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Mapping the European ICT Poles of Excellence: The Atlas of ICT Activity in Europe

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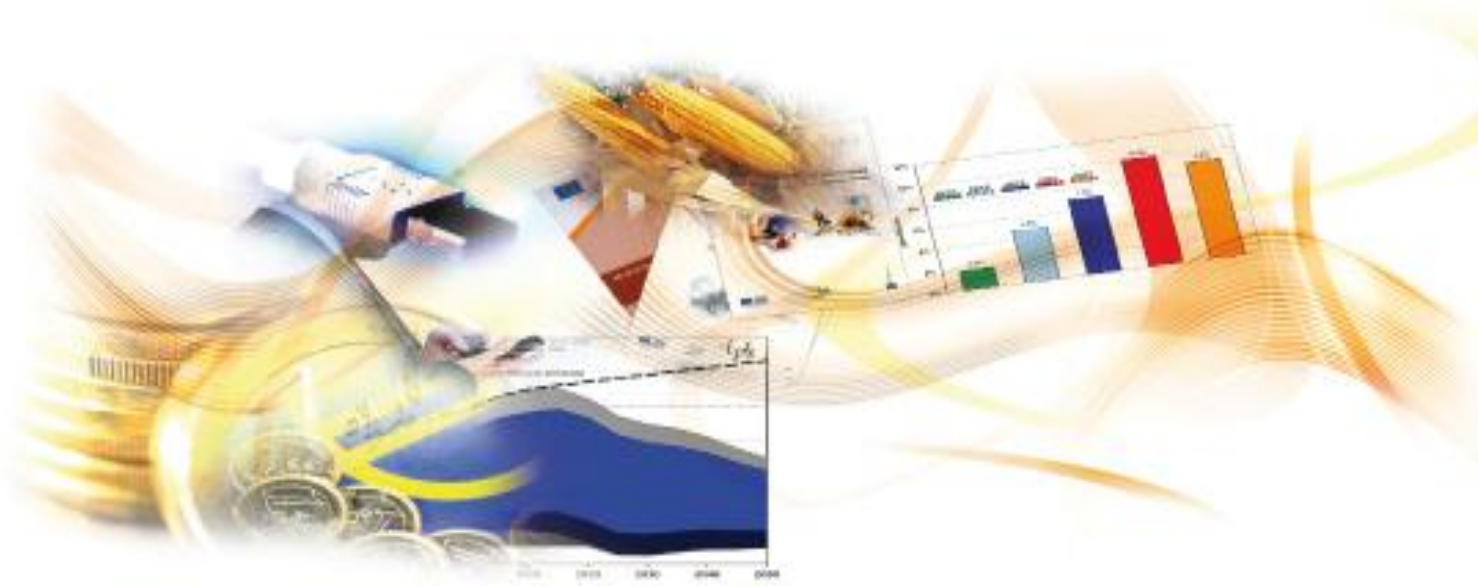

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Preface

The European ICT Poles of Excellence (EIPE) research project is a joint project of DG CNECT and the JRC Institute for Prospective Technological Studies (Project Nr 31786-2010-06). It investigated the issues of growth, jobs and innovation, which have become the main priorities of the European Union's growth strategy programme 'Europe 2020'. The overall objectives of the EIPE project are to set the general conceptual and methodological conditions for defining, identifying, analysing and monitoring the existence and progress of current and future EIPE, in order to develop a clear capacity to distinguish these among the many European ICT clusters, observe their dynamics and offer an analysis of their characteristics.

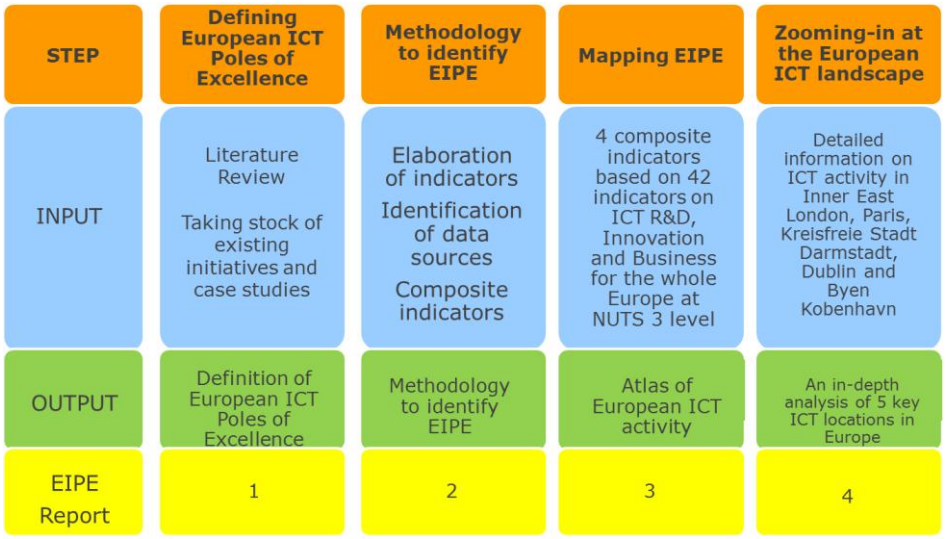
The EIPE project spanned the period between 2010 and 2013. Over this time, it developed a tool based on a database of original ICT activity indicators, which was enriched with geographical information to allow localisation and aggregation at NUTS 3. The tool helps to answer such questions as:

- How is ICT R&D, innovation and economic activity distributed in Europe?
- Which locations are attracting new investments in the ICT sector?
- What is the position of individual European locations in the global network of ICT activity?

The EIPE project had four main steps (see Figure 1). First, European ICT Poles of Excellence were defined. Second, a statistical methodology to identify EIPE was elaborated. Third, the empirical mapping of EIPE was performed and fourth, an in-depth analysis of five NUTS 3 regions was undertaken. This work was documented in a series of EIPE reports:

- Defining European ICT Poles of Excellence. A Literature Review,
- Identifying European ICT Poles of Excellence. The Methodology,
- Mapping the European ICT Poles of Excellence. The Atlas of ICT Activity in Europe.
- Analysing the European ICT Poles of Excellence. Case studies of Inner London East, Paris, Kreisfreie Stadt Darmstadt, Dublin and Byen Kobenhavn.
- Key Findings and Implications of the European ICT Poles of Excellence project.

Figure 1: Overview of the EIPE project



More information on the European ICT Poles of Excellence (EIPE) project can be found under: http://is.jrc.ec.europa.eu/pages/ISG/EIPE.html

Table of Contents

1. Introduction

This is the third EIPE Report. It presents the results of an empirical mapping of ICT activity in Europe and the ranking of the top European NUTS 3 regions based on their performance in the EIPE Composite Indicator (EIPE CI). It also ranks regions by each of the 42 indicators which contributed to the building of the EIPE composite indicator. This report offers a snapshot of the performance of regions that are identified as the main locations of ICT activity in Europe. It is meant to provide a comprehensive picture of how ICT activity is distributed across Europe and where its main locations are. This information is expected to give a better overview of the European ICT landscape. In order to provide dynamic access to the information gathered within the EIPE project, this report is accompanied by an online visualisation tool.[1]

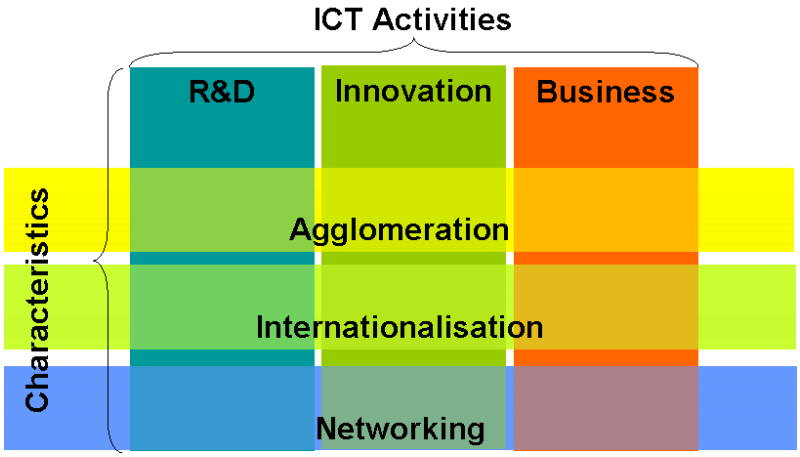
This report builds on the previous two EIPE reports, which have led to the definition of EIPE (Nepelski et al. 2013) and the elaboration of the methodology for an empirical identification of EIPE (De Prato and Nepelski 2013a).

EIPE are defined as follows:

> **European ICT Poles of Excellence (EIPE) are geographical agglomerations of best performing Information and Communication Technologies production, R&D and innovation activities, located in the European Union, that exert a central role in global international networks.**

Following this definition, an empirical framework has been elaborated, which is presented graphically in Figure 2.

Figure 2: Empirical framework to identify ICT Poles of Excellence



This report implements the method to identify EIPE that was developed in the second EIPE report (De Prato and Nepelski 2013a). By using the data collected in the project and organized along three types of ICT activities (see Figure 2), it presents the results of ranking all of the 1,303 European NUTS3 level regions according to the following criteria:

- EIPE Composite Indicator (EIPE CI), which is composed of
  - an ICT R&D sub-indicator,
  - an ICT Innovation sub-indicator,
  - an ICT Business sub-indicator,

[1] Available at: http://is.jrc.ec.europa.eu/pages/ISG/EIPE.html

- 42 individual indicators that were defined in the course of the EIPE study and that served to construct the above mentioned sub-indicators and the final EIPE Composite Indicator (See Chapter 6).

The EIPE study distinguishes three main types of regions according to the intensity of ICT activity:

- 1st tier region, i.e. scoring between 81 and 100 on the EIPE CI,
- 2nd tier region, i.e. scoring between 61 and 80 on the EIPE CI), and
- 3rd tier region, i.e. scoring between 41 and 60 on the EIPE CI).

In the following, Chapter 2 presents the EIPE final Composite Indicator (CI) Ranking. Chapter 3 gives more details on the performance of the three regions that have been identified as 1st tier locations of ICT activity in Europe. This is followed by the presentation of the rankings based on the three composite sub-indicators (SI) namely ICT R&D, ICT Innovation and ICT Business Activity (Chapter 4). Chapter 5 shows the ranks for each of the individual indicators, grouped along the above mentioned ICT activities (Sections 5.1, 5.2 and 5.3).

Finally, Chapter 6 presents the full list of indicators with their main characteristics. Chapter 7 provides the main details on the methodology used for the construction of the composite indicators and chapter 8 (Annex 3) describes the data sources used in the EIPE study.

Methodological note: The EIPE Ranking

The EIPE ranking is based on the EIPE Composite Indicator (CI), an indicator that is formed by compiling individual indicators into a single index, on the basis of an underlying model of the multi-dimensional concept that was introduced in EIPE Report 2 (De Prato and Nepelski 2013a). The EIPE CI is computed on the basis of the composite sub-indicators created for each of the activities: ICT R&D, Innovation and Business, by aggregating the values of the three sub-indicators and thus synthesising all information in one final EIPE CI. Sub-indicator values are equally weighted. In order to present EIPE CI on a scale from 0 to 100, the values are standardized with the MiniMax procedure.

The EIPE *ranking*, as well as all the ranking for each of the presented indicators, is determined by applying the following criterion: to a region a RANK is attributed by associating it with a number which is one plus the number of distinct regions that come before the region in question. If two or more regions tie for a rank, to each of the tied region is attributed the same rank. For example, if two regions have the same value of 100 in the EIPE CI, they will both rank the same, i.e. 1. The region that follows, i.e. the next one to score a lower value in the EIPE CI, e.g. 99 (thus the one with the next highest EIPE CI), will be ranked 3, because in the row above, there are two regions, rather than one. The rank is increased every time the values upon which the list is ordered change. As a consequence of the application of this criterion, the rankings do not always show consecutive integers as markers of the ranking position. The integer number qualifying the position of the region X in the ranking corresponds to the number of distinct ranks that come before region X, plus one. This method of ranking is not a dense ranking, as a dense ranking method would have returned no gaps in the ranking (the rank of each row would have been one plus the number of distinct ranks coming before the row in question).

2. European ICT Poles of Excellence

Three high performance regions – first tier ICT Poles of Excellence

Three European NUTS 3 regions were identified that are considered as 1st tier regions, i.e. EIPE CI between 81 and 100 (see Table 1). These regions are:

1. Munchen Kreisfreie Stadt (DE212), Germany (EIPE CI = 100),
2. Inner London East (UK12), UK (EIPE CI = 97),
3. Paris (FR101), France (EIPE CI = 95).

According to Table 1, there are eight 2nd tier regions, i.e. EIPE CI between 61 and 80, and thirty three 3rd tier regions, i.e. EIPE CI between 41 and 60.

High geographical concentration of ICT activity in Europe

Only a very small number of EU regions demonstrate intensive ICT activity, and a large share of the total EU ICT activity is concentrated in them (see Figure 3). The distribution of the values of the EIPE Indicator is visible in Figure 4. It shows that ICT excellence is concentrated in a relatively small number of regions. About 86% of European regions score less than 20 in the EIPE indicator. This concentration process is observable in all the indicators.

Strong clustering of ICT activity

Larger areas of intensive ICT activities, sometimes including a 1st tier region, are made up of several regions belonging to the same neighbourhood (see Figure 3). These agglomerated regions include half the top 34. The other half of the top 34 regions appear isolated (in geographical terms): mainly capital cities, several important locations of ICT R&D and a few remaining regions.

Excellence builds on high performance across all activities

Excellence builds on high and balanced performance in all activities, i.e. ICT R&D, Innovation and Business, and in all three characteristics: Agglomeration, Internationalisation and Networking (see Figure 5).

Table 1: Top performing regions according to the EIPE Composite Indicator (EIPE CI>41)

Level	EIPE Rank	NUTS3 Code	Region name	EIPE CI
1st tier	1	DE212	Munchen, Kreisfreie Stadt	100
	2	UKI12	Inner London - East	97
	3	FR101	Paris	95
2nd tier	4	DE122	Karlsruhe, Stadtkreis	80
	5	UKH12	Cambridgeshire CC	78
	6	SE110	Stockholms lan	77
	7	DE711	Darmstadt, Kreisfreie Stadt	73
	8	FI181	Uusimaa	70
	9	NL414	Zuidoost-Noord-Brabant	70
	10	NL326	Groot-Amsterdam	64
	11	BE242	Arr. Leuven	61
3rd tier	12	DEA22	Bonn, Kreisfreie Stadt	59
	13	FR105	Hauts-de-Seine	59
	14	ITC45	Milano	59
	15	DE300	Berlin	58
	16	IE021	Dublin	57
	17	DEA21	Aachen, Kreisfreie Stadt	55
	18	NL333	Delft en Westland	55
	19	UKJ14	Oxfordshire	51
	20	UKM25	Edinburgh, City of	51
	21	DE111	Stuttgart, Stadtkreis	50
	22	DE125	Heidelberg, Stadtkreis	49
	23	DE21H	Munchen, Landkreis	49
	24	BE100	Arr. de Bruxelles-Capitale	48
	25	DK011	Byen Kobenhavn	48
	26	UKJ11	Berkshire	48
	27	AT130	Wien	47
	28	ES300	Madrid	46
	29	UKJ23	Surrey	45
	30	DE712	Frankfurt am Main, Kreisfreie Stadt	44
	31	UKJ33	Hampshire CC	43
	32	DE252	Erlangen, Kreisfreie Stadt	42
	33	FR103	Yvelines	42
	34	DED21	Dresden, Kreisfreie Stadt	41

Note: The table includes the ranking of 34 best scoring out of 1303 European NUTS 3 regions, i.e. scoring above 41 points on the EIPE Composite Indicator. 1st Tier regions score between 81 and 100, 2nd tier regions between 61 and 80 and 3rd tier regions between 41 and 60 on the EIPE CI. The scale of the EIPE Composite Indicator represents a normalized scale with minimum 0 and maximum 100. The EIPE raw indicator is a z-scores indicator computed over equally weighted 42 indicators. For further methodological details please refer to Annexes of the current report and to the methodological report documenting the methodology behind the EIPE ranking (De Prato and Nepelski 2013a).

Figure 3: ICT activity in Europe according to the EIPE Composite Indicator

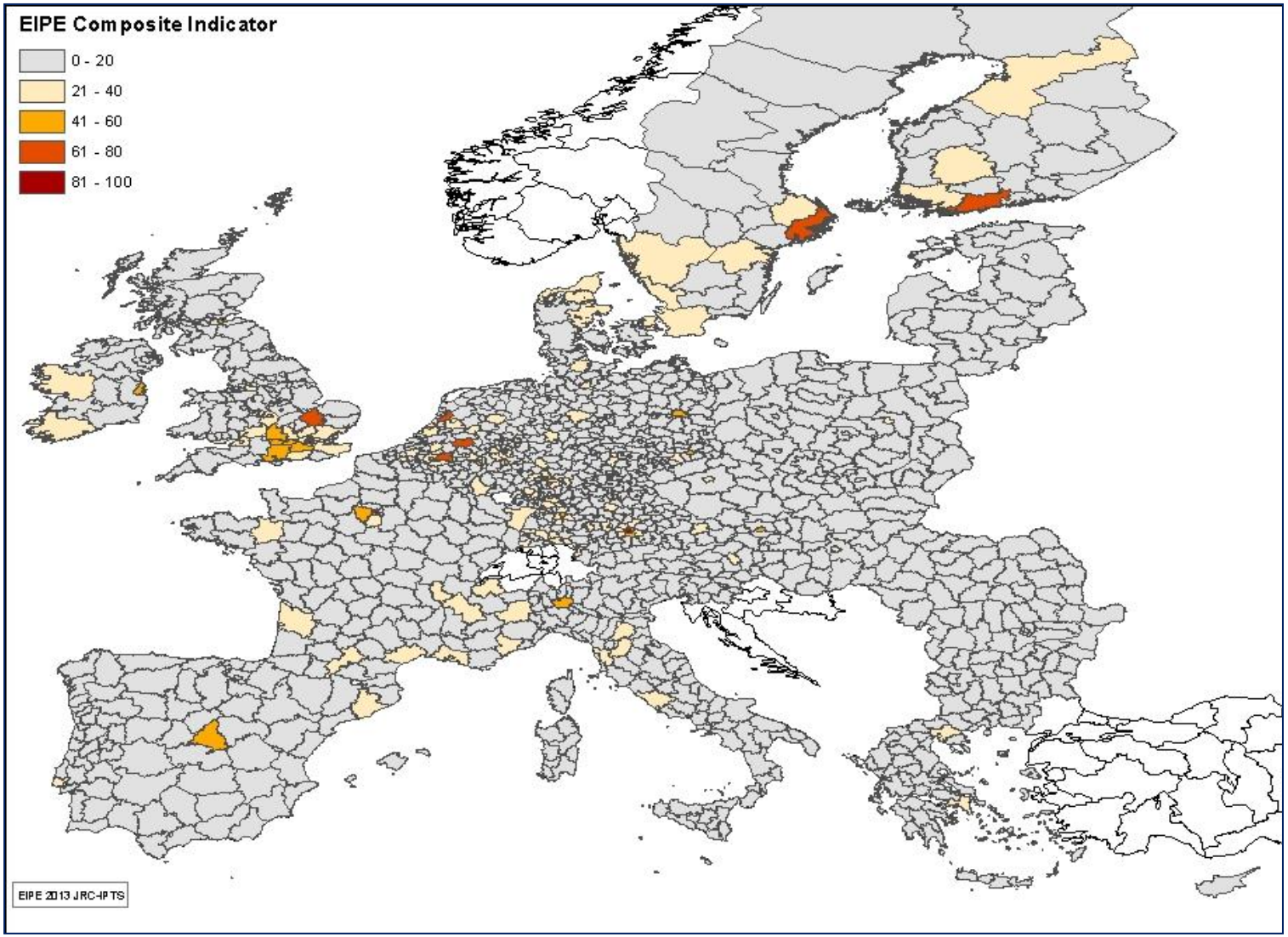


Figure 4: Frequency of EIPE Composite Indicator values

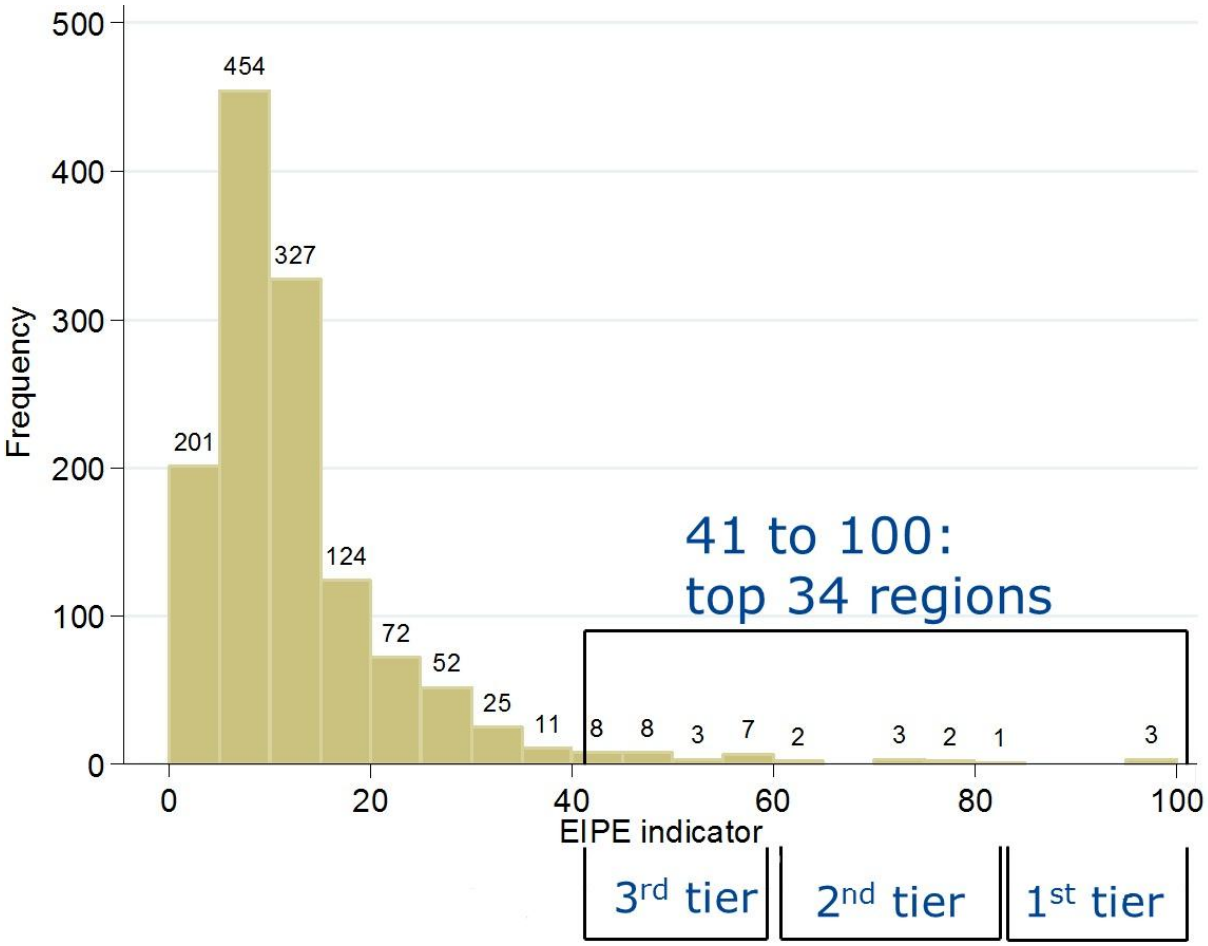


Table 2: Descriptive statistics of the EIPE Composite Indicator

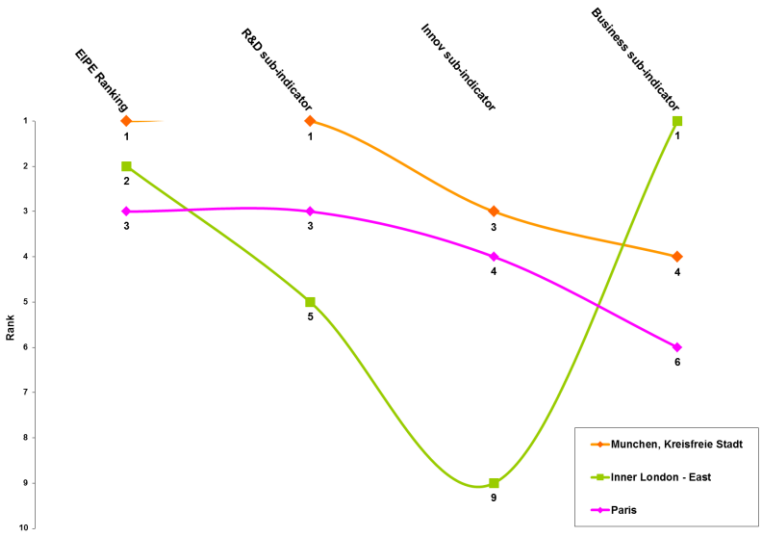
Number of observations	Mean value	Standard deviation	Variance
1303	12.05	11.08	122.88

3. The 1st Tier EIPEs

Excellence builds on high performance across all activities

Excellence builds on a high and balanced performance in all activities, i.e. ICT R&D, Innovation and Business, and in all three characteristics: Agglomeration, Internationalisation and Networking. This is illustrated by the top three EIPEs and their performance across the sub-indicators. According to Figure 5, the performance of the individual regions across the three dimensions is quite balanced. For example, München Kreisfreie Stadt, number 1 in the overall EIPE comparison, ranks 1st in the ICT R&D, 3rd in the ICT innovation and 4th in the ICT business ranking. Similarly, Inner London East holds 5th, 9th and 1st place in the individual sub-indicators.

Figure 5: Performance of the top three EIPEs across ICT activities



Diversity dominates

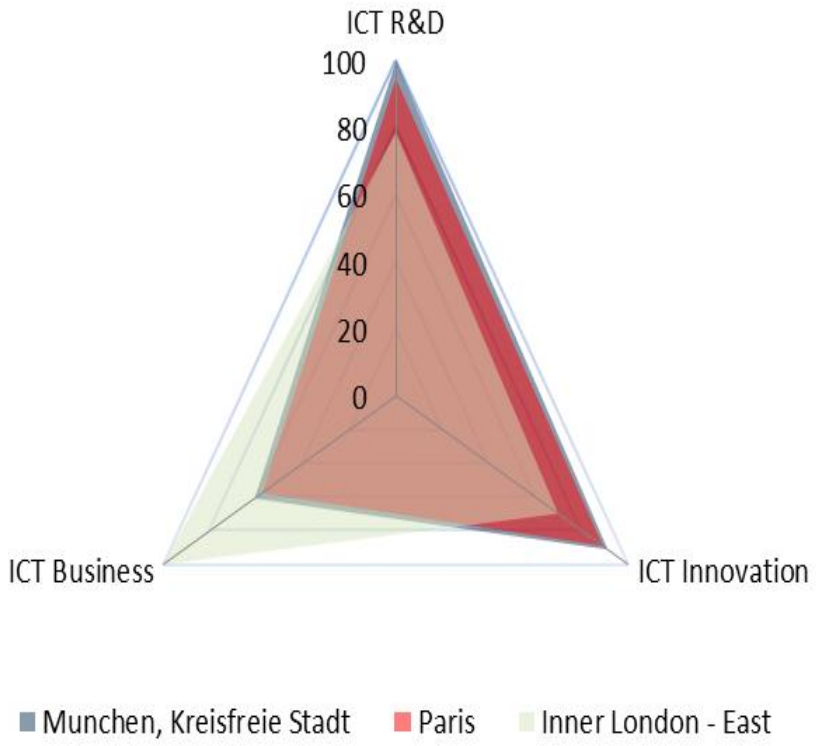
However, the regions are also highly diverse, as regards their size (e.g. population, area), their status (e.g. global cities, capital cities, regional capital cities, etc.), their institutions and their general or dedicated policies (e.g. at national, regional and local level). The local industrial composition varies, favouring the development of ICT activity in close relation to specific vertical sectors. This in turn contributes to the diversity in specialisation, each region having one or several specific strengths. The internationalisation of each activity follows a different pattern, some regions have a more local orientation (within the EU), while others have far reaching connections (the US and Asia). Each region has developed a different portfolio of partners, resulting in different network structures emerging for activities, locations, etc. Not all regions share a neighbourhood with one or several similarly ranked regions. Proximity is unevenly distributed and some regions are more isolated than others.

A deeper case-study level of analysis of the data shows that EIPEs are characterised by several commonalities but are also very diverse (Nepelski and De Prato 2013b). Among the commonalities, the concentration-as-a-rule observed from a geographical perspective is also observable in the activities of the public and private organisations, their activities and their financing. All regions have global reach, with intense cross-border activities in ICT R&D, innovation and business and have gained an enviable hub position in a usually very complex web of network connections. Also, the current assets of each region appear to be rooted deep in time, with their current activities and

profile resulting from a history several decades as regards their industrial structure, policy decisions, institutional settings, migration and education outcomes, etc.

All of the above aspects impact the region and result in very differently balanced EIPE profiles of EIPEs (see Figure 6). These small differences in performance of individual locations across the sub-indicators give some hints regarding the composition and details of the European ICT landscape. In particular, it shows how different and unique each location is and that all of them have their strengths and weaknesses.

