

# The Global, Regional and Local Geography of Vienna's Foreign Direct Investment

Research: Ronald Wall

Assignment:

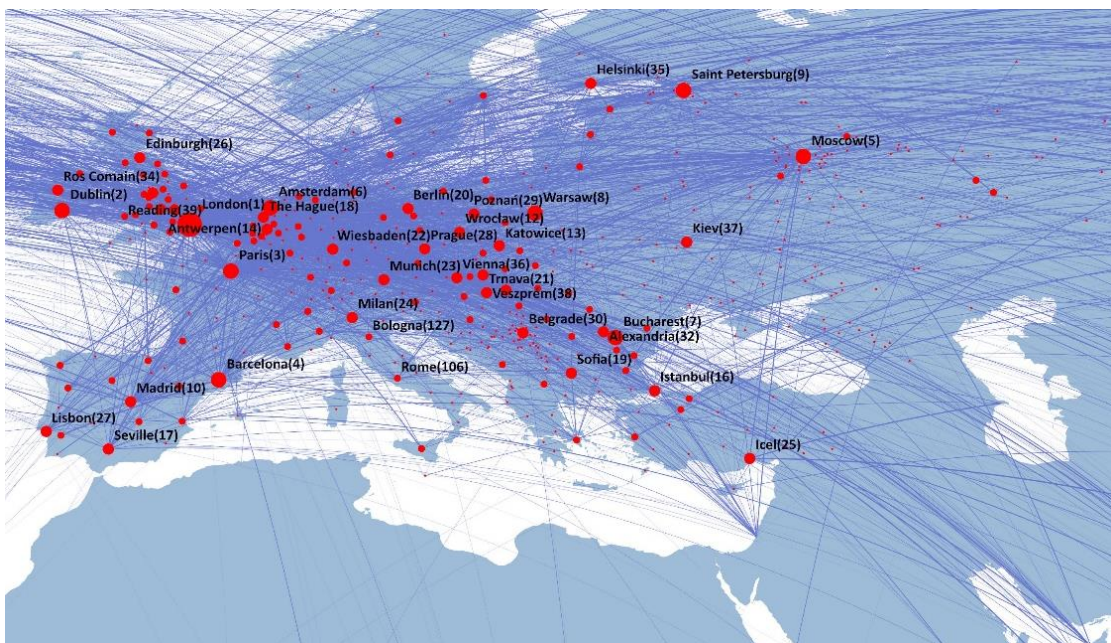
Mag. Alexander Göltz-Morpurgo

Municipal Department 23 – Economic Affairs, Labour and Statistics

Economic Affairs Section

Meiereistraße 7, Sektor B

1020 Vienna



Date: 27-05-2019

<b>Contents</b>	<b>Page</b>
1.1. Introduction	3
1.2. Assignment and methodology	4
2. Results:	5
2.1. Strength results	5
2.1.1. Global scale	5
2.1.2. European scale	8
2.1.3. Austria-Vienna scale	10
2.1.4. Investment sources into Vienna.	12
2.2. Competition results	15
2.2.1. Methodology	15
2.2.2. Radar diagram of competitors and their FDI sectors	16
2.2.3. Vienna's competitors at the global scale	17
2.2.4. Vienna's competitors at the European scale (NUTS-2)	18
2.2.5. Top 5 European competitors of Vienna and their investor source cities	20
2.3. Sectoral specialization and diversification results	22
3. Conclusions and recommendations	24

## 1.1. Introduction

Foreign direct investment (FDI) is fundamental to rapidly evolving international economic integration (globalisation). It enables steady and extensive links between economies. Under the right policy conditions (OECD, 2008)<sup>1</sup>, FDI can support local enterprise development and promote the competitive position of both host (destination) and home (source) economy. Furthermore, FDI reassures the transfer of knowledge and technology between economies. It also creates the opportunity for host economies to promote their products and services more widely in international markets. Additionally, FDI has a positive effect on international trade development, and is an important source of capital for a range of home and host economies. The significant growth of FDI over the past years, and its international universality reveal an increase in the monetary size and number of FDI transactions, plus a rising diversification of enterprises across economies and sectors (OECD, 2008).

The geographical distribution of FDI is determined by the value-added activities of MNEs, because the locational advantage of different places influences the location decisions of the firm (Dunning, 1998)<sup>2</sup>. In turn, this affects the development of human resources, employment, technological progress and trade. FDI is considered an important engine for economic growth in recipient countries (Bhandari, 2007) and is said to be more beneficial than other forms of capital such as loans or stock. Although strictly speaking FDI only concerns capital movements, it also serves as a facilitator of employment, higher productivity, entrepreneurial competition and technology spillovers and facilitate higher economic growth and development (Asiedu, 2002<sup>3</sup>).

Almost all FDI research is carried out at the country level. Unique to this study is that it explores FDI flows from source cities to destination cities. This is important because the world is urbanizing fast, and the role of cities in the world economy are increasingly important (Alderson and Beckfield 2004<sup>4</sup>, Wall 2016<sup>5</sup>). Furthermore, drawing conclusions from country level analysis is too general to advise cities (Fu 2016)<sup>6</sup>. This is because almost all FDI flows to cities, and the distribution to the cities in a country is very uneven. Therefore, if we aim to achieve urban sustainability, it makes sense to explore FDI to cities, to reveal regional differences and hereby address specific territorial disparities.

The FDI data used in this report has been sourced from the Financial Times' fDi Markets database and concerns 'greenfield' investments, whereby parent companies start up entirely new ventures in foreign countries by developing new operational facilities from the ground up. The reason for focusing on greenfield FDI (and excluding mergers and acquisitions) in this report, is not only that greenfield project investment is a strong indicator of the attractiveness of a region or city, but also because the data can uniquely be aggregated at sectoral, country and city levels. The data covers the period 2003-2018 and had to be completed for missing values and cross-matched with other databases e.g. ORBIS, geocoded for geographic coordinates and aggregated to spatial scales e.g. global, world regions, countries and cities. The data covers 11045 unique world cities.

---

<sup>1</sup> OECD Benchmark Definition of Foreign Direct Investment, FOURTH EDITION 2008

<sup>2</sup> Dunning, J. H. (1998). Location and the multinational enterprise: a neglected factor? *Journal of international business studies*, 29(1), 45-66.

<sup>3</sup> Asiedu, E. (2002). On the determinants of foreign direct investment to developing countries: is Africa different? *World development*, 30(1), 107-119.

<sup>4</sup> Alderson, A. S., & Beckfield, J. (2004). Power and position in the world city system. *American Journal of sociology*, 109(4), 811-851.

<sup>5</sup> Wall, R. (2009). *Netscape: cities and global corporate networks* (No. EPS-2009-169-ORG).

<sup>6</sup> Fu, X. (2016). *The Oxford Companion to the Economics of China* edited by Shenggen Fan, Ravi Kanbur, Shang-Jin Wei, and Xiaobo Zhang Oxford University Press, 2014. *World Trade Review*, 15(4), 709-711.

Because the FDI was geocoded for cities, the scale was too fine grained for comprehensive analysis and the municipal delimitations too arbitrary. Therefore the FDI data was recoded to NUTS-3 and NUTS-2 units. These are geographic units called NUTS (Nomenclature of Territorial Units for Statistics) that the European Union uses for more standardized referencing of the subdivisions of countries for statistical purposes. NUTS-3 proved to still be too fine grained, so NUTS-2 was chosen as the best unit to represent urban regions of cities.

## **1.2. Assignment and methodology**

The agreed assignment with the City of Vienna, was to do a study on the competitive strength of Vienna within the global network of FDI between global cities, and at different geographic scales. The study has been divided into three main areas i.e. Vienna's strength in attracting FDI (inward investment) relative to other cities; who its competitors are based on value, sectors and source of investment, and Vienna's sectoral specialization compared to its competitors.

### *Strength:*

This step explores the total size of FDI attracted by Vienna in terms of million Euros and how this is ranked in comparison to all other world cities. It also shows how Vienna ranks in terms of exponential growth rate of FDI over the period 2003 to 2018, compared to all other cities. The results depict GIS maps at the global, European and Austrian scale, tables and graphs. To do this, network analysis techniques have been utilized, using UCINET software. ArcGIS has been used to map the data. The above has been carried out at the NUTS-2 level.

### *Competitors:*

In this step, a network analysis technique called the "Manhattan Distance", has been utilized (UCINET software). This is explained in more detail further on. Based on this, the top FDI competitors of Vienna have been revealed. The calculation considers types of sectors, their monetary size, as well as source and destination of the FDI.

Next, Vienna and its top competitors have been mapped in ArcGIS, but also the source cities that invest in Vienna and its competitors. These were mapped at global, European and Austrian scales. Also, radar diagrams have been made for Vienna and its competitors to show which sectors they compete in.

### *Specialization:*

Lastly, based on Vienna and its regional clusters of competitors, as well as the exponential growth rates of FDI in these sectors, the top 10 recommended sectors for Vienna to specialize have been revealed, within a set of 39 unique sectors. This step used cluster analysis techniques.

The structure of the rest of the report is as follows: The first chapter provides an analysis of the strength of FDI attraction to Vienna and this city's position in the global network of foreign investments. The second chapter highlights the FDI competitors of Vienna based on network analysis techniques. Chapter three reviews how Vienna can specialize its FDI sectors. The last chapter offers conclusions.

## 2. Results:

### 2.1. Strength results

#### 2.1.1. Global scale

In this first part of the analysis the position of Vienna within international FDI networks is explored. This is carried out in three separate studies. The first studies Vienna's relative position within the global network of FDI between 6498 cities worldwide. It means what is Vienna's position in terms of inward investments when compared to inward investments of all other global cities. The second investigates Vienna's position within the European network of FDI. This means its inward investment strength when compared to only the inward FDI strengths of all other European cities. Thirdly, the FDI flows only to Vienna are explored.

The first GIS map (Figure 1) reveals the flow of FDI between 6498 global cities, over the period 2003 - 2018. The data unit is FDI in million \$. The purple lines represent individual investment linkages between pairs of cities e.g. the total investment between London and Johannesburg, or Moscow and Vienna. The thicker the line the more investment that took place between a city pair. The map only represents the top 10 000 investment linkages between global cities, because if all 200 000 linkages were represented in the map, it would be covered entirely with purple lines. However, showing the top 10 000 linkages reveals the backbone of the global economy.

It is evident that most flows are between cities in the Northern Hemisphere, particularly between North America and Europe, Europe and Pacific Asia, and North America and Pacific Asia. Only a few cities in the Southern Hemisphere are connected to the global investment backbone e.g. Sao Paulo (14th position), Jakarta (31st position), Johannesburg (69th position) and Santiago (90th position).

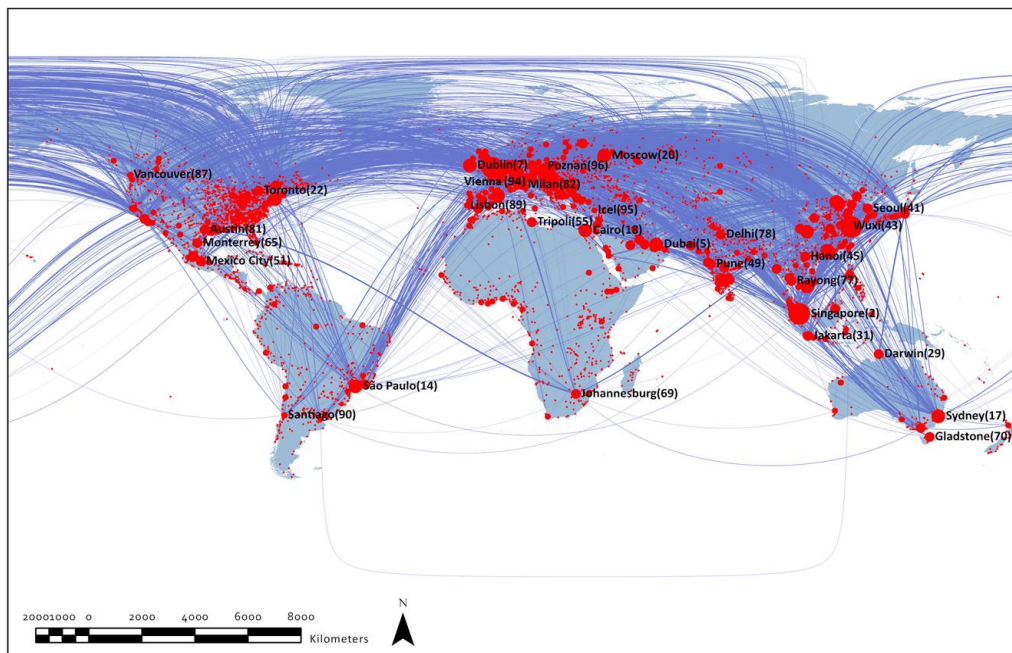


Figure 1: The global FDI network. Purple lines = FDI linkages. Red dots = aggregate FDI.

In the map, the red dots represent the total FDI (inward investment) received by a city over the period 2003 – 2018. The larger the red dot, the more investment it received. For instance, in Australia we see that Sydney is represented by the biggest red dot, as it received the most FDI over that period. The map therefore represents the inward investment of all 6498 cities worldwide. For instance, in Africa the inward FDI of all cities are represented in the map, even though not all the purple linkages are shown.

