively large" (and only then) if the number of job changes between the two branches is greater than would have been expected taking all the factors mentioned into account. Consequently, the "Skill-Relatedness" index compares the actual number of job changes measured with those that would have occurred if job changes between the two branches (given the characteristics of the branch) had been purely random. This (in the case of random changes) "expected" labour flows thus represents the benchmark for the classification of the observed labour flows. It can be easily calculated based on probability theory (cf. Otto et al., 2014).

Specifically, the "skill-relatedness" indicator as a measure of the cognitive "proximity" between two branches i and j is thus denoted as

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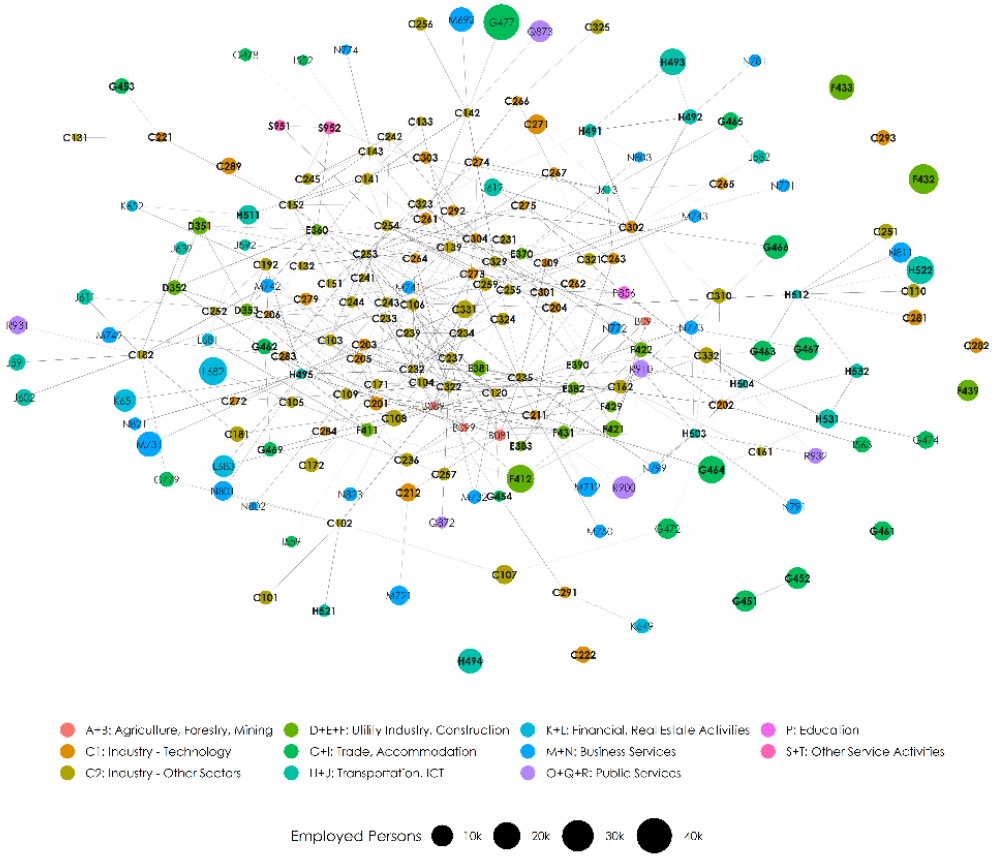
social insurance contributions as of 30 June each year. Information on employees and companies can be linked by means of anonymous personal and company numbers, so that on this basis (also) changes of job of employees can be identified.

Equation *(3)* $SR_{ij} = \frac{F_{ij}}{\hat{F}_{ij}}$,

where F_{ij} denotes the observed job changes between branches i and j, and $\hat{F}_{ij}$ denotes the expected job changes between i and j. If this "skill-relatedness" index is > 1, the actual flows between the two branches are greater than would be expected in the case of purely random job entries and exits, which means that the pair of branches can be regarded as technologically or cognitively "related" or "skill-related". With index values < 1, on the other hand, job changes between the two branches are less frequent than would be expected, and a technological or cognitive relatedness obviously is not high in this case.[27] On the basis of the matrix of these 70,225 indicator values for the 265 branch groups of the NACE classification (level 3) it is now possible to represent the entire network of cognitively or technologically "related" branches and to use it subsequently for the calculation of the embeddedness (see above) as part of the empirical SWOT analysis for the individual branches in each stakeholder region.

5.2 Network of branches

Figure A1: Network of branches (total Vienna metropolitan area).