Figure 6: Comparison of the performance of the top three EIPEs across three ICT activities



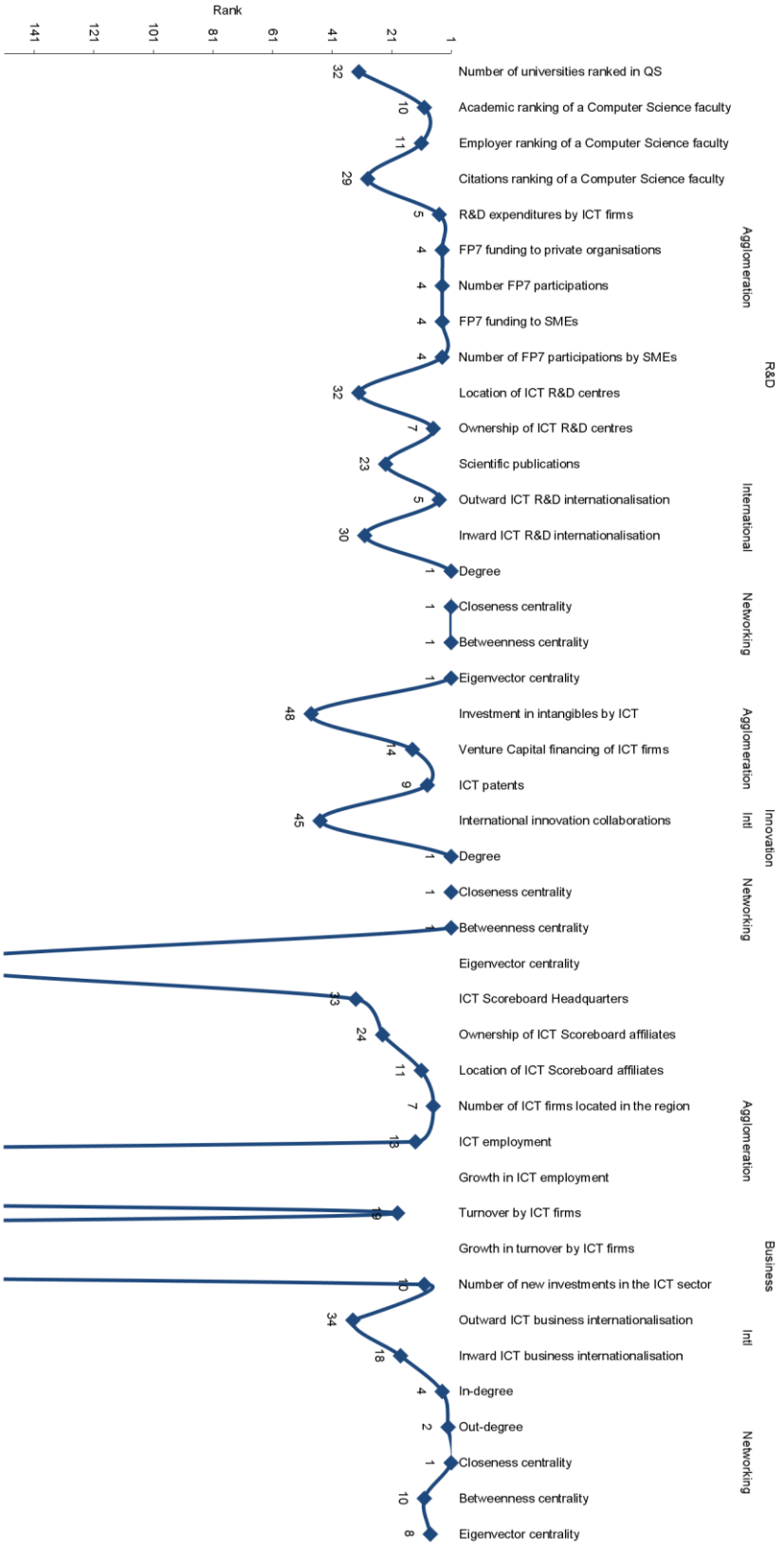
3.1 Munchen Kreisfreie Stadt

Table 3: Munchen Kreisfreie Stadt EIPE ID card

Activity	Characteristic	Name of Indicator	Indicator ID	Rank
R&D	Agglomeration	Universities ranked in the QS University Ranking	AgRD 1	32
		Academic ranking of a Computer Science faculty	AgRD 2	10
		Employer ranking of a Computer Science faculty	AgRD 3	11
		Citations ranking of a Computer Science faculty	AgRD 4	29
		R&D expenditures by ICT firms	AgRD 5	5
		ICT FP7 funding	AgRD 6	4
		ICT FP7 participations	AgRD 7	4
		ICT FP7 funding to SMEs	AgRD 8	4
		ICT FP7 participations by SMEs	AgRD 9	4
		Location of ICT R&D centres	AgRD 10	32
		Ownership of ICT R&D centres	AgRD 11	7
		Scientific publications in Computer Science	AgRD 12	23
	Internationalisation	Outward ICT R&D internationalisation	IntRD 1	5
		Inward ICT R&D internationalisation	IntRD 2	30
	Networking	Degree in ICT R&D network	NetRD 1	1
		Closeness centrality in ICT R&D network	NetRD 2	1
		Betweenness centrality in ICT R&D network	NetRD 3	1
		Eigenvector centrality in ICT R&D network	NetRD 4	1
Innovation	Agglomeration	Investment in intangibles by ICT firms	AgIn 1	48
		Venture Capital financing to ICT firms	AgIn 2	14
		ICT patents	AgIn 3	9
	Internationalisation	International co-inventions	IntIn 1	45
	Networking	Degree in ICT innovation network	NetIn 1	1
		Closeness centrality ICT innovation network	NetIn 2	1
		Betweenness centrality ICT innovation network	NetIn 3	1
		Eigenvector centrality ICT innovation network	NetIn 4	182
Business	Agglomeration	Location of ICT Scoreboard Headquarters	AgBuss 1	33
		Ownership of ICT Scoreboard affiliates	AgBuss 2	24
		Location of ICT Scoreboard affiliates	AgBuss 3	11
		Location of ICT firms	AgBuss 4	7
		ICT employment	AgBuss 5	13
		Growth in ICT employment	AgBuss 6	1265
		Turnover by ICT firms	AgBuss 7	19
		Growth in turnover by ICT firms	AgBuss 8	1264
		New business investments in the ICT sector	AgBuss 9	10
	Internationalisation	Outward ICT business internationalisation	IntBuss 1	34
		Inward ICT business internationalisation	IntBuss 2	18
	Networking	In-degree in ICT business network	NetBuss 1	4
		Out-degree in ICT business network	NetBuss 2	2
		Closeness centrality in ICT business network	NetBuss 3	1
		Betweenness centrality in ICT business network	NetBuss 4	10
		Eigenvector centrality in ICT business network	NetBuss 5	8

Note: The table reports the performance of Munchen Kreisfreie Stadt (DE212) in each out of the 42 indicators used in the EIPE ranking and grouped around three dimensions, i.e. ICT R&D, ICT Innovation and ICT Business. The scale represents the rank in the comparison with the remaining 1,302 European Nuts 3 regions. For further methodological details please refer to Annexes of the current report and to the methodological report documenting the methodology behind the EIPE ranking (De Prato and Nepelski 2013a).

Figure 7: Performance of Munchen Kreisfreie Stadt across 42 EIPE indicators



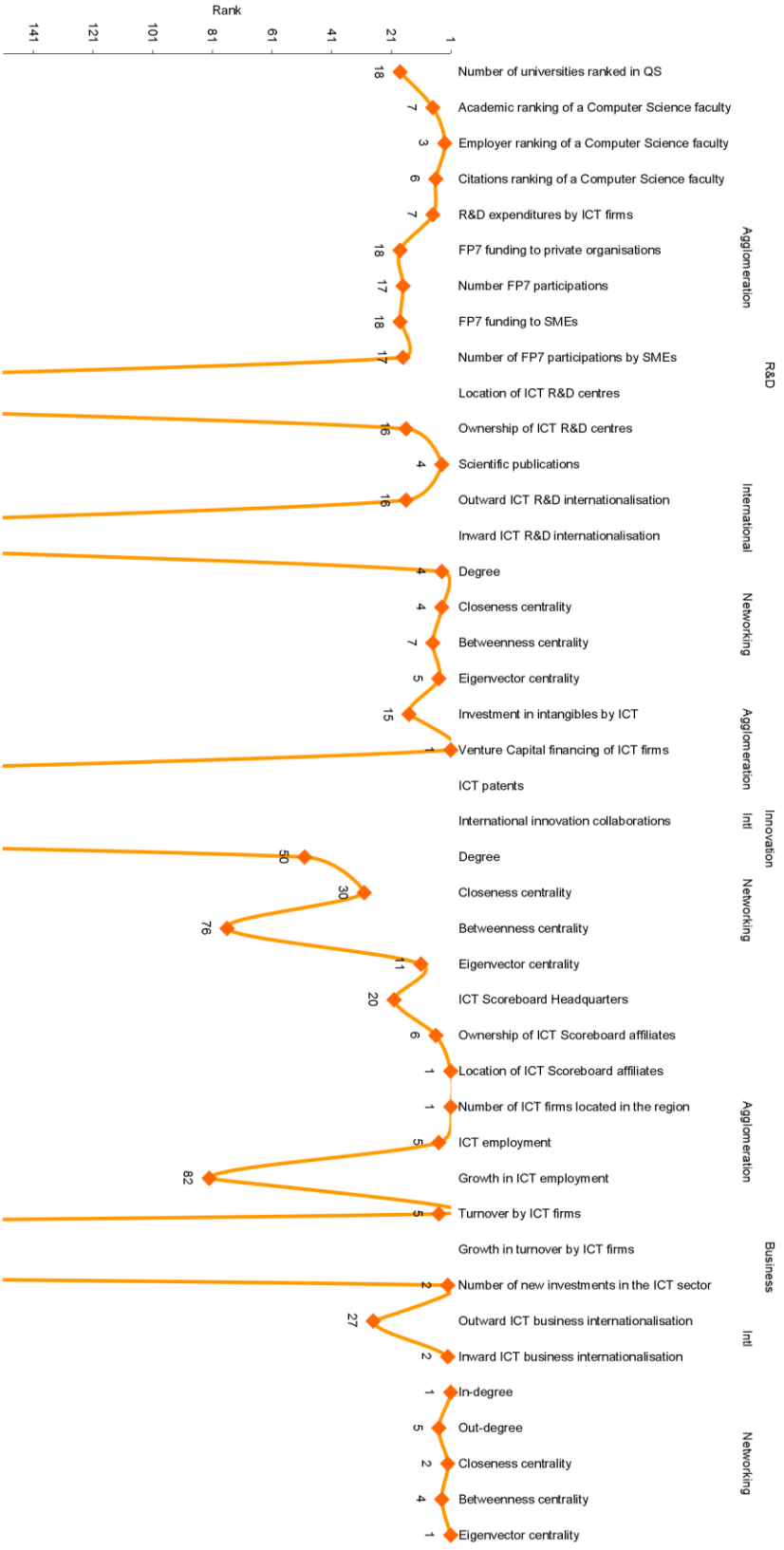
3.2 Inner London East

Table 4: Inner London East EIPE ID card

Activity	Characteristic	Name of Indicator	Indicator ID	Rank
R&D	Agglomeration	Universities ranked in the QS University Ranking	AgRD 1	18
		Academic ranking of a Computer Science faculty	AgRD 2	7
		Employer ranking of a Computer Science faculty	AgRD 3	3
		Citations ranking of a Computer Science faculty	AgRD 4	6
		R&D expenditures by ICT firms	AgRD 5	7
		ICT FP7 funding	AgRD 6	18
		ICT FP7 participations	AgRD 7	17
		ICT FP7 funding to SMEs	AgRD 8	18
		ICT FP7 participations by SMEs	AgRD 9	17
		Location of ICT R&D centres	AgRD 10	314
		Ownership of ICT R&D centres	AgRD 11	16
		Scientific publications in Computer Science	AgRD 12	4
	Internationalisation	Outward ICT R&D internationalisation	IntRD 1	16
		Inward ICT R&D internationalisation	IntRD 2	260
	Networking	Degree in ICT R&D network	NetRD 1	4
		Closeness centrality in ICT R&D network	NetRD 2	4
		Betweenness centrality in ICT R&D network	NetRD 3	7
		Eigenvector centrality in ICT R&D network	NetRD 4	5
Innovation	Agglomeration	Investment in intangibles by ICT firms	AgIn 1	15
		Venture Capital financing to ICT firms	AgIn 2	1
		ICT patents	AgIn 3	372
	Internationalisation	International co-inventions	IntIn 1	561
	Networking	Degree in ICT innovation network	NetIn 1	50
		Closeness centrality ICT innovation network	NetIn 2	30
		Betweenness centrality ICT innovation network	NetIn 3	76
		Eigenvector centrality ICT innovation network	NetIn 4	11
Business	Agglomeration	Location of ICT Scoreboard Headquarters	AgBuss 1	20
		Ownership of ICT Scoreboard affiliates	AgBuss 2	6
		Location of ICT Scoreboard affiliates	AgBuss 3	1
		Location of ICT firms	AgBuss 4	1
		ICT employment	AgBuss 5	5
		Growth in ICT employment	AgBuss 6	82
		Turnover by ICT firms	AgBuss 7	5
		Growth in turnover by ICT firms	AgBuss 8	1264
		New business investments in the ICT sector	AgBuss 9	2
	Internationalisation	Outward ICT business internationalisation	IntBuss 1	27
		Inward ICT business internationalisation	IntBuss 2	2
	Networking	In-degree in ICT business network	NetBuss 1	1
		Out-degree in ICT business network	NetBuss 2	5
		Closeness centrality in ICT business network	NetBuss 3	2
		Betweenness centrality in ICT business network	NetBuss 4	4
		Eigenvector centrality in ICT business network	NetBuss 5	1

Note: The table reports the performance of Inner London East (UKI12) in each out of the 42 indicators used in the EIPE ranking and grouped around three dimensions, i.e. ICT R&D, ICT Innovation and ICT Business. The scale represents the rank in the comparison with the remaining 1,302 European Nuts 3 regions. For further methodological details please refer to Annexes of the current report and to the methodological report documenting the methodology behind the EIPE ranking (De Prato and Nepelski 2013a).

Figure 8: Performance of Inner East London across 42 EIPE indicators



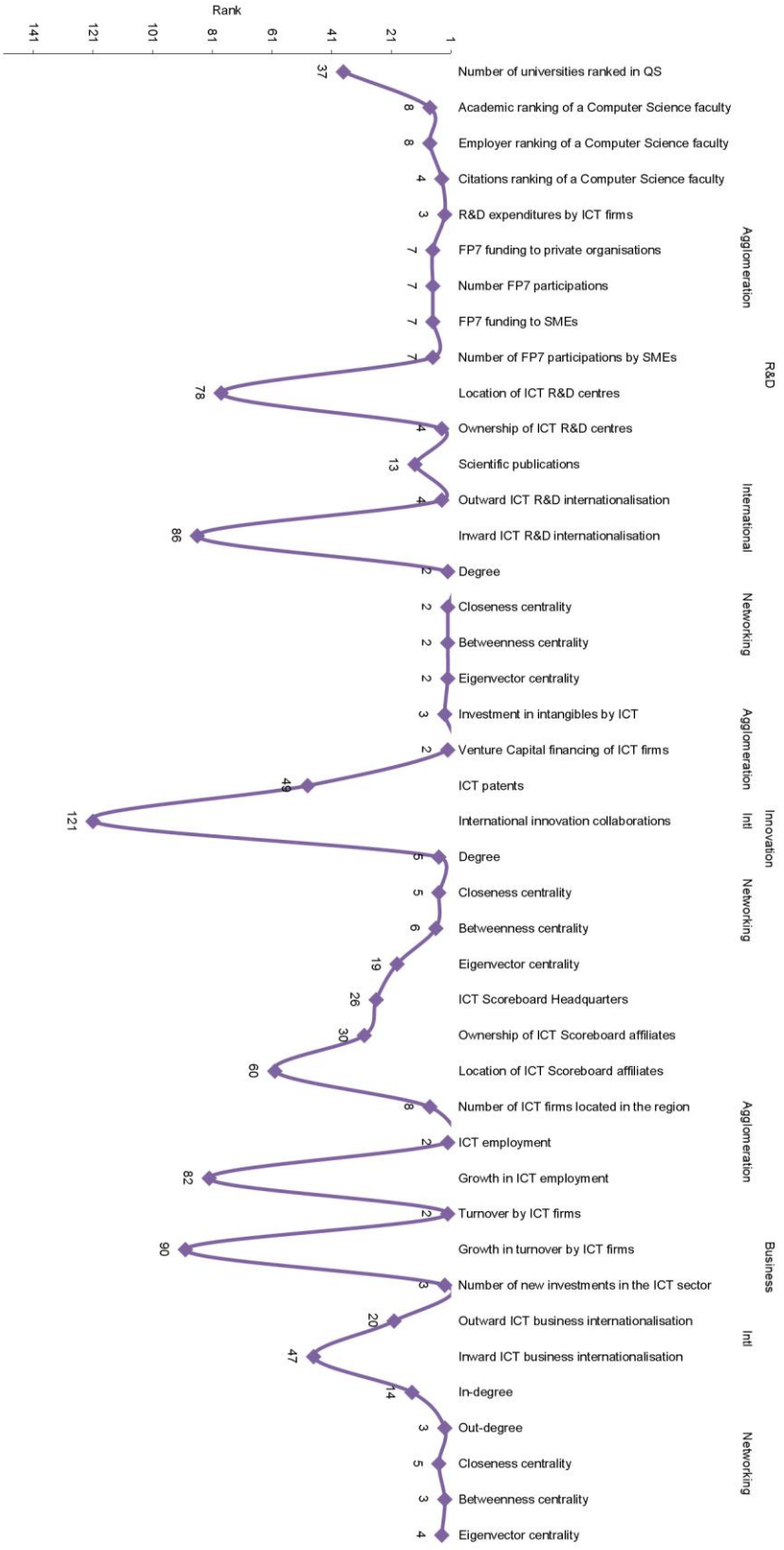
3.3 Paris

Table 5: Paris EIPE ID card

Activity	Characteristic	Name of Indicator	Indicator ID	Rank
R&D	Agglomeration	Universities ranked in the QS University Ranking	AgRD 1	37
		Academic ranking of a Computer Science faculty	AgRD 2	8
		Employer ranking of a Computer Science faculty	AgRD 3	8
		Citations ranking of a Computer Science faculty	AgRD 4	4
		R&D expenditures by ICT firms	AgRD 5	3
		ICT FP7 funding	AgRD 6	7
		ICT FP7 participations	AgRD 7	7
		ICT FP7 funding to SMEs	AgRD 8	7
		ICT FP7 participations by SMEs	AgRD 9	7
		Location of ICT R&D centres	AgRD 10	78
		Ownership of ICT R&D centres	AgRD 11	4
		Scientific publications in Computer Science	AgRD 12	13
	Internationalisation	Outward ICT R&D internationalisation	IntRD 1	4
		Inward ICT R&D internationalisation	IntRD 2	86
	Networking	Degree in ICT R&D network	NetRD 1	2
		Closeness centrality in ICT R&D network	NetRD 2	2
		Betweenness centrality in ICT R&D network	NetRD 3	2
		Eigenvector centrality in ICT R&D network	NetRD 4	2
Innovation	Agglomeration	Investment in intangibles by ICT firms	AgIn 1	3
		Venture Capital financing to ICT firms	AgIn 2	2
		ICT patents	AgIn 3	49
	Internationalisation	International co-inventions	IntIn 1	121
	Networking	Degree in ICT innovation network	NetIn 1	5
		Closeness centrality ICT innovation network	NetIn 2	5
		Betweenness centrality ICT innovation network	NetIn 3	6
		Eigenvector centrality ICT innovation network	NetIn 4	19
Business	Agglomeration	Location of ICT Scoreboard Headquarters	AgBuss 1	26
		Ownership of ICT Scoreboard affiliates	AgBuss 2	30
		Location of ICT Scoreboard affiliates	AgBuss 3	60
		Location of ICT firms	AgBuss 4	8
		ICT employment	AgBuss 5	2
		Growth in ICT employment	AgBuss 6	82
		Turnover by ICT firms	AgBuss 7	2
		Growth in turnover by ICT firms	AgBuss 8	90
		New business investments in the ICT sector	AgBuss 9	3
	Internationalisation	Outward ICT business internationalisation	IntBuss 1	20
		Inward ICT business internationalisation	IntBuss 2	47
	Networking	In-degree in ICT business network	NetBuss 1	14
		Out-degree in ICT business network	NetBuss 2	3
		Closeness centrality in ICT business network	NetBuss 3	5
		Betweenness centrality in ICT business network	NetBuss 4	3
		Eigenvector centrality in ICT business network	NetBuss 5	4

Note: The table reports the performance of Paris (FR101) in each out of the 42 indicators used in the EIPE ranking and grouped around three dimensions, i.e. ICT R&D, ICT Innovation and ICT Business. The scale represents the rank in the comparison with the remaining 1,302 European Nuts 3 regions. For further methodological details please refer to Annexes of the current report and to the methodological report documenting the methodology behind the EIPE ranking (De Prato and Nepelski 2013a).

Figure 9: Performance of Paris across 42 EIPE indicators



3.4 European ICT Poles of Excellence and their neighbourhoods

3.4.1 Munchen Kreisfreie Stadt

Figure 10: Geographical position of EIPE in Germany

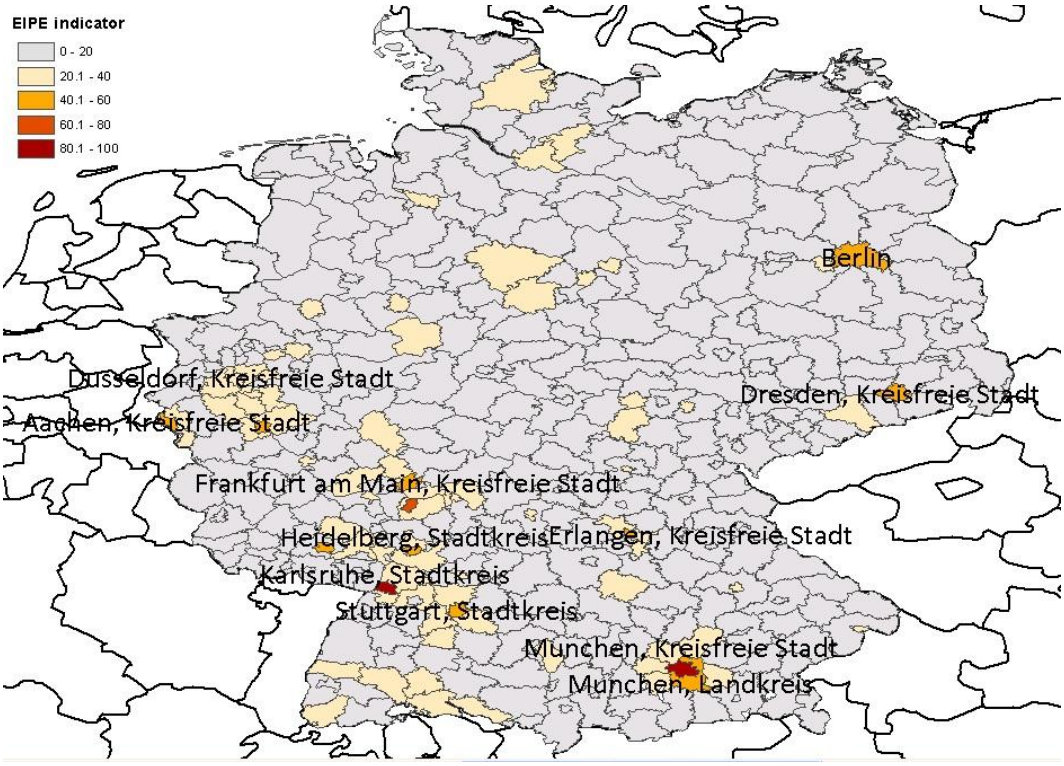
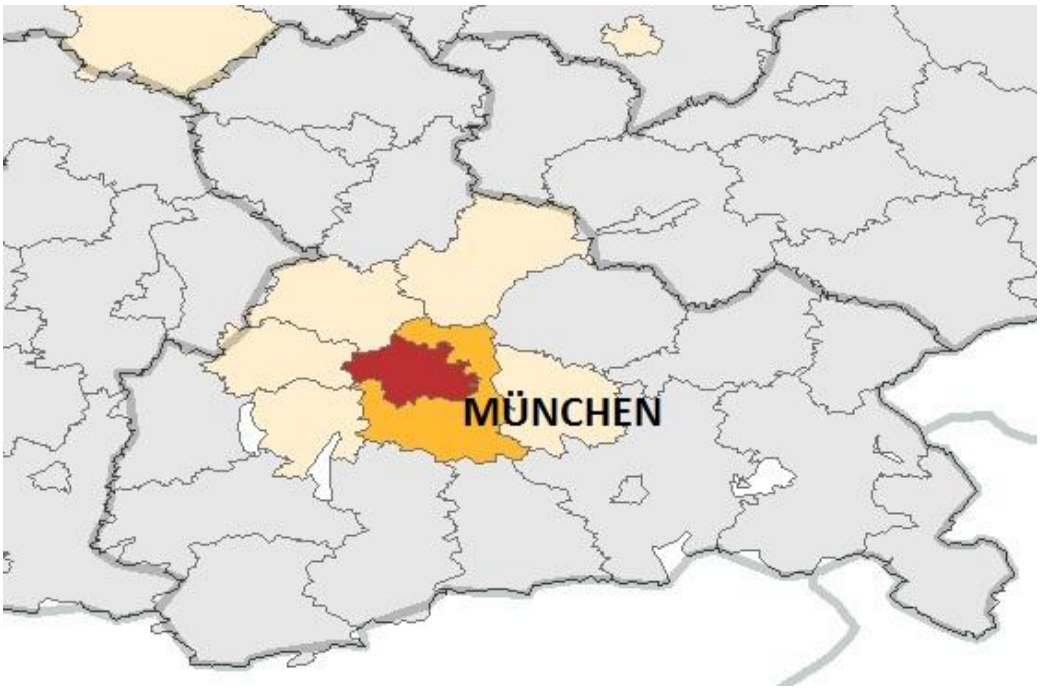


Figure 11: München Kreisfreie Stadt within NUTS2 region Oberbayern (NUTS1: Bayern)



3.4.2 Inner London East

Figure 12: Geographical position of EIPE in the UK

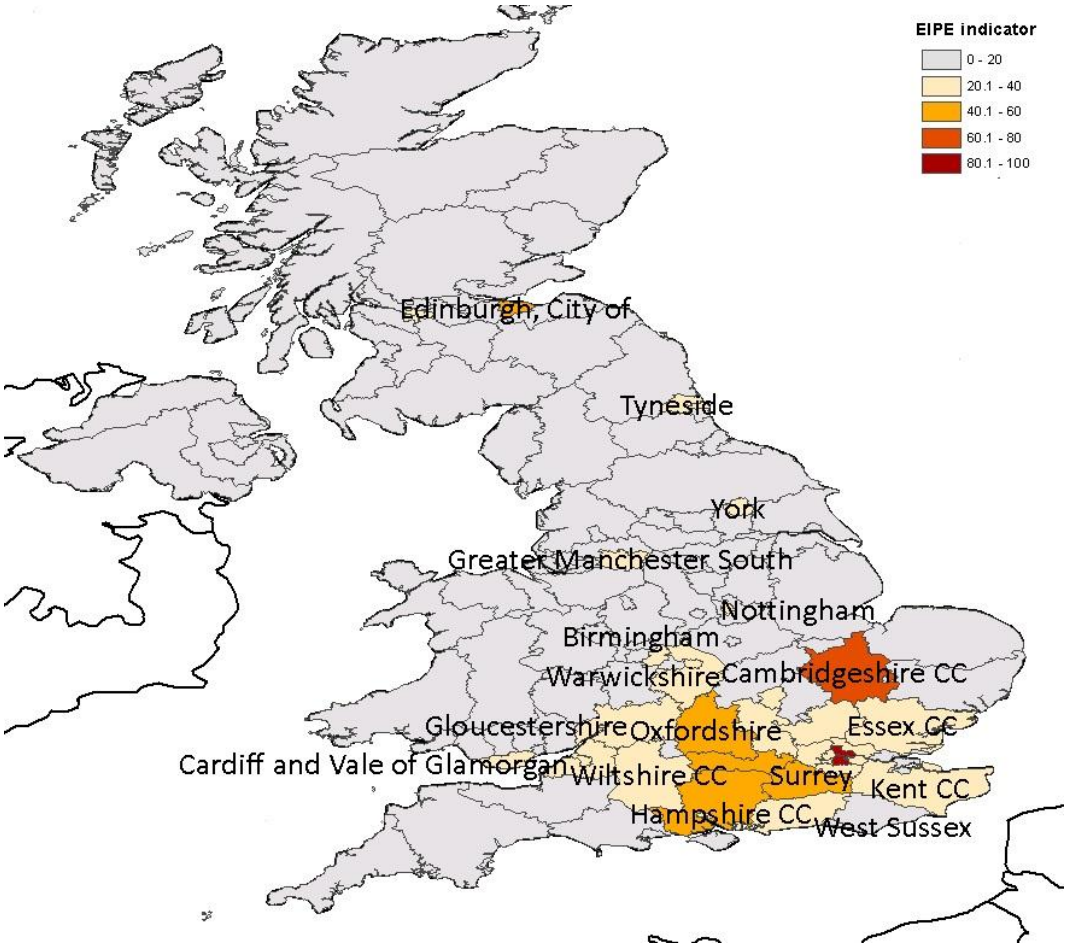
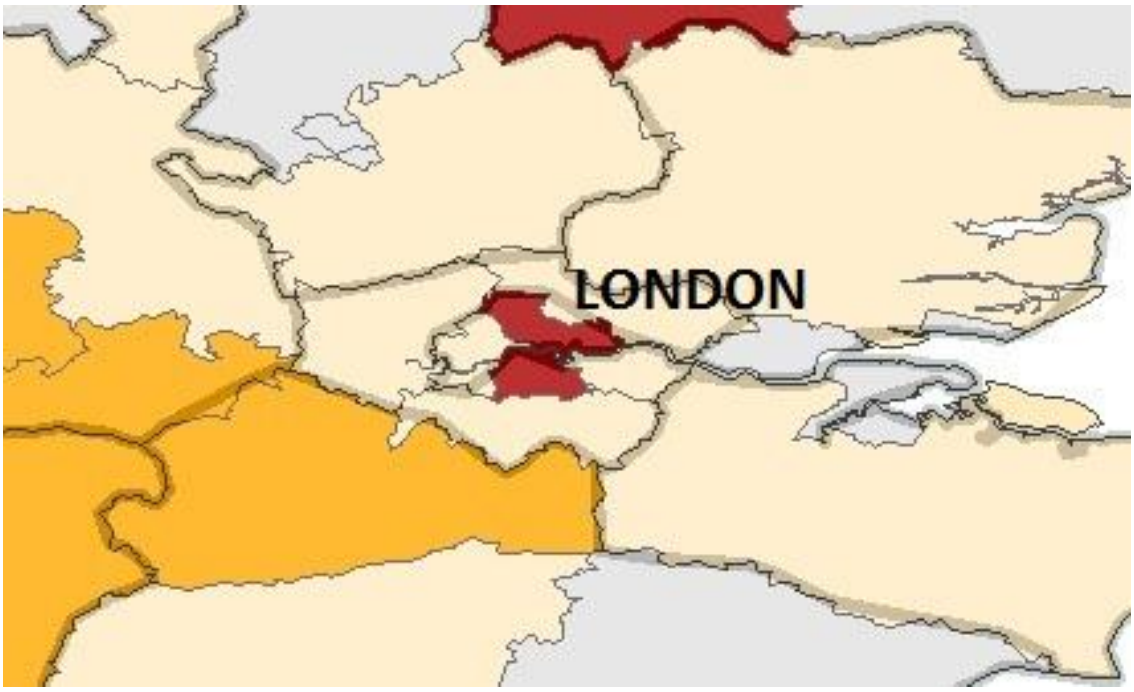