There are three major FDI hotspots in the world. These are the east coast of North America, Europe (particularly West Europe), and Pacific Asia. Other secondary hotspots are the east coast of Australia, the region of India, the region of Sao Paulo and the Middle East.

Clearly, Vienna falls within one of the richest FDI regions of the world, which is interesting because of the powerful attractiveness of the European region, but also means that it has many proximate competitors. Interesting is that Vienna holds the 94th inward investment position, out of 6498 world cities, which is extremely good.

In the next map (Figure 2), we still observe the position of cities in the global network of FDI but zoom in into the European region. This allows us in more detail to see how Vienna (94th) ranks in comparison to other European cities. Firstly, it is seen that over the period 2003 – 2018 the major regions of FDI concentration are the UK, North West Europe and the East European belt (e.g. Vienna, Prague and Berlin). Remembering that this analysis compares global cities, we see that the most powerful attractor of FDI is London (3rd in the world), followed by Dublin (7th), Paris (11th), Barcelona (19th), Moscow (20th) etc. The table (Figure 3), which represents the top 100 FDI cities, shows this more clearly - in which we see that Amsterdam holds the 28th position, Bucharest the 33rd position, Warsaw the 35th position, and Saint Petersburg the 37th position etc.

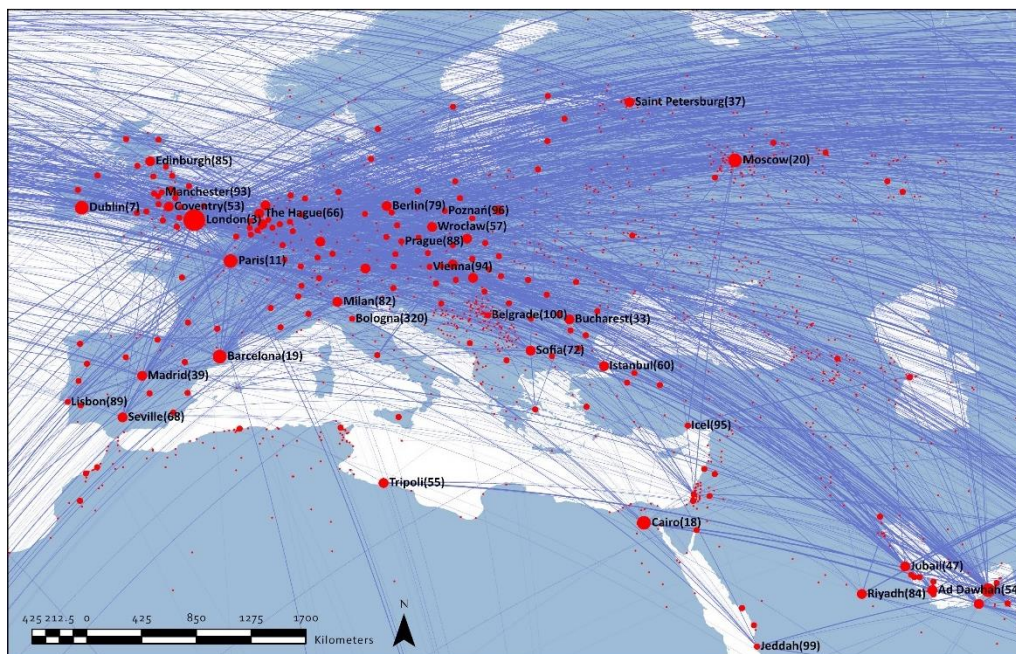


Figure 2: The global FDI network (Zoom-in Europe).

It is also clear in this table (ranked by FDI in million \$) that the major FDI region of the world is Asia, with Shanghai holding the 1st position, followed by Singapore 2nd, Beijing 4th, Hong Kong 6th, Bangalore 9th and Guangzhou 10th etc. In fact, the Asian region holds 43 of the top 100 FDI destinations, and 31 of the top 50 destinations. Clearly, Chinese cities hold the lions share in this, claiming 12 of the top 50 positions. The second most prominent region for FDI is Europe, holding 33 West European and east European top FDI cities. We can therefore say that Vienna (94th) falls in the second most powerful FDI region of the world, which is an advantage, but also a disadvantage considering the number of local competitors.

Rank	NUTS2 Name	NUTS2 Major City	World Region	Country	FDI (million \$)
1	0	Shanghai	Asia and Pacific	China	225532.67
2	0	Singapore	Asia and Pacific	Singapore	191452.47
3	Inner London - East	London	West Europe	United Kingdom	138703.96
4	0	Beijing	Asia and Pacific	China	104397.11
5	0	Dubai	Middle East	UAE	96487.89
6	0	Hong Kong	Asia and Pacific	Hong Kong	87095.64
7	Southern and Eastern	Dublin	West Europe	Ireland	68788.48
8	0	New York	North America	United States	66272.00
9	0	Bangalore	Asia and Pacific	India	61013.10
10	0	Guangzhou	Asia and Pacific	China	60210.60
11	Île de France	Paris	West Europe	France	55875.10
12	0	Ho Chi Minh City	Asia and Pacific	Vietnam	54134.48
13	0	Tianjin	Asia and Pacific	China	54036.63
14	0	São Paulo	Latin America	Brazil	54019.58
15	0	Suzhou	Asia and Pacific	China	47700.88
16	0	Chongqing	Asia and Pacific	China	47409.33
17	0	Sydney	Asia and Pacific	Australia	47177.01
18	0	Cairo	Africa	Egypt	46979.01
19	Cataluña	Barcelona	West Europe	Spain	46742.41
20	0	Moscow	Rest of Europe	Russia	45031.09
21	0	Al Jubail	Middle East	Saudi Arabia	40986.18
22	0	Toronto	North America	Canada	40618.27
23	0	Nanjing	Asia and Pacific	China	38457.42
24	0	Madras	Asia and Pacific	India	37849.43
25	0	Shenzhen	Asia and Pacific	China	37662.43
26	0	Kuala Lumpur	Asia and Pacific	Malaysia	35541.85
27	0	Abu Dhabi	Middle East	UAE	34985.66
28	Noord-Holland	Amsterdam	West Europe	Netherlands	33585.38
29	0	Darwin	Asia and Pacific	Australia	33476.16
30	0	Melbourne	Asia and Pacific	Australia	33322.02
31	0	Jakarta	Asia and Pacific	Indonesia	32858.40
32	0	Manila	Asia and Pacific	Philippines	32761.28
33	Bucuresti - Ilfov	Bucharest	Rest of Europe	Romania	32621.76
34	0	Bombay	Asia and Pacific	India	32255.47
35	Mazowieckie	Warsaw	Rest of Europe	Poland	32118.04
36	0	Tokyo	Asia and Pacific	Japan	31693.99
37	0	Saint Petersburg	Rest of Europe	Russia	30378.42
38	0	Chengdu	Asia and Pacific	China	29994.13
39	Comunidad de Madrid	Madrid	West Europe	Spain	29793.05
40	0	Hankou	Asia and Pacific	China	28789.31
41	0	Seoul	Asia and Pacific	South Korea	27849.05
42	0	Hyderabad	Asia and Pacific	India	26960.62
43	0	Wuxi	Asia and Pacific	China	26849.08
44	0	Dalian	Asia and Pacific	China	26378.18
45	0	Hanoi	Asia and Pacific	Vietnam	26350.24
46	0	Los Angeles	North America	United States	26302.73
47	0	Jubail	Middle East	Saudi Arabia	25632.40
48	0	Shenyang	Asia and Pacific	China	25400.74
49	0	Pune	Asia and Pacific	India	25284.29
50	0	Xi'an	Asia and Pacific	China	24819.69

Figure 3a (part A): The top 100 global FDI destinations (2003 to 2018)

51	0	Mexico City	Latin America	Mexico	24460.76
52	0	Rio de Janeiro	Latin America	Brazil	23977.82
53	West Midlands	Coventry	West Europe	United Kingdom	23604.57
54	0	Ad Dawhah	Middle East	Qatar	23313.87
55	0	Tripoli	Africa	Libya	22627.10
56	0	Bangkok	Asia and Pacific	Thailand	22397.18
57	Dolnoslaskie	Wrocław	Rest of Europe	Poland	21892.36
58	0	Ningbo	Asia and Pacific	China	21880.00
59	Prov. Antwerpen	Antwerpen	West Europe	Belgium	21600.16
60	Istanbul	Istanbul	Rest of Europe	Turkey	21283.04
61	0	Montréal	North America	Canada	20778.52
62	Közép-Magyarország	Budapest	Rest of Europe	Hungary	20732.54
63	0	Qingdao	Asia and Pacific	China	20515.13
64	Slaskie	Katowice	Rest of Europe	Poland	20503.93
65	0	Monterrey	Latin America	Mexico	20385.42
66	Zuid-Holland	The Hague	West Europe	Netherlands	19918.42
67	0	Karachi	Asia and Pacific	Pakistan	19601.14
68	Andalucía	Seville	West Europe	Spain	19579.26
69	0	Johannesburg	Africa	South Africa	19253.78
70	0	Gladstone	Asia and Pacific	Australia	19227.77
71	0	Rangoon (Yangon)	Asia and Pacific	Myanmar (Burma)	19180.08
72	Югозападен	Sofia	Rest of Europe	Bulgaria	19142.28
73	Darmstadt	Wiesbaden	West Europe	Germany	19072.03
74	0	Westlake (LA)	North America	United States	18500.00
75	Oberbayern	Munich	West Europe	Germany	18368.26
76	0	North Kalimantan	Asia and Pacific	Indonesia	17800.00
77	0	Rayong	Asia and Pacific	Thailand	17792.11
78	0	Delhi	Asia and Pacific	India	17640.04
79	Berlin	Berlin	West Europe	Germany	17284.83
80	Západné Slovensko	Trnava	Rest of Europe	Slovakia	17245.16
81	0	Austin	North America	United States	17166.50
82	Lombardia	Milan	West Europe	Italy	17104.28
83	0	Houston	North America	United States	17042.10
84	0	Riyadh	Middle East	Saudi Arabia	17039.93
85	Eastern Scotland	Edinburgh	West Europe	United Kingdom	16497.34
86	0	Buenos Aires	Latin America	Argentina	16224.23
87	0	Vancouver	North America	Canada	15690.36
88	Praha	Prague	Rest of Europe	Czech Republic	15570.23
89	Área Metropolitana de Lisboa	Lisbon	West Europe	Portugal	14985.70
90	0	Santiago	Latin America	Chile	14856.35
91	0	Xiamen	Asia and Pacific	China	14656.98
92	0	Kunshan	Asia and Pacific	China	14366.55
93	Greater Manchester	Manchester	West Europe	United Kingdom	14315.46
94	Wien	Vienna	West Europe	Austria	14298.25
95	Adana, Mersin	İcel	Rest of Europe	Turkey	14287.15
96	Wielkopolskie	Poznań	Rest of Europe	Poland	13863.24
97	0	Hangzhou	Asia and Pacific	China	13817.89
98	0	Suhar	Middle East	Oman	13815.66
99	0	Jeddah	Middle East	Saudi Arabia	13751.17
100	0	Belgrade	Rest of Europe	Serbia	13696.79
6498					3453238.86

Figure 3a (part B): The top 100 global FDI destinations (2003 – 2018)



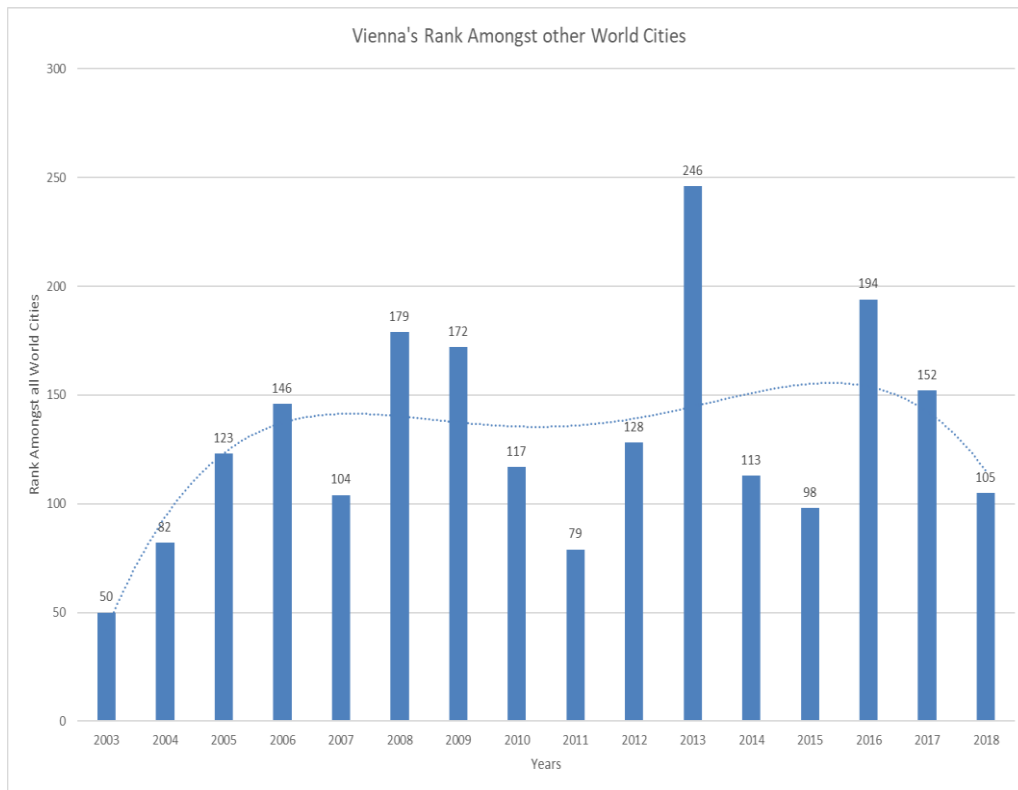


Figure 3b Vienna's rank amongst other world cities.