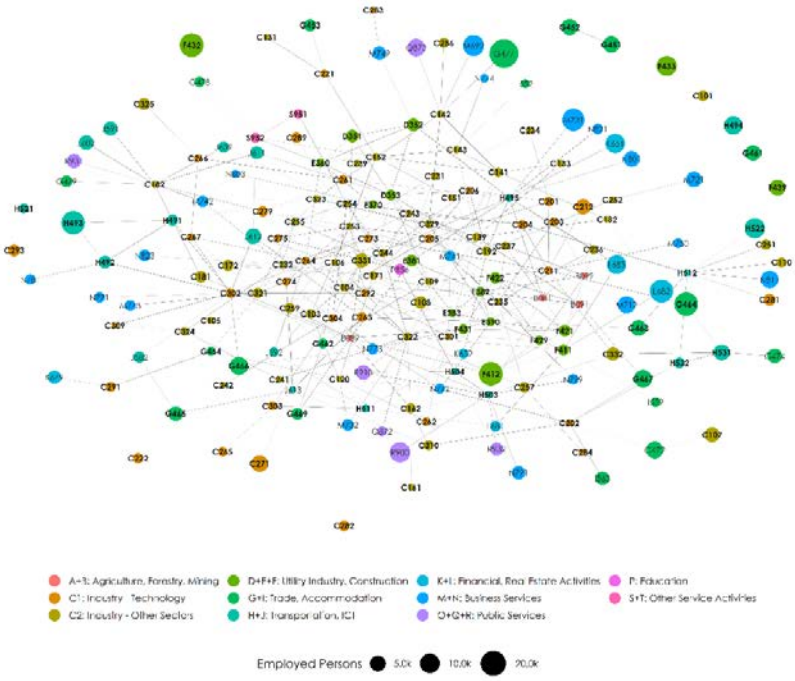


Source: Statistics Austria, network structure based on Neffke et al. (2017B), ESPON MISTA (2020) team calculations. For illustrative purposes, only NACE 3-digit branch groups marking productive activities (in

[27] In the further analysis, a normalized "skill-relatedness" index is used, which assumes values between -1 and +1. Positive values thus indicate cognitive proximity, whereas negative values do not indicate such proximity.

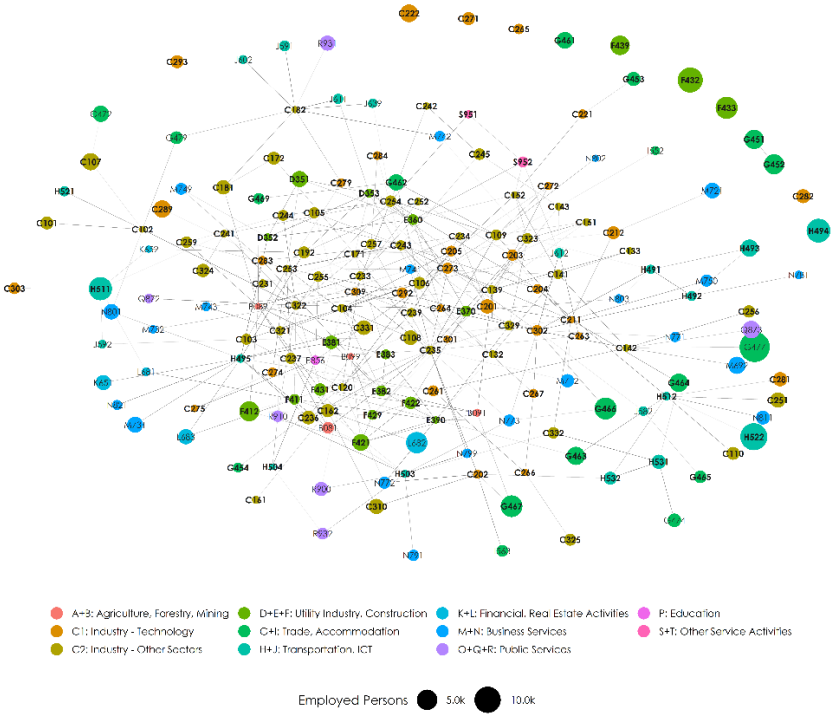
bold) and non-productive activities with strong links to productive activities with at least 100 employees are displayed.

Figure A2: Network of branches (city of Vienna).



Source: Statistics Austria, network structure based on Neffke et al. (2017B), ESPON MISTA (2020) team calculations. For illustrative purposes, only NACE 3-digit branch groups marking productive activities (in bold) and non-productive activities with strong links to productive activities with at least 100 employees are displayed.