Figure 13: Inner London East within NUTS2 region Inner London (NUTS1: London)



3.4.3 Paris

Figure 14: Geographical position of EIPE in France

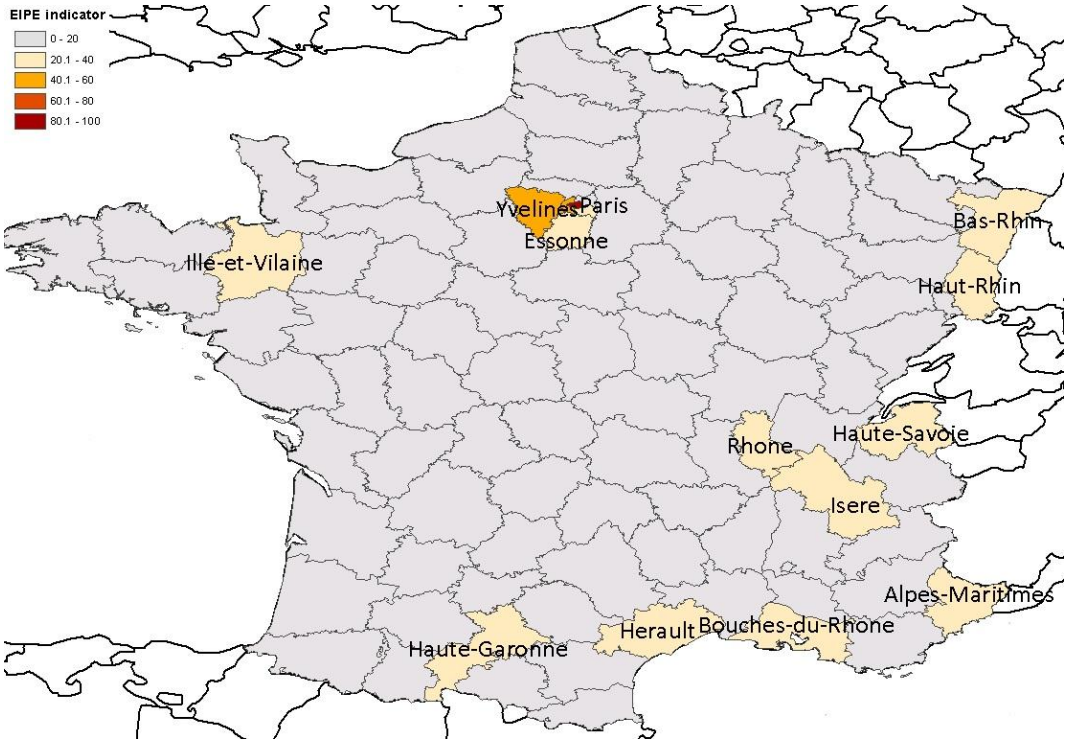
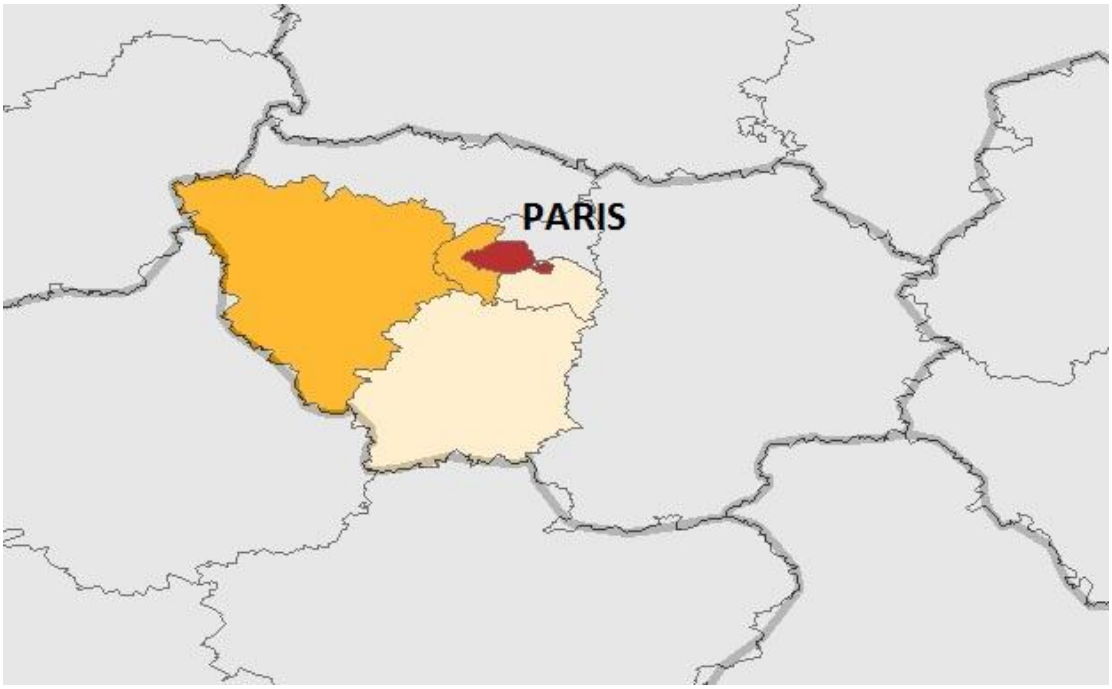


Figure 15: Paris within NUTS2 region Ile-de-France (NUTS1: Ile-de-France)



4. The ICT Activity Sub-indicators

The methodological framework proposed and described in the second EIPE Report allows us to identify a set of 42 indicators, attributed to a matrix of ICT activities and their characterisation (De Prato and Nepelski 2013a), as shown in Figure 2. A composite sub-indicator (CSI) has been developed for each of the ICT activities in order to account for the performance and endowment of regions.

The definitions adopted for the ICT activities are:

- **R&D activities**: Research and development comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge and the use of this stock of knowledge to devise new applications (OECD 2002). R&D is often scientific or for the development of particular technologies and is frequently carried out as corporate or governmental activity (OECD 2008a).
- **Innovation activities**: Innovations comprise implemented technologically-new products and processes and significant technological improvements in products and processes (OECD 2005).
- **Business activities**: These activities relate to the production of tangible and intangible goods and services that are produced and meet the needs of consumers in the market and encompass the aggregate economic activities of the commercial and manufacturing sectors of an economy.

In this section, the composite EIPE Sub-Indicators (CSI), computed on the basis of the indicators corresponding to each activity, are presented.

For each CSI, the ranking of 30 regions with the highest result in terms of the analysed indicator is presented. Then, the geographic distribution of each ICT activity is given on the map of Europe at NUTS 3 level. Finally, some descriptive statistics and a frequency graph are provided.

4.1 The ICT R&D Composite Sub-indicator

Table 6: Top performing regions according to the ICT R&D CSI

Rank	NUTS3 Code	Region name	ICT R&D SI	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	DE122	Karlsruhe, Stadtkreis	96	4
3	FR101	Paris	94	3
4	NL333	Delft en Westland	83	17
5	UKI12	Inner London - East	78	2
6	BE242	Arr. Leuven	73	11
7	DEB32	Kaiserslautern, Kreisfreie Stadt	67	36
8	FI181	Uusimaa	62	9
9	DEA21	Aachen, Kreisfreie Stadt	60	18
10	DE125	Heidelberg, Stadtkreis	57	23
11	UKM25	Edinburgh, City of	55	20
12	NL414	Zuidoost-Noord-Brabant	54	8
13	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	52	25
14	DE711	Darmstadt, Kreisfreie Stadt	51	7
15	UKH12	Cambridgeshire CC	51	5
16	ITC45	Milano	51	14
17	NL326	Groot-Amsterdam	50	10
18	ITE43	Roma	48	40
19	GR300	Attiki	48	49
20	AT130	Wien	47	27
21	IE021	Dublin	46	16
22	SE110	Stockholms lan	46	6
23	ES511	Barcelona	44	42
24	UKJ14	Oxfordshire	43	19
25	DE111	Stuttgart, Stadtkreis	41	21
26	DEA22	Bonn, Kreisfreie Stadt	40	12
27	ES300	Madrid	39	28
28	UKE21	York	39	63
29	DE300	Berlin	38	15
30	PL127	Miasto Warszawa	38	50

Note: The table includes the ranking of 30 best scoring out of 1303 European NUTS 3 regions. The regions are ranked based on their performance measured by the ICT R&D Sub-Indicator. The scale represents a normalized scale with minimum 0 and maximum 100. The ICT R&D Sub-Indicator is based on equally weighted 18 indicators. For further methodological details please refer to Annexes of the current report and to the methodological report documenting the methodology behind the EIPE ranking (De Prato and Nepelski 2013a).

Figure 16: Distribution of the ICT R&D activity in Europe according to the ICT R&D CSI

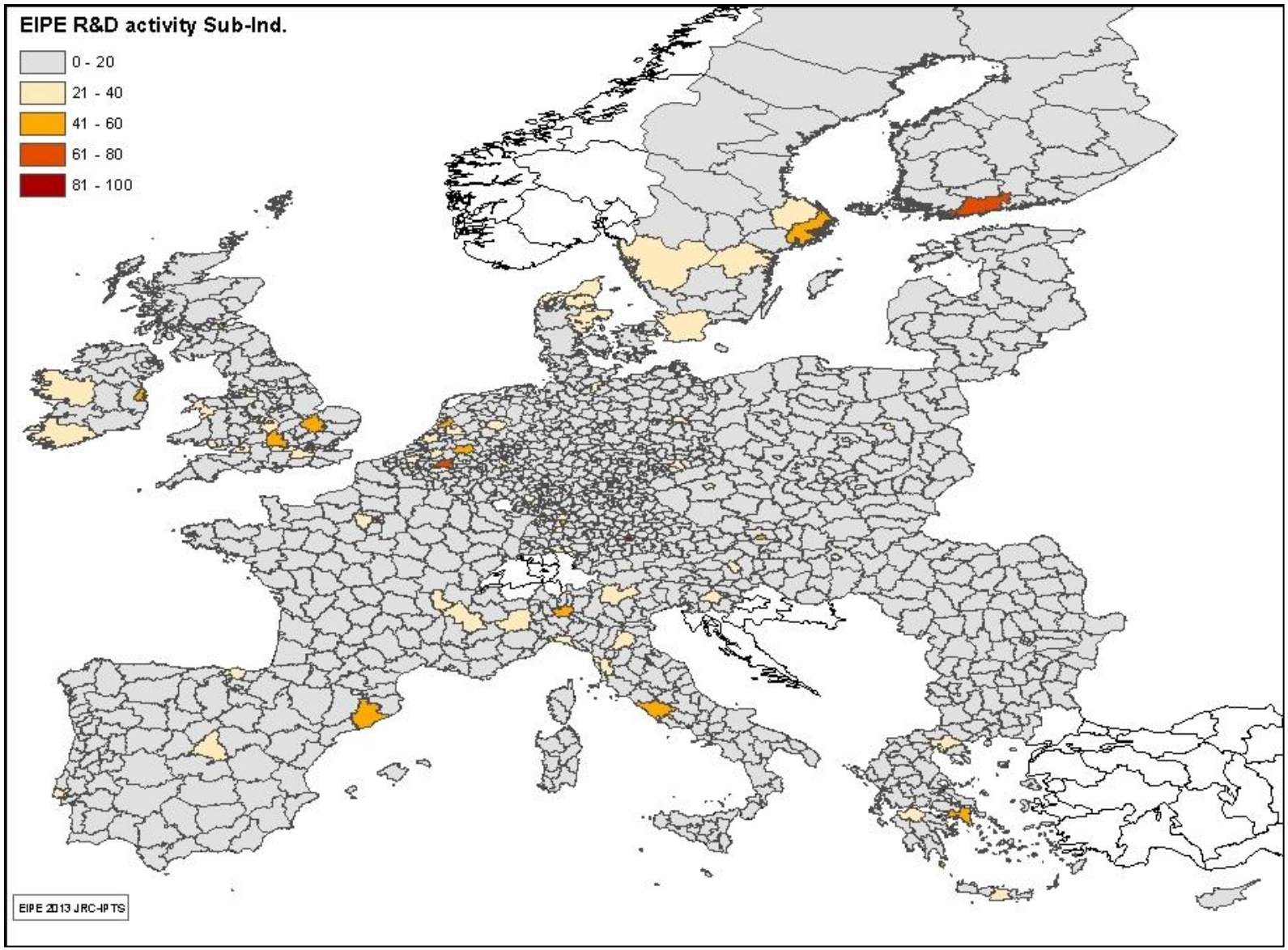


Figure 17: Frequency of the ICT R&D CSI values

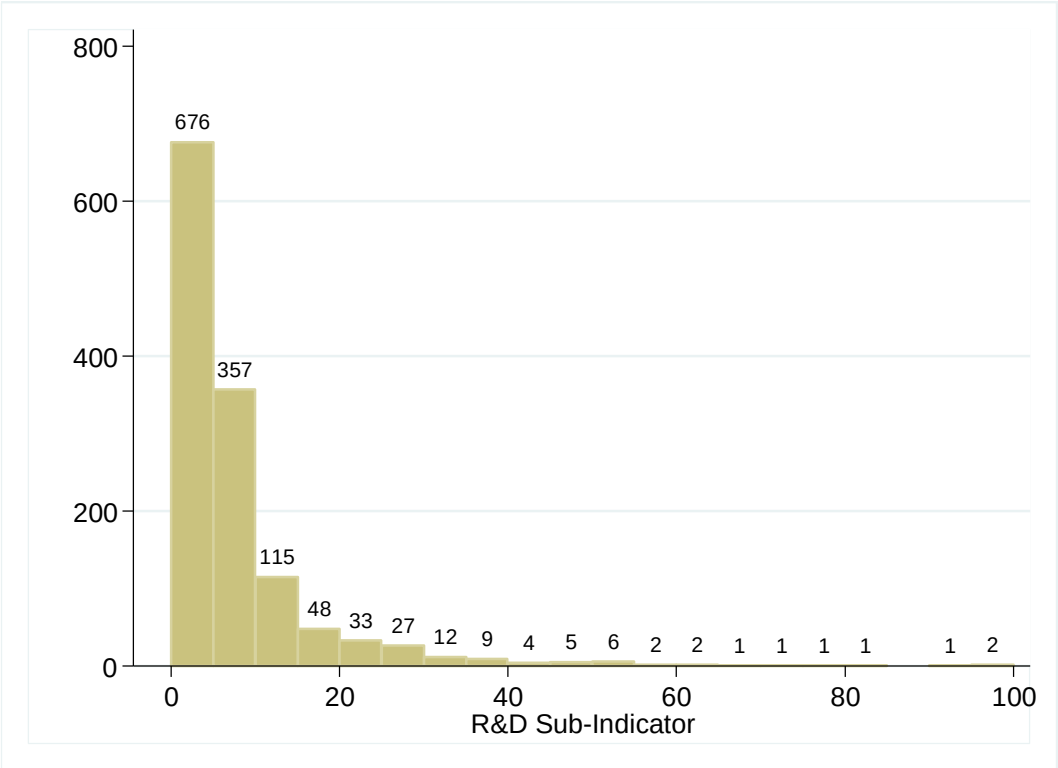


Table 7: Descriptive statistics of the ICT R&D CSI

Number of observations	Mean value	Standard deviation	Variance
1303.00	6.69	10.61	112.56

4.2 The ICT Innovation Composite Sub-indicator

Table 8: Top performing regions according to the ICT Innovation CSI

Rank	NUTS3 Code	Region name	ICT Innovation SI	EIPE Rank
1	UKH12	Cambridgeshire CC	100	5
2	SE110	Stockholms lan	91	6
3	DE212	Munchen, Kreisfreie Stadt	91	1
4	FR101	Paris	88	3
5	NL414	Zuidoost-Noord-Brabant	80	8
6	DE21H	Munchen, Landkreis	76	22
7	DE300	Berlin	75	15
8	UKJ33	Hampshire CC	72	31
9	UKI12	Inner London - East	69	2
10	UKJ11	Berkshire	67	26
11	UKJ14	Oxfordshire	66	19
12	FR105	Hauts-de-Seine	66	13
13	DEA21	Aachen, Kreisfreie Stadt	65	18
14	FI181	Uusimaa	65	9
15	UKJ23	Surrey	65	29
16	DED21	Dresden, Kreisfreie Stadt	63	34
17	DE252	Erlangen, Kreisfreie Stadt	63	32
18	ITC45	Milano	63	14
19	UKI11	Inner London - West	61	65
20	FR714	Isere	60	35
21	DEA22	Bonn, Kreisfreie Stadt	58	12
22	UKM25	Edinburgh, City of	56	20
23	DE711	Darmstadt, Kreisfreie Stadt	55	7
24	DE139	Lorrach	54	94
25	DE232	Regensburg, Kreisfreie Stadt	53	64
26	DK011	Byen Kobenhavn	53	24
27	UKI23	Outer London - West and North West	52	68
28	FR103	Yvelines	52	33
28	SE224	Skane lan	52	37
30	DEG03	Jena, Kreisfreie Stadt	51	39

Note: The table includes the ranking of 30 best scoring out of 1,303 European NUTS 3 regions. The regions are ranked based on their performance measured by the ICT Innovation Sub-indicator. The scale represents a normalized scale with minimum 0 and maximum 100. The ICT Innovation Sub-indicator is based on equally weighted 8 indicators. For further methodological details please refer to Annexes of the current report and to the methodological report documenting the methodology behind the EIPE ranking (De Prato and Nepelski 2013a).

Figure 18: Distribution of the ICT Innovation activity in Europe according to the ICT Innovation CSI

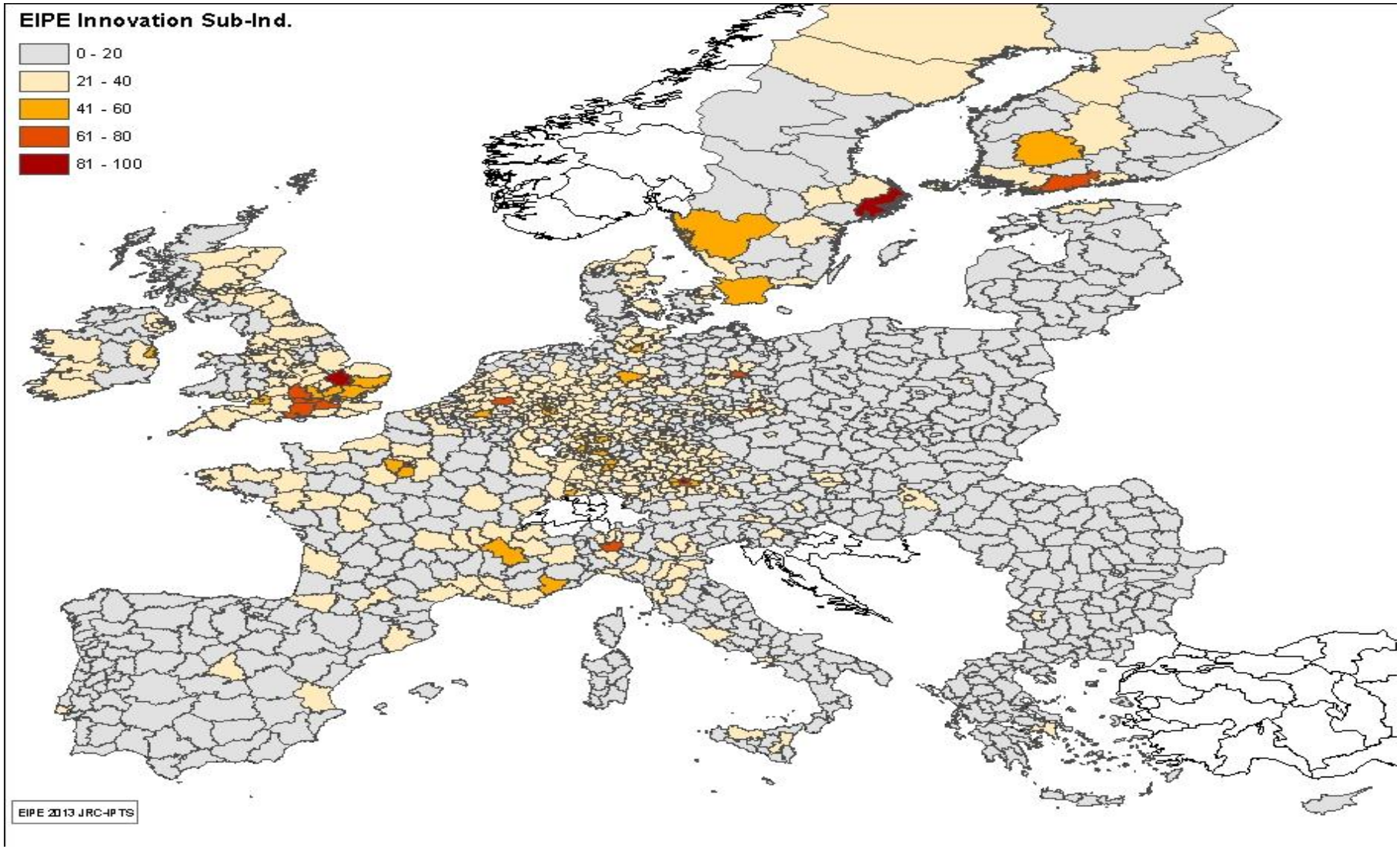


Figure 19: Frequency of the ICT Innovation CSI values

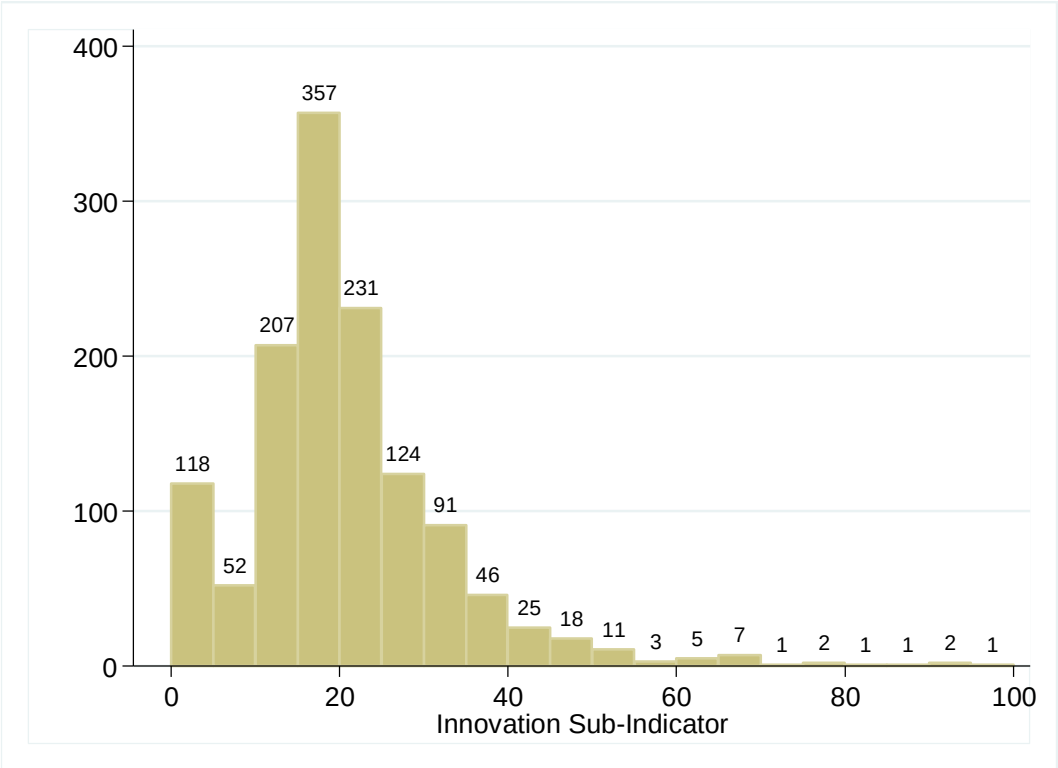


Table 9: Descriptive statistics of the ICT Innovation CSI

Number of observations	Mean value	Standard deviation	Variance
1303	20.04	12.45	155.03

4.3 The ICT Business activity composite sub-indicator

Table 10: Top performing regions according to the ICT Business CSI

Rank	NUTS3 Code	Region name	ICT Innovation SI	EIPE Rank
1	UKI12	Inner London - East	100	2
2	DE711	Darmstadt, Kreisfreie Stadt	79	7
3	NL326	Groot-Amsterdam	74	10
4	DE212	Munchen, Kreisfreie Stadt	62	1
5	DE122	Karlsruhe, Stadtkreis	62	4
6	FR101	Paris	59	3
7	SE110	Stockholms lan	59	6
8	FR105	Hauts-de-Seine	54	13
9	DEA22	Bonn, Kreisfreie Stadt	53	12
10	FI181	Uusimaa	51	9
11	UKH12	Cambridgeshire CC	49	5
12	IE021	Dublin	49	16
13	DE25C	Weissenburg-Gunzenhausen	47	118
14	DE718	Hochtaunuskreis	46	51
15	NL414	Zuidoost-Noord-Brabant	46	8
16	DEB11	Koblenz, Kreisfreie Stadt	44	83
17	ES300	Madrid	40	28
18	DK012	Kobenhavns omegn	40	41
19	DE712	Frankfurt am Main, Kreisfreie Stadt	39	30
20	DE111	Stuttgart, Stadtkreis	38	21
21	DK011	Byen Kobenhavn	38	24
22	ITC45	Milano	38	14
23	UKJ31	Portsmouth	37	91
24	DE300	Berlin	36	15
25	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	36	25
26	DEA11	Dusseldorf, Kreisfreie Stadt	36	38
27	DE21B	Freising	36	57
28	AT130	Wien	34	27
29	BE242	Arr. Leuven	33	11
30	DE21H	Munchen, Landkreis	32	22

Note: The table includes the ranking of 30 best scoring out of 1,303 European NUTS 3 regions. The regions are ranked based on their performance measured by the ICT Business Sub-indicator. The scale represents a normalized scale with minimum 0 and maximum 100. The ICT Business Sub-indicator is based on equally weighted 16 indicators. For further methodological details please refer to Annexes of the current report and to the methodological report documenting the methodology behind the EIPE ranking (De Prato and Nepelski 2013a).