In Figure 3b we see the change of FDI attraction rank of Vienna, compared to all other world cities. The lowest points are when it ranked highest (best). Vienna ranked highest in 2003 (50th best FDI attractor on the world). From 2003 to 2009, it dropped in world rankings. It then ranked higher again in the 2010 – 2012 period, reaching 79th in 2011. Between 2012 and 2016 Vienna's ranks were more sporadic and the overall trend line shows it worsened. Since 2016 till 2018 we see by the trend line that FDI into Vienna has improved again, relative to all other world cities.

### 2.1.2. European scale

In this next part of the FDI strength analysis, we only focus on FDI from the world to European cities (Figure 4). Therefore, it can be expected that the rank position of Vienna and other European cities will be different to that of the previous global FDI network analysis. It is clear by the purple lines the flows of capital form global source cities to the destination FDI cities in Europe. We see that most FDI comes from North American and Pacific Asian source cities. Hidden is the fact that many European cities also receive a lot of FDI from European source cities. We see that hardly any FDI is sourced from the Southern Hemisphere, which is an interesting prospect for European cities, because the global South is economically developing and rising rapidly. For instance, Africa has the second highest growth rate of inward FDI, after North America. Seeing that European cities compete heavily for FDI from the global North, the South might be an interesting prospect in future. In this map we already see that Vienna holds the 36th FDI position amongst European cities.

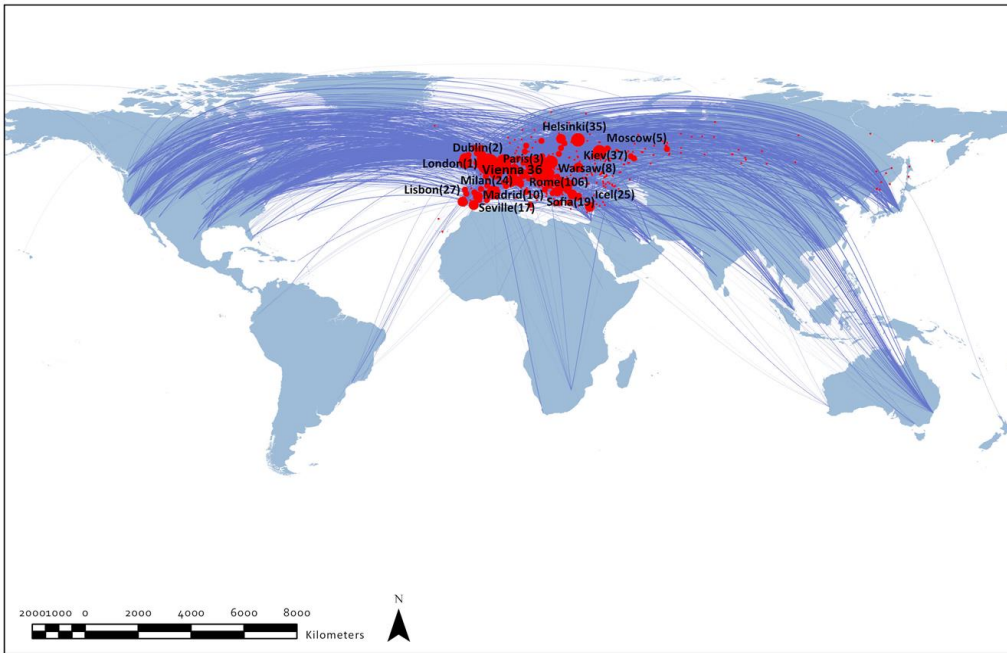


Figure 4: The European FDI network. Purple lines = FDI linkages. Red dots = aggregate FDI.

The following map shows the same data as the previous one but is a zoom-in to more clearly reveal the strength of FDI into European cities (Figure 5). It is evident that London holds the 1st position, followed by Dublin 2nd, Paris 3rd, Barcelona 4th, Moscow 5th, Amsterdam 6th, Bucharest 7th, Warsaw 8th, Saint Petersburg 9th and Madrid 10th, etc. Again, we see that in this network the UK, North West Europe and the East European Belt are the dominant FDI regions for inward FDI.

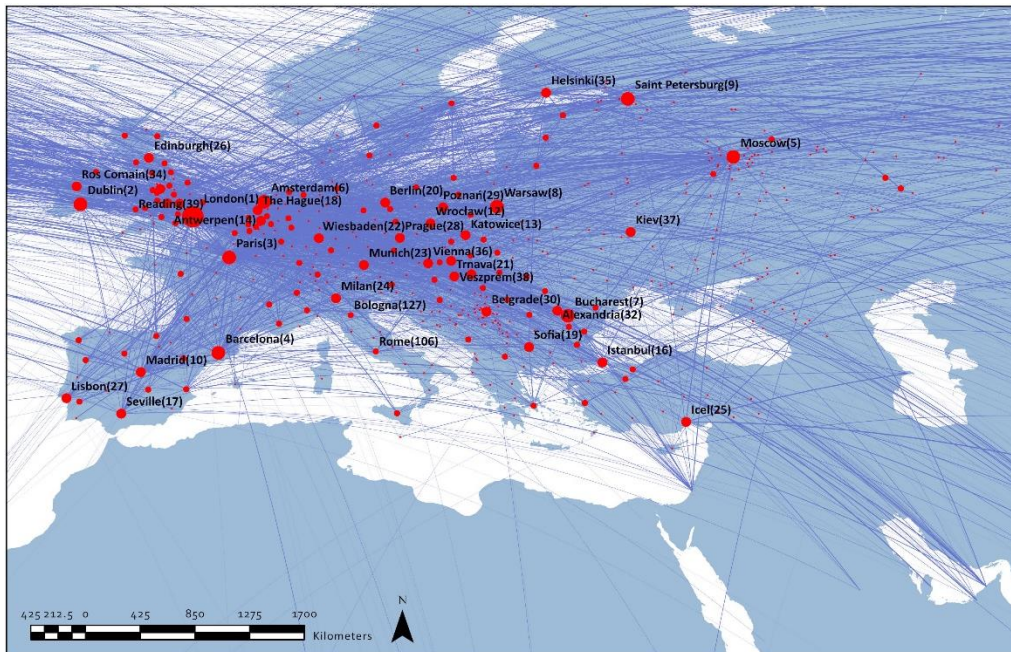


Figure 5: The European FDI network (zoom-in Europe).

Rank	NUTS2 Name	NUTS2 Major City	World Region	Country	FDI (million \$)
1	Inner London - East	London	West Europe	United Kingdom	128460.00
2	Southern and Eastern	Dublin	West Europe	Ireland	62945.61
3	Île de France	Paris	West Europe	France	49706.31
4	Cataluña	Barcelona	West Europe	Spain	43047.21
5	0	Moscow	Rest of Europe	Russia	39446.99
6	Noord-Holland	Amsterdam	West Europe	Netherlands	29343.16
7	Bucuresti - Ilfov	Bucharest	Rest of Europe	Romania	28967.20
8	Mazowieckie	Warsaw	Rest of Europe	Poland	28084.21
9	0	Saint Petersburg	Rest of Europe	Russia	27616.71
10	Comunidad de Madrid	Madrid	West Europe	Spain	25336.63
11	West Midlands	Coventry	West Europe	United Kingdom	21243.30
12	Dolnoslaskie	Wroclaw	Rest of Europe	Poland	19173.78
13	Slaskie	Katowice	Rest of Europe	Poland	18408.17
14	Prov. Antwerpen	Antwerpen	West Europe	Belgium	18299.00
15	Közép-Magyarország	Budapest	Rest of Europe	Hungary	17796.99
16	Istanbul	Istanbul	Rest of Europe	Turkey	17334.95
17	Andalucía	Seville	West Europe	Spain	16942.05
18	Zuid-Holland	The Hague	West Europe	Netherlands	16446.71
19	Югозападен	Sofia	Rest of Europe	Bulgaria	16321.07
20	Berlin	Berlin	West Europe	Germany	15155.52
21	Západné Slovensko	Trnava	Rest of Europe	Slovakia	15047.00
22	Darmstadt	Wiesbaden	West Europe	Germany	14897.39
23	Oberbayern	Munich	West Europe	Germany	14794.74
24	Lombardia	Milan	West Europe	Italy	14013.65
25	Adana, Mersin	Icel	Rest of Europe	Turkey	13803.93
26	Eastern Scotland	Edinburgh	West Europe	United Kingdom	13705.09
27	Área Metropolitana de Lisboa	Lisbon	West Europe	Portugal	13092.51
28	Praha	Prague	Rest of Europe	Czech Republic	11941.82
29	Wielkopolskie	Poznań	Rest of Europe	Poland	11708.11
30	0	Belgrade	Rest of Europe	Serbia	11606.52
31	Greater Manchester	Manchester	West Europe	United Kingdom	11447.11
32	Sud - Muntenia	Alexandria	Rest of Europe	Romania	11317.89
33	Leicestershire, Rutland and Northamptonshire	Leicester	West Europe	United Kingdom	11291.56
34	Border, Midland and Western	Ros Comain	West Europe	Ireland	11282.51
35	Helsinki-Uusimaa	Helsinki	West Europe	Finland	11211.23
36	Wien	Vienna	West Europe	Austria	11029.86
37	0	Kiev	Rest of Europe	Ukraine	10724.30
38	Közép-Dunántúl	Veszprém	Rest of Europe	Hungary	10637.47
39	Berkshire, Buckinghamshire and Oxfordshire	Reading	West Europe	United Kingdom	10230.07
40	Bratislavský kraj	Bratislava	Rest of Europe	Slovakia	10034.35
41	Rhône-Alpes	Lyon	West Europe	France	9947.95
42	Stockholm	Stockholm	West Europe	Sweden	9910.11
43	West Wales and The Valleys	Swansea	West Europe	United Kingdom	9617.39
44	Lietuva	Vilnius	Rest of Europe	Lithuania	9443.45
45	Comunidad Valenciana	Valencia	West Europe	Spain	9412.60
46	Lódzkie	Lódź	Rest of Europe	Poland	9392.21
47	Pomorskie	Gdańsk	Rest of Europe	Poland	9220.46
48	Malopolskie	Kraków	Rest of Europe	Poland	9013.38
49	Northern Ireland	Belfast	West Europe	United Kingdom	8977.54
50	North Eastern Scotland	Aberdeen	West Europe	United Kingdom	8743.73
530					1803322.63

Figure 6a: The European top 50 FDI destination (2003 – 2018)

The map rankings are clearer in the provided table (Figure 6a), which shows the top 50 out of 530 European city destinations. The rankings are based on the total FDI received by these cities in terms of million \$. 28 of the top 50 destinations are in West Europe, and the remainder in East Europe. The most frequent cities are from the United Kingdom. Vienna, as indicated holds the 36th position out of 530 cities, which is very good.

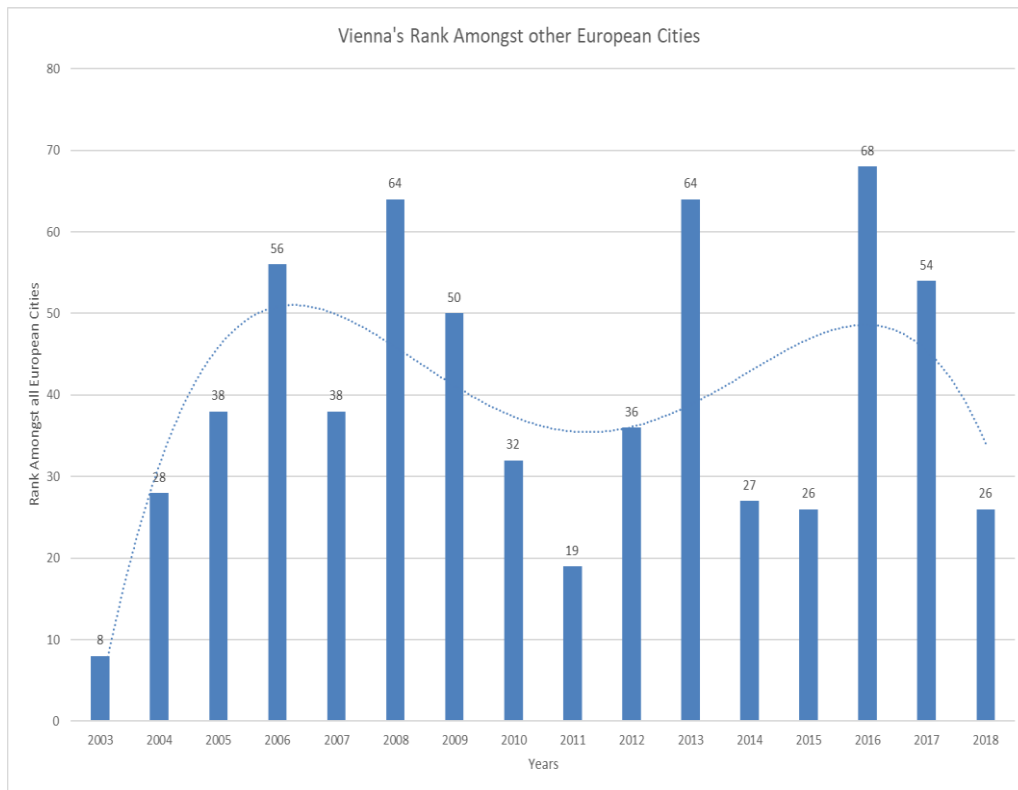


Figure 6b Vienna's rank amongst other European cities.