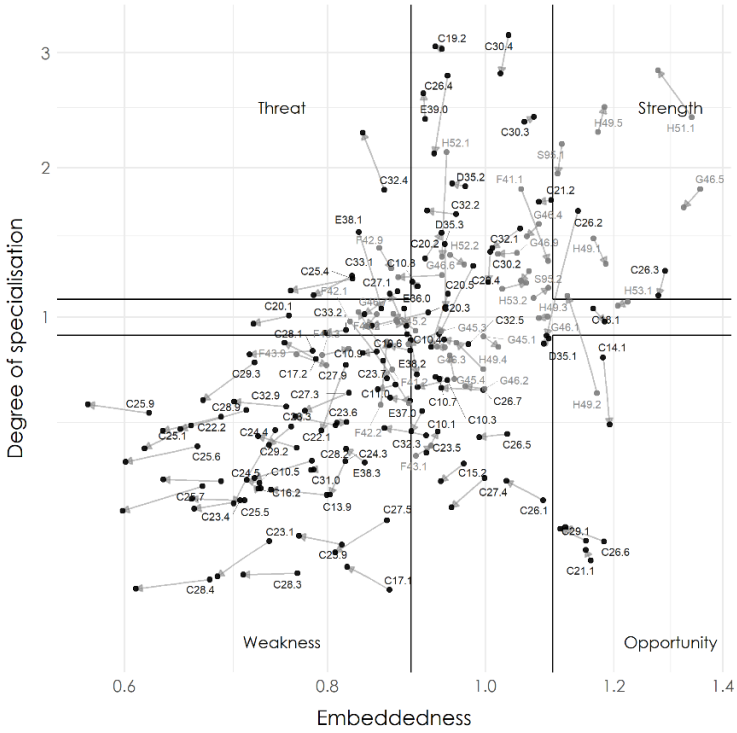
Figure A3: Network of branches (environs).



Source: Statistics Austria, network structure based on Neffke et al. (2017B), ESPON MISTA (2020) team calculations. For illustrative purposes, only NACE 3-digit branch groups marking productive activities (in bold) and non-productive activities with strong links to productive activities with at least 100 employees are displayed.

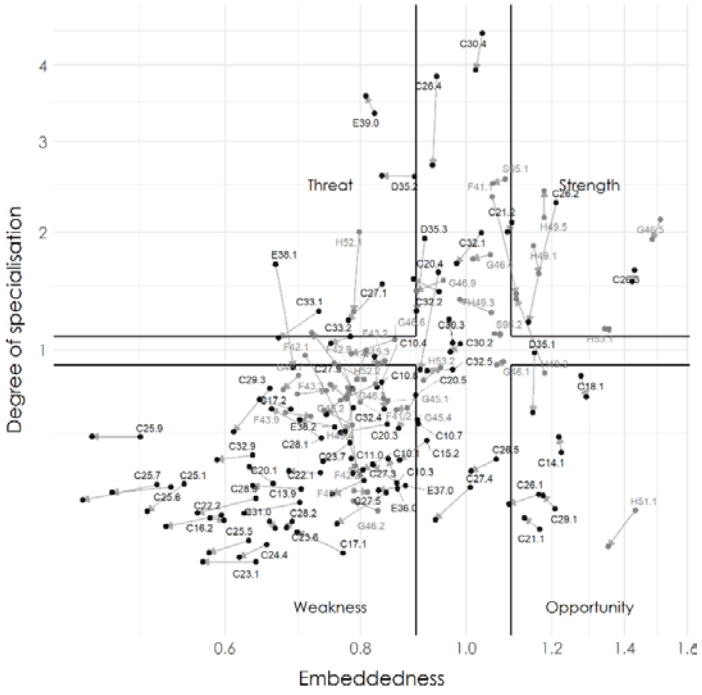
5.3 A dynamic perspective on the SWOT profiles

Figure A4: Dynamic of the SWOT Profile (total Vienna metropolitan area).



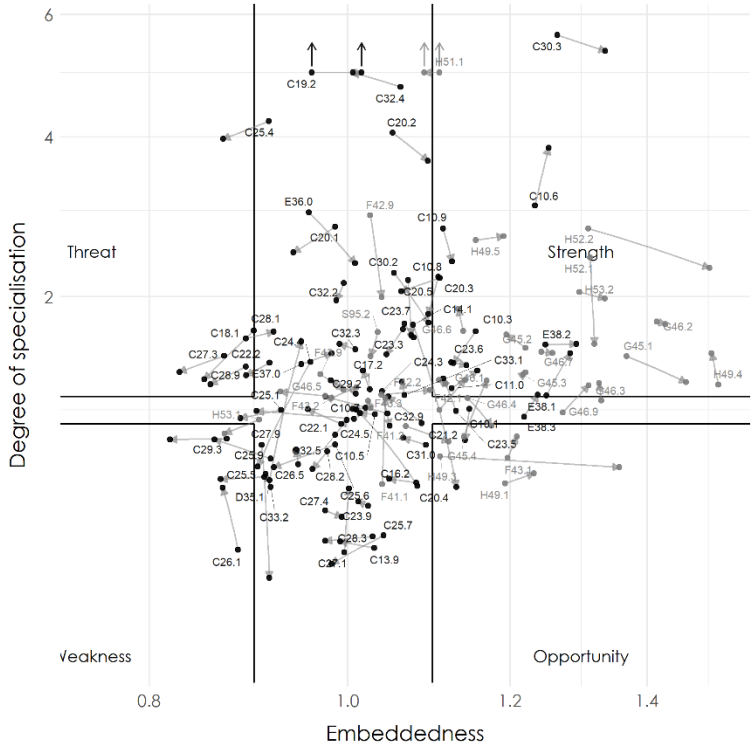
Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Figure A5: Dynamic of the SWOT Profile (city of Vienna).



Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

Figure A6: Dynamic of the SWOT Profile (environs).



Source: Statistics Austria, ESPON MISTA (2020) team calculations. Industry (service) activities in black (grey). For illustrative purposes only branches with at least 100 employees are displayed. For NACE codes and branches see Table A8 in the annex.

5.4 Top 10 Tables for Subregions

Table A1: Top 10 branches in terms of size (2017).

NACE	Name	Empl.	Share in %
Total metropolitan region			
F43.2	Electrical, plumbing and other construction installation activities	25995	1.85
H52.2	Support activities for transportation	21571	1.53
F41.2	Construction of residential and non-residential buildings	21381	1.52
G46.4	Wholesale of household goods	20637	1.47
H49.3	Other passenger land transport	18910	1.34
F43.3	Building completion and finishing	16831	1.20
H49.4	Freight transport by road and removal services	16050	1.14
G46.6	Wholesale of other machinery, equipment and supplies	13981	0.99
G46.7	Other specialised wholesale	13434	0.96
G45.2	Maintenance and repair of motor vehicles	10285	0.73
City of Vienna			
G46.4	Wholesale of household goods	17119	1.71
F43.2	Electrical, plumbing and other construction installation activities	17058	1.70
F41.2	Construction of residential and non-residential buildings	16710	1.67
H49.3	Other passenger land transport	16005	1.60
H52.2	Support activities for transportation	10650	1.06
F43.3	Building completion and finishing	10625	1.06
H49.4	Freight transport by road and removal services	8244	0.82
G46.6	Wholesale of other machinery, equipment and supplies	7859	0.78
G46.7	Other specialised wholesale	7489	0.75
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	6071	0.61
Environs			
H52.2	Support activities for transportation	10921	2.70
F43.2	Electrical, plumbing and other construction installation activities	8937	2.21
H49.4	Freight transport by road and removal services	7806	1.93
H51.1	Passenger air transport	7215	1.78
F43.3	Building completion and finishing	6206	1.53
G46.6	Wholesale of other machinery, equipment and supplies	6122	1.51
G46.7	Other specialised wholesale	5945	1.47
G45.2	Maintenance and repair of motor vehicles	4726	1.17
F41.2	Construction of residential and non-residential buildings	4671	1.16
F43.9	Other specialised construction activities	4324	1.07

Source: Statistics Austria, MISTA team calculations.

Table A2: Top 10 branches in terms of growth (2012-2017).

NACE	Name	Empl.	Growth p.a. in %
Total metropolitan region			
C30.3	Manufacture of air and spacecraft and related machinery	1019	12.88
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2526	12.05
E39.0	Remediation activities and other waste management services	393	11.60
C19.2	Manufacture of refined petroleum products	1236	9.90
H49.2	Freight rail transport	2625	9.85
C26.1	Manufacture of electronic components and boards	959	8.97
C21.1	Manufacture of basic pharmaceutical products	204	8.61
F41.2	Construction of residential and non-residential buildings	21381	8.18
C25.4	Manufacture of weapons and ammunition	609	7.61
H51.1	Passenger air transport	7394	6.45
City of Vienna			
C30.3	Manufacture of air and spacecraft and related machinery	369	16.09
F41.2	Construction of residential and non-residential buildings	16710	12.24
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2490	11.90
F42.2	Construction of utility projects	1477	11.71
E39.0	Remediation activities and other waste management services	382	11.07
C10.8	Manufacture of other food products	2170	10.96
E36.0	Water collection, treatment and supply	172	10.59
C21.1	Manufacture of basic pharmaceutical products	194	9.19
H49.2	Freight rail transport	2323	7.96
H53.2	Other postal and courier activities	1112	7.91
Environs			
C26.1	Manufacture of electronic components and boards	473	21.72
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	1020	17.83
D35.1	Electric power generation, transmission and distribution	2331	16.79
C30.3	Manufacture of air and spacecraft and related machinery	650	11.28
G45.4	Sale, maintenance and repair of motorcycles and related parts and accessories	258	10.73
C20.4	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	207	10.44
F41.1	Development of building projects	383	9.98
C25.4	Manufacture of weapons and ammunition	604	7.43
H51.1	Passenger air transport	7215	7.16
C32.4	Manufacture of games and toys	1166	7.14

Source: Statistics Austria, ESPON MISTA (2020) team calculations. For illustrative purposes only branches with at least 100 employees in 2017 are displayed.