Figure 20: Distribution of the ICT Business activity in Europe according to the ICT Business CSI

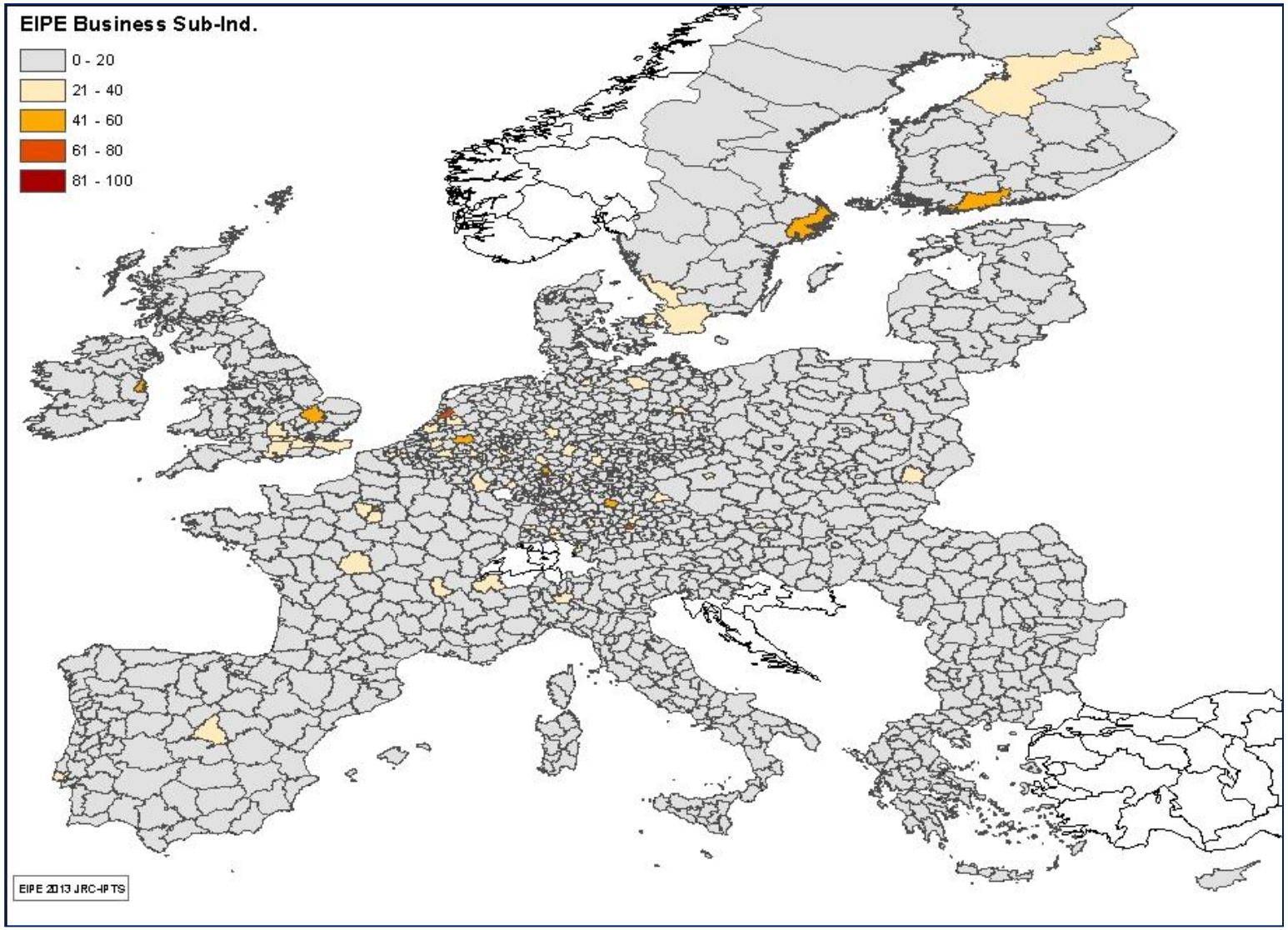


Figure 21: Frequency of the ICT Business CSI values

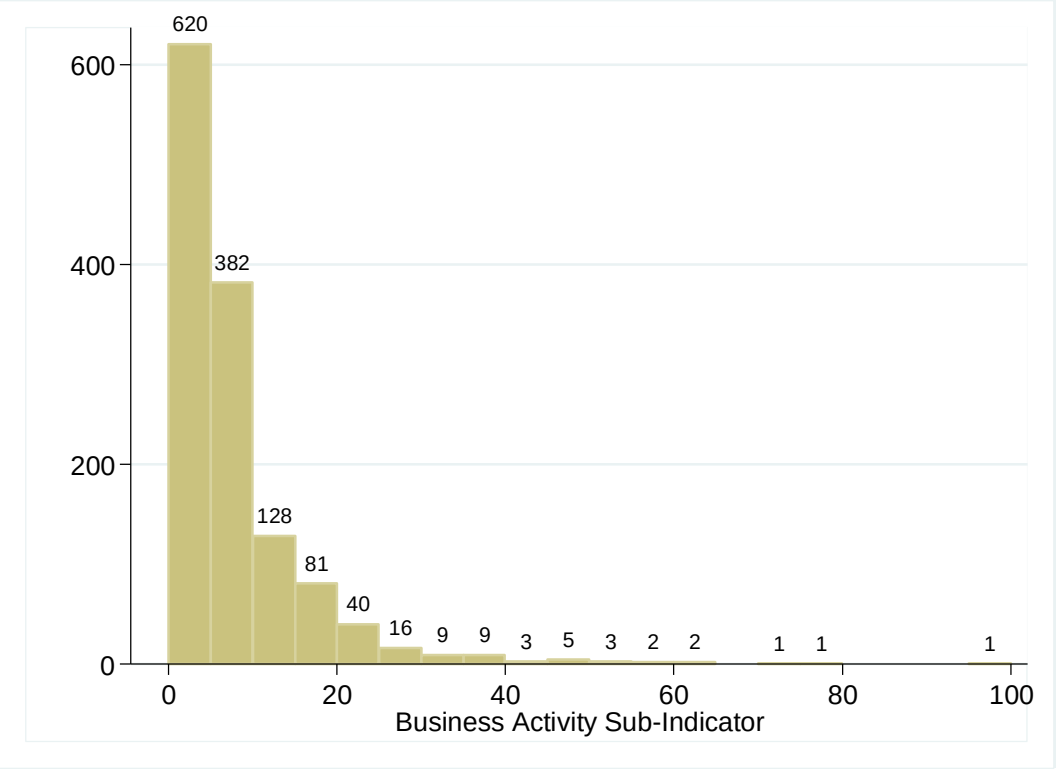


Table 11: Descriptive statistics of the ICT Business CSI

Number of observations	Mean value	Standard deviation	Variance
1303.00	7.95	8.47	71.80

5. Individual EIPE Indicators

A list of indicators for the EIPE project has been carefully selected on the basis of the EIPE methodological framework of activities and their characteristics and the discussion on their empirical measurements. The full list of these indicators meeting the characteristics specified by the definition, framework and criteria, can be found in Table 12. This list constitutes the EIPE ID card, which provides a schematic presentation of the organisation of the EIPE indicators around the three activities and their three characteristics. A full list of indicators and their description can be found in Section 6.1.

Table 12: Overview of the EIPE indicators: the EIPE ID card

Activity	Characteristic	Name of Indicator	Indicator ID	Nr
R&D	Agglomeration	Universities ranked in the QS University Ranking	AgRD 1	1
		Academic ranking of a Computer Science faculty	AgRD 2	2
		Employer ranking of a Computer Science faculty	AgRD 3	3
		Citations ranking of a Computer Science faculty	AgRD 4	4
		R&D expenditures by ICT firms	AgRD 5	5
		ICT FP7 funding to private organisations	AgRD 6	6
		ICT FP7 participations	AgRD 7	7
		ICT FP7 funding to SMEs	AgRD 8	8
		ICT FP7 participations by SMEs	AgRD 9	9
		Location of ICT R&D centres	AgRD 10	10
		Ownership of ICT R&D centres	AgRD 11	11
		Scientific publications in Computer Science	AgRD 12	12
	Internationalisation	Outward ICT R&D internationalisation	IntRD 1	13
		Inward ICT R&D internationalisation	IntRD 2	14
	Networking	Degree in ICT R&D network	NetRD 1	15
		Closeness centrality in ICT R&D network	NetRD 2	16
		Betweenness centrality in ICT R&D network	NetRD 3	17
		Eigenvector centrality in ICT R&D network	NetRD 4	18
Innovation	Agglomeration	Investment in intangibles by ICT firms	AgIn 1	19
		Venture Capital financing to ICT firms	AgIn 2	20
		ICT patents	AgIn 3	21
	Internationalisation	International co-inventions	IntIn 1	22
	Networking	Degree in ICT innovation network	NetIn 1	23
		Closeness centrality ICT innovation network	NetIn 2	24
		Betweenness centrality ICT innovation network	NetIn 3	25
		Eigenvector centrality ICT innovation network	NetIn 4	26
Business	Agglomeration	Location of ICT Scoreboard Headquarters	AgBuss 1	27
		Ownership of ICT Scoreboard affiliates	AgBuss 2	28
		Location of ICT Scoreboard affiliates	AgBuss 3	29
		Location of ICT firms	AgBuss 4	30
		ICT employment	AgBuss 5	31
		Growth in ICT employment	AgBuss 6	32
		Turnover by ICT firms	AgBuss 7	33
		Growth in turnover by ICT firms	AgBuss 8	34
		New business investments in the ICT sector	AgBuss 9	35
	Internationalisation	Outward ICT business internationalisation	IntBuss 1	36
		Inward ICT business internationalisation	IntBuss 2	37
	Networking	In-degree in ICT business network	NetBuss 1	38
		Out-degree in ICT business network	NetBuss 2	39
		Closeness centrality in ICT business network	NetBuss 3	40
		Betweenness centrality in ICT business network	NetBuss 4	41
		Eigenvector centrality in ICT business network	NetBuss 5	42

5.1 ICT R&D

5.1.1 Universities ranked in QS University Ranking

Table 13: Top ranking regions according to the Universities ranked in QS University Ranking indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKL12	Gwynedd	100	266
2	DE711	Darmstadt, Kreisfreie Stadt	83	7
3	DE125	Heidelberg, Stadtkreis	82	23
4	DE423	Potsdam, Kreisfreie Stadt	77	82
5	UKE21	York	60	63
6	NL333	Delft en Westland	55	17
7	DE142	Tubingen, Landkreis	54	55
8	UKJ32	Southampton	50	130
9	DEA21	Aachen, Kreisfreie Stadt	46	18
10	DE122	Karlsruhe, Stadtkreis	40	4
11	UKF14	Nottingham	39	139
12	UKG33	Coventry	38	169
13	DEA22	Bonn, Kreisfreie Stadt	36	12
13	UKJ14	Oxfordshire	36	19
13	SE121	Uppsala lan	36	47
16	DK011	Byen Kobenhavn	35	24
17	BE310	Arr. Nivelles	32	151
18	UKI12	Inner London - East	30	2
18	NL331	Agglomeratie Leiden en Bollenstreek	30	70
20	UKK11	Bristol, City of	27	48
21	UKL22	Cardiff and Vale of Glamorgan	26	107
22	BE242	Arr. Leuven	25	11
22	UKM25	Edinburgh, City of	25	20
24	UKG31	Birmingham	23	83
25	BE234	Arr. Gent	22	94
26	UKE32	Sheffield	21	270
27	DE111	Stuttgart, Stadtkreis	20	21
27	IE021	Dublin	20	16
27	UKH12	Cambridgeshire CC	20	5

Indicator description	
Indicator ID	AgRD 1
Name of indicator	Universities ranked in the QS University Ranking
What does it measure?	Measures the number of universities in QS university ranking based in a region
Unit of measurement	Region's share in the total number of EU ranked universities to a region's share in the EU population
Definition of ICT dimension	none
Unit of observation	NUTS 3
Source	QS World University Rankings by QS (see Section 8.1)
Reference year(s) considered	2011

Figure 22: Frequency of the Universities ranked in QS University Ranking indicator values

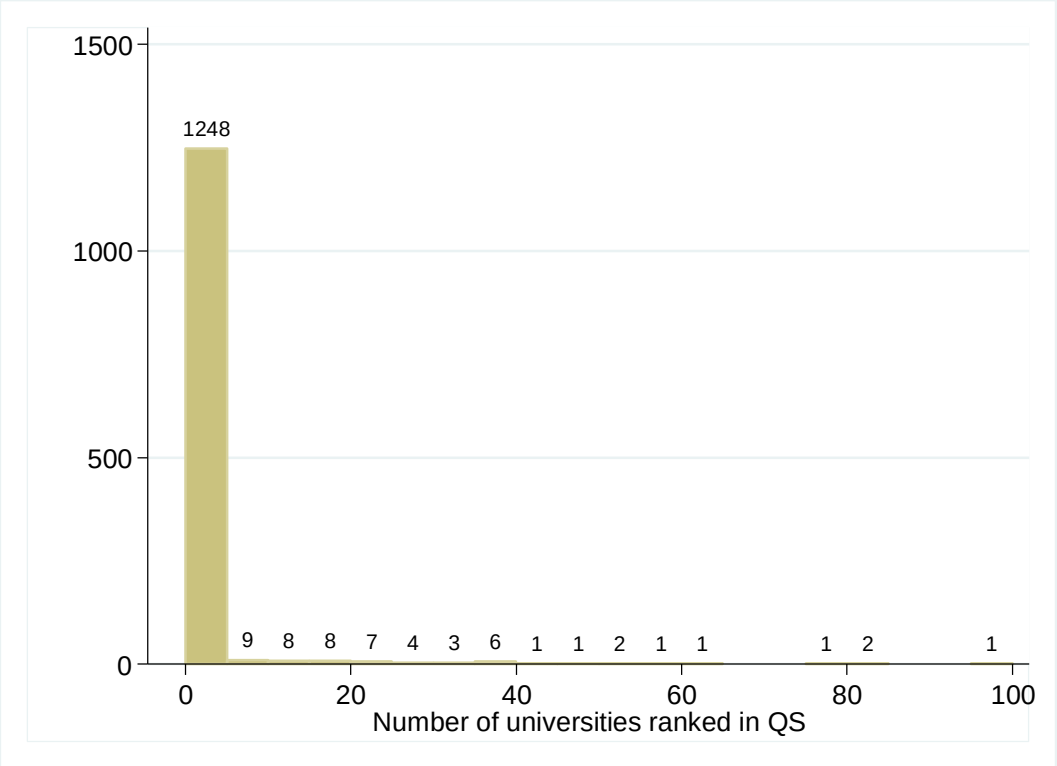


Table 14: Descriptive statistics of the Universities ranked in QS University Ranking indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.16	7.01	49.17

5.1.2 Academic Ranking of a Computer Science Faculty

Table 15: Top ranking regions according to the Academic Computer Science faculty QS Ranking indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKH12	Cambridgeshire CC	100	5
2	UKJ14	Oxfordshire	87	19
3	UKI22	Outer London - South	73	114
4	UKM25	Edinburgh, City of	58	20
5	UKD31	Greater Manchester South	49	88
6	NL333	Delft en Westland	46	17
7	UKI12	Inner London - East	44	2
8	FR101	Paris	42	3
9	DE300	Berlin	39	15
10	DE212	Munchen, Kreisfreie Stadt	38	1
10	BE242	Arr. Leuven	38	11
12	NL326	Groot-Amsterdam	38	10
13	UKM34	Glasgow City	37	78
14	DEA21	Aachen, Kreisfreie Stadt	36	18
15	NL414	Zuidoost-Noord-Brabant	35	8
16	UKJ32	Southampton	35	130
17	DE122	Karlsruhe, Stadtkreis	35	4
18	NL310	Utrecht	34	46
19	FI181	Uusimaa	32	9
20	IE021	Dublin	32	16
21	ITC45	Milano	32	14
22	DK042	Ostjylland	32	129
23	AT130	Wien	31	27
24	ITE43	Roma	31	40
25	SE110	Stockholms lan	31	6
26	UKK11	Bristol, City of	28	48
27	FR714	Isere	28	35
28	UKG33	Coventry	27	169
29	UKE21	York	27	63
29	ITD55	Bologna	27	76

Indicator description	
Indicator ID	AgRD 2
Name of indicator	Academic ranking of a Computer Science faculty
What does it measure?	Measures the performance of the Computer Science faculty according to the academic ranking of QS
Unit of measurement	The highest rank of a Computer Science faculty in the academic ranking
Definition of ICT dimension	Computer science faculty
Unit of observation	NUTS 3
Source	QS World University Rankings by QS (see Section 8.1)
Reference year(s) considered	2011

Figure 23: Frequency of the Academic Computer Science faculty QS Ranking indicator values

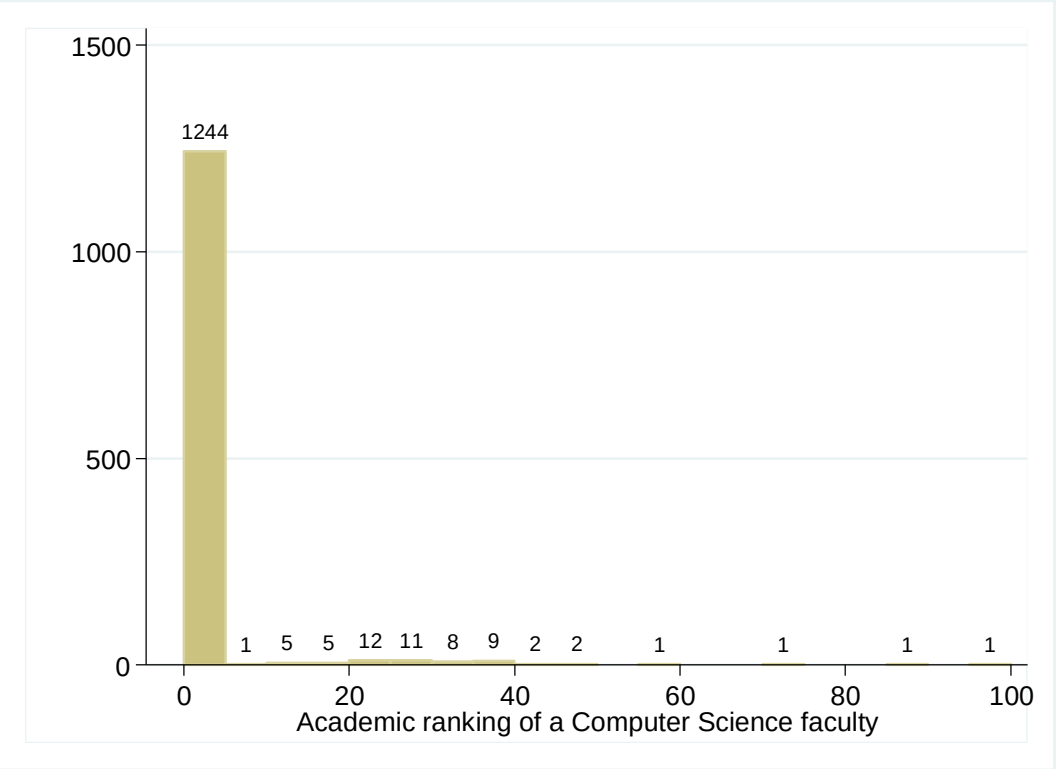


Table 16: Descriptive statistics of the Academic Computer Science faculty QS Ranking indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.38	7.25	52.59

5.1.3 Employer Ranking of a Computer Science Faculty

Table 17: Top ranking regions according to the Employer Computer Science faculty QS Ranking indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKH12	Cambridgeshire CC	100	5
2	UKJ14	Oxfordshire	95	19
3	UKI12	Inner London - East	68	2
4	UKI22	Outer London - South	57	114
5	UKM25	Edinburgh, City of	53	20
6	ITC45	Milano	49	14
6	UKK11	Bristol, City of	49	48
8	FR101	Paris	48	3
9	UKD31	Greater Manchester South	48	88
10	UKG33	Coventry	47	169
11	DE212	Munchen, Kreisfreie Stadt	45	1
12	IE021	Dublin	38	16
12	FI181	Uusimaa	38	9
14	NL335	Groot-Rijnmond	38	72
15	ITD55	Bologna	36	76
16	UKM34	Glasgow City	36	78
17	DE122	Karlsruhe, Stadtkreis	35	4
18	DK011	Byen Kobenhavn	34	24
19	ES511	Barcelona	33	42
20	UKE42	Leeds	33	284
21	DEA21	Aachen, Kreisfreie Stadt	33	18
22	SE110	Stockholms lan	33	6
23	SE224	Skane lan	33	37
24	NL333	Delft en Westland	32	17
25	UKK12	Bath and North East Somerset, North	32	69
26	UKG31	Birmingham	32	83
27	NL326	Groot-Amsterdam	31	10
28	UKF22	Leicestershire CC and Rutland	30	208
29	DE300	Berlin	29	15
30	GR300	Attiki	28	49

Indicator description	
Indicator ID	AgRD 3
Name of indicator	Employer ranking of a Computer Science faculty
What does it measure?	Measures the performance of the Computer Science faculty according to the employer ranking of QS
Unit of measurement	The highest rank of a Computer Science faculty in the employer ranking
Definition of ICT dimension	Computer science faculty
Unit of observation	NUTS 3
Source	QS World University Rankings by QS (see Section 8.1)
Reference year(s) considered	2011

Figure 24: Frequency of the Employer ranking of a Computer Science faculty indicator values

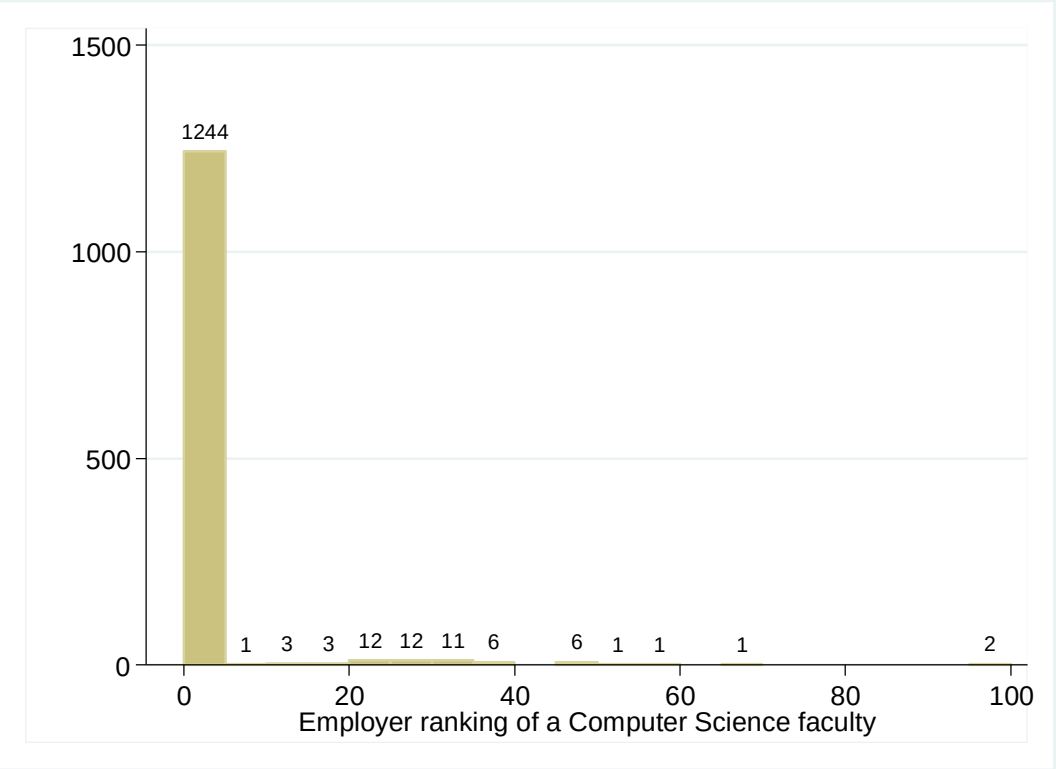


Table 18: Descriptive statistics of Employer Computer Science faculty QS Ranking indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.47	7.63	58.27

5.1.4 Citations Ranking of a Computer Science Faculty

Table 19: Top ranking regions according to the Citations Computer Science faculty QS Ranking indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKL12	Gwynedd	100	266
2	PL127	Miasto Warszawa	91	50
3	NL335	Groot-Rijnmond	77	72
4	FR101	Paris	75	3
5	IE021	Dublin	73	16
6	UKI12	Inner London - East	72	2
7	NL331	Agglomeratie Leiden en Bollenstreek	64	70
8	UKJ14	Oxfordshire	61	19
9	NL326	Groot-Amsterdam	61	10
10	UKI11	Inner London - West	58	65
11	UKH12	Cambridgeshire CC	55	5
12	DEA22	Bonn, Kreisfreie Stadt	51	12
13	DE423	Potsdam, Kreisfreie Stadt	50	82
14	UKI22	Outer London - South	50	114
15	DK011	Byen Kobenhavn	49	24
15	UKD31	Greater Manchester South	49	88
17	BE100	Arr. de Bruxelles-Capitale / Arr. van	49	25
18	BE211	Arr. Antwerpen	47	54
19	GR122	Thessaloniki	46	171
20	FI181	Uusimaa	45	9
20	UKJ32	Southampton	45	130
22	DE142	Tubingen, Landkreis	44	55
23	SE121	Uppsala lan	43	47
24	SE224	Skane lan	42	37
25	BE242	Arr. Leuven	41	11
26	UKE32	Sheffield	41	270
27	ES511	Barcelona	40	42
28	DK042	Ostjylland	37	129
29	DE212	Munchen, Kreisfreie Stadt	37	1
30	BE234	Arr. Gent	37	94

Indicator description	
Indicator ID	AgRD 4
Name of indicator	Citations ranking of a Computer Science faculty
What does it measure?	Measures the performance of the Computer Science faculty according to the citations ranking of QS
Unit of measurement	The highest rank of a Computer Science faculty in the citations ranking
Definition of ICT dimension	Computer science faculty
Unit of observation	NUTS 3
Source	QS World University Rankings by QS (see Section 8.1)
Reference year(s) considered	2011

Figure 25: Frequency of the Citations Computer Science faculty QS Ranking indicator values

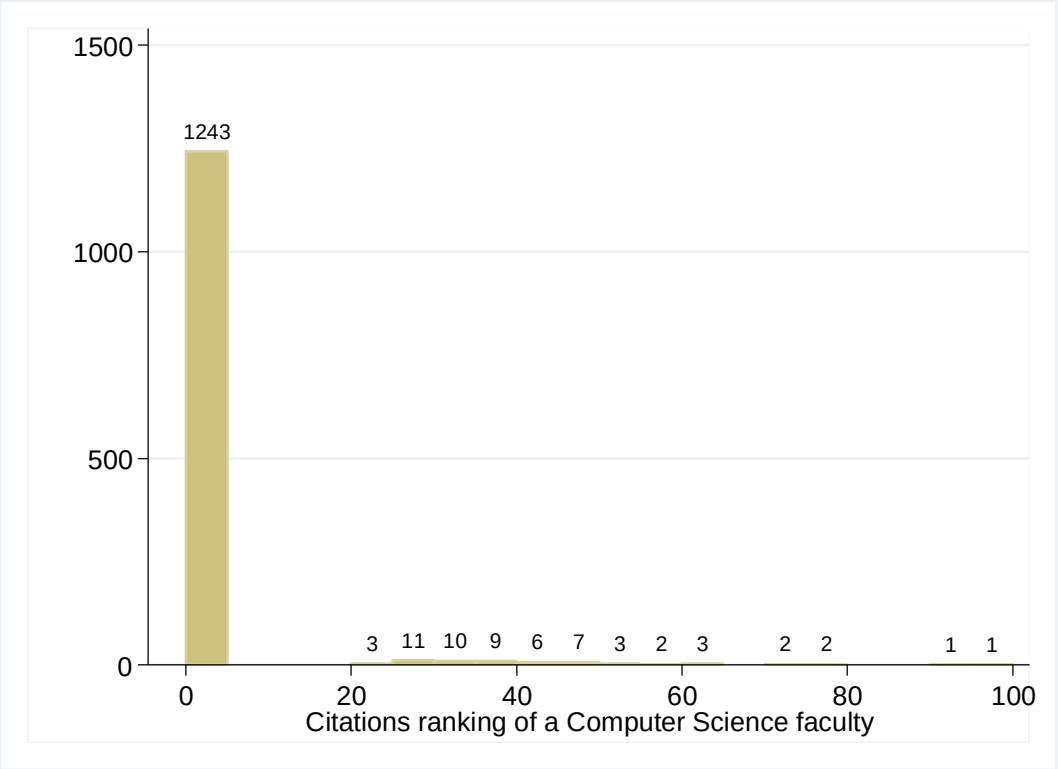


Table 20: Descriptive statistics of Citations Computer Science faculty QS Ranking indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.94	9.57	91.58

5.1.5 R&D Expenditures by ICT Firms

Table 21: Top ranking regions according to R&D expenditures by ICT firms indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE122	Karlsruhe, Stadtkreis	100	4
2	FI181	Uusimaa	63	9
3	FR101	Paris	36	3
4	SE110	Stockholms lan	31	6
5	DE212	Munchen, Kreisfreie Stadt	13	1
6	DEA22	Bonn, Kreisfreie Stadt	10	12
7	UKI12	Inner London - East	10	2
8	DE711	Darmstadt, Kreisfreie Stadt	9	7
9	NL414	Zuidoost-Noord-Brabant	9	8
10	UKH12	Cambridgeshire CC	8	5
11	DEA47	Paderborn	6	74
12	BE254	Arr. Kortrijk	4	162
13	BE253	Arr. Ieper	4	194
14	FR103	Yvelines	4	33
15	DE21B	Freising	4	57
16	NL230	Flevoland	4	280
17	UKI21	Outer London - East and North East	3	151
18	UKC22	Tyneside	3	175
19	DK032	Sydjylland	3	300
20	NL326	Groot-Amsterdam	3	10
21	DE235	Cham	3	284
22	UKE41	Bradford	3	298
23	ITC45	Milano	2	14
24	ES300	Madrid	2	28
25	DEA25	Aachen, Kreis	2	110
26	AT221	Graz	1	52
27	NL336	Zuidoost-Zuid-Holland	1	301
28	DK041	Vestjylland	1	279
29	AT223	Ostliche Obersteiermark	1	522
30	UKJ23	Surrey	1	29