In Figure 6b we see the rank of Vienna compared to that of all other European cities. In 2003, Vienna was the 8th most attractive FDI destination in Europe. Since 2004 to 2008 there was a period that it lost a lot of its attractiveness for investment, dropping to 64th in 2008. The period 2009 to 2012 showed again a large improvement in its attractiveness, reaching 19th position in Europe in 2011. After that follows a more erratic period between 2013 and 2016, with 2016 being Vienna's worst year. Between 2016 and 2018 Vienna has again improved its rank a lot.

### 2.1.3. Austria-Vienna scale

The third study on FDI strength concerns only world FDI into Austria (Figure 7). Like previous analyses, most FDI comes from north America and Pacific Asian city sources. Very little FDI comes from the global South. Again, much FDI to Vienna originates from European source cities, which will be clear in the next map. As expected, Vienna holds the 1st FDI position in Austria.

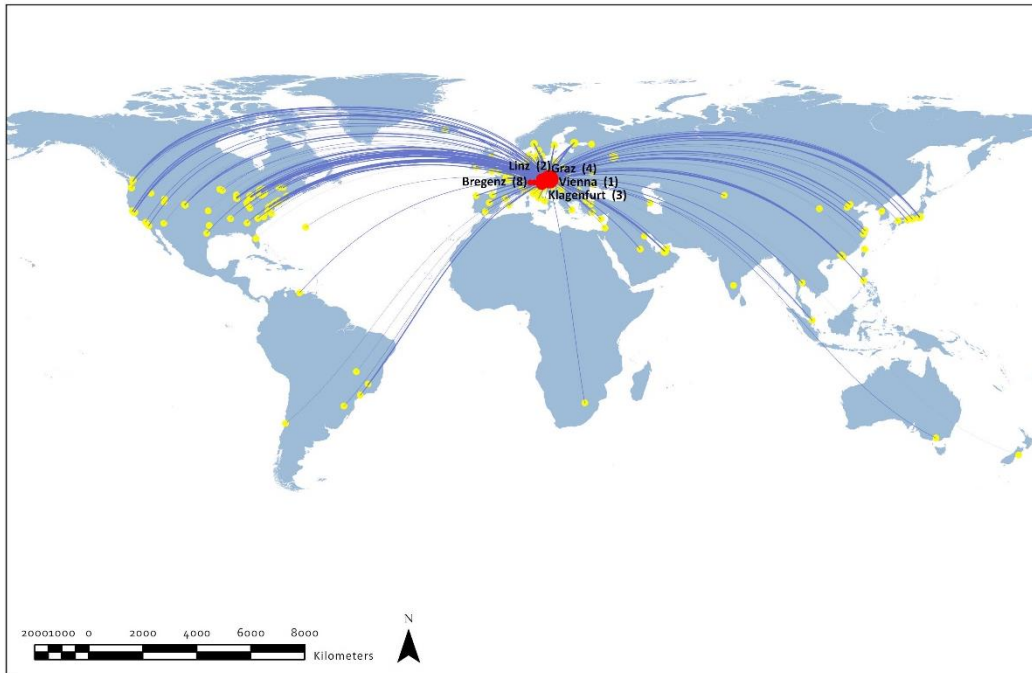


Figure 7: The Austrian FDI network. Purple lines = FDI linkages. Red dots = aggregate FDI.

Clearly much FDI into Austrian cities is sourced from European cities, particularly from German, Swiss and Italian cities (Figure 8). The strongest concentration of non-European sourced FDI comes from North America, as is evident in the map.

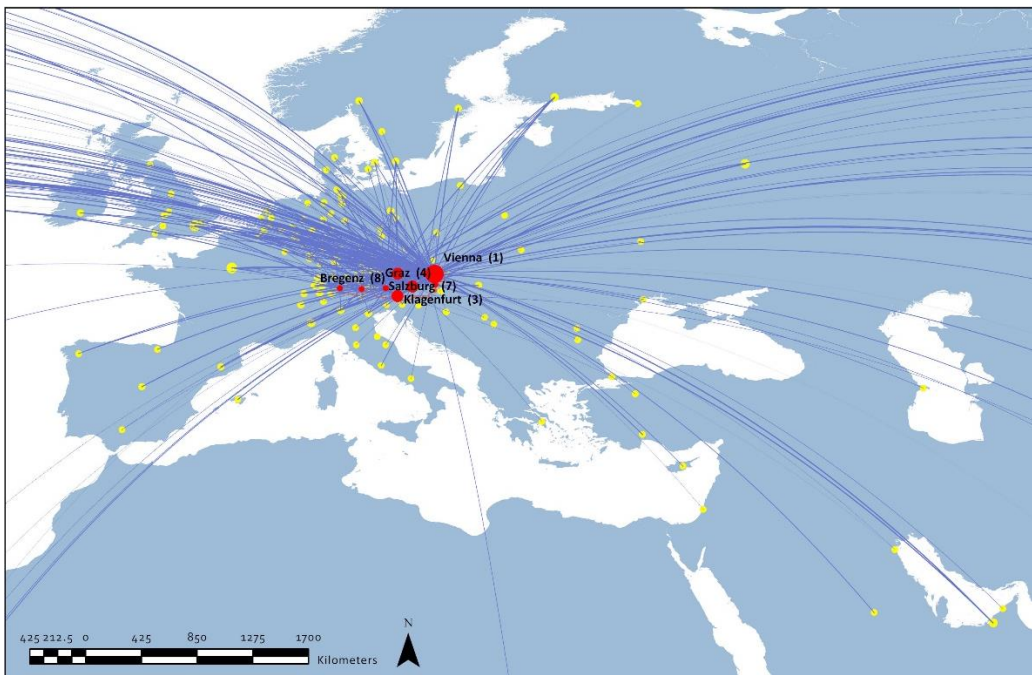


Figure 8: The Austrian FDI network (zoom-in Europe).

In the following map (Figure 9), we see the rank of Austrian cities, in terms of inward FDI. Vienna holds the 1st position, followed by Linz 2<sup>nd</sup>, Klagenfurt 3<sup>rd</sup>, Graz 4<sup>th</sup> etc. This is more clearly shown in the provided table (Figure 10). The big yellow dot is Munich, which is the 2nd strongest FDI source city into Austria.

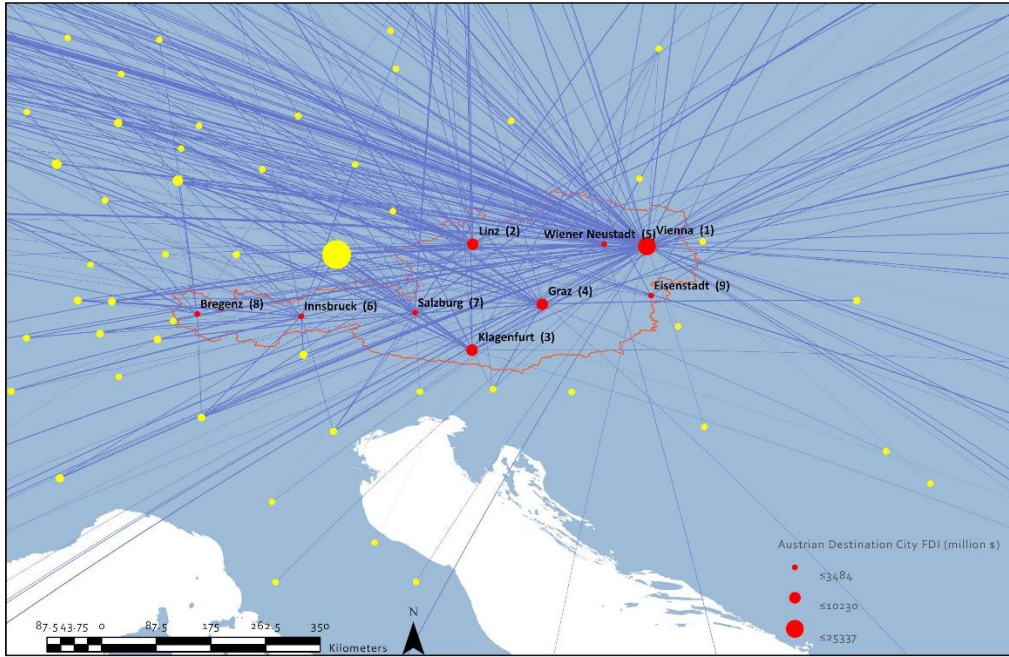


Figure 9: The Austrian FDI network (zoom-in Austria).

Rank	NUTS2 Name	NUTS2 Major City	World Region	Country	FDI (million \$)
1	Wien	Vienna	West Europe	Austria	14298.25
2	Oberösterreich	Linz	West Europe	Austria	4710.33
3	Kärnten	Klagenfurt	West Europe	Austria	4356.76
4	Steiermark	Graz	West Europe	Austria	3872.14
5	Niederösterreich	Wiener Neustadt	West Europe	Austria	2003.32
6	Tirol	Innsbruck	West Europe	Austria	1129.15
7	Salzburg	Salzburg	West Europe	Austria	1099.17
8	Vorarlberg	Bregenz	West Europe	Austria	531.85
9	Burgenland (AT)	Eisenstadt	West Europe	Austria	199.74
9					32200.71

Figure 10: The Austrian top FDI destinations.

#### 2.1.4. Investment sources into Vienna.

In the next table (Figure 11) we see the top 50 out of 180 cities, that are the biggest investors into Vienna during the period 2003 – 2018. This is based on the total FDI received from these cities in terms of millions of \$. The 1st ranked city is Mainz, followed by Munich 2nd, Paris 3rd, Detroit 4th, London 5th, Turin 6th, Bonn 7th, Amsterdam 8th, Abu Dhabi 9th, and Hamburg 10th etc. Most FDI sources are in West Europe, followed by 11 from North America.

The provided graph shows us the top 50 ranked source cities into Vienna, but in which the FDI volumes are graphically represented (Figure 12). It is seen that the most powerful investor cities are Mainz, Munich and Paris, followed by Detroit and London, and then Turin, Bonn and Amsterdam.

In the next results we see the same data as in Figure 12, but now aggregated to country level (Figure 13). In this way we can see which countries the biggest investors into Vienna are. Germany holds the 1st position, followed by the United States 2nd, Italy 3rd, France 4th, The Netherlands 5th, United Kingdom 6th, Switzerland 7th, United Arab Emirates 8th, Spain 9th, and Russia 10th. Germany is by far, and not unexpectedly, the most powerful investor into Vienna.

The next part again aggregates the FDI of Figure 12 and Figure 13 to the regional level (Figure 14). Clearly, Vienna receives most investment by far from West Europe, followed at a distance by North America, then Asia, then Rest of Europe etc.

Rank	NUTS2 Name	NUTS2 Name2	NUTS2 Major City	World Region	Country	FDI (million \$)
1	DEB3AT13	Rheinessen-Pfalz	Mainz	West Europe	Germany	942.67
2	DE21AT13	Oberbayern	Munich	West Europe	Germany	933.70
3	FR10AT13	Île de France	Paris	West Europe	France	909.80
4	USDetroitAT13		Detroit	North America	United States	750.90
5	UK14AT13	Inner London - East	London	West Europe	United Kingdom	631.36
6	ITC1AT13	Piemonte	Turin	West Europe	Italy	542.70
7	DEA2AT13	Köln	Bonn	West Europe	Germany	539.90
8	NL32AT13	Noord-Holland	Amsterdam	West Europe	Netherlands	506.62
9	AEAbuDhabiAT13		Abu Dhabi	Middle East	UAE	426.20
10	DE60AT13	Hamburg	Hamburg	West Europe	Germany	408.20
11	DE71AT13	Darmstadt	Wiesbaden	West Europe	Germany	388.20
12	CH06AT13	Zentralschweiz	Stans	West Europe	Switzerland	299.96
13	RUMoscowAT13		Moscow	Rest of Europe	Russia	290.60
14	ITH1AT13	Provincia Bolzano	Bolzano	West Europe	Italy	245.04
15	NL33AT13	Zuid-Holland	The Hague	West Europe	Netherlands	236.50
16	DEA1AT13	Düsseldorf	Düsseldorf	West Europe	Germany	216.27
17	FI18AT13	Helsinki-Uusimaa	Helsinki	West Europe	Finland	208.00
18	JPTokyoAT13		Tokyo	Asia and Pacific	Japan	207.00
19	USNewYorkAT13		New York	North America	United States	189.30
20	CH01AT13	Région lémanique	Sion	West Europe	Switzerland	168.70
21	ITC4AT13	Lombardia	Milan	West Europe	Italy	154.58
22	DE24AT13	Oberfranken	Coburg	West Europe	Germany	151.70
23	USDenverAT13		Denver	North America	United States	148.40
24	USDDeerfield(IL)AT13		Deerfield (IL)	North America	United States	130.40
25	CAAuroraAT13		Aurora	North America	Canada	129.89
26	SE11AT13	Stockholm	Stockholm	West Europe	Sweden	128.40
27	DEA3AT13	Münster	Münster	West Europe	Germany	124.60
28	DE11AT13	Stuttgart	Stuttgart	West Europe	Germany	124.55
29	CH04AT13	Zürich	Zürich	West Europe	Switzerland	117.40
30	CNShenzhenAT13		Shenzhen	Asia and Pacific	China	117.20
31	ITH3AT13	Veneto	Venice	West Europe	Italy	116.30
32	USRichmondAT13		Richmond	North America	United States	114.10
33	USSanFranciscoAT13		San Francisco	North America	United States	114.10
34	DE30AT13	Berlin	Berlin	West Europe	Germany	112.42
35	ES30AT13	Comunidad de Madrid	Madrid	West Europe	Spain	110.10
36	BE10AT13	Région de Bruxelles-Capitale	Brussels	West Europe	Belgium	94.10
37	USSanJoseAT13		San Jose	North America	United States	79.00
38	ESS3AT13	Illes Balears	Palma	West Europe	Spain	76.10
39	LI00AT13	Liechtenstein	Vaduz	West Europe	Liechtenstein	72.30
40	CH02AT13	Espace Mittelland	Bern	West Europe	Switzerland	72.20
41	TR61AT13	Antalya, Isparta, Burdur	Burdur	Rest of Europe	Turkey	72.00
42	SE22AT13	Sydsverige	Karlskrona	West Europe	Sweden	69.30
43	USBethesda(MD)AT13		Bethesda (MD)	North America	United States	68.63
44	NL31AT13	Utrecht	Utrecht	West Europe	Netherlands	67.70
45	USChicagoAT13		Chicago	North America	United States	67.20
46	DEA5AT13	Arnsberg	Dortmund	West Europe	Germany	65.60
47	USWashingtonAT13		Washington	North America	United States	65.52
48	HKHongKongAT13		Hong Kong	Asia and Pacific	Hong Kong	63.10
49	DE91AT13	Braunschweig	Braunschweig	West Europe	Germany	61.98
50	CAMontréalAT13		Montréal	North America	Canada	60.00