Table A3: Top 10 branches in terms of localisation (location quotient, 2017).

NACE	Name	Empl.	LQ
Total metropolitan region			
C19.2	Manufacture of refined petroleum products	1236	3.06
H51.1	Passenger air transport	7394	2.83
C30.4	Manufacture of military fighting vehicles	140	2.80
E39.0	Remediation activities and other waste management services	393	2.62
H49.5	Transport via pipeline	338	2.50
C30.3	Manufacture of air and spacecraft and related machinery	1019	2.42
C32.4	Manufacture of games and toys	1387	2.28
C26.4	Manufacture of consumer electronics	218	2.11
S95.1	Repair of computers and communication equipment	559	1.95
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2526	1.88
City of Vienna			
C30.4	Manufacture of military fighting vehicles	140	3.94
E39.0	Remediation activities and other waste management services	382	3.58
C26.4	Manufacture of consumer electronics	200	2.72
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2490	2.60
S95.1	Repair of computers and communication equipment	513	2.51
H49.5	Transport via pipeline	234	2.43
C21.2	Manufacture of pharmaceutical preparations	4414	2.00
G46.5	Wholesale of information and communication equipment	3788	1.93
C19.2	Manufacture of refined petroleum products	511	1.78
G46.4	Wholesale of household goods	17119	1.74
Environs			
H51.1	Passenger air transport	7215	9.61
C32.4	Manufacture of games and toys	1166	6.67
C19.2	Manufacture of refined petroleum products	725	6.25
C30.3	Manufacture of air and spacecraft and related machinery	650	5.36
C25.4	Manufacture of weapons and ammunition	604	3.97
C10.6	Manufacture of grain mill products, starches and starch products	838	3.84
C20.2	Manufacture of pesticides and other agrochemical products	117	3.66
H49.5	Transport via pipeline	104	2.68
C20.1	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	1518	2.49
C10.9	Manufacture of prepared animal feeds	492	2.39

Source: Statistics Austria, ESPON MISTA (2020) team calculations. For illustrative purposes only branches with at least 100 employees are displayed.

Table A4: Top 10 branches in terms of embeddedness (2017).

NACE	Name	Empl.	Embed.
Total metropolitan region			
G46.5	Wholesale of information and communication equipment	4691	1.32
C26.3	Manufacture of communication equipment	724	1.28
H51.1	Passenger air transport	7394	1.28
H53.1	Postal activities under universal service obligation	6603	1.21
C14.1	Manufacture of wearing apparel, except fur apparel	689	1.19
H49.1	Passenger rail transport, interurban	1532	1.19
C18.1	Printing and service activities related to printing	3119	1.18
H49.5	Transport via pipeline	338	1.18
C21.1	Manufacture of basic pharmaceutical products	204	1.15
H49.2	Freight rail transport	2625	1.12
City of Vienna			
G46.5	Wholesale of information and communication equipment	3788	1.48
C26.3	Manufacture of communication equipment	706	1.42
H51.1	Passenger air transport	179	1.35
H53.1	Postal activities under universal service obligation	5115	1.34
C18.1	Printing and service activities related to printing	1594	1.29
C26.6	Manufacture of irradiation, electromedical and electrotherapeutic equipment	120	1.22
C14.1	Manufacture of wearing apparel, except fur apparel	482	1.22
H49.5	Transport via pipeline	234	1.18
C29.1	Manufacture of motor vehicles	808	1.18
H49.1	Passenger rail transport, interurban	1335	1.17
Environs			
H49.4	Freight transport by road and removal services	7806	1.51
H52.2	Support activities for transportation	10921	1.50
G45.1	Sale of motor vehicles	4184	1.46
G46.2	Wholesale of agricultural raw materials and live animals	2358	1.43
H49.3	Other passenger land transport	2905	1.36
C30.3	Manufacture of air and spacecraft and related machinery	650	1.34
H53.2	Other postal and courier activities	1007	1.34
G46.3	Wholesale of food, beverages and tobacco	3478	1.33
H52.1	Warehousing and storage	317	1.32
G46.9	Non-specialised wholesale trade	516	1.31

Source: Statistics Austria, ESPON MISTA (2020) team calculations. For illustrative purposes only branches with at least 100 employees are displayed.

Table A5: Top Strengths (2017).