Indicator description	
Indicator ID	AgRD 5
Name of indicator	R&D expenditures by ICT firms
What does it measure?	Measures the average annual amount spent on R&D in the ICT sector
Unit of measurement	Region's share in the R&D expenditures by ICT firms in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 26: Frequency of the R&D expenditures by ICT firms indicator values

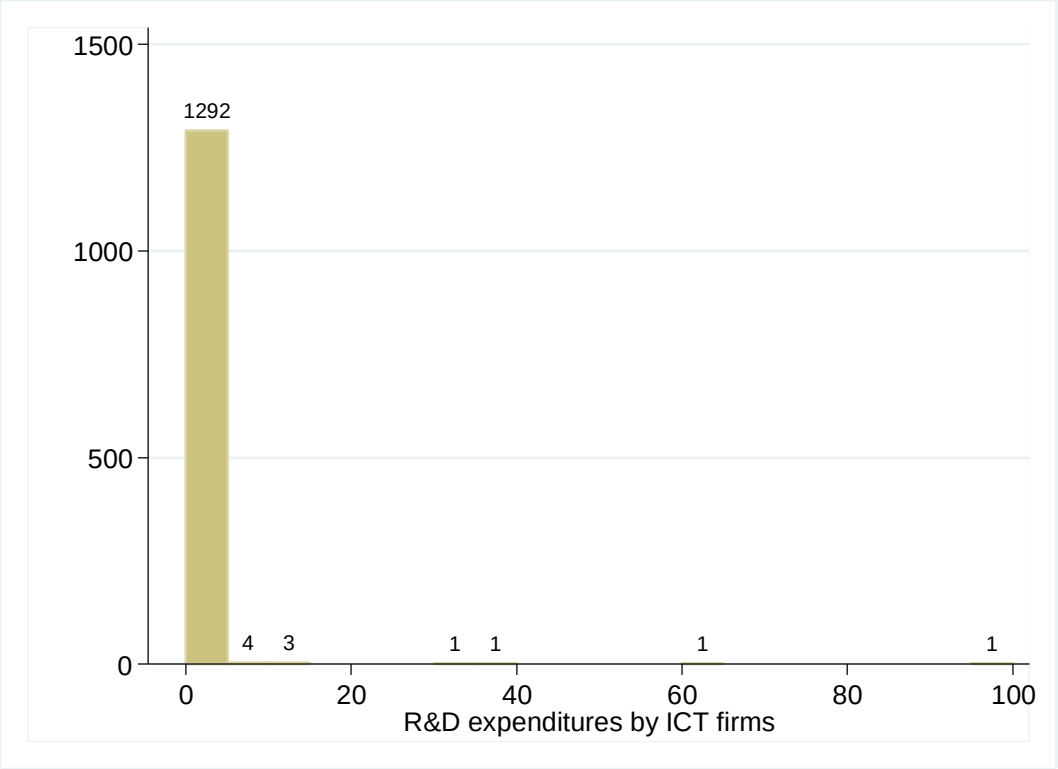


Table 22: Descriptive statistics of R&D expenditures by ICT firms indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.27	3.60	12.99

5.1.6 ICT FP7 Funding to Private Organisations

Table 23: Top ranking regions according to ICT FP7 funding to private organisations indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE122	Karlsruhe, Stadtkreis	100	4
2	DEB32	Kaiserslautern, Kreisfreie Stadt	82	36
3	NL333	Delft en Westland	68	17
4	DE212	Munchen, Kreisfreie Stadt	55	1
5	BE242	Arr. Leuven	46	11
6	DEA21	Aachen, Kreisfreie Stadt	33	18
7	FR101	Paris	29	3
8	DE125	Heidelberg, Stadtkreis	27	23
9	AT221	Graz	26	52
10	NL414	Zuidoost-Noord-Brabant	22	8
11	DE222	Passau, Kreisfreie Stadt	22	123
12	DE711	Darmstadt, Kreisfreie Stadt	22	7
13	UKG13	Warwickshire	21	85
14	UKD53	Sefton	21	223
15	ITE17	Pisa	20	165
15	GR431	Irakleio	20	251
17	DEB35	Mainz, Kreisfreie Stadt	19	44
18	UKI12	Inner London - East	19	2
19	DE111	Stuttgart, Stadtkreis	19	21
20	ITD20	Trento	19	198
21	DEF0F	Stormarn	18	190
22	DED16	Freiberg	17	103
23	FI181	Uusimaa	17	9
24	DEG03	Jena, Kreisfreie Stadt	17	39
25	UKM25	Edinburgh, City of	17	20
26	DE943	Oldenburg (Oldenburg), Kreisfreie Stadt	16	234
27	DEG0F	Ilm-Kreis	16	126
28	DED21	Dresden, Kreisfreie Stadt	16	34
29	DE232	Regensburg, Kreisfreie Stadt	14	64
30	AT332	Innsbruck	14	276

Indicator description	
Indicator ID	AgRD 6
Name of indicator	ICT FP7 funding
What does it measure?	Measures the amount received for research in ICT R&D
Unit of measurement	Region's share in the total EU ICT FP7 funding to a region's share in the EU population
Definition of ICT dimension	ICT areas of the ICT FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 27: Frequency of the ICT FP7 funding to private organisations indicator values

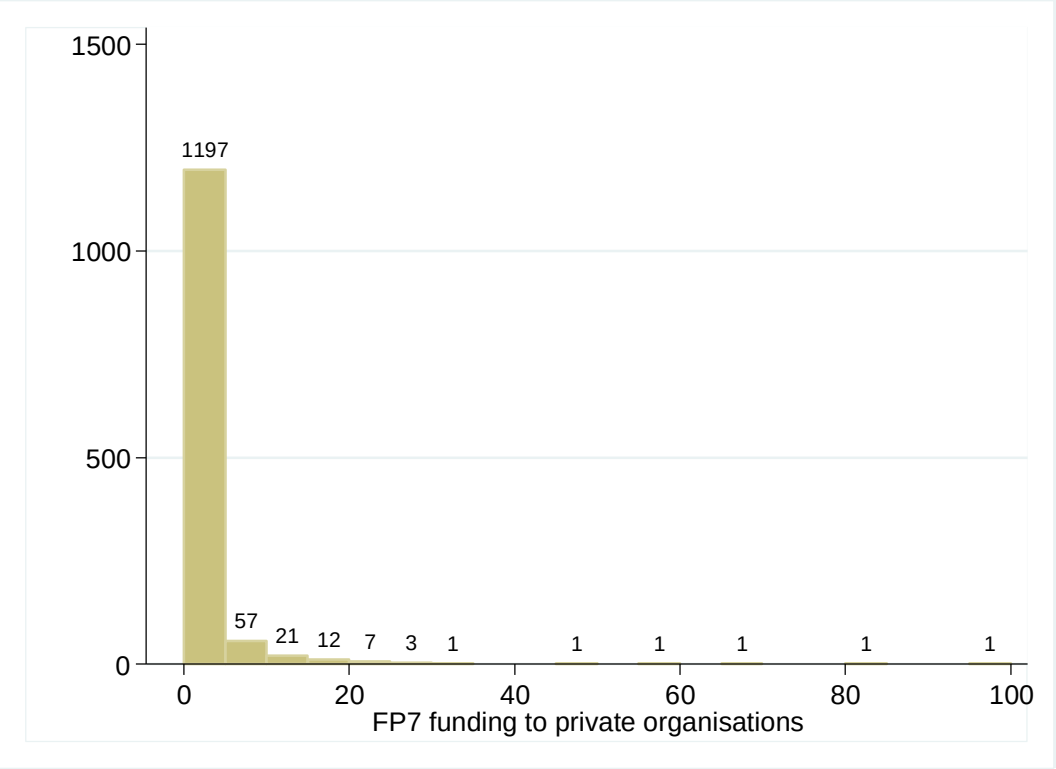


Table 24: Descriptive statistics of ICT FP7 funding to private organisations indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.39	5.58	31.18

5.1.7 ICT FP7 Participations

Table 25: Top ranking regions according to ICT FP7 participations indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DEB32	Kaiserslautern, Kreisfreie Stadt	100	36
2	DE122	Karlsruhe, Stadtkreis	98	4
3	NL333	Delft en Westland	85	17
4	DE212	Munchen, Kreisfreie Stadt	67	1
5	BE242	Arr. Leuven	61	11
6	DEA21	Aachen, Kreisfreie Stadt	45	18
7	DE125	Heidelberg, Stadtkreis	44	23
7	FR101	Paris	44	3
9	DE222	Passau, Kreisfreie Stadt	38	123
10	AT221	Graz	37	52
10	UKD53	Sefton	37	223
12	DE711	Darmstadt, Kreisfreie Stadt	36	7
13	GR431	Irakleio	34	251
14	NL414	Zuidoost-Noord-Brabant	33	8
15	DEG03	Jena, Kreisfreie Stadt	32	39
15	ITE17	Pisa	32	165
17	UKI12	Inner London - East	31	2
18	DEF0F	Stormarn	30	190
18	ITD20	Trento	30	198
20	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	29	25
21	UKG13	Warwickshire	29	85
22	DE111	Stuttgart, Stadtkreis	28	21
23	SI021	Osrednjeslovenska	26	185
24	FI181	Uusimaa	25	9
25	DED16	Freiberg	25	103
26	DEG0F	Ilm-Kreis	23	126
26	UKL17	Bridgend and Neath Port Talbot	23	272
28	DED21	Dresden, Kreisfreie Stadt	22	34
29	GR434	Chania	22	445
30	AT130	Wien	21	27

Indicator description	
Indicator ID	AgRD 7
Name of indicator	ICT FP7 participations
What does it measure?	It measures the total number of ICT R&D ICT FP7 projects to which organisations, located in the observed region, have participated to
Unit of measurement	Region's share in the total number of ICT FP7 participations to a region's share in the EU population
Definition of ICT dimension	ICT areas of the ICT FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 28: Frequency of the ICT FP7 participations indicator values

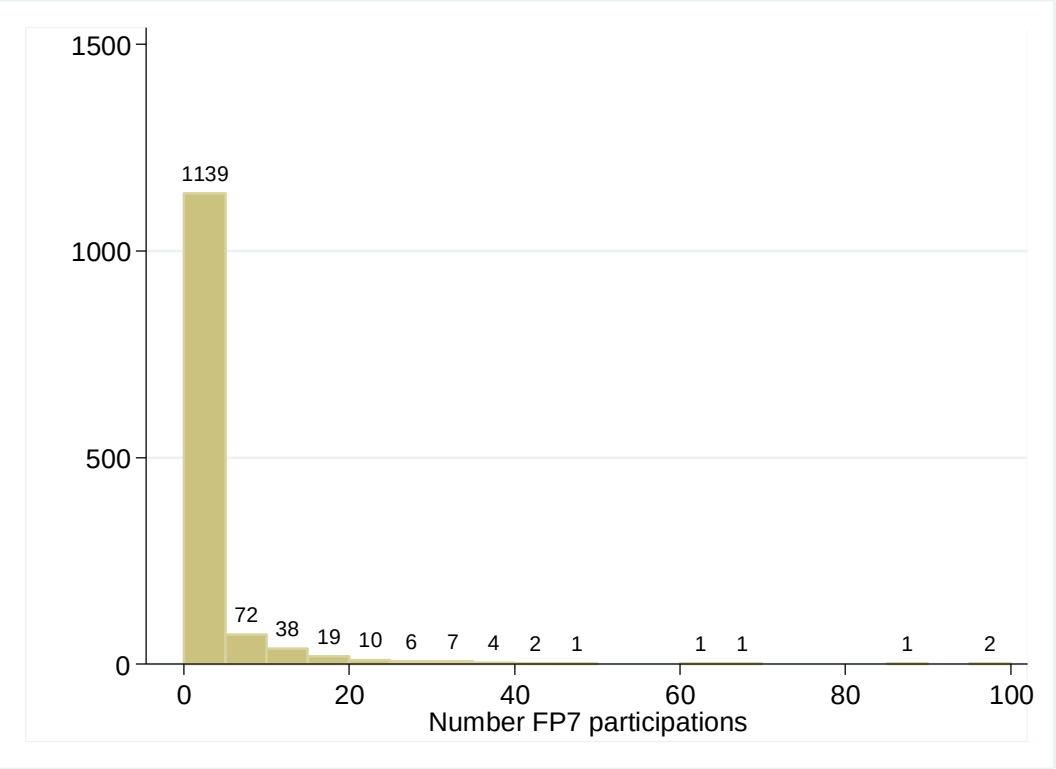


Table 26: Descriptive statistics of ICT FP7 participations indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.36	7.37	54.39

5.1.8 ICT FP7 Funding to SMEs

Table 27: Top ranking regions according to ICT FP7 funding to SMEs indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE122	Karlsruhe, Stadtkreis	100	4
2	DEB32	Kaiserslautern, Kreisfreie Stadt	82	36
3	NL333	Delft en Westland	68	17
4	DE212	Munchen, Kreisfreie Stadt	55	1
5	BE242	Arr. Leuven	46	11
6	DEA21	Aachen, Kreisfreie Stadt	33	18
7	FR101	Paris	29	3
8	DE125	Heidelberg, Stadtkreis	27	23
9	AT221	Graz	26	52
10	NL414	Zuidoost-Noord-Brabant	22	8
11	DE222	Passau, Kreisfreie Stadt	22	123
12	DE711	Darmstadt, Kreisfreie Stadt	22	7
13	UKG13	Warwickshire	21	85
14	UKD53	Sefton	21	223
15	ITE17	Pisa	20	165
15	GR431	Irakleio	20	251
17	DEB35	Mainz, Kreisfreie Stadt	19	44
18	UKI12	Inner London - East	19	2
19	DE111	Stuttgart, Stadtkreis	19	21
20	ITD20	Trento	19	198
21	DEF0F	Stormarn	18	190
22	DED16	Freiberg	17	103
23	FI181	Uusimaa	17	9
24	DEG03	Jena, Kreisfreie Stadt	17	39
25	UKM25	Edinburgh, City of	17	20
26	DE943	Oldenburg (Oldenburg), Kreisfreie Stadt	16	234
27	DEG0F	Ilm-Kreis	16	126
28	DED21	Dresden, Kreisfreie Stadt	16	34
29	DE232	Regensburg, Kreisfreie Stadt	14	64
30	AT332	Innsbruck	14	276

Indicator description	
Indicator ID	AgRD 8
Name of indicator	ICT FP7 funding to SMEs
What does it measure?	It measures the total amount of ICT R&D ICT FP7 funding given to SMEs located in the observed region
Unit of measurement	Region's share in the total EU ICT FP7 funding to SMEs to a region's share in the EU population
Definition of ICT dimension	ICT areas of the FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 29: Frequency of the ICT FP7 funding to SMEs indicator values

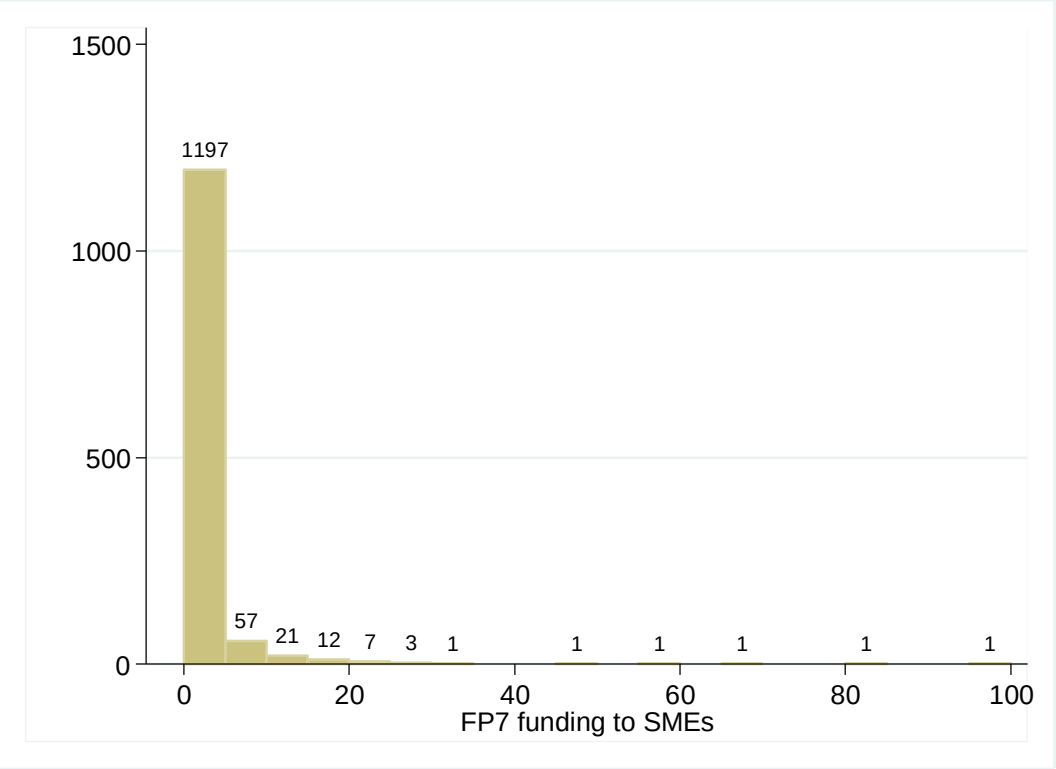


Table 28: Descriptive statistics of ICT FP7 funding to SMEs indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.39	5.58	31.18

5.1.9 ICT FP7 Participations by SMEs

Table 29: Top ranking regions according to ICT FP7 participations by SMEs indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DEB32	Kaiserslautern, Kreisfreie Stadt	100	36
2	DE122	Karlsruhe, Stadtkreis	98	4
3	NL333	Delft en Westland	85	17
4	DE212	Munchen, Kreisfreie Stadt	67	1
5	BE242	Arr. Leuven	61	11
6	DEA21	Aachen, Kreisfreie Stadt	45	18
7	DE125	Heidelberg, Stadtkreis	44	23
7	FR101	Paris	44	3
9	DE222	Passau, Kreisfreie Stadt	38	123
10	AT221	Graz	37	52
10	UKD53	Sefton	37	223
12	DE711	Darmstadt, Kreisfreie Stadt	36	7
13	GR431	Irakleio	34	251
14	NL414	Zuidoost-Noord-Brabant	33	8
15	DEG03	Jena, Kreisfreie Stadt	32	39
15	ITE17	Pisa	32	165
17	UKI12	Inner London - East	31	2
18	DEF0F	Stormarn	30	190
18	ITD20	Trento	30	198
20	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	29	25
21	UKG13	Warwickshire	29	85
22	DE111	Stuttgart, Stadtkreis	28	21
23	SI021	Osrednjeslovenska	26	185
24	FI181	Uusimaa	25	9
25	DED16	Freiberg	25	103
26	DEG0F	Ilm-Kreis	23	126
26	UKL17	Bridgend and Neath Port Talbot	23	272
28	DED21	Dresden, Kreisfreie Stadt	22	34
29	GR434	Chania	22	445
30	AT130	Wien	21	27

Indicator description	
Indicator ID	AgRD 9
Name of indicator	ICT FP7 participations by SMEs
What does it measure?	It measures the total number of ICT R&D FP7 projects to which SMEs, located in the observed region, have participated to
Unit of measurement	Region's share in the total number of ICT FP7 SMEs participations to a region's share in the EU population
Definition of ICT dimension	ICT areas of the FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 30: Frequency of the ICT FP7 participations by SMEs indicator values

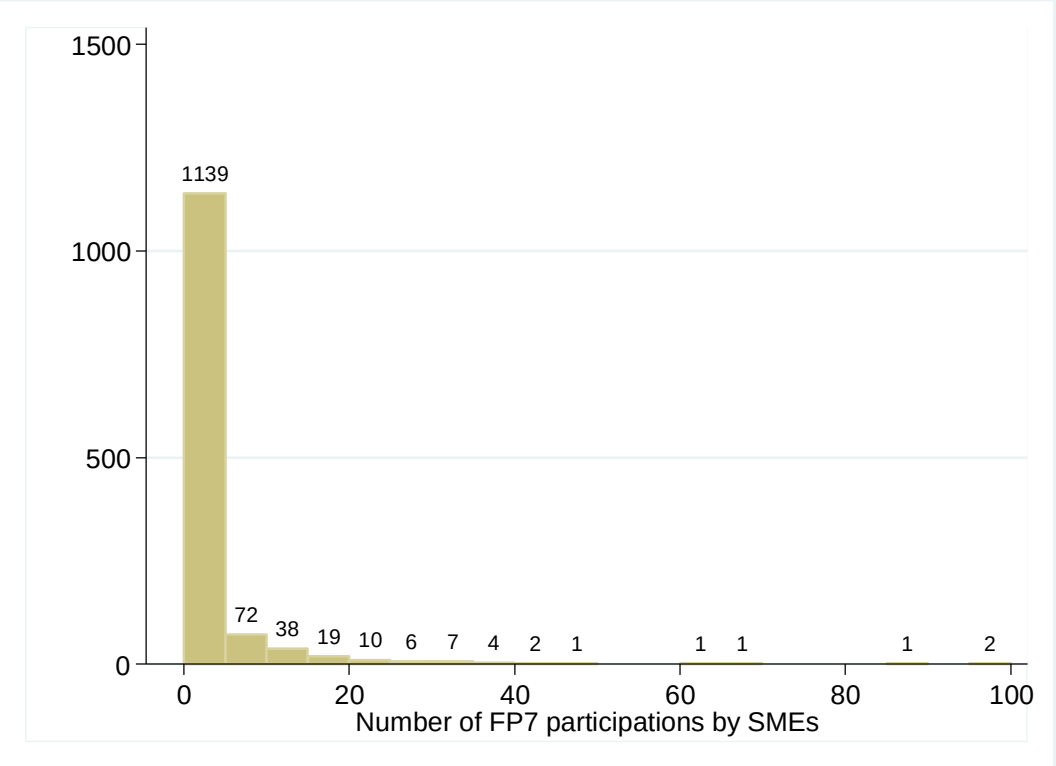


Table 30: Descriptive statistics of ICT FP7 participations by SMEs indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.35	7.37	54.39

5.1.10 Location of ICT R&D Centres

Table 31: Top ranking regions according to Location of ICT R&D centres indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE261	Aschaffenburg, Kreisfreie Stadt	100	144
2	DE252	Erlangen, Kreisfreie Stadt	98	32
3	DE117	Heilbronn, Stadtkreis	84	163
4	DE243	Coburg, Kreisfreie Stadt	83	178
5	DE147	Bodenseekreis	82	128
6	DE223	Straubing, Kreisfreie Stadt	76	365
7	DK012	Kobenhavns omegn	74	41
8	DE222	Passau, Kreisfreie Stadt	67	123
9	DE262	Schweinfurt, Kreisfreie Stadt	63	604
10	DEF02	Kiel, Kreisfreie Stadt	57	106
10	DE713	Offenbach am Main, Kreisfreie Stadt	57	356
12	DE913	Wolfsburg, Kreisfreie Stadt	57	186
13	DE211	Ingolstadt, Kreisfreie Stadt	55	275
14	DE112	Boblingen	55	67
15	DE712	Frankfurt am Main, Kreisfreie Stadt	51	30
15	DE232	Regensburg, Kreisfreie Stadt	51	64
17	UKJ31	Portsmouth	51	91
18	UKM25	Edinburgh, City of	50	20
19	DE217	Dachau	50	156
20	DE241	Bamberg, Kreisfreie Stadt	49	377
21	UKJ11	Berkshire	48	26
22	IE013	West	48	122
23	DEA11	Dusseldorf, Kreisfreie Stadt	47	38
24	DE115	Ludwigsburg	46	45
25	DE24B	Kulmbach	45	674
26	DEB3D	Donnersbergkreis	44	120
26	DEF04	Neumunster, Kreisfreie Stadt	44	361
28	DE21H	Munchen, Landkreis	43	22
28	DE919	Osterode am Harz	43	567
30	SE123	Ostergotlands lan	40	66

Indicator description	
Indicator ID	AgRD 10
Name of indicator	Location of ICT R&D centres
What does it measure?	It measures the total number of ICT R&D centres located in the observed region
Unit of measurement	Region's share in the total number of R&D centres located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on HIS iSuppli classification of the major "semiconductors influencers"
Unit of observation	NUTS3
Source	R&D Centre location by IHS iSuppli (Section 8.4)
Reference year(s) considered	2012

Figure 31: Frequency of the Location of ICT R&D centres indicator values

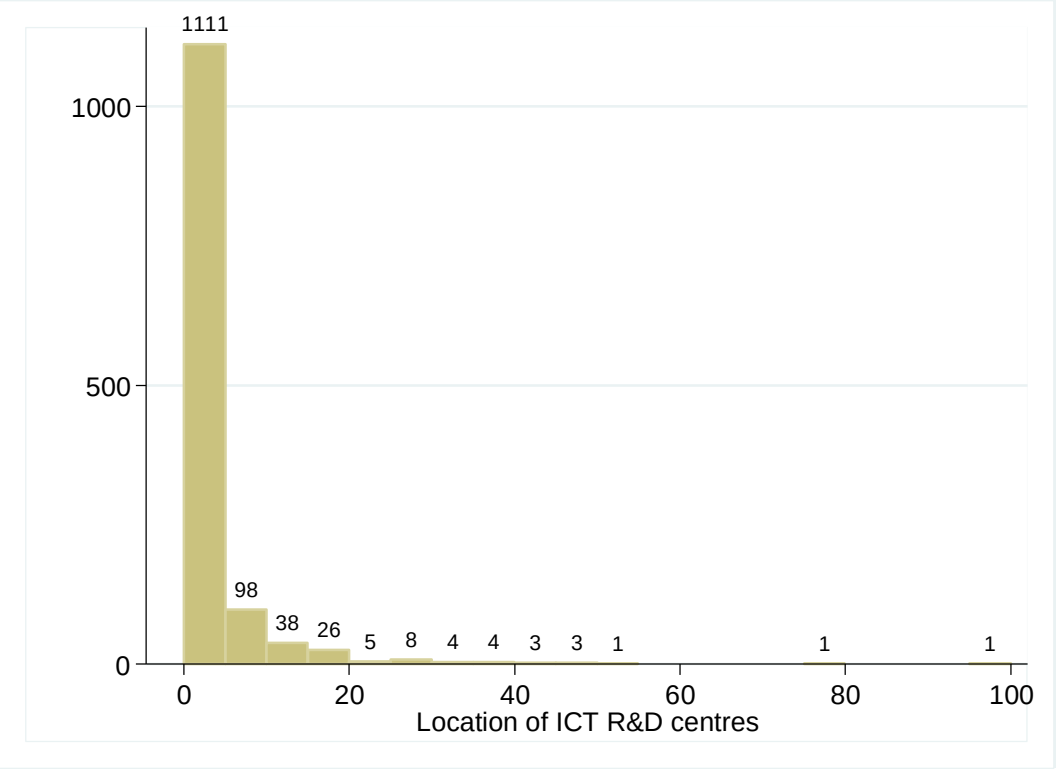


Table 32: Descriptive statistics of Location of ICT R&D centres indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.46	6.71	45.08

5.1.11 Ownership of ICT R&D Centres

Table 33: Top ranking regions according to Ownership of ICT R&D centres indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE243	Coburg, Kreisfreie Stadt	100	178
2	DE115	Ludwigsburg	55	45
3	NL331	Agglomeratie Leiden en Bollenstreek	28	70
4	FR101	Paris	26	3
5	DE125	Heidelberg, Stadtkreis	20	23
6	DE929	Region Hannover	19	60
7	DE212	Munchen, Kreisfreie Stadt	16	1
8	DE147	Bodenseekreis	16	128
9	NL326	Groot-Amsterdam	14	10
10	FI181	Uusimaa	13	9
11	SE110	Stockholms lan	12	6
12	FR105	Hauts-de-Seine	12	13
13	NL421	Noord-Limburg	12	219
14	DEA11	Dusseldorf, Kreisfreie Stadt	10	38
15	DEA5B	Soest	9	258
16	UKI12	Inner London - East	7	2
17	DEA47	Paderborn	6	74
18	UKE41	Bradford	5	298
19	ITE43	Roma	4	40
20	ITC45	Milano	1	14

Indicator description	
Indicator ID	AgRD 11
Name of indicator	Ownership of ICT R&D centres
What does it measure?	It measures the total number of ICT R&D centres owned worldwide by companies located in the observed region
Unit of measurement	Region's share in the total number of R&D centres owned by EU firms to a region's share in the EU population
Definition of ICT dimension	Based on HIS iSuppli classification of the major "semiconductors influencers"
Unit of observation	NUTS3
Source	R&D Centre location by IHS iSuppli (Section 8.4)
Reference year(s) considered	2012