180

11990.49

Figure 11: Vienna's top 50 city sources of FDI (table).

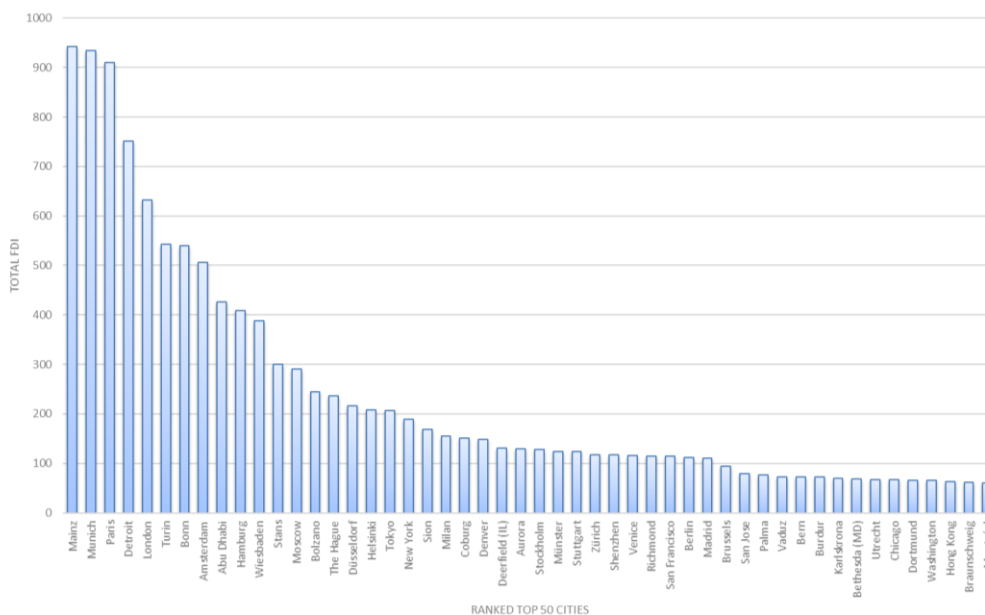


Figure 12: Vienna's top 50 city sources of FDI (graph).

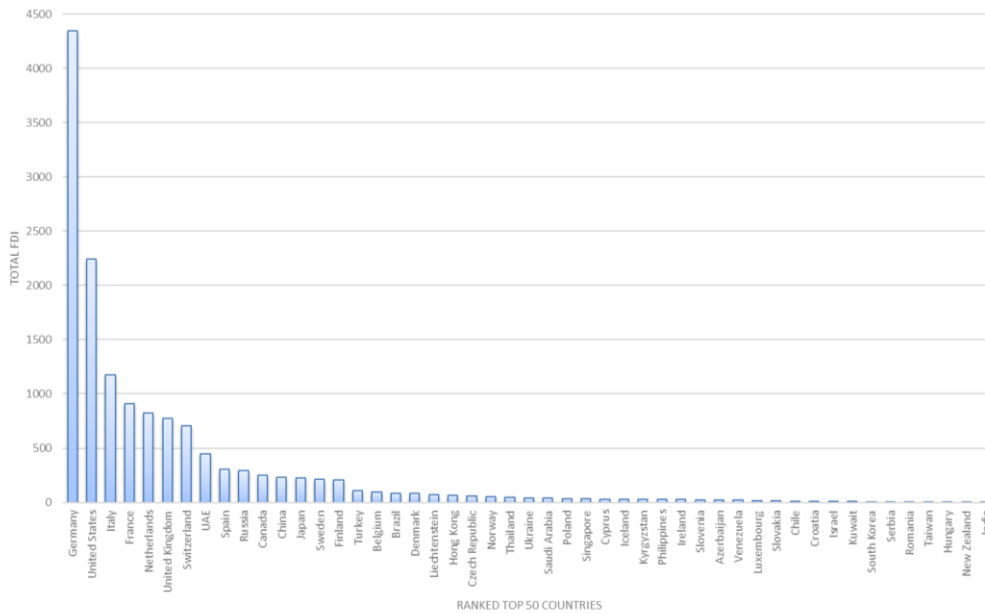


Figure 13: Vienna's top 50 country sources of FDI (graph).

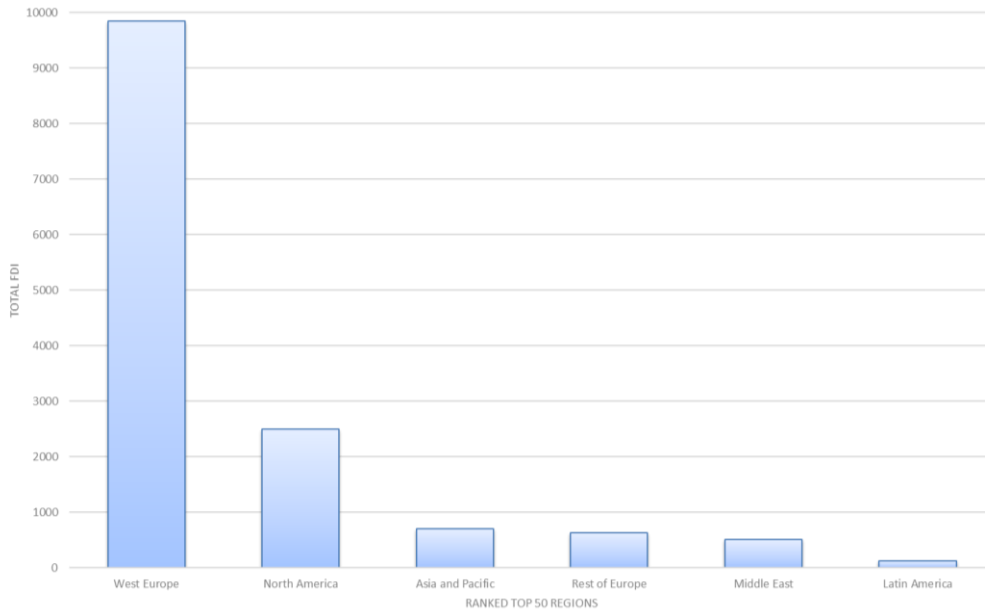


Figure 14: Vienna's top 50 regional sources of FDI (graph).

The following table looks at the exponential growth rates of only major West European cities (Figure 15), in which Vienna holds the 24<sup>th</sup> position in terms of volume of investment. The growth rates have been calculated for the period 2003 to 2018 and 2010 to 2018. Cities like London, Dublin and Paris hold positive growth rates for both periods. However, in the case of Vienna we see that for both periods there has been a negative growth of inward FDI, although the more recent period does better.



Rank	Row Labels	Total FDI	Growth (2003-2018)	Growth (2010-2018)
1	London	154241	7.68%	1.27%
2	Dublin	69896	0.85%	5.52%
3	Paris	57368	7.16%	8.93%
4	Barcelona	48291	-0.23%	3.58%
5	Bucharest	36137	-2.05%	-0.14%
6	Amsterdam	34570	11.13%	11.65%
7	Warsaw	33224	0.58%	5.48%
8	Madrid	31234	-1.65%	3.03%
9	Wrocław	22780	0.38%	1.54%
10	Antwerpen	21939	-0.48%	0.11%
11	Istanbul	21837	-4.73%	-23.25%
12	Budapest	21644	-8.47%	-7.32%
13	Katowice	21004	-3.94%	7.43%
14	Sofia	20669	-8.16%	0.69%
15	Seville	20470	-1.38%	7.35%
16	Hague-Rotterdam	20146	-1.44%	1.11%
17	Prague	19969	-2.90%	-4.11%
18	Munich	18834	-4.40%	4.81%
19	Berlin	17690	-0.72%	9.28%
20	Milan	17323	-0.99%	-0.80%
21	Edinburgh	16831	9.98%	4.56%
22	Lisbon	15805	-4.14%	-3.74%
23	Bratislava	14692	-2.90%	0.42%
24	Vienna	14683	-3.26%	-2.19%
25	Manchester	14564	7.70%	-1.90%
26	Helsinki	14096	9.79%	3.24%
27	Lyon	13398	2.49%	15.96%
28	Stockholm	13097	-0.04%	0.86%
29	Vilnius	12836	1.95%	5.74%
30	Gdańsk	12167	4.34%	-1.44%

Figure 15: Key European exponential growth rates of FDI.

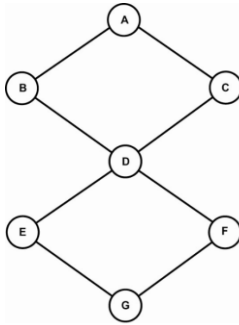
## 2.2. Competition results

### 2.2.1. Methodology.

This chapter explores the competition strength of Vienna in comparison to other world cities, in terms of attracting FDI. All cities are in fierce competition for attracting FDI, but it remains unclear which territories compete for which sectors of investments (Burger et al. 2012). These ‘place wars’ take place at local, regional, national, continental and global scales (Gordon, 1999, Alderson and Beckfield 2004). Most competition studies assume that cities compete equally and ignore to identify the diversity of territorial competition (Phelps and Wu, 2009).

A method to calculate city competition within FDI networks has been developed based on the diagram below. In this diagram, a hypothetical model of 7 cities (A – G) is shown. In the case of City A and City G both receive their investments from different cities. City A gets it from City B and City C, while City G receives investment from City E

and City F. For this reason they are 0% competitors. In the case of City B and City C, we see that they both get their investments from City A and City D. Therefore, they are 100% competitors. In the case of City A and City D, we see that City A only gets its FDI from City B and City C, while City D get it from City B, City C, City E and City F. Therefore they have a 50% market overlap for investment. Besides this property, to be 100% competitors, the cities would also have to attract the same sectors of FDI (e.g. healthcare, energy, financial services and biotech), with the same monetary values for each sector.



#### Parameters

- Cities A and G are linked to different cities = 0% market overlap.
- Cities B and C are linked to the same cities = 100% market overlap.
- Cities A and D are partly linked to the same cities = partial overlap.
- Cities must attract identical sectors of FDI (type and monetary values) to be 100% competitors of each other.

#### 2.2.2. Radar diagram of competitors and their FDI sectors.

Based on the explanation of the Manhattan Distance model the main European competitors of Vienna have been calculated. In the radar diagram (Figure 16) we see that Copenhagen proves to be the 1<sup>st</sup> competitor of Vienna, followed by Geneva 2<sup>nd</sup>, and Stockholm 3<sup>rd</sup>. One of the key reasons of this competition is the similarity of the FDI sector types and monetary magnitude. We see firstly Vienna's sectors ordered from strongest sector to weakest sector i.e. Financial Services, Automotive Components, Communications, Textiles, Transportation, Biotechnology, Hotels & Tourism etc. Below Vienna, we see in red Copenhagen's ranked sectors, then Geneva's sectors, and lastly Stockholm's sectors. If each of the four cities had the same FDI strengths, then there would only be one radar diagram, as each city's sectors would fall perfectly on top of each other. No city is ever in perfect competition with another but have a percentage market overlap. In the case of Copenhagen we see that it is also strong in Financial Services, Communications, Textiles, Transportation, Biotechnology etc. Below that we see Geneva with similar strengths etc.