NACE	Name	Empl.
Total metropolitan region		
H51.1	Passenger air transport	7394
H49.5	Transport via pipeline	338
G46.5	Wholesale of information and communication equipment	4691
S95.1	Repair of computers and communication equipment	559
H49.1	Passenger rail transport, interurban	1532
C26.3	Manufacture of communication equipment	724
H49.2	Freight rail transport	2625
City of Vienna		
H49.5	Transport via pipeline	234
G46.5	Wholesale of information and communication equipment	3788
C26.3	Manufacture of communication equipment	706
H49.1	Passenger rail transport, interurban	1335
F41.1	Development of building projects	1251
H53.1	Postal activities under universal service obligation	5115
H49.2	Freight rail transport	2323
C26.2	Manufacture of computers and peripheral equipment	227
Environs		
C30.3	Manufacture of air and spacecraft and related machinery	650
C10.6	Manufacture of grain mill products, starches and starch products	838
H52.2	Support activities for transportation	10921
H49.5	Transport via pipeline	104
C10.9	Manufacture of prepared animal feeds	492
H53.2	Other postal and courier activities	1007
G46.2	Wholesale of agricultural raw materials and live animals	2358
H49.4	Freight transport by road and removal services	7806
G46.6	Wholesale of other machinery, equipment and supplies	6122
H52.1	Warehousing and storage	317

Source: Statistics Austria, ESPON MISTA (2020) team calculations. For illustrative purposes only branches with at least 100 employees are displayed.

Table A6: Top Opportunities (2017).

NACE	Name	Empl.
Total metropolitan region		
C14.1	Manufacture of wearing apparel, except fur apparel	689
C26.6	Manufacture of irradiation, electromedical and electrotherapeutic equipment	135
C29.1	Manufacture of motor vehicles	808
C21.1	Manufacture of basic pharmaceutical products	204
City of Vienna		
C18.1	Printing and service activities related to printing	1594
D35.1	Electric power generation, transmission and distribution	2250
C14.1	Manufacture of wearing apparel, except fur apparel	482
C29.1	Manufacture of motor vehicles	808
C26.6	Manufacture of irradiation, electromedical and electrotherapeutic equipment	120
C21.1	Manufacture of basic pharmaceutical products	194
H51.1	Passenger air transport	179
Environs		
G46.4	Wholesale of household goods	3518
F43.1	Demolition and site preparation	855
C10.1	Processing and preserving of meat and production of meat products	1039
F41.2	Construction of residential and non-residential buildings	4671
H49.3	Other passenger land transport	2905
H49.1	Passenger rail transport, interurban	197
C14.1	Manufacture of wearing apparel, except fur apparel	207
H49.2	Freight rail transport	302

Source: Statistics Austria, ESPON MISTA (2020) team calculations. For illustrative purposes only branches with at least 100 employees are displayed.

Table A7: Top Threats (2017).

NACE	Name	Empl.
Total metropolitan region		
C32.4	Manufacture of games and toys	1387
F42.9	Construction of other civil engineering projects	627
G46.6	Wholesale of other machinery, equipment and supplies	13981
C10.6	Manufacture of grain mill products, starches and starch products	858
C33.1	Repair of fabricated metal products, machinery and equipment	5328
C25.4	Manufacture of weapons and ammunition	609
City of Vienna		
E39.0	Remediation activities and other waste management services	382
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2490
C19.2	Manufacture of refined petroleum products	511
C32.2	Manufacture of musical instruments	303
G46.9	Non-specialised wholesale trade	1567
H52.1	Warehousing and storage	656
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	6071
F41.2	Construction of residential and non-residential buildings	16710
Environs		
C25.4	Manufacture of weapons and ammunition	604
C22.2	Manufacture of plastics products	3172
C27.3	Manufacture of wiring and wiring devices	486
C28.1	Manufacture of general-purpose machinery	1457
C28.9	Manufacture of other special-purpose machinery	2956

Source: Statistics Austria, ESPON MISTA (2020) team calculations. For illustrative purposes only branches with at least 100 employees are displayed.

5.5 Summary table on size and SWOT-profiles of all productive activities

Table A.8: NACE 3-dgit branch groups and SWOT profiles.