Figure 32: Frequency of the Ownership of ICT R&D centres indicator values

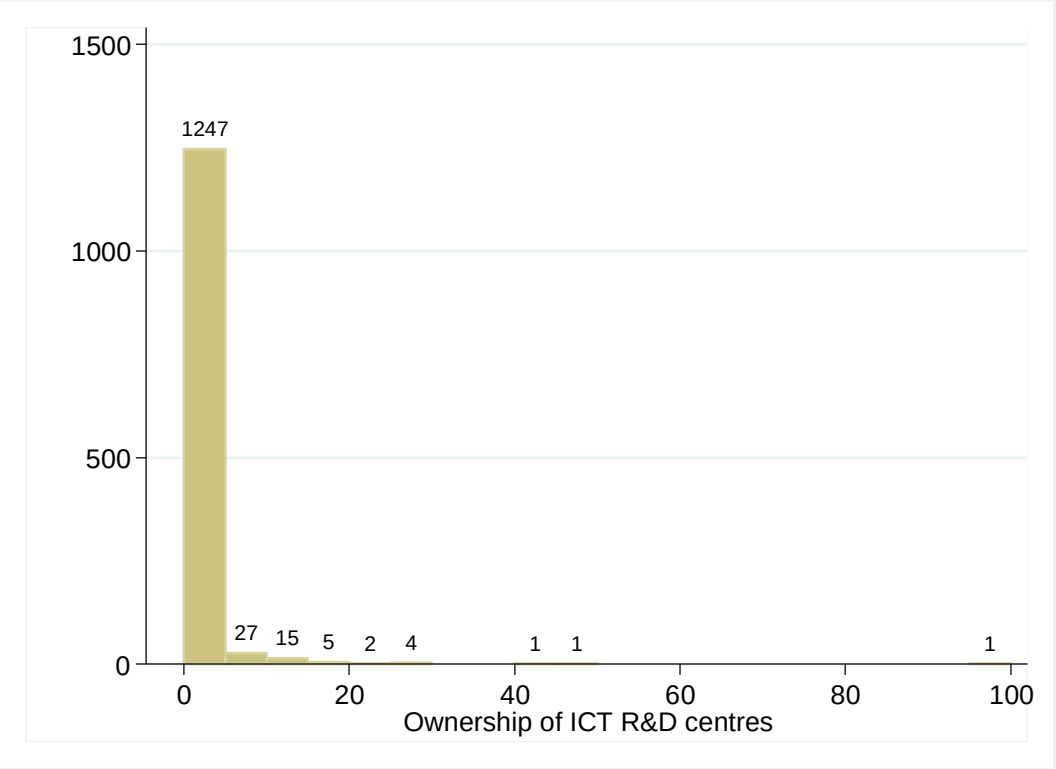


Table 34: Descriptive statistics of Ownership of ICT R&D centres indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.77	4.12	13.93

5.1.12 Scientific Publications in Computer Science

Table 35: Top ranking regions according to scientific publications in Computer Science indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	NL333	Delft en Westland	100	17
2	DE138	Konstanz	93	53
3	DE711	Darmstadt, Kreisfreie Stadt	89	7
4	UKI12	Inner London - East	88	2
5	DED16	Freiberg	79	103
6	BE242	Arr. Leuven	75	11
7	DEB3D	Donnersbergkreis	72	120
8	DEB32	Kaiserslautern, Kreisfreie Stadt	70	36
9	UKE21	York	67	63
10	DEA21	Aachen, Kreisfreie Stadt	64	18
11	DE122	Karlsruhe, Stadtkreis	61	4
12	GR411	Lesvos	57	1189
13	FR101	Paris	49	3
14	GR232	Achaia	47	234
15	UKM25	Edinburgh, City of	45	20
16	DE125	Heidelberg, Stadtkreis	45	23
17	UKH31	Southend-on-Sea	44	257
18	UKH12	Cambridgeshire CC	42	5
19	ITE17	Pisa	41	165
20	BE234	Arr. Gent	37	94
21	DE279	Neu-Ulm	37	92
22	UKG13	Warwickshire	34	85
23	DE212	Munchen, Kreisfreie Stadt	34	1
24	UKF14	Nottingham	34	139
25	NL414	Zuidoost-Noord-Brabant	34	8
26	UKJ14	Oxfordshire	33	19
27	DE142	Tubingen, Landkreis	33	55
28	NL326	Groot-Amsterdam	33	10
29	UKM34	Glasgow City	32	78
30	UKL17	Bridgend and Neath Port Talbot	32	272

Indicator description	
Indicator ID	AgRD 12
Name of indicator	Scientific publications in Computer Science
What does it measure?	It measures the total number of scientific publications , in the Computer Science area produced by organisations located in the observed region
Unit of measurement	Region's share in the total number of publications in Computer Science to a region's share in the EU population
Definition of ICT dimension	Computer Science as defined by Web of Science® classification of Research Areas
Unit of observation	NUTS 3
Source	Bibliometrics: Web of Science by Thomson Reuters (Section 8.3)
Reference year(s) considered	2000-2012

Figure 33: Frequency of the scientific publications in Computer Science indicator values

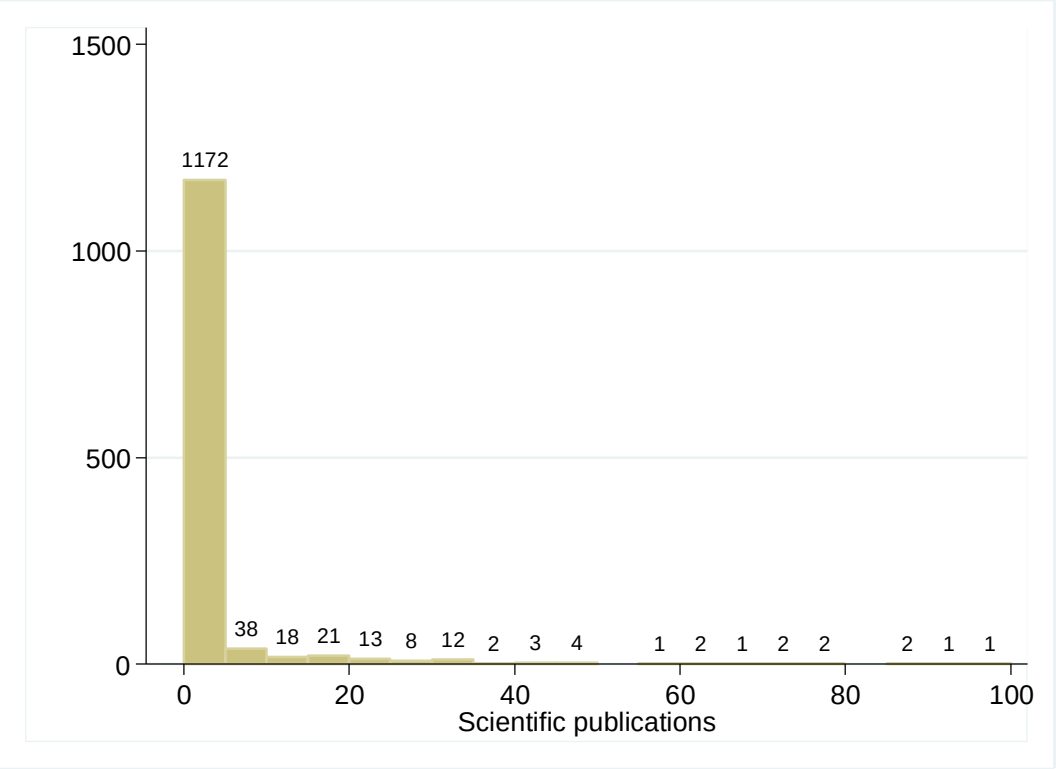


Table 36: Descriptive statistics of scientific publications in Computer Science indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.32	9.45	89.45

5.1.13 Outward ICT R&D Internationalisation

Table 37: Top ranking regions according to Outward ICT R&D internationalisation indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE243	Coburg, Kreisfreie Stadt	100	178
2	DE115	Ludwigsburg	70	45
3	NL331	Agglomeratie Leiden en Bollenstreek	51	70
4	FR101	Paris	32	3
5	DE212	Munchen, Kreisfreie Stadt	26	1
6	NL326	Groot-Amsterdam	24	10
7	DE929	Region Hannover	24	60
8	FI181	Uusimaa	21	9
9	SE110	Stockholms lan	20	6
10	FR105	Hauts-de-Seine	19	13
11	NL421	Noord-Limburg	19	219
12	DEA5B	Soest	15	258
13	DEA11	Dusseldorf, Kreisfreie Stadt	15	38
14	DE125	Heidelberg, Stadtkreis	14	23
15	DE147	Bodenseekreis	13	128
16	UKI12	Inner London - East	11	2
17	UKE41	Bradford	9	298
18	DEA47	Paderborn	9	74
19	ITE43	Roma	4	40
20	ITC45	Milano	1	14

Indicator description	
Indicator ID	IntRD 2
Name of indicator	Outward ICT R&D internationalisation
What does it measure?	It measures the number of ICT R&D centres located abroad (outside the country) that are owned by companies' headquarters located in a region
Unit of measurement	Region's share in the total number of R&D centres located abroad that are owned by companies' headquarters located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on HIS iSuppli classification of the major "semiconductors influencers"
Unit of observation	NUTS3
Source	R&D Centre location by IHS iSuppli (Section 8.4)
Reference year(s) considered	2012

Figure 34: Frequency of the Outward ICT R&D internationalisation values

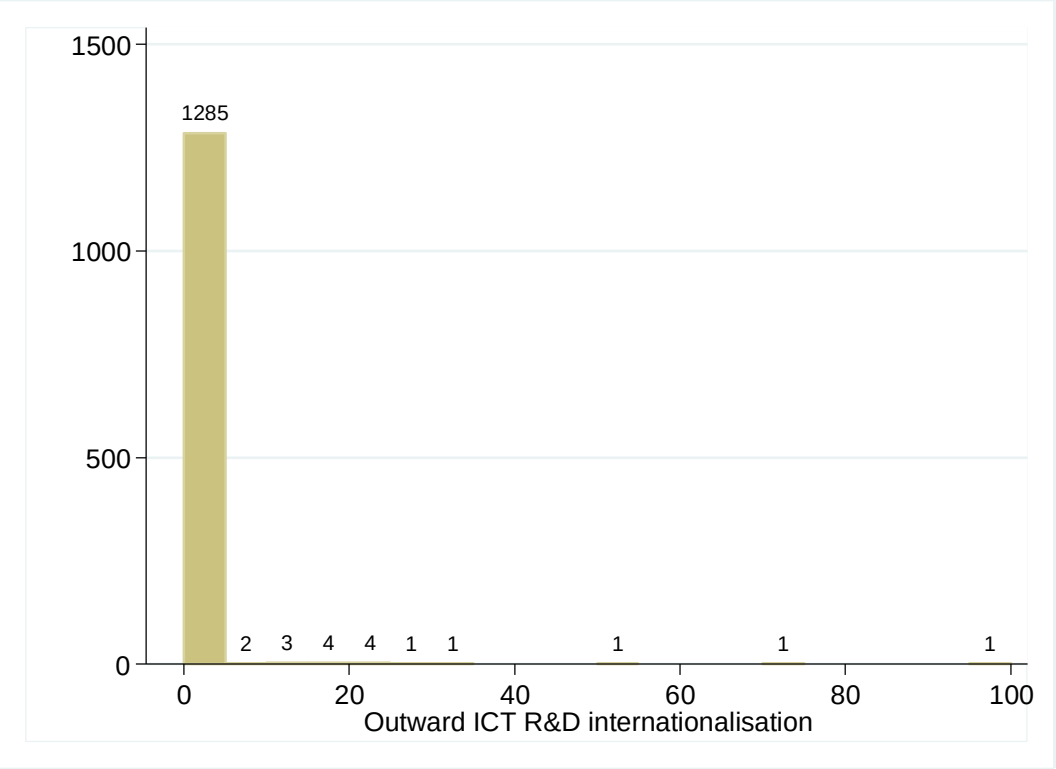


Table 38: Descriptive statistics of Outward ICT R&D internationalisation indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.38	4.19	17.54

5.1.14 Inward ICT R&D Internationalisation

Table 39: Top ranking regions according to Inward ICT R&D internationalisation indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE261	Aschaffenburg, Kreisfreie Stadt	100	144
2	DE223	Straubing, Kreisfreie Stadt	76	365
3	DK012	Kobenhavns omegn	74	41
4	DE252	Erlangen, Kreisfreie Stadt	65	32
5	DE713	Offenbach am Main, Kreisfreie Stadt	57	356
6	DE913	Wolfsburg, Kreisfreie Stadt	57	186
7	UKM25	Edinburgh, City of	50	20
8	DE217	Dachau	50	156
9	UKJ11	Berkshire	48	26
10	IE013	West	48	122
11	DE112	Boblingen	46	67
12	DEB3D	Donnersbergkreis	44	120
12	DEF04	Neumunster, Kreisfreie Stadt	44	361
14	DE919	Osterode am Harz	43	567
15	DE22C	Dingolfing-Landau	37	580
16	DEB32	Kaiserslautern, Kreisfreie Stadt	35	36
17	UKH12	Cambridgeshire CC	34	5
17	UKJ31	Portsmouth	34	91
19	DE136	Schwarzwald-Baar-Kreis	32	96
19	DE147	Bodenseekreis	32	128
21	DE21H	Munchen, Landkreis	32	22
22	DEG06	Eichsfeld	31	242
23	SI024	Obalno-kraska	31	639
24	DE712	Frankfurt am Main, Kreisfreie Stadt	30	30
25	UKJ33	Hampshire CC	29	31
25	DEA11	Dusseldorf, Kreisfreie Stadt	29	38
25	DE21J	Pfaffenhofen a. d. Ilm	29	409
28	DE80E	Nordwestmecklenburg	29	769
29	DEF02	Kiel, Kreisfreie Stadt	28	106
30	BE242	Arr. Leuven	28	11

Indicator description	
Indicator ID	IntRD 2
Name of indicator	Inward ICT R&D internationalisation
What does it measure?	It measures the number of ICT R&D centres located in a region that are owned by foreign companies
Unit of measurement	Region's share in the total number of R&D centres owned by foreign companies in the EU to a region's share in the EU population
Definition of ICT dimension	Based on HIS iSuppli classification of the major "semiconductors influencers"
Unit of observation	NUTS3
Source	R&D Centre location by IHS iSuppli (Section 8.4)
Reference year(s) considered	2012

Figure 35: Frequency of the Inward ICT R&D internationalisation indicator values

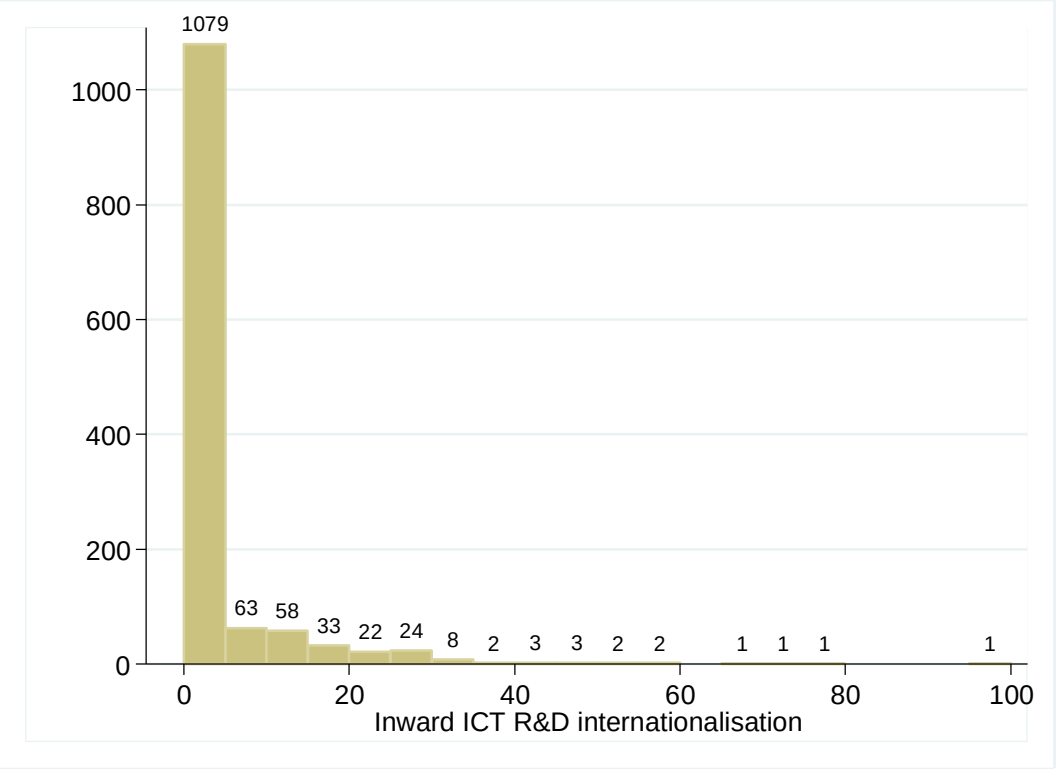


Table 40: Descriptive statistics of Inward ICT R&D internationalisation indicator

Number of observations	Mean value	Standard deviation	Variance
1303	3.06	8.59	73.77

5.1.15 Degree in ICT R&D Network

Table 41: Top ranking regions according to Degree in ICT R&D network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	FR101	Paris	97	3
3	ES300	Madrid	86	28
4	UKI12	Inner London - East	85	2
4	GR300	Attiki	85	49
6	ITC45	Milano	85	14
7	ITE43	Roma	85	40
8	ES511	Barcelona	80	42
9	FI181	Uusimaa	78	9
10	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	74	25
11	AT130	Wien	72	27
12	DE122	Karlsruhe, Stadtkreis	70	4
13	BE242	Arr. Leuven	69	11
14	DE300	Berlin	69	15
15	SE110	Stockholms lan	67	6
16	ITC11	Torino	67	56
17	NL414	Zuidoost-Noord-Brabant	62	8
18	NL333	Delft en Westland	62	17
19	HU101	Budapest	61	73
20	FR105	Hauts-de-Seine	60	13
21	NL326	Groot-Amsterdam	59	10
22	FR103	Yvelines	57	33
23	PT171	Grande Lisboa	57	93
24	DE111	Stuttgart, Stadtkreis	55	21
25	UKG13	Warwickshire	55	85
26	AT221	Graz	54	52
26	GR122	Thessaloniki	54	171
28	IE021	Dublin	54	16
28	ES523	Valencia / Valencia	54	213
30	ITD20	Trento	53	198

Indicator description	
Indicator ID	NetRD 1
Name of indicator	Degree in ICT R&D network
What does it measure?	It measures the total number of connections a region maintains with other regions through organizations participating in common ICT FP7 projects
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	ICT areas of the FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 36: Frequency of the Degree in ICT R&D network indicator values

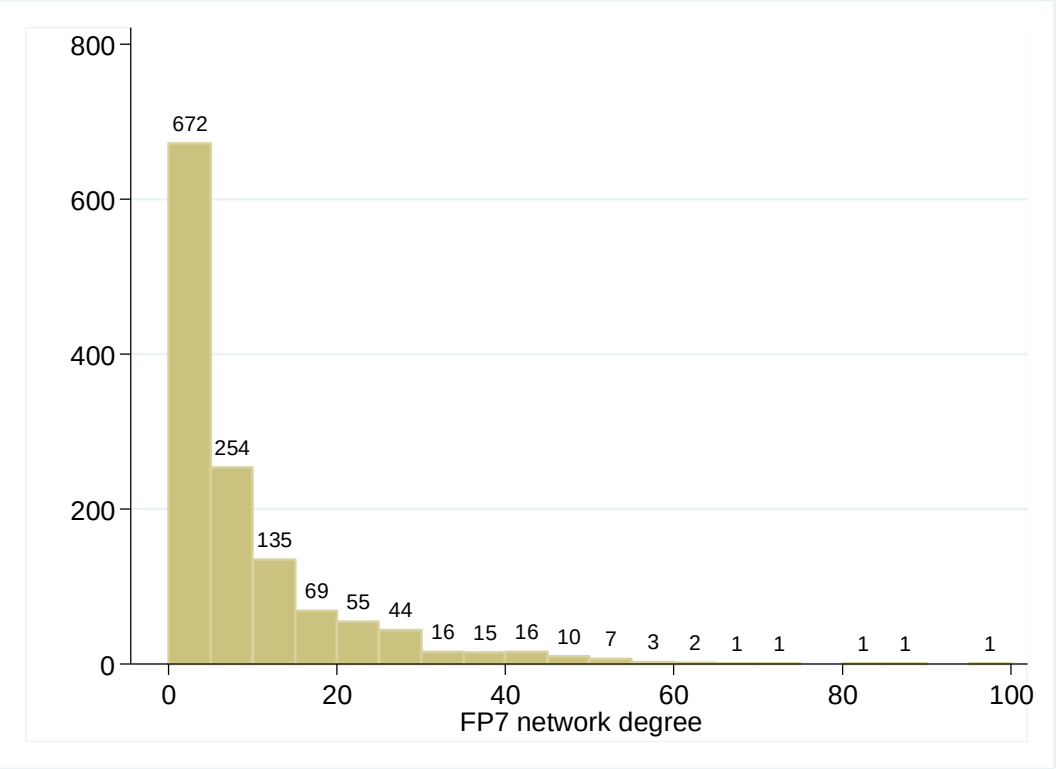


Table 42: Descriptive statistics of degree in ICT R&D network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	8.42	11.63	135.40

5.1.16 Closeness Centrality in ICT R&D Network

Table 43: Top ranking regions according to Closeness centrality in ICT R&D network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	FR101	Paris	98	3
3	ES300	Madrid	93	28
4	UKI12	Inner London - East	92	2
4	GR300	Attiki	92	49
6	ITC45	Milano	92	14
7	ITE43	Roma	92	40
8	ES511	Barcelona	90	42
9	FI181	Uusimaa	89	9
10	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	87	25
11	AT130	Wien	86	27
12	DE122	Karlsruhe, Stadtkreis	85	4
13	BE242	Arr. Leuven	84	11
14	DE300	Berlin	84	15
15	SE110	Stockholms lan	83	6
16	ITC11	Torino	83	56
17	NL414	Zuidoost-Noord-Brabant	81	8
18	NL333	Delft en Westland	81	17
19	HU101	Budapest	80	73
20	FR105	Hauts-de-Seine	80	13
21	NL326	Groot-Amsterdam	79	10
22	FR103	Yvelines	78	33
23	PT171	Grande Lisboa	78	93
24	DE111	Stuttgart, Stadtkreis	77	21
25	UKG13	Warwickshire	77	85
26	AT221	Graz	77	52
26	GR122	Thessaloniki	77	171
28	IE021	Dublin	77	16
28	ES523	Valencia / Valencia	77	213
30	ITD20	Trento	76	198

Indicator description	
Indicator ID	NetRD 2
Name of indicator	Closeness centrality in ICT R&D network
What does it measure?	It measures the average distance that each node is from all other nodes in the network
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	ICT areas of the ICT FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 37: Frequency of the Closeness centrality in ICT R&D network indicator values

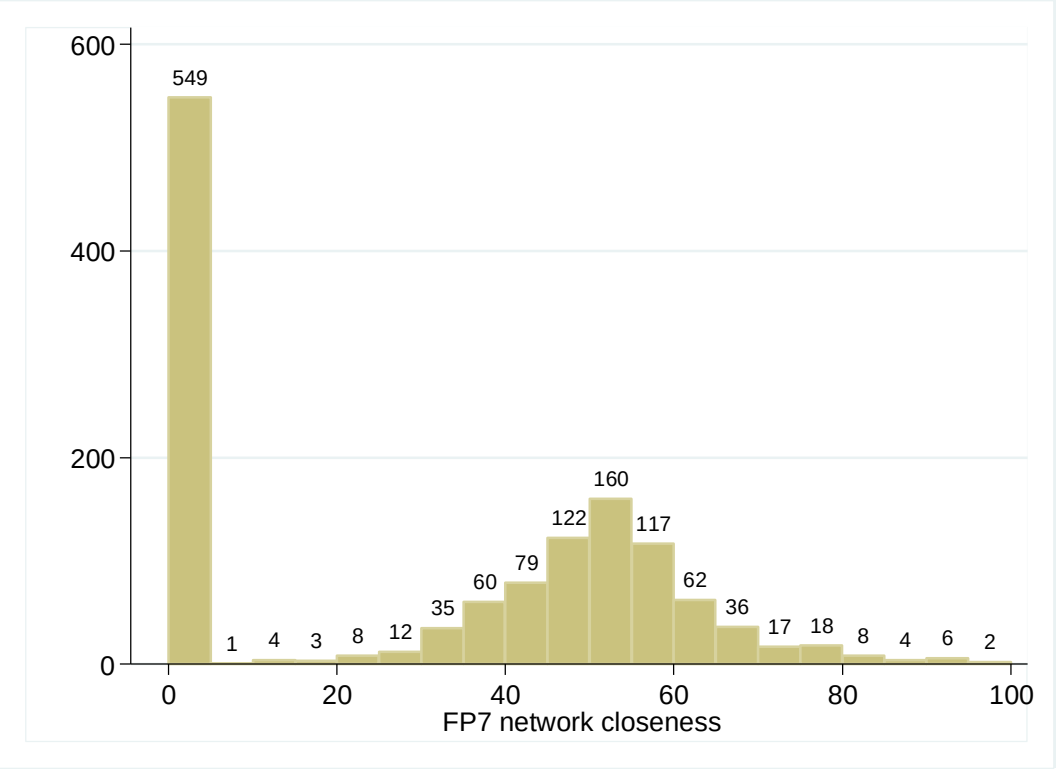


Table 44: Descriptive statistics of Closeness centrality in ICT R&D network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	29.64	27.11	735.27

5.1.17 Betweenness Centrality in ICT R&D Network

Table 45: Top ranking regions according to Betweenness centrality in ICT R&D network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	FR101	Paris	82	3
3	ITE43	Roma	59	40
4	ES300	Madrid	55	28
5	ITC45	Milano	54	14
6	GR300	Attiki	53	49
7	UKI12	Inner London - East	52	2
8	ES511	Barcelona	45	42
9	FI181	Uusimaa	42	9
10	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	37	25
11	AT130	Wien	34	27
12	SE110	Stockholms lan	28	6
13	BE242	Arr. Leuven	26	11
14	DE300	Berlin	25	15
15	DE122	Karlsruhe, Stadtkreis	24	4
16	ITC11	Torino	22	56
17	AT221	Graz	17	52
18	NL333	Delft en Westland	17	17
19	HU101	Budapest	15	73
20	DE111	Stuttgart, Stadtkreis	15	21
21	NL326	Groot-Amsterdam	15	10
22	NL414	Zuidoost-Noord-Brabant	15	8
23	RO321	Bucuresti	14	215
24	PT171	Grande Lisboa	13	93
25	FR105	Hauts-de-Seine	12	13
26	IE021	Dublin	12	16
27	ES213	Vizcaya	12	240
28	SI021	Osrednjeslovenska	12	185
29	UKG13	Warwickshire	11	85
30	ES523	Valencia / Valencia	11	213

Indicator description	
Indicator ID	NetRD 3
Name of indicator	Betweenness centrality in ICT R&D network
What does it measure?	It measures the number of shortest paths in a network that traverse through that node
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	ICT areas of the FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 38: Frequency of the Betweenness centrality in ICT R&D network indicator values

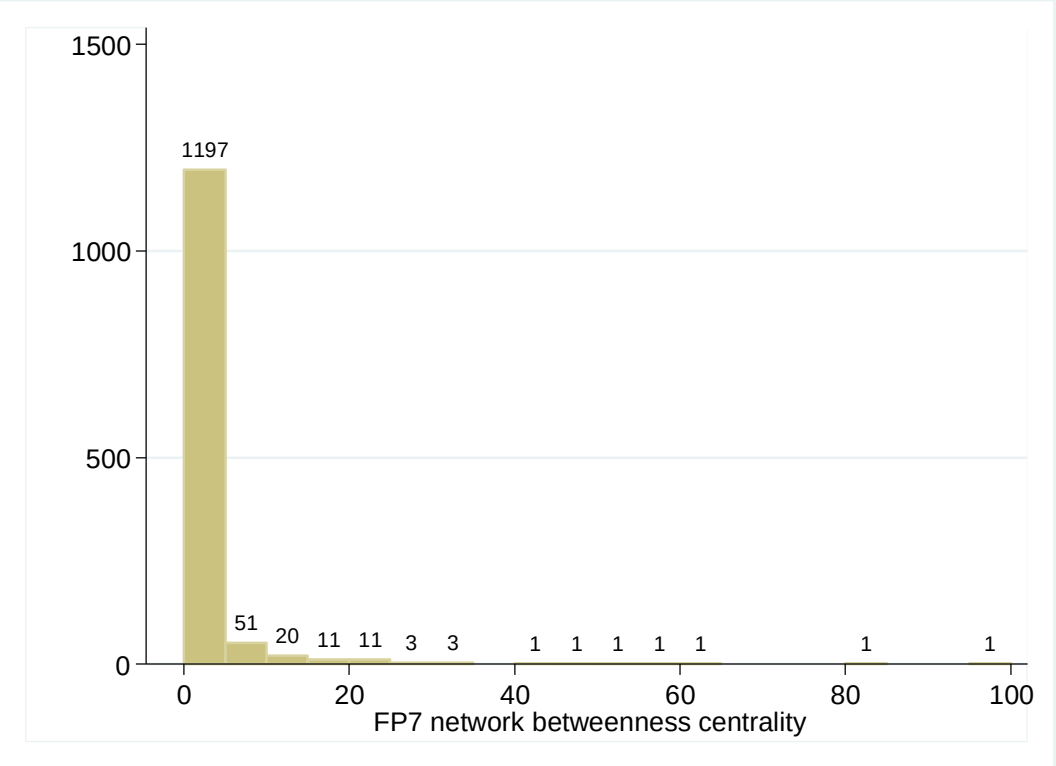


Table 46: Descriptive statistics of Betweenness centrality in ICT R&D network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.53	5.97	35.65