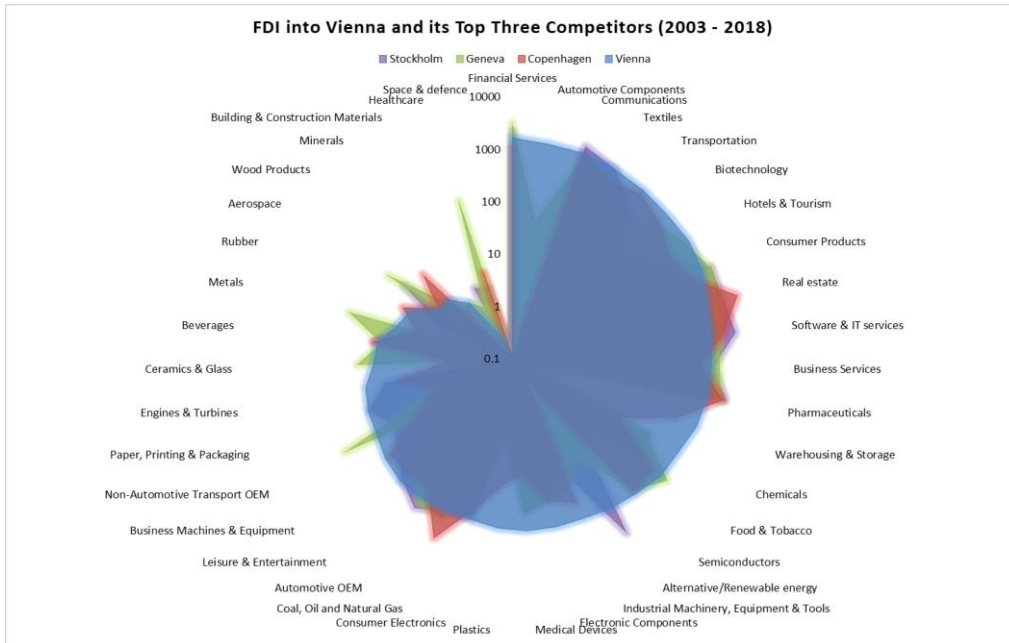


Figure 16: Vienna's top 3 competitors and their FDI sector profile.

### 2.2.3. Vienna's competitors at the global scale.

In this map we see the top 20 global competitors of Vienna based on the calculated Competition Index (Figure 17). See also the supporting table (Figure 18) for Vienna's top 30 list of competitors. These are Copenhagen, Chicago, Bogota, Geneva, Taipei, Stockholm, Luxembourg, Brussels, Atlanta, Auckland, Helsinki, Hangzhou, Nairobi, Zürich, Kolkata, Rome, Almaty, Cape Town, Monaco, Boston, Vilnius, Ros Comain, Clifton, Oslo, Dallas, Bern, Düsseldorf, Greenock, Den Bosch. Interesting is that Vienna competes with internationally renowned cities, but not global primary cities like London, New York, Paris, Tokyo, Shanghai etc. In this context, we can say that Vienna competes in the 2nd tier league of cities. We see that most of its competitors are in West Europe, followed by North America, then Pacific Asia. Vienna has two African competitors, namely Nairobi (14th) and Cape Town (19th). In the table we see that 16 of the top 30 competitors are in West Europe, 5 are in north America, and 5 are in Asia.

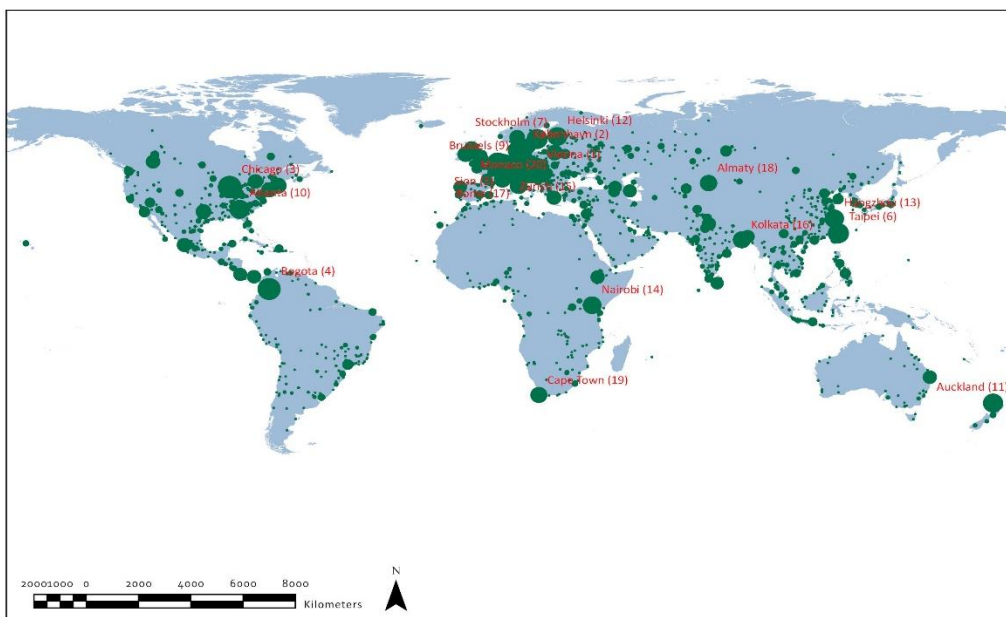


Figure 17: The geography of Vienna's global competitors.

RANK	MAJOR CITY	NUTS2 ID	NUTS2 NAME	COUNTRY	WORLD_REGION	COMPETITION INDEX
1	Vienna	AT13	Wien	Austria	West Europe	8000
2	Copenhagen	DK01	Hovedstaden	Denmark	West Europe	9090
3	Chicago	USChicago	Chicago	United States	North America	9240
4	Bogota	COBogota	Bogota	Colombia	Latin America	9286
5	Geneva	CH01	Région lémanique	Switzerland	West Europe	9373
6	Taipei	TWTaipei	Taipei	Taiwan	Asia and Pacific	9793
7	Stockholm	SE11	Stockholm	Sweden	West Europe	9816
8	Luxembourg	LU00	Luxembourg	Luxembourg	West Europe	9830
9	Brussels	BE10	Région de Bruxelles-Capitale	Belgium	West Europe	9869
10	Atlanta	USAtlanta	Atlanta	United States	North America	10091
11	Auckland	NZAuckland	Auckland	New Zealand	Asia and Pacific	10092
12	Helsinki	FI1B	Helsinki-Uusimaa	Finland	West Europe	10108
13	Hangzhou	CNHangzhou	Hangzhou	China	Asia and Pacific	10212
14	Nairobi	KENairobi	Nairobi	Kenya	Africa	10416
15	Zürich	CH04	Zürich	Switzerland	West Europe	10502
16	Kolkata	INKolkata	Kolkata	India	Asia and Pacific	10585
17	Rome	IT14	Lazio	Italy	West Europe	10651
18	Almaty	KZAlmaty	Almaty	Kazakhstan	Asia and Pacific	10695
19	Cape Town	ZACape Town	Cape Town	South Africa	Africa	10829
20	Monaco	FR82	Provence-Alpes-Côte d'Azur	France	West Europe	10830
21	Boston	USBoston	Boston	United States	North America	10838
22	Vilnius	LT00	Lietuva	Lithuania	Rest of Europe	10956
23	Ros Comain	IE01	Border, Midland and Western	Ireland	West Europe	10983
24	Clifton	USClifton	Clifton	United States	North America	11081
25	Oslo	NO01	Oslo og Akershus	Norway	West Europe	11121
26	Dallas	USDallas	Dallas	United States	North America	11177
27	Bern	CH02	Espace Mittelland	Switzerland	West Europe	11239
28	Düsseldorf	DEA1	Düsseldorf	Germany	West Europe	11240
29	Greenock	UKM3	South Western Scotland	United Kingdom	West Europe	11241
30	Den Bosch	NL41	Noord-Brabant	Netherlands	West Europe	11244

Figure 18: Vienna's top 30 global competitors.

#### 2.2.4. Vienna's competitors at the European scale (NUTS-2).

The following map (Figure 19) shows only the West European competitors of Vienna, mapped on the NUTS-2 (Nomenclature of Territorial Units for Statistics- level 2) map. The map depicts the top 30 competitors. The supporting table (Figure 20) shows in more detail who these competitors are and which countries they are from. 25 of the top 30 competitors are from West Europe. Also at this scale we see that Vienna competes at the 2nd tier of European competitors and not primary European cities like London, Paris, Amsterdam, Frankfurt and Munich. We also see that Vienna's main competitors are not regionally concentrated (dark green areas), but quite scattered throughout West Europe. This was based on a GIS hot-spot analysis, which proved that there were no significant regional clustering effects (not shown). It means that Vienna's competition is randomly scattered throughout Europe.

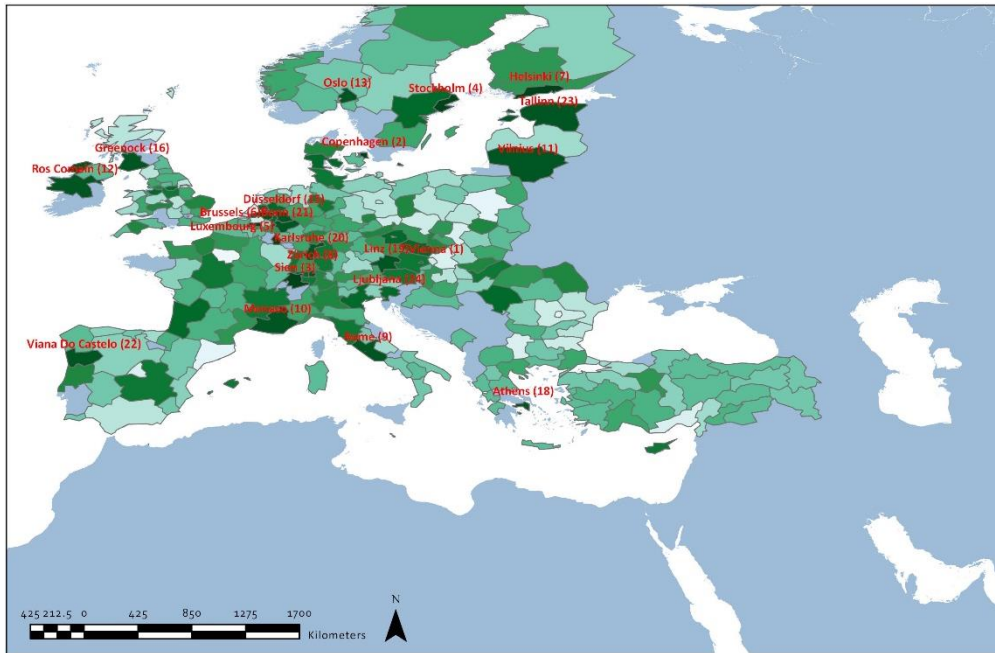


Figure 19: Vienna's top West European competitors (NUTS-2). Dark green = strongest competitors.

RANK	MAJOR CITY	NUTS2 ID	NUTS2 NAME	COUNTRY	WORLD REGION	COMPETITION INDEX
1	Vienna	AT13	Wien	Austria	West Europe	8000
2	Copenhagen	DK01	Hovedstaden	Denmark	West Europe	9090
3	Geneva	CH01	Région lémanique	Switzerland	West Europe	9373
4	Stockholm	SE11	Stockholm	Sweden	West Europe	9816
5	Luxembourg	LU00	Luxembourg	Luxembourg	West Europe	9830
6	Brussels	BE10	Région de Bruxelles-Capitale	Belgium	West Europe	9869
7	Helsinki	FI1B	Helsinki-Uusimaa	Finland	West Europe	10108
8	Zürich	CH04	Zürich	Switzerland	West Europe	10502
9	Rome	IT14	Lazio	Italy	West Europe	10651
10	Monaco	FR82	Provence-Alpes-Côte d'Azur	France	West Europe	10830
11	Vilnius	LT00	Lietuva	Lithuania	Rest of Europe	10956
12	Ros Comain	IE01	Border, Midland and Western	Ireland	West Europe	10983
13	Oslo	NO01	Oslo og Akershus	Norway	West Europe	11121
14	Bern	CH02	Espace Mittelland	Switzerland	West Europe	11239
15	Düsseldorf	DEA1	Düsseldorf	Germany	West Europe	11240
16	Greenock	UKM3	South Western Scotland	United Kingdom	West Europe	11241
17	Den Bosch	NL41	Noord-Brabant	Netherlands	West Europe	11244
18	Athens	EL30	Αττική	Greece	West Europe	11301
19	Linz	AT31	Oberösterreich	Austria	West Europe	11452
20	Karlsruhe	DE12	Karlsruhe	Germany	West Europe	11530
21	Bonn	DEA2	Köln	Germany	West Europe	11531
22	Viana Do Castelo	PT11	Norte	Portugal	West Europe	11646
23	Tallinn	EE00	Eesti	Estonia	Rest of Europe	11648
24	Ljubljana	SI04	Zahodna Slovenija	Slovenia	Rest of Europe	11933
25	Prague	CZ02	Střední Čechy	Czech Republic	Rest of Europe	11947
26	Liverpool	UKD7	Merseyside	United Kingdom	West Europe	12018
27	Šibenik	HR03	Jadranska Hrvatska	Croatia	Rest of Europe	12136
28	Aarau	CH03	Nordwestschweiz	Switzerland	West Europe	12210
29	Maastricht	NL42	Limburg (NL)	Netherlands	West Europe	12235
30	Venice	ITH3	Veneto	Italy	West Europe	12247

Figure 20: Vienna's top 30 West European competitors (NUTS-2).