NACE	Name	Total Empl.	City	Environs	Total Reg.
C10.1	Processing and preserving of meat and production of meat products	2134	W	O	
C10.2	Processing and preserving of fish, crustaceans and molluscs	1	W		
C10.3	Processing and preserving of fruit and vegetables	753	W	S	
C10.4	Manufacture of vegetable and animal oils and fats	205	W		
C10.5	Manufacture of dairy products	522	W		W
C10.6	Manufacture of grain mill products, starches and starch products	858	W	S	T
C10.7	Manufacture of bakery and farinaceous products	6968			
C10.8	Manufacture of other food products	3844			
C10.9	Manufacture of prepared animal feeds	582	W	S	W
C11.0	Manufacture of beverages	1773	W	S	W
C12.0	Manufacture of tobacco products	28			
C13.1	Preparation and spinning of textile fibres	1	W		W
C13.2	Weaving of textiles	52	W		W
C13.3	Finishing of textiles	65	W		
C13.9	Manufacture of other textiles	472	W		W
C14.1	Manufacture of wearing apparel, except fur apparel	689	O	O	O
C14.2	Manufacture of articles of fur	44			
C14.3	Manufacture of knitted and crocheted apparel	71	W		W
C15.1	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur	64	W		W
C15.2	Manufacture of footwear	137	W	O	
C16.1	Sawmilling and planing of wood	52	W	O	W
C16.2	Manufacture of products of wood, cork, straw and plaiting materials	1883	W		W
C17.1	Manufacture of pulp, paper and paperboard	231	W	O	W
C17.2	Manufacture of articles of paper and paperboard	2275	W		W
C18.1	Printing and service activities related to printing	3119	O		
C18.2	Reproduction of recorded media	24	O		O
C19.1	Manufacture of coke oven products	1			
C19.2	Manufacture of refined petroleum products	1236	T		
C20.1	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms	2044	W		
C20.2	Manufacture of pesticides and other agrochemical products	169	W		
C20.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	846	W		
C20.4	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	651			
C20.5	Manufacture of other chemical products	739	W		
C20.6	Manufacture of man-made fibres	1	W		W
C21.1	Manufacture of basic pharmaceutical products	204	O	O	O
C21.2	Manufacture of pharmaceutical preparations	5395			
C22.1	Manufacture of rubber products	334	W		W

C22.2	Manufacture of plastics products	4071	W	T	W
C23.1	Manufacture of glass and glass products	207	W		W
C23.2	Manufacture of refractory products	19	W		W
C23.3	Manufacture of clay building materials	124	W		W
C23.4	Manufacture of other porcelain and ceramic products	126	W		W
C23.5	Manufacture of cement, lime and plaster	167	W	S	
C23.6	Manufacture of articles of concrete, cement and plaster	1677	W	S	W
C23.7	Cutting, shaping and finishing of stone	740	W		W
C23.9	Manufacture of abrasive products and non-metallic mineral products n.e.c.	174	W		W
C24.1	Manufacture of basic iron and steel and of ferro-alloys	32	W	O	W
C24.2	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	24	W		W
C24.3	Manufacture of other products of first processing of steel	284	W		W
C24.4	Manufacture of basic precious and other non-ferrous metals	570	W		W
C24.5	Casting of metals	666	W		W
C25.1	Manufacture of structural metal products	2847	W		W
C25.2	Manufacture of tanks, reservoirs and containers of metal	45	W		W
C25.3	Manufacture of steam generators, except central heating hot water boilers	22	W		W
C25.4	Manufacture of weapons and ammunition	609	W	T	T
C25.5	Forging, pressing, stamping and roll-forming of metal; powder metallurgy	507	W	W	W
C25.6	Treatment and coating of metals; machining	1657	W		W
C25.7	Manufacture of cutlery, tools and general hardware	1301	W		W
C25.9	Manufacture of other fabricated metal products	1516	W	W	W
C26.1	Manufacture of electronic components and boards	959		W	
C26.2	Manufacture of computers and peripheral equipment	237	S		
C26.3	Manufacture of communication equipment	724	S		S
C26.4	Manufacture of consumer electronics	218			
C26.5	Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks	753			
C26.6	Manufacture of irradiation, electromedical and electrotherapeutic equipment	135	O	W	O
C26.7	Manufacture of optical instruments and photographic equipment	244			
C26.8	Manufacture of magnetic and optical media	-			
C27.1	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus	7091	T		
C27.2	Manufacture of batteries and accumulators	51	W		W
C27.3	Manufacture of wiring and wiring devices	713	W	T	W
C27.4	Manufacture of electric lighting equipment	399			
C27.5	Manufacture of domestic appliances	146	W		W
C27.9	Manufacture of other electrical equipment	1174	W		W
C28.1	Manufacture of general-purpose machinery	3292	W	T	W
C28.2	Manufacture of other general-purpose machinery	2513	W		W
C28.3	Manufacture of agricultural and forestry machinery	151	W		W
C28.4	Manufacture of metal forming machinery and machine tools	131	W	W	W
C28.9	Manufacture of other special-purpose machinery	4078	W	T	W