5.1.18 Eigenvector Centrality in ICT R&D Network

Table 47: Top ranking regions according to Eigenvector centrality in ICT R&D network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	FR101	Paris	99	3
3	ES300	Madrid	78	28
4	GR300	Attiki	75	49
5	UKI12	Inner London - East	72	2
6	ITC45	Milano	68	14
7	ITE43	Roma	64	40
8	ES511	Barcelona	52	42
9	FI181	Uusimaa	45	9
10	AT130	Wien	41	27
11	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	40	25
12	DE300	Berlin	40	15
13	BE242	Arr. Leuven	37	11
14	SE110	Stockholms lan	36	6
15	DE122	Karlsruhe, Stadtkreis	36	4
16	FR105	Hauts-de-Seine	34	13
17	NL414	Zuidoost-Noord-Brabant	32	8
18	ITC11	Torino	32	56
19	FR103	Yvelines	32	33
20	HU101	Budapest	27	73
21	NL333	Delft en Westland	26	17
22	GR122	Thessaloniki	25	171
23	DE111	Stuttgart, Stadtkreis	24	21
24	PT171	Grande Lisboa	24	93
25	NL326	Groot-Amsterdam	22	10
26	ITD20	Trento	22	198
27	IE021	Dublin	22	16
28	UKG13	Warwickshire	20	85
29	PL127	Miasto Warszawa	19	50
30	ES523	Valencia / Valencia	19	213

Indicator description	
Indicator ID	NetRD 4
Name of indicator	Eigenvector centrality in ICT R&D network
What does it measure?	It measures the importance of a node in a network, based on the importance of its direct neighbours
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	ICT areas of the FP7 programme
Unit of observation	NUTS3
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year(s) considered	2007-2011

Figure 39: Frequency of the Eigenvector centrality in ICT R&D network indicator values

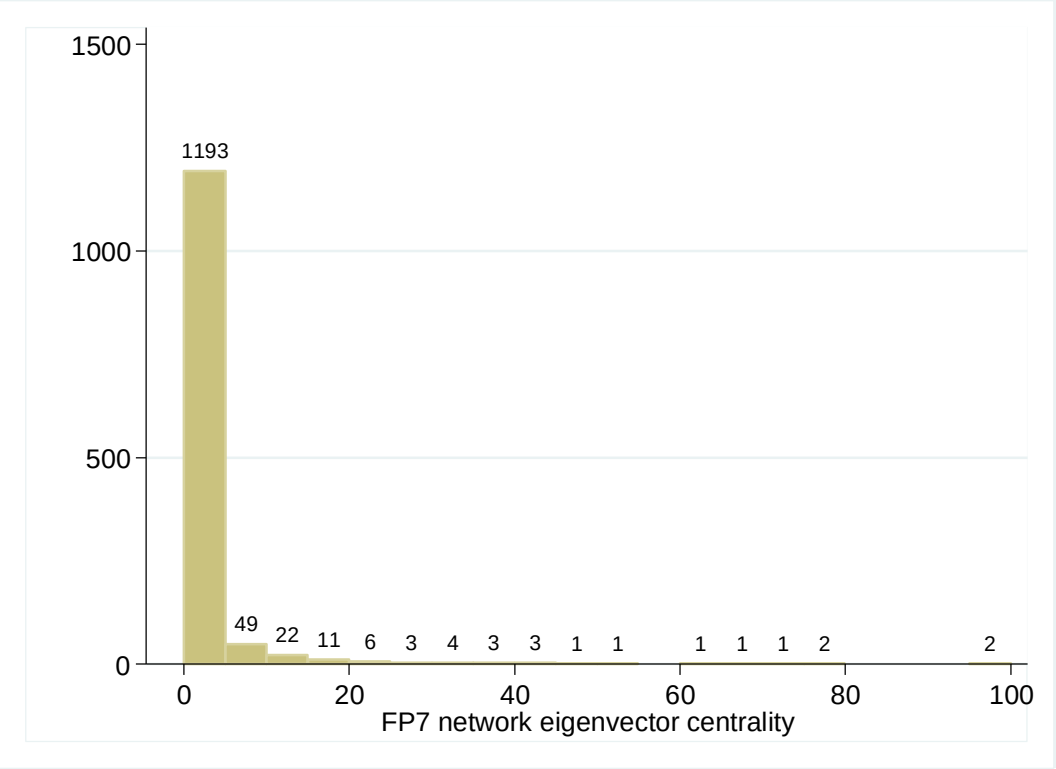


Table 48: Descriptive statistics of Eigenvector centrality in ICT R&D network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.81	7.52	56.59

5.2 ICT Innovation

5.2.1 Investment in Intangibles by ICT Firms

Table 49: Top ranking regions according to Investment in intangibles by ICT firms indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DEA22	Bonn, Kreisfreie Stadt	100	12
2	UKI21	Outer London - East and North East	30	151
3	FR101	Paris	23	3
4	DE122	Karlsruhe, Stadtkreis	10	4
5	ITC45	Milano	7	14
6	NL332	Agglomeratie 's-Gravenhage	7	80
7	SE110	Stockholms lan	4	6
7	LU000	Luxembourg (Grand-Duche)	4	71
9	DK011	Byen Kobenhavn	4	24
10	ES300	Madrid	3	28
11	FI181	Uusimaa	2	9
12	BE212	Arr. Mechelen	2	150
13	DE711	Darmstadt, Kreisfreie Stadt	2	7
14	DEF0B	Rendsburg-Eckernforde	2	138
15	UKI12	Inner London - East	2	2
16	UKC22	Tyneside	1	175
17	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	1	25
18	UKJ11	Berkshire	1	26
19	DEB1B	Westerwaldkreis	1	264
20	DEB11	Koblenz, Kreisfreie Stadt	1	83
21	AT130	Wien	1	27
22	FR105	Hauts-de-Seine	1	13
23	PT171	Grande Lisboa	1	93
24	FR108	Val-d'Oise	0	249
25	UKH12	Cambridgeshire CC	0	5
26	NL326	Groot-Amsterdam	0	10
27	DK032	Sydjylland	0	300
28	DEA47	Paderborn	0	74
29	FR103	Yvelines	0	33
30	PL325	Rzeszowski	0	376

Indicator description	
Indicator ID	AgIn 1
Name of indicator	Investment in intangibles by ICT firms
What does it measure?	Measures the average annual amount spent on intangibles in the ICT sector
Unit of measurement	Region's share in the total investments in intangibles by ICT firms in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 40: Frequency of the Investment in intangibles by ICT firms indicator values

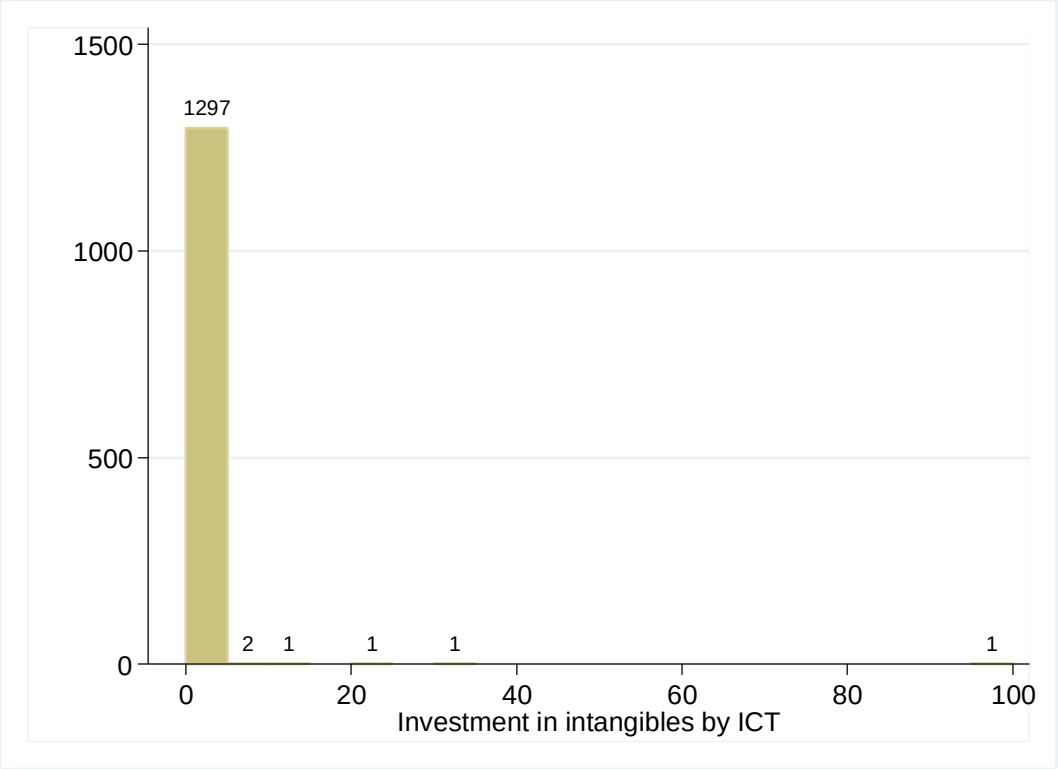


Table 50: Descriptive statistics of Investment in intangibles by ICT firms indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.16	2.99	8.97

5.2.2 Venture Capital Financing of ICT Firms

Table 51: Top ranking regions according to Venture Capital financing of ICT firms indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKI12	Inner London - East	100	2
2	FR101	Paris	80	3
3	UKH12	Cambridgeshire CC	79	5
4	DK011	Byen Kobenhavn	70	24
5	IE021	Dublin	67	16
6	SE110	Stockholms lan	65	6
7	UKJ11	Berkshire	54	26
8	FI181	Uusimaa	52	9
9	DE232	Regensburg, Kreisfreie Stadt	50	64
10	UKN01	Belfast	49	338
11	FR105	Hauts-de-Seine	49	13
12	UKM25	Edinburgh, City of	48	20
13	FI200	Aland	40	687
14	DE212	Munchen, Kreisfreie Stadt	39	1
15	UKK11	Bristol, City of	38	48
16	BE253	Arr. Ieper	35	194
17	BE242	Arr. Leuven	30	11
18	DE926	Holzminden	29	558
19	FI1A2	Pohjois-Pohjanmaa	29	58
20	SE123	Ostergotlands lan	28	66
20	DED16	Freiberg	28	103
22	UKG33	Coventry	27	169
23	UKM28	West Lothian	27	219
24	DE711	Darmstadt, Kreisfreie Stadt	26	7
25	DE122	Karlsruhe, Stadtkreis	25	4
26	UKM34	Glasgow City	25	78
27	DE252	Erlangen, Kreisfreie Stadt	24	32
28	BE212	Arr. Mechelen	23	150
29	DE423	Potsdam, Kreisfreie Stadt	22	82
30	DE111	Stuttgart, Stadtkreis	22	21

Indicator description	
Indicator ID	AgIn 2
Name of indicator	Venture Capital financing to ICT firms
What does it measure?	Measures the amount of venture capital invested in the ICT sector
Unit of measurement	Region's share in the total VC funding in to ICT firms in the EU to a region's share in the EU population
Definition of ICT dimension	Based on the Dow Jones classification of industry segments
Unit of observation	NUTS 3
Source	Venture Capital: VentureSource by Dow Jones (Section 8.8)
Reference year(s) considered	2000-2012

Figure 41: Frequency of the Venture Capital financing of ICT firms indicator values

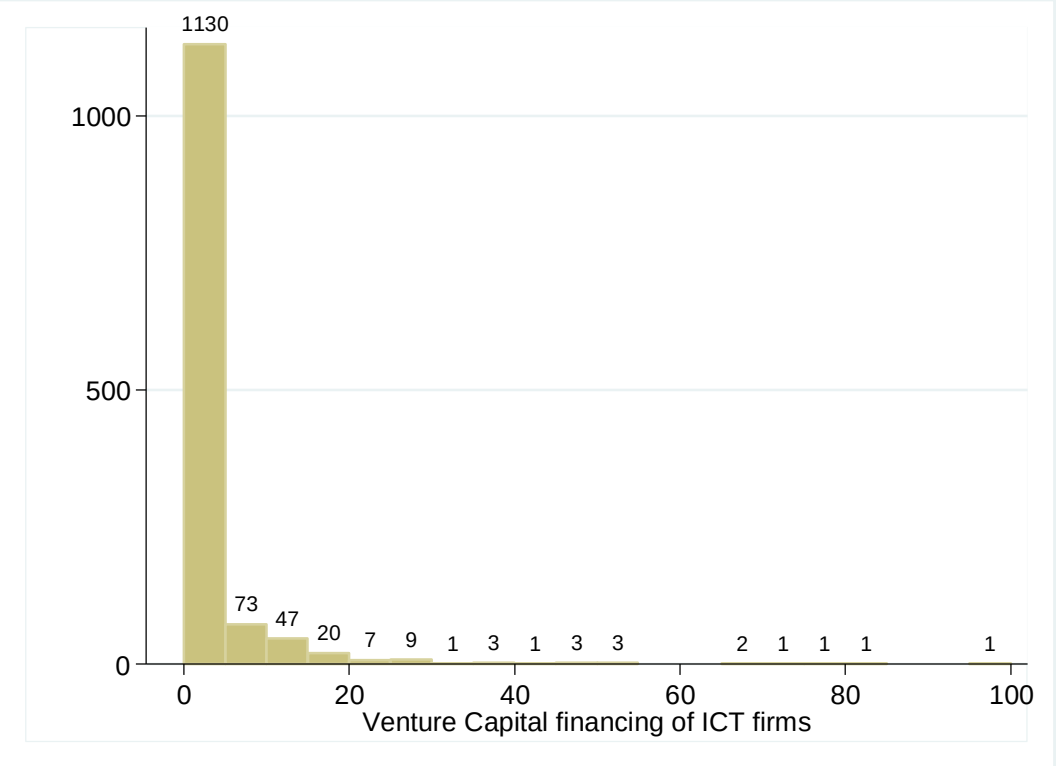


Table 52: Descriptive statistics of Venture Capital financing of ICT firms indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.43	7.73	59.71

5.2.3 ICT Patents

Table 53: Top ranking regions according to ICT patents indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	NL414	Zuidoost-Noord-Brabant	100	8
2	DE252	Erlangen, Kreisfreie Stadt	51	32
3	DEA21	Aachen, Kreisfreie Stadt	38	18
4	DE21H	Munchen, Landkreis	34	22
5	DE257	Erlangen-Hochstadt	26	170
6	DE136	Schwarzwald-Baar-Kreis	23	96
7	DE21L	Starnberg	23	97
8	DE218	Ebersberg	22	149
9	DE212	Munchen, Kreisfreie Stadt	21	1
10	DE232	Regensburg, Kreisfreie Stadt	21	64
11	FI197	Pirkanmaa	21	117
12	DE238	Regensburg, Landkreis	18	268
13	DE111	Stuttgart, Stadtkreis	18	21
14	UKH12	Cambridgeshire CC	17	5
15	DE115	Ludwigsburg	17	45
16	DE144	Ulm, Stadtkreis	16	369
17	DE711	Darmstadt, Kreisfreie Stadt	16	7
18	FR714	Isere	15	35
19	FI181	Uusimaa	14	9
20	DE112	Boblingen	14	67
21	DE21C	Furstenfeldbruck	14	137
22	FI1A2	Pohjois-Pohjanmaa	14	58
23	DE125	Heidelberg, Stadtkreis	13	23
24	DE21F	Miesbach	13	342
25	DE248	Forchheim	13	387
26	DE925	Hildesheim	13	195
27	DEG03	Jena, Kreisfreie Stadt	13	39
28	DE133	Emmendingen	12	148
29	DE122	Karlsruhe, Stadtkreis	11	4
30	DE258	Furth, Landkreis	11	403

Indicator description	
Indicator ID	AgIn 3
Name of indicator	ICT patents
What does it measure?	It measures the amount of ICT patent applications with inventors residing in the region
Unit of measurement	Region's share in the total number of ICT patents in the EU to a region's share in the EU population
Definition of ICT dimension	Based on the OECD definition of ICT patents following IPC taxonomy (OECD 2008b)
Unit of observation	NUTS 3
Source	Patent data: REGPAT by OECD (see Section 8.6)
Reference year(s) considered	2000-2009

Figure 42: Frequency of the ICT patents indicator values

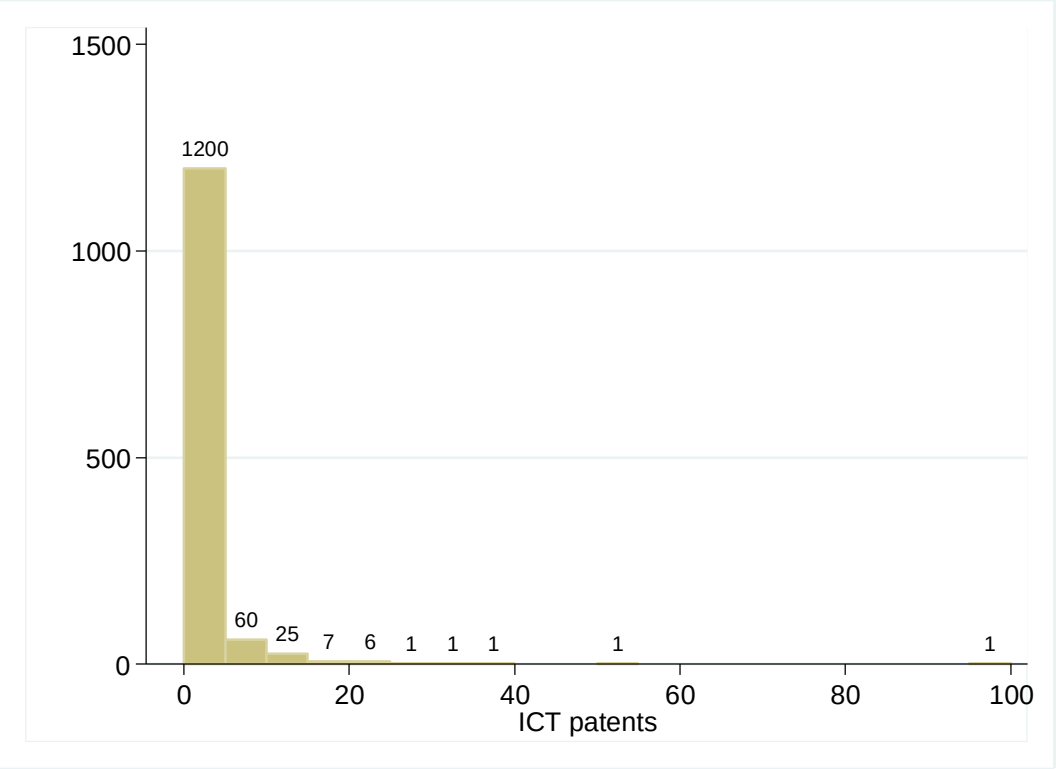


Table 54: Descriptive statistics of ICT patents indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.43	4.49	19.80

5.2.4 International Co-inventions

Table 55: Top ranking regions according to International co-inventions indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE139	Lorrach	100	94
2	DEB3C	Bad Durkheim	42	154
3	DE13A	Waldshut	40	321
4	DEA21	Aachen, Kreisfreie Stadt	38	18
5	DEB36	Neustadt an der Weinstrasse,	37	389
6	DE125	Heidelberg, Stadtkreis	36	23
7	DEB3I	Rhein-Pfalz-Kreis	35	109
8	DE71A	Main-Taunus-Kreis	32	218
9	AT342	Rheintal-Bodenseegebiet	31	125
10	UKH12	Cambridgeshire CC	30	5
11	DEB34	Ludwigshafen am Rhein, Kreisfreie	30	287
12	DE711	Darmstadt, Kreisfreie Stadt	28	7
13	BE336	Bezirk Verviers - Deutschsprachige	27	676
14	DEB38	Speyer, Kreisfreie Stadt	27	304
15	FR422	Haut-Rhin	27	188
16	DE21H	Munchen, Landkreis	27	22
17	DE252	Erlangen, Kreisfreie Stadt	27	32
18	DE138	Konstanz	26	53
19	DE131	Freiburg im Breisgau, Stadtkreis	25	238
20	DEA24	Leverkusen, Kreisfreie Stadt	25	145
21	DE146	Biberach	25	390
22	BE341	Arr. Arlon	25	867
23	DE21L	Starnberg	23	97
24	AT331	Ausserfern	22	887
25	DEB31	Frankenthal (Pfalz), Kreisfreie Stadt	21	337
26	BE345	Arr. Virton	21	1045
27	DE11C	Heidenheim	20	455
28	DE21C	Furstenfeldbruck	20	137
28	DE126	Mannheim, Stadtkreis	20	277
30	BE242	Arr. Leuven	20	11

Indicator description	
Indicator ID	IntIn 1
Name of indicator	International co-inventions
What does it measure?	It measures the number of international ICT patents, i.e. patents with at least two inventors residing in different countries, and attributes to the observed region the (fractional) count) of those patents for which at least one inventor is residing in the region.
Unit of measurement	Region's share in the total number of international ICT patents in the EU to a region's share in the EU population
Definition of ICT dimension	Based on the OECD definition of ICT following IPC taxonomy (OECD 2008b).
Unit of observation	NUTS 3
Source	Patent data: REGPAT by OECD (see Section 8.6)
Reference year(s) considered	2000-2009

Figure 43: Frequency of the International co-inventions indicator values

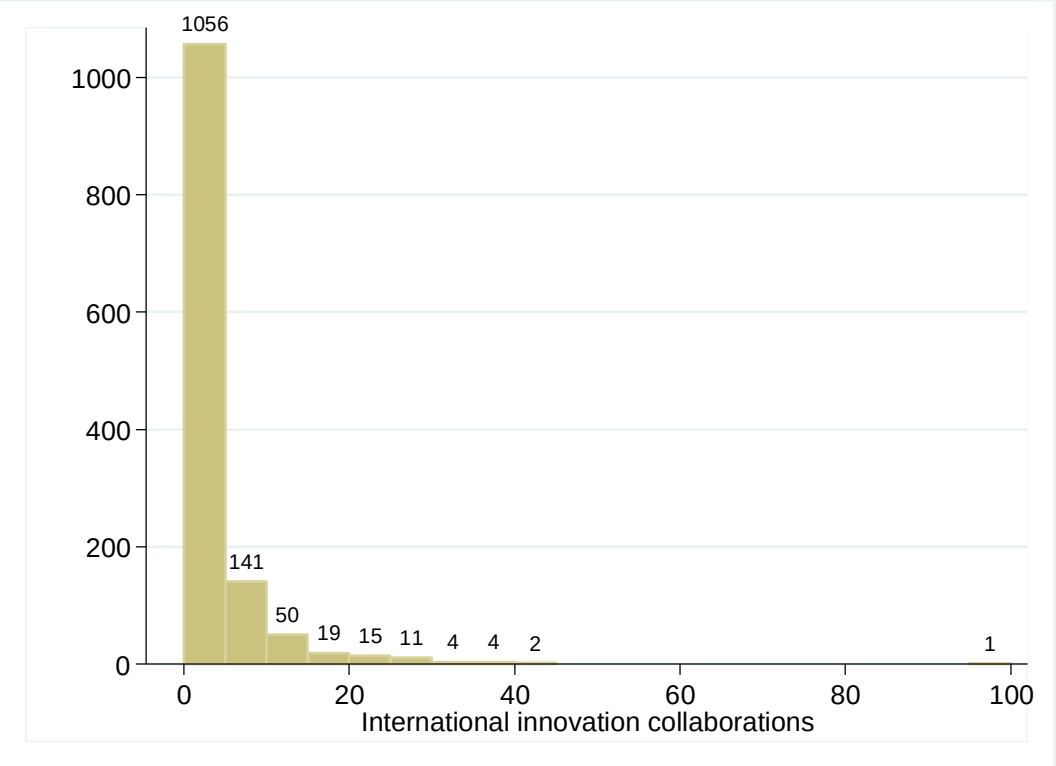


Table 56: Descriptive statistics of International co-inventions indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.94	5.94	35.26

5.2.5 Degree in ICT Innovation Network

Table 57: Top ranking regions according to Degree in ICT innovation network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	DE300	Berlin	88	15
3	DE21H	Munchen, Landkreis	80	22
4	UKH12	Cambridgeshire CC	70	5
5	FR101	Paris	69	3
6	UKJ33	Hampshire CC	63	31
7	SE110	Stockholms lan	60	6
8	DE128	Rhein-Neckar-Kreis	59	99
9	FR105	Hauts-de-Seine	56	13
10	DE111	Stuttgart, Stadtkreis	55	21
11	ITC45	Milano	54	14
12	DE115	Ludwigsburg	53	45
13	UKJ14	Oxfordshire	52	19
14	DED21	Dresden, Kreisfreie Stadt	52	34
15	DE112	Boblingen	51	67
16	FR103	Yvelines	50	33
17	UKI11	Inner London - West	50	65
18	DE716	Darmstadt-Dieburg	49	115
19	DE712	Frankfurt am Main, Kreisfreie Stadt	49	30
20	UKJ23	Surrey	49	29
21	DE929	Region Hannover	49	60
22	FR714	Isere	48	35
23	DE600	Hamburg	48	87
24	DE252	Erlangen, Kreisfreie Stadt	48	32
25	DEA23	Koln, Kreisfreie Stadt	47	43
26	UKI23	Outer London - West and North West	46	68
27	DE125	Heidelberg, Stadtkreis	45	23
28	DE257	Erlangen-Hochstadt	44	170
29	UKJ11	Berkshire	44	26
30	AT130	Wien	44	27

Indicator description	
Indicator ID	NetIn 1
Name of indicator	Degree in ICT innovation network
What does it measure?	It measures the total number of connections a region maintains with other regions through joint inventions
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on the OECD definition of ICT following IPC taxonomy (OECD 2008b).
Unit of observation	NUTS 3 for EU and TL3 for the remaining OECD countries
Source	Patent data: REGPAT by OECD (see Section 8.6)
Reference year(s) considered	2000-2009

Figure 44: Frequency of the Degree in ICT innovation network indicator values

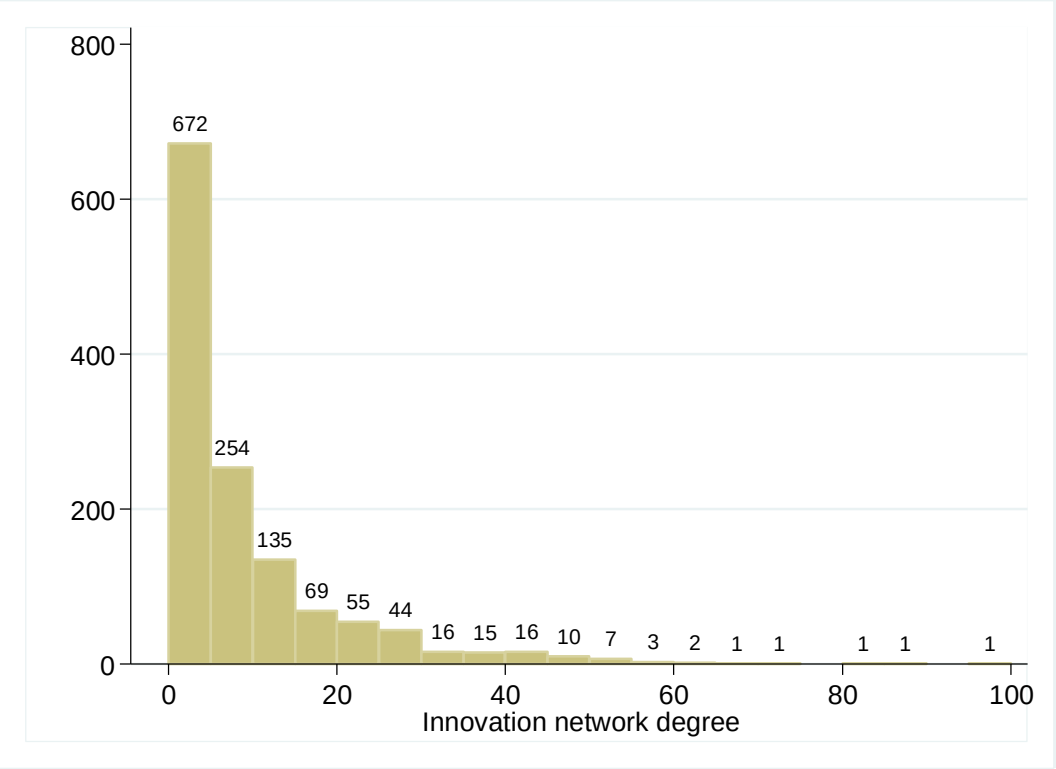


Table 58: Descriptive statistics of Degree in ICT innovation network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	8.42	11.63	135.40

5.2.6 Closeness Centrality in ICT Innovation Network

Table 59: Top ranking regions according to Closeness centrality in ICT innovation network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	92	1
2	DE300	Berlin	91	15
3	DE21H	Munchen, Landkreis	90	22
4	UKH12	Cambridgeshire CC	90	5
5	FR101	Paris	90	3
6	UKJ33	Hampshire CC	89	31
7	SE110	Stockholms lan	89	6
8	FR105	Hauts-de-Seine	88	13
9	UKI11	Inner London - West	87	65
10	UKJ14	Oxfordshire	87	19
11	UKJ23	Surrey	87	29
12	ITC45	Milano	87	14
13	FR103	Yvelines	87	33
14	FR714	Isere	87	35
15	UKJ11	Berkshire	87	26
16	UKI23	Outer London - West and North West	86	68
17	UKH23	Hertfordshire	86	90
18	DE128	Rhein-Neckar-Kreis	86	99
19	DE111	Stuttgart, Stadtkreis	86	21
20	FI181	Uusimaa	86	9
21	DE112	Boblingen	86	67
22	DEA23	Koln, Kreisfreie Stadt	86	43
23	DE115	Ludwigsburg	85	45
24	DED21	Dresden, Kreisfreie Stadt	85	34
25	FR104	Essonne	85	62
26	FR823	Alpes-Maritimes	85	77
27	DE125	Heidelberg, Stadtkreis	85	23
28	NL414	Zuidoost-Noord-Brabant	85	8
29	UKH33	Essex CC	85	111
30	UKI12	Inner London - East	85	2