2.2.5. *Top 5 European competitors of Vienna and their investor source cities.*

In the next section we explore the FDI source cities of Vienna and its top 5 West European competitors. The source cities are coded in yellow and the bigger the dot the more FDI invested in Vienna and its competitors. The first map (Figure 21) shows at the top, Vienna's FDI sources at the global scale (left) and European scale (right). Vienna gets much investment from West European cities, as well as from north America, then Asia. It particularly attracts investment from the Dutch – German -Swiss axis of investment. In the provided table (Figure 24) we can trace exactly which are the ranked major FDI source cities of Vienna. In the table's columns Vienna is seen. The lower the rank digit the more it has invested in Vienna. Its number one source investor is Munich (digit-2), followed by Paris (digit-3), London (digit-5) and Amsterdam (digit-8) etc. Below Vienna's maps we see those of its 1st European competitor, Copenhagen, as well as the FDI source cities investing into Copenhagen. Firstly we see that it also attracts investment from mainly West Europe, North America, and Asia – although the magnitudes of FDI differ. We do also see that the major cities differ quite a lot. This shows us that cities are not all in equal competition for FDI from the same places. Nonetheless, the similarity between all Vienna and Copenhagen's source cities is the most similar of all competitors. As seen in Table 24, Paris is the key investor of Copenhagen (digit-3), then London (digit-4), then Stockholm (digit-5) etc. The FDI source geographies of the other competitors of Vienna can be seen in Figure 22 and Figure 23, and the exact ranks of FDI sources seen in the table (Figure 24).

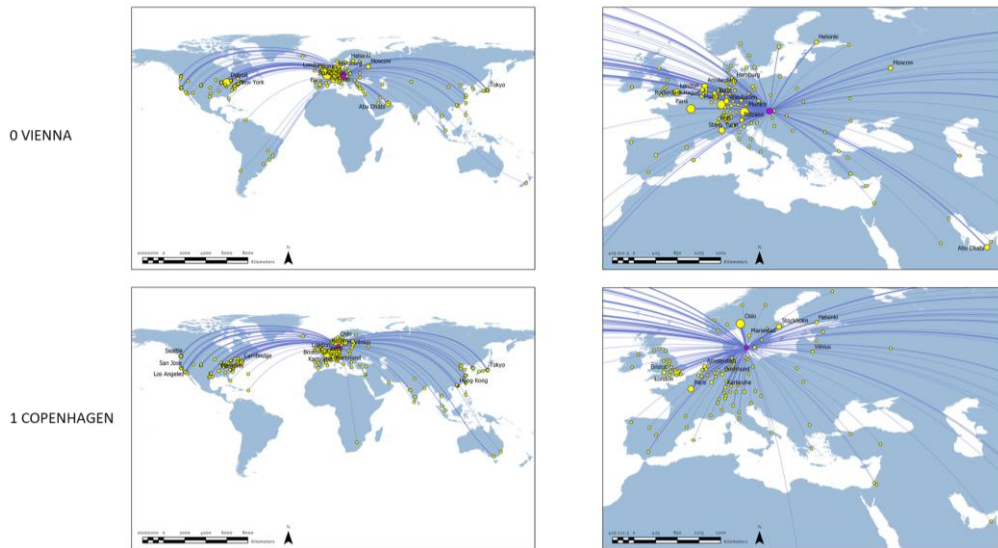


Figure 21: Vienna and its 1<sup>st</sup> competitor Copenhagen's FDI source cities (yellow dots).

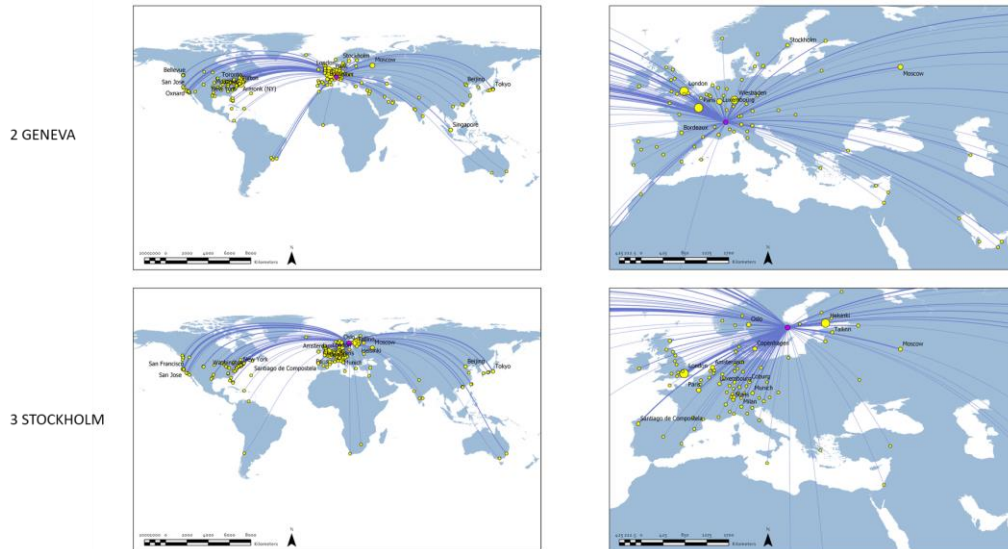


Figure 22: 2<sup>nd</sup> competitor Geneva and 3<sup>rd</sup> competitor Stockholm FDI source cities (yellow dots).

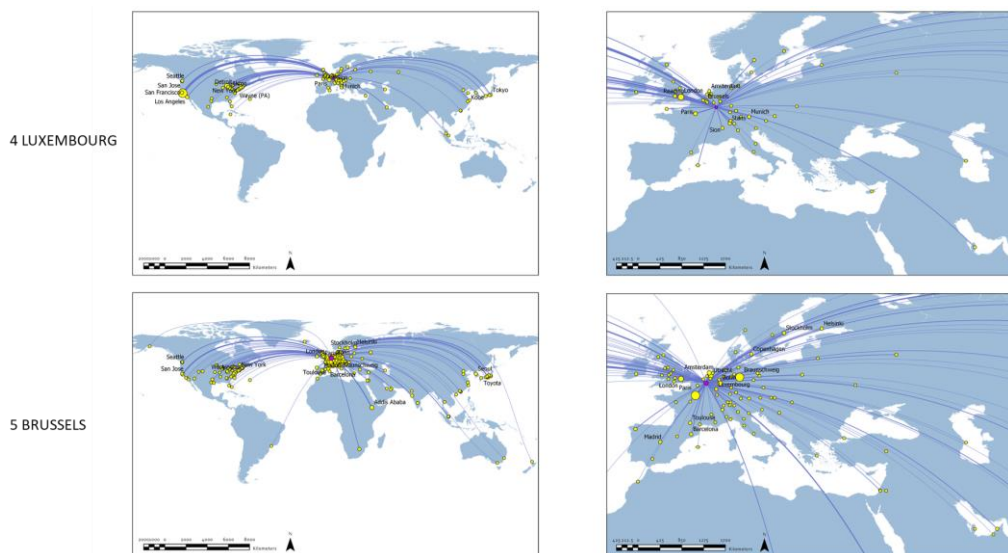


Figure 23: 4<sup>th</sup> competitor Luxembourg and 5<sup>th</sup> competitor Brussels FDI source cities (yellow dots).

FINAL RANK	SOURCECITY	Atlanta	Auckland	Bogota	Brussels	Chicago	Copenhagen	Geneva	Luxembourg	Stockholm	Taipei	Vienna	AVERAGE RANK
1	London	4	10	7	5	1	4	1	2	1	4	5	4
2	Paris	1	15	1	1	3	3	2	4	4	5	3	4
3	Tokyo	2	7	27	22	15	9	17	18	15	1	18	14
4	New York	70	12	4	9	64	24	3	5	3	3	19	20
5	Helsinki	48	24	33	15	14	15	33	48	2	41	17	26
6	Bonn	14	37	11	4	22	41	61	38	49	29	7	28
7	Munich	26	54	89	29	28	25	28	9	13	13	2	29
8	Amsterdam	21	33	60	7	12	8	31	19	6	112	8	29
9	San Jose	70	59	59	10	64	13	11	1	11	6	37	30
10	Milan	10	64	85	45	8	39	21	47	16	27	21	35
11	San Francisco	70	39	38	61	64	45	72	10	9	14	33	41
12	Beijing	60	13	88	33	50	55	20	32	18	7	80	41
13	Hong Kong	108	3	88	38	9	16	40	54	58	2	48	42
14	Geneva	124	14	29	24	44	70	87	11	25	18	20	42
15	Stockholm	5	56	137	13	16	5	14	35	92	74	26	43
16	Los Angeles	70	25	14	126	64	10	22	7	43	12	83	43
17	Luxembourg	7	97	13	18	56	12	5	48	14	126	99	45
18	Stans	25	9	28	89	90	65	87	6	17	81	12	47
19	Stuttgart	8	54	115	40	64	29	87	40	36	11	28	47
20	Copenhagen	82	22	22	17	85	100	43	74	7	10	55	47
21	Zürich	64	18	88	55	25	64	87	34	29	24	29	47
22	Santiago de Compostela	87	65	17	21	33	97	49	48	12	40	56	48
23	Washington	70	54	48	11	64	14	54	85	19	62	47	48
24	Madrid	27	54	5	14	48	47	48	48	59	150	35	49
25	Moscow	70	54	88	26	63	54	6	78	8	96	13	51
26	Wiesbaden	93	99	88	106	11	44	4	21	31	56	11	51
27	Seattle	70	50	25	20	64	7	84	12	127	23	85	52
28	Venice	35	54	88	93	23	100	27	48	47	21	31	52
29	Singapore	47	89	88	31	7	66	12	72	92	19	68	54
30	Brussels	49	54	47	99	103	32	42	16	32	87	36	54
31	Shenzhen	81	77	32	94	64	48	39	84	30	28	30	55
32	Karlskrona	30	54	88	99	69	22	23	48	92	70	42	58
33	Dublin	38	35	156	27	4	83	41	45	39	98	82	59
34	Bellevue	70	103	79	32	64	38	15	39	44	46	124	59
35	Barcelona	40	52	8	19	32	145	122	86	61	39	54	60

Figure 24: The source city ranks of Vienna (vertical axis) and its top 10 competitors (horizontal axis).

Table 24 is also important because it shows the average rank of the FDI source cities to the top 10 competitors of Vienna. For instance, FDI source city London is the major investor into Vienna and its top 10 competitors, based on the average rank of these cities, which is 4 (last column). Paris also proves to have an average rank of 4, while Tokyo has an average rank of 14, and New York 20, etc. Others are Helsinki, Bonn, Munich, Amsterdam etc. This is an interesting list for Vienna, because it shows which cities invest most into it and its competitors. This list of cities concerns the ones Vienna should approach to attract foreign investments in future. That means finding the firms in these cities that invest in Vienna's competitors, to convince them in future to invest instead in Vienna. It can also mean improving the business and political relations with these source cities because they have already well-established ties.

### 2.3. Sectoral specialization and diversification results

In this next step, the FDI sectors of Vienna and its top 10 competitors have been explored to find out which sectors Vienna has an above average advantage over its competitors. It is clear from the graph (Figure 25) that Vienna's competitive strength is Automotive Components 1<sup>st</sup>, then Biotechnology 2<sup>nd</sup>, followed by Textiles (3<sup>rd</sup>), Warehousing & Storage (4<sup>th</sup>) and Transportation (5<sup>th</sup>) etc. However, Vienna underperforms in FDI sectors like Software & IT Services, Real Estate etc.

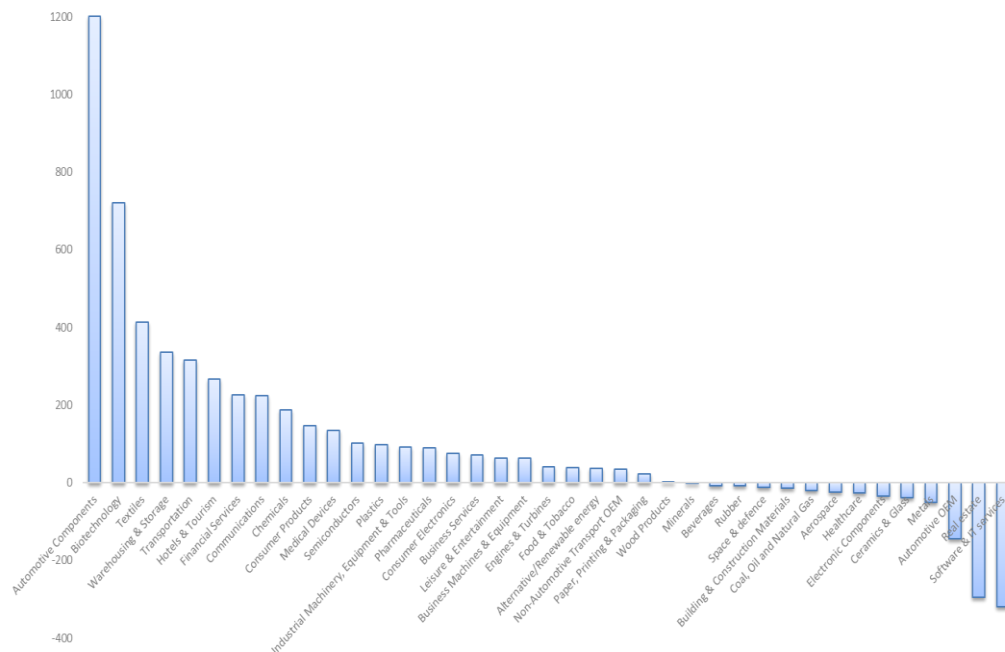


Figure 25: The sectoral advantage of Vienna's FDI sectors in comparison to its top 10 competitors.