C29.1	Manufacture of motor vehicles	808	O		O
C29.2	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	595	W		W
C29.3	Manufacture of parts and accessories for motor vehicles	2732	W	W	W
C30.1	Building of ships and boats	12	W		
C30.2	Manufacture of railway locomotives and rolling stock	1048			
C30.3	Manufacture of air and spacecraft and related machinery	1019		S	
C30.4	Manufacture of military fighting vehicles	140			
C30.9	Manufacture of transport equipment n.e.c.	38	W		W
C31.0	Manufacture of furniture	2710	W		W
C32.1	Manufacture of jewellery, bijouterie and related articles	1015			
C32.2	Manufacture of musical instruments	457	T		
C32.3	Manufacture of sports goods	448	W		W
C32.4	Manufacture of games and toys	1387	W		T
C32.5	Manufacture of medical and dental instruments and supplies	2455			
C32.9	Manufacturing n.e.c.	417	W		W
C33.1	Repair of fabricated metal products, machinery and equipment	5328			T
C33.2	Installation of industrial machinery and equipment	3210			
D35.1	Electric power generation, transmission and distribution	4581	O		
D35.2	Manufacture of gas; distribution of gaseous fuels through mains	2526	T	O	
D35.3	Steam and air conditioning supply	1122			
E36.0	Water collection, treatment and supply	600	W		
E37.0	Sewerage	668	W		W
E38.1	Waste collection	3051	W	S	
E38.2	Waste treatment and disposal	924	W	S	W
E38.3	Materials recovery	316	W	S	W
E39.0	Remediation activities and other waste management services	393	T	O	
F41.1	Development of building projects	1634	S		
F41.2	Construction of residential and non-residential buildings	21381	T	O	
F42.1	Construction of roads and railways	4257	W	S	W
F42.2	Construction of utility projects	2388	W		W
F42.9	Construction of other civil engineering projects	627			T
F43.1	Demolition and site preparation	1510	W	O	
F43.2	Electrical, plumbing and other construction installation activities	25995			
F43.3	Building completion and finishing	16831	W		W
F43.9	Other specialised construction activities	9782	W		W
G45.1	Sale of motor vehicles	10072	W	S	
G45.2	Maintenance and repair of motor vehicles	10285	W	S	
G45.3	Sale of motor vehicle parts and accessories	3308	W	S	W
G45.4	Sale, maintenance and repair of motorcycles and related parts and accessories	584	W	S	
G46.1	Wholesale on a fee or contract basis	7398		S	
G46.2	Wholesale of agricultural raw materials and live animals	3104	W	S	
G46.3	Wholesale of food, beverages and tobacco	8458	W	S	

G46.4	Wholesale of household goods	20637		O	
G46.5	Wholesale of information and communication equipment	4691	S		S
G46.6	Wholesale of other machinery, equipment and supplies	13981		S	T
G46.7	Other specialised wholesale	13434	W	S	
G46.9	Non-specialised wholesale trade	2083	T	S	
H49.1	Passenger rail transport, interurban	1532	S	O	S
H49.2	Freight rail transport	2625	S	O	S
H49.3	Other passenger land transport	18910		O	
H49.4	Freight transport by road and removal services	16050	W	S	
H49.5	Transport via pipeline	338	S	S	S
H50.1	Sea and coastal passenger water transport	-			
H50.2	Sea and coastal freight water transport	-			
H50.3	Inland passenger water transport	135			
H50.4	Inland freight water transport	39			
H51.1	Passenger air transport	7394	O		S
H51.2	Freight air transport and space transport	82	W	S	
H52.1	Warehousing and storage	973	T	S	
H52.2	Support activities for transportation	21571		S	
H53.1	Postal activities under universal service obligation	6603	S	W	
H53.2	Other postal and courier activities	2119		S	
S95.1	Repair of computers and communication equipment	559		O	S
S95.2	Repair of personal and household goods	1312			

Source: ESPON MISTA (2020) team *calculations; S… Strength, W… Weakness, O… Opportunity, T… Threat; Empty cell indicates no specific SWOT profile in the region.*

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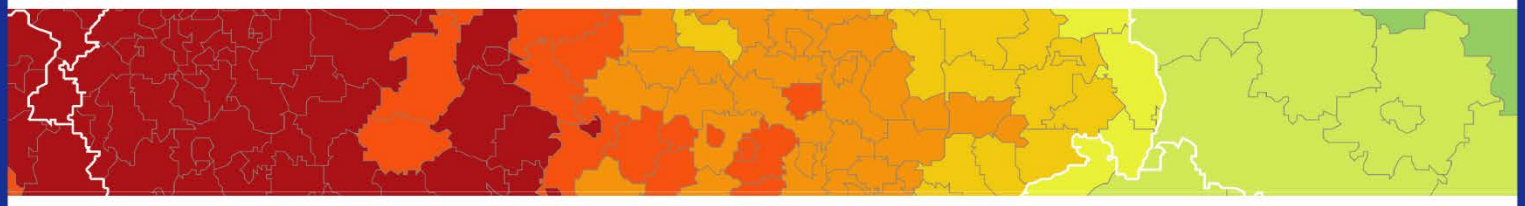

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