Taking the previous step further, the strength of Vienna's major competitors is offset against the exponential growth rates of these same sectors in West Europe. These were calculated for all sectors over the period of 2010 – 2018. The results are seen in the graph (Figure 26). It shows Vienna's strength versus growth, hereby giving a selection of sectors for it to further specialize, but also several sectors to diversify in future. Vienna should further strengthen its Biotechnology and Automotive Components industry, because it has a clear competitive advantage over its competitors in this, but also because these sectors have positive growth rates (particularly biotechnology). At a second level, Textiles, Transportation, Communications are also good to strengthen. In fact all sectors captured in red oval are of interest for Vienna to strengthen. The ones in the green oval are also interesting but riskier. However, instead of only eyeballing the potential sectors, a separate cluster analysis has been carried out on the strength and growth values (Figure 27).



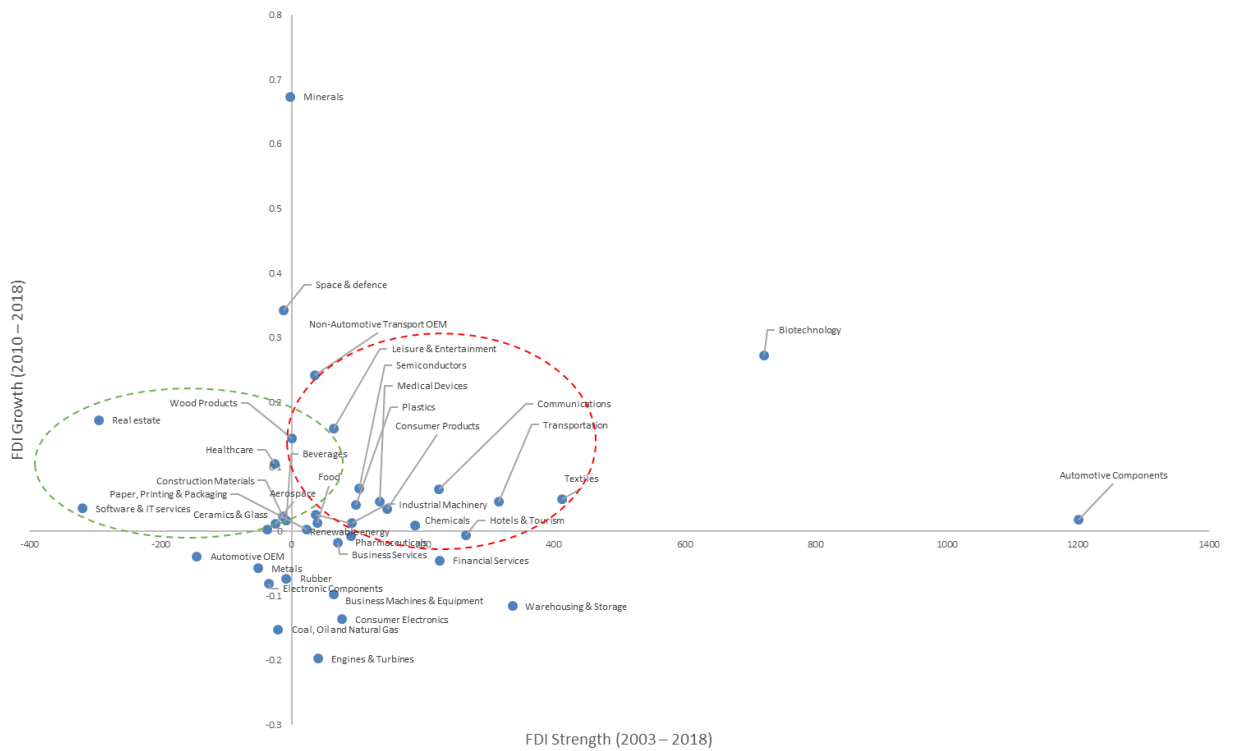


Figure 26: Vienna's sectoral strength versus the West European sectoral growth rates.

In the cluster analysis results Biotechnology and Automotive Components are clearly unique sectors that Vienna should strengthen in future. Then at second place Automotive OEM, Software & IT Services and Real Estate are recommended sectors for Vienna to diversify in. In Figure 25 we see that Vienna underperform in these sectors, but in the cluster analysis it is put forward as interesting industries to develop for Vienna's future. At the next level, Textiles, Transportation, Warehousing & Storage, Hotels & Tourism, Chemicals, Communications and Financial Services are interesting for Vienna to focus on.

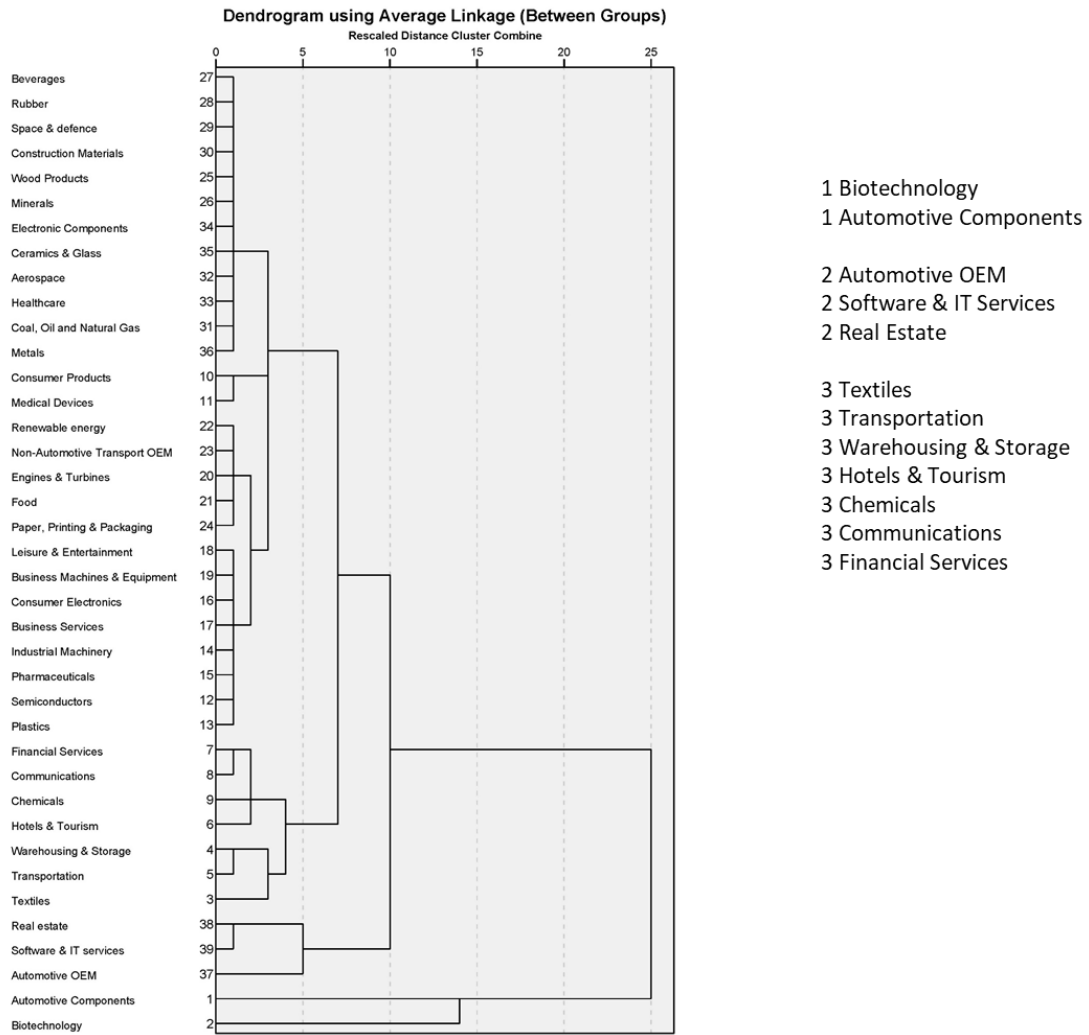


Figure 27: Vienna's sectoral strength versus the West European sectoral growth rates (cluster analysis).

### 3. Conclusion and recommendations

#### *The FDI strength of Vienna*

The study shows that at the global scale, Vienna holds the 94<sup>th</sup> inward investment position, out of 6498 world cities. This means that Vienna is one of the top 100 destinations for world investment. Within the European scale of inward international investment, we see that Vienna holds the 36th position out of 530 European cities, which is very good.

The results show that Vienna falls within the second richest international FDI region after Asia. Within Europe it is located within the East European belt, which is the third strongest FDI cluster, after the UK and North West Europe. It is interesting for Vienna that the European region is so attractive, but it also means that there are many proximate cities that are competitors. This means that it needs to strategically choose the FDI sectors that it has an advantage in, to attract future investment – which is the aim of this study.

At the global and European scale, it is shown that limited FDI is sourced from the Southern Hemisphere, which is an interesting prospect for Vienna in future, because the global South is economically developing and rising rapidly (particularly Africa).

The study on international FDI to Austrian cities shows, as could be expected, that Vienna holds the 1st position, followed by Linz 2nd, Klagenfurt 3rd, and Graz 4th. Like the global

and European scales it is seen that most of Austrian non-European FDI comes from North America and Pacific Asian city sources. Very little FDI comes from the global South.

Most FDI to Austrian cities are sourced from European cities, particularly from German, Swiss and Italian cities (Figure 8). The strongest concentration of non-European sourced FDI comes from North America

The 1st ranked city for Vienna sources of FDI is from Mainz, followed by Munich 2nd, Paris 3rd, Detroit 4th, London 5th, Turin 6th, Bonn 7th, Amsterdam 8th, Abu Dhabi 9th, and Hamburg 10th etc. Most FDI sources are in West Europe, followed by 11 from North America.

At the aggregation level of country level FDI into Vienna, Germany holds the 1st position, followed by the United States 2nd, Italy 3rd, France 4th, The Netherlands 5th, United Kingdom 6th, Switzerland 7th, United Arab Emirates 8th, Spain 9th, and Russia 10th. Germany is by far, and not unexpectedly, the most powerful investor into Vienna.

The analysis on FDI growth shows that Vienna has experienced negative growth of inward FDI. It is therefore important that this city develops policies to attract more targeted investment.

#### *The FDI competitiveness of Vienna*

Based on the FDI competition analysis, it is shown that Vienna's top global competitors are Copenhagen, Chicago, Bogota, Geneva, Taipei, Stockholm, Luxembourg, Brussels, Atlanta, Auckland, Helsinki, Hangzhou, Nairobi, Zürich, Kolkata, Rome, Almaty, Cape Town, Monaco, Boston, Vilnius, Ros Comain, Clifton, Oslo, Dallas, Bern, Düsseldorf, Greenock, Den Bosch. These cities compete for FDI in Financial Services, Automotive Components, Communications, Textiles, Transportation, Biotechnology, Hotels & Tourism etc.

It is seen that Vienna competes with internationally renowned cities, but not global primary cities like London, New York, Paris, Tokyo, Shanghai etc. It therefore competes in the 2nd tier league of international cities. We see that most of its competitors are in West Europe, followed by North America, then Pacific Asia. 16 of Vienna's top 30 competitors are in West Europe, 5 are in north America, and 5 are in Asia.

In Europe, 25 of Vienna's top 30 competitors are from West Europe, 5 from East Europe. Also at the European scale it is seen that Vienna competes at the 2nd tier of European competitors and not primary European cities like London, Paris, Amsterdam, Frankfurt and Munich. It is also shown that Vienna's main competitors are not regionally concentrated, but quite scattered throughout West Europe. Vienna needs to do more to climb to the 1<sup>st</sup> tier of FDI cities, which would require targeting the correct sectors of FDI, and using its Invest Promotion Agency to aggressively target and attract firms in these sectors.

Vienna gets much investment from West European cities, as well as from North America, then Asia. It particularly attracts investment from the Dutch – German -Swiss axis of investment. This is an interesting region that Vienna should explore to build stronger relations with.

In a study on which source cities are the main sources of FDI into Vienna and top 10 competitors, it was found that the key FDI source city is London. Paris is the second most important, followed by Tokyo, New York, Helsinki, Bonn, Munich, Amsterdam etc. This list of cities concerns the ones Vienna should approach to attract foreign investments in future. That means finding the firms in these cities that invest in Vienna's competitors, to convince them in future to invest instead in Vienna. It can also mean improving the business and political relations with these source cities because they have already well-established ties.

*The specialization and diversification of Vienna's FDI sectors.*

It is shown in the study that Vienna should further strengthen its existing strength in the Biotechnology and Automotive Components industry, because it has a clear competitive advantage over its competitors in this, but also because these sectors have positive growth rates (particularly biotechnology).

In terms of diversification into new sectors of FDI, it is recommended that Vienna primarily develops the Automotive OEM, Software & IT Services and Real Estate sectors. At the next level of priority it is suggested that Vienna develop the sectors of Textiles, Transportation, Warehousing & Storage, Hotels & Tourism, Chemicals, Communications and Financial Services.

---