Indicator description	
Indicator ID	NetIn 2
Name of indicator	Closeness centrality in ICT innovation network
What does it measure?	It measures the average distance that each node is from all other nodes in the network
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on the OECD definition of ICT following IPC taxonomy (OECD 2008b).
Unit of observation	NUTS 3 for EU and TL3 for the remaining OECD countries
Source	Patent data: REGPAT by OECD (see Section 8.6)
Reference year(s) considered	2000-2009

Figure 45: Frequency of the Closeness centrality in ICT innovation network indicator values

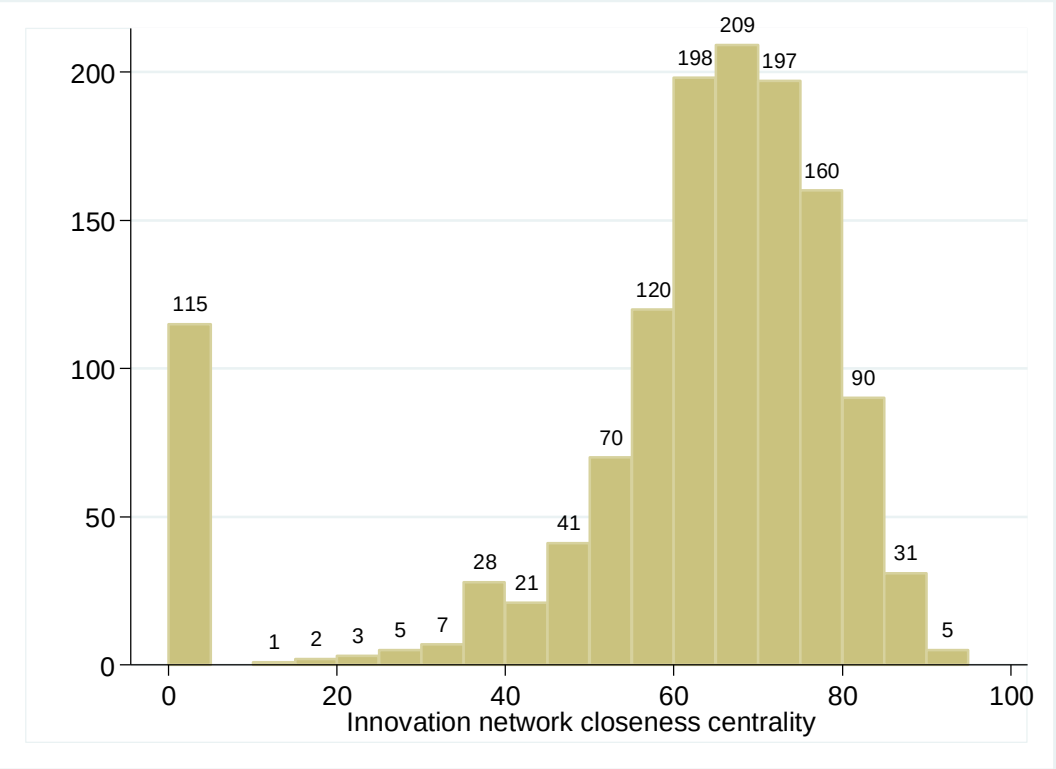


Table 60: Descriptive statistics of Closeness centrality in ICT innovation network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	59.94	21.87	478.53

5.2.7 Betweenness Centrality in ICT Innovation Network

Table 61: Top ranking regions according to Betweenness centrality in ICT innovation network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	DE300	Berlin	84	15
3	SE110	Stockholms lan	60	6
4	ITC45	Milano	55	14
5	DE21H	Munchen, Landkreis	52	22
6	FR101	Paris	46	3
7	UKH12	Cambridgeshire CC	43	5
8	UKJ33	Hampshire CC	32	31
9	FR105	Hauts-de-Seine	31	13
10	FR714	Isere	31	35
11	DE128	Rhein-Neckar-Kreis	27	99
12	BE242	Arr. Leuven	26	11
13	FI181	Uusimaa	25	9
14	DED21	Dresden, Kreisfreie Stadt	24	34
15	FR103	Yvelines	24	33
16	UKJ23	Surrey	23	29
17	BG411	Sofia (stolitsa)	23	263
18	AT130	Wien	23	27
19	ES300	Madrid	23	28
19	DE600	Hamburg	23	87
21	RO321	Bucuresti	22	215
22	UKJ14	Oxfordshire	22	19
23	UKI11	Inner London - West	21	65
24	DE111	Stuttgart, Stadtkreis	20	21
25	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	17	25
26	ITE43	Roma	17	40
26	DE929	Region Hannover	17	60
28	UKH14	Suffolk	16	210
29	FR104	Essonne	16	62
30	DE115	Ludwigsburg	16	45

Indicator description	
Indicator ID	NetIn 3
Name of indicator	Betweenness centrality in ICT innovation network
What does it measure?	It measures the number of shortest paths in a network that traverse through that node
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on the OECD definition of ICT following IPC taxonomy (OECD 2008b).
Unit of observation	NUTS 3 for EU and TL3 for the remaining OECD countries
Source	Patent data: REGPAT by OECD (see Section 8.6)
Reference year(s) considered	2000-2009

Figure 46: Frequency of the Betweenness centrality in ICT innovation network indicator values

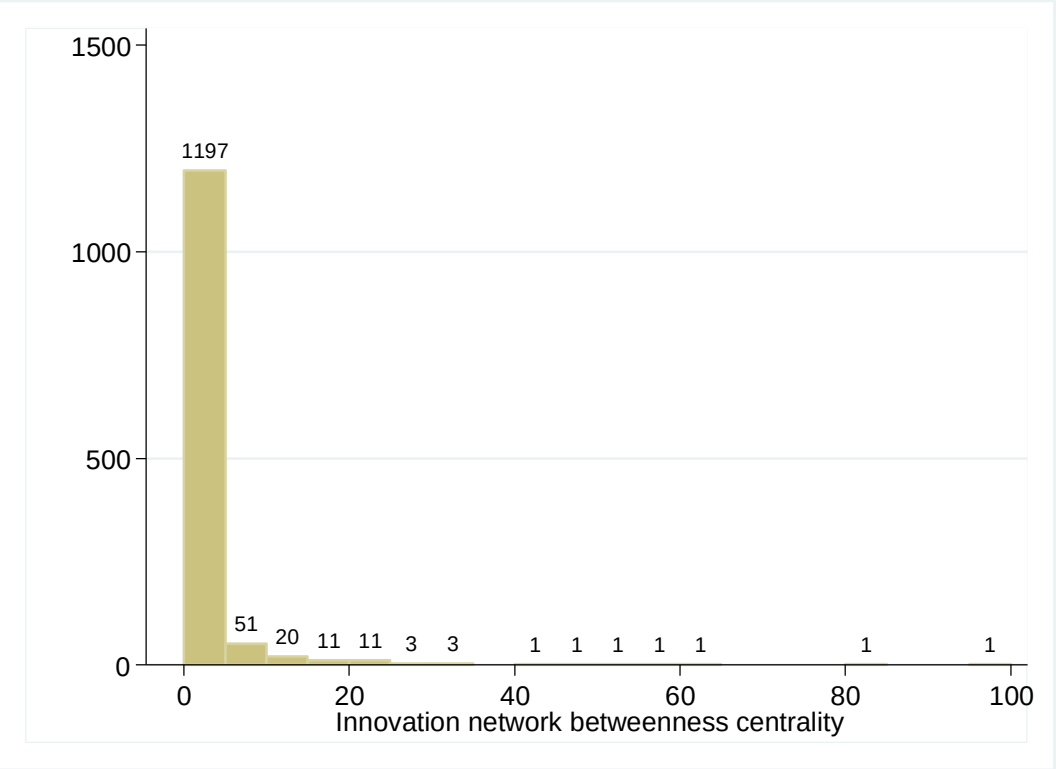


Table 62: Descriptive statistics of Betweenness centrality in ICT innovation network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.53	5.97	35.64

5.2.8 Eigenvector Centrality in ICT Innovation Network

Table 63: Top ranking regions according to Eigenvector centrality in ICT innovation network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKH12	Cambridgeshire CC	100	5
2	UKJ33	Hampshire CC	98	31
3	SE110	Stockholms lan	94	6
4	UKJ14	Oxfordshire	85	19
5	UKJ23	Surrey	83	29
6	DED21	Dresden, Kreisfreie Stadt	82	34
7	UKI11	Inner London - West	81	65
8	NL414	Zuidoost-Noord-Brabant	79	8
9	UKI23	Outer London - West and North West	72	68
10	UKJ11	Berkshire	71	26
11	UKI12	Inner London - East	66	2
12	UKM25	Edinburgh, City of	65	20
13	DEG03	Jena, Kreisfreie Stadt	63	39
14	ITC45	Milano	58	14
15	DEB3I	Rhein-Pfalz-Kreis	58	109
16	DEB35	Mainz, Kreisfreie Stadt	58	44
17	UKH23	Hertfordshire	57	90
18	FR714	Isere	56	35
19	FR101	Paris	56	3
20	UKK12	Bath and North East Somerset, North Somerset and South Gloucestershire	55	69
21	DEB3J	Mainz-Bingen	55	254
22	SE224	Skane lan	54	37
23	UKK15	Wiltshire CC	51	203
24	SE232	Vastra Gotalands lan	50	59
25	UKL22	Cardiff and Vale of Glamorgan	50	107
26	DEB3C	Bad Durkheim	49	154
27	UKJ32	Southampton	49	130
28	DEA52	Dortmund, Kreisfreie Stadt	48	89
29	DEA23	Koln, Kreisfreie Stadt	48	43
29	UKJ13	Buckinghamshire CC	48	116

Indicator description	
Indicator ID	NetIn 4
Name of indicator	Eigenvector centrality in ICT innovation network
What does it measure?	It measures the importance of a node in a network, based on the importance of its direct neighbours
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on the OECD definition of ICT following IPC taxonomy (OECD 2008b).
Unit of observation	NUTS 3 for EU and TL3 for the remaining OECD countries
Source	Patent data: REGPAT by OECD (see Section 8.6)
Reference year(s) considered	2000-2009

Figure 47: Frequency of the Eigenvector centrality in ICT innovation network indicator values

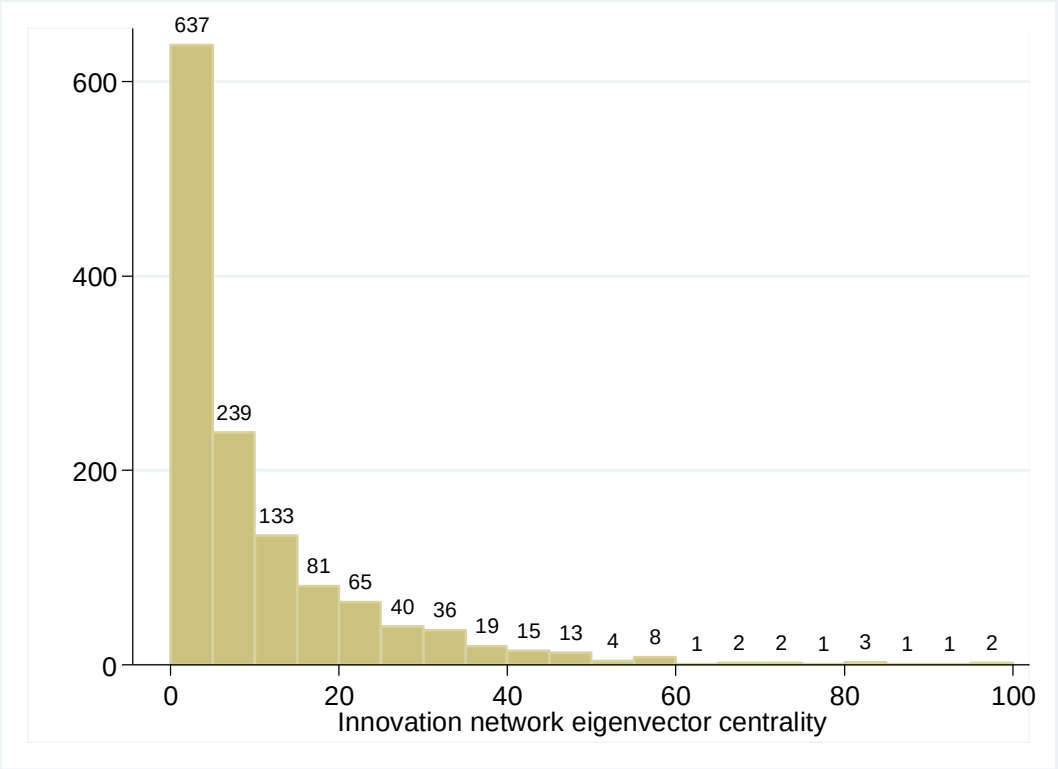


Table 64: Descriptive statistics of Eigenvector centrality in ICT innovation network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	9.62	13.40	179.57

5.3 ICT Business

5.3.1 Location of ICT Scoreboard Headquarters

Table 65: Top ranking regions according to Location of ICT Scoreboard Headquarters indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE25C	Weissenburg-Gunzenhausen	100	118
2	UKH12	Cambridgeshire CC	92	5
2	UKJ31	Portsmouth	92	91
4	BE253	Arr. Ieper	88	194
5	DEB11	Koblenz, Kreisfreie Stadt	87	83
6	FI181	Uusimaa	86	9
7	DE718	Hochtaunuskreis	82	51
8	BE242	Arr. Leuven	77	11
9	DK012	Kobenhavns omegn	73	41
10	DE235	Cham	71	284
11	DEG0B	Schmalkalden-Meiningen	70	202
12	DE138	Konstanz	67	53
13	DE711	Darmstadt, Kreisfreie Stadt	65	7
14	DE122	Karlsruhe, Stadtkreis	64	4
15	SE110	Stockholms lan	61	6
16	DE133	Emmendingen	58	148
17	DE21B	Freising	57	57
18	DK011	Byen Kobenhavn	56	24
19	DE264	Aschaffenburg, Landkreis	54	127
20	UKI12	Inner London - East	53	2
21	DE735	Schwalm-Eder-Kreis	50	237
22	DE145	Alb-Donau-Kreis	49	309
23	FI1A2	Pohjois-Pohjanmaa	48	58
24	UKE21	York	47	63
24	DE12B	Enzkreis	47	212
26	FR101	Paris	45	3
26	DEG01	Erfurt, Kreisfreie Stadt	45	143
28	DE136	Schwarzwald-Baar-Kreis	44	96
29	UKJ14	Oxfordshire	43	19
29	NL333	Delft en Westland	43	17

Indicator description	
Indicator ID	AgBus 1
Name of indicator	Location of ICT Scoreboard Headquarters
What does it measure?	It measures the number of ICT Scoreboard Headquarters located in the observed region
Unit of measurement	Region's share in the total number of ICT Scoreboard Headquarters located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 48: Frequency of the Location of ICT Scoreboard Headquarters indicator values

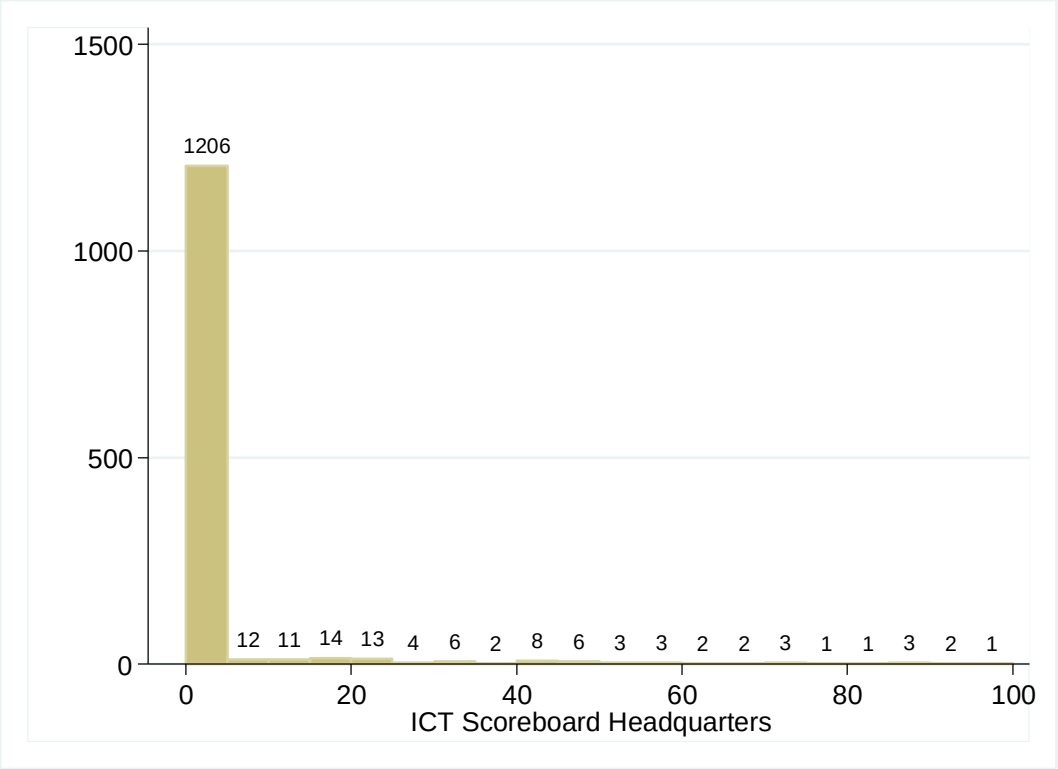


Table 66: Descriptive statistics of Location of ICT Scoreboard Headquarters indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.50	10.95	119.94

5.3.2 Ownership of ICT Scoreboard Affiliates

Table 67: Top ranking regions according to Ownership of ICT Scoreboard affiliates indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE711	Darmstadt, Kreisfreie Stadt	100	7
2	DEB15	Birkenfeld	47	245
3	DE25C	Weissenburg-Gunzenhausen	40	118
4	DE718	Hochtaunuskreis	29	51
5	DEB11	Koblenz, Kreisfreie Stadt	28	83
6	UKI12	Inner London - East	26	2
7	DE122	Karlsruhe, Stadtkreis	25	4
8	DEA22	Bonn, Kreisfreie Stadt	22	12
9	NL326	Groot-Amsterdam	20	10
10	DE137	Tuttlingen	18	157
11	DEG03	Jena, Kreisfreie Stadt	16	39
12	NL414	Zuidoost-Noord-Brabant	15	8
13	DEB35	Mainz, Kreisfreie Stadt	15	44
14	DE80G	Parchim	15	333
15	NL332	Agglomeratie 's-Gravenhage	14	80
16	DE735	Schwalm-Eder-Kreis	14	237
17	UKJ31	Portsmouth	14	91
18	SE231	Hallands lan	14	166
19	DE111	Stuttgart, Stadtkreis	14	21
20	UKH12	Cambridgeshire CC	13	5
21	AT342	Rheintal-Bodenseegebiet	13	125
22	DE138	Konstanz	12	53
23	IE021	Dublin	11	16
24	DE212	Munchen, Kreisfreie Stadt	11	1
25	DEA11	Dusseldorf, Kreisfreie Stadt	10	38
26	UKH21	Luton	10	265
27	DE276	Augsburg, Landkreis	10	177
28	SE110	Stockholms lan	10	6
29	DEA47	Paderborn	10	74
30	FR101	Paris	9	3

Indicator description	
Indicator ID	AgBus 2
Name of indicator	Ownership of ICT Scoreboard affiliates
What does it measure?	It measures the number of ICT Scoreboard affiliates owned worldwide by ICT Scoreboard Headquarters located in the observed region
Unit of measurement	Region's share in the total number of ICT Scoreboard affiliates owned by EU ICT Scoreboard Headquarters to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 49: Frequency of the Ownership of ICT Scoreboard affiliates indicator values

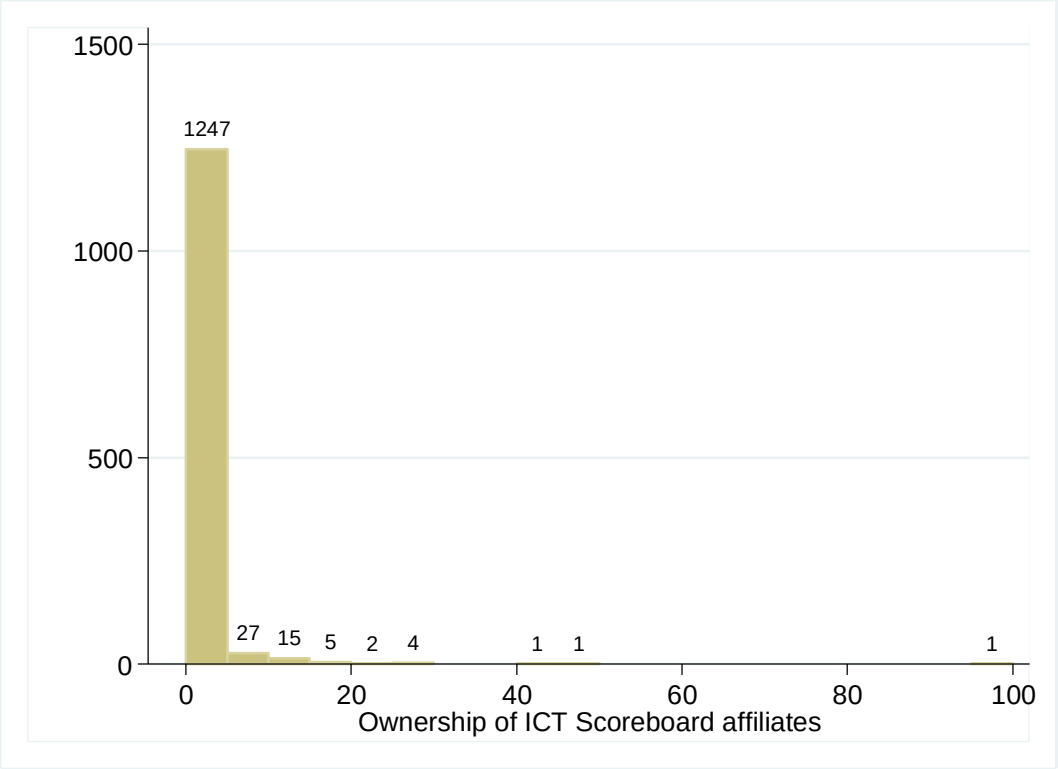


Table 68: Descriptive statistics of Ownership of ICT Scoreboard affiliates indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.77	4.12	17.02

5.3.3 Location of ICT Scoreboard Affiliates

Table 69: Top ranking regions according to Location of ICT Scoreboard affiliates indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKI12	Inner London - East	100	2
2	DE711	Darmstadt, Kreisfreie Stadt	77	7
3	IE021	Dublin	52	16
4	DE122	Karlsruhe, Stadtkreis	49	4
5	UKJ31	Portsmouth	46	91
6	DEB11	Koblenz, Kreisfreie Stadt	45	83
7	DEG03	Jena, Kreisfreie Stadt	44	39
8	DE718	Hochtaunuskreis	42	51
9	NL326	Groot-Amsterdam	41	10
10	DEB3D	Donnersbergkreis	38	120
11	DE212	Munchen, Kreisfreie Stadt	37	1
12	DE21B	Freising	35	57
13	DEA22	Bonn, Kreisfreie Stadt	35	12
14	UKH12	Cambridgeshire CC	34	5
15	DE21H	Munchen, Landkreis	33	22
16	DEA11	Dusseldorf, Kreisfreie Stadt	33	38
17	DE712	Frankfurt am Main, Kreisfreie Stadt	30	30
18	DE111	Stuttgart, Stadtkreis	27	21
19	DE25C	Weissenburg-Gunzenhausen	27	118
20	DE137	Tuttlingen	27	157
21	DEB35	Mainz, Kreisfreie Stadt	27	44
22	UKH21	Luton	26	265
23	DK011	Byen Kobenhavn	26	24
24	DE23A	Tirschenreuth	25	478
25	DE279	Neu-Ulm	25	92
26	FR105	Hauts-de-Seine	24	13
27	DE261	Aschaffenburg, Kreisfreie Stadt	24	144
28	SE110	Stockholms lan	24	6
29	DE264	Aschaffenburg, Landkreis	23	127
30	NL327	Het Gooi en Vechtstreek	20	133

Indicator description	
Indicator ID	AgBus 3
Name of indicator	Location of ICT Scoreboard affiliates
What does it measure?	It measures the total number of ICT Scoreboard affiliates located in the observed region
Unit of measurement	Region's share in the total number of ICT Scoreboard affiliates located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 50: Frequency of the Location of ICT Scoreboard affiliates indicator values

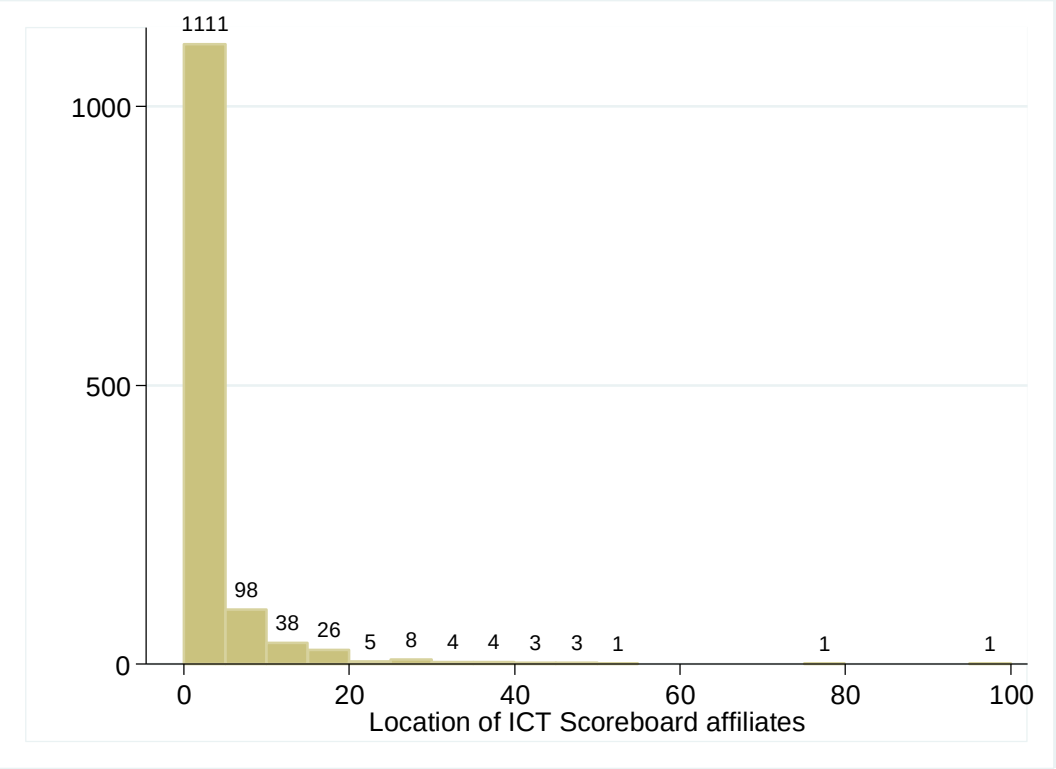


Table 70: Descriptive statistics of Location of ICT Scoreboard affiliates indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.46	6.71	45.08

5.3.4 Location of ICT Firms

Table 71: Top ranking regions according to Location of ICT firms indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKI12	Inner London - East	100	2
2	BE253	Arr. Ieper	49	194
3	SE110	Stockholms lan	46	6
4	UKH12	Cambridgeshire CC	45	5
5	UKJ12	Milton Keynes	39	98
6	DE711	Darmstadt, Kreisfreie Stadt	36	7
7	DE212	Munchen, Kreisfreie Stadt	35	1
8	FR101	Paris	32	3
9	FR105	Hauts-de-Seine	31	13
10	DE266	Rhon-Grabfeld	31	563
11	UKE11	Kingston upon Hull, City of	30	351
12	UKE21	York	26	63
13	NL326	Groot-Amsterdam	26	10
14	DE222	Passau, Kreisfreie Stadt	25	123
15	UKG33	Coventry	25	169
16	UKJ23	Surrey	24	29
17	UKJ14	Oxfordshire	24	19
17	DEB11	Koblenz, Kreisfreie Stadt	24	83
19	FI181	Uusimaa	24	9
20	DE121	Baden-Baden, Stadtkreis	24	570
21	IE021	Dublin	23	16
22	DE94H	Wittmund	22	1000
23	DE122	Karlsruhe, Stadtkreis	22	4
24	UKF14	Nottingham	21	139
25	NL327	Het Gooi en Vechtstreek	21	133
26	DE271	Augsburg, Kreisfreie Stadt	19	181
27	UKG13	Warwickshire	19	85
28	UKH23	Hertfordshire	19	90
29	UKL11	Isle of Anglesey	19	721
30	UKJ11	Berkshire	18	26

Indicator description	
Indicator ID	AgBus 4
Name of indicator	Location of ICT firms
What does it measure?	It measures the number of ICT firms located in the observed region
Unit of measurement	Region's share in the total number of ICT firms located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 51: Frequency of the Location of ICT firms indicator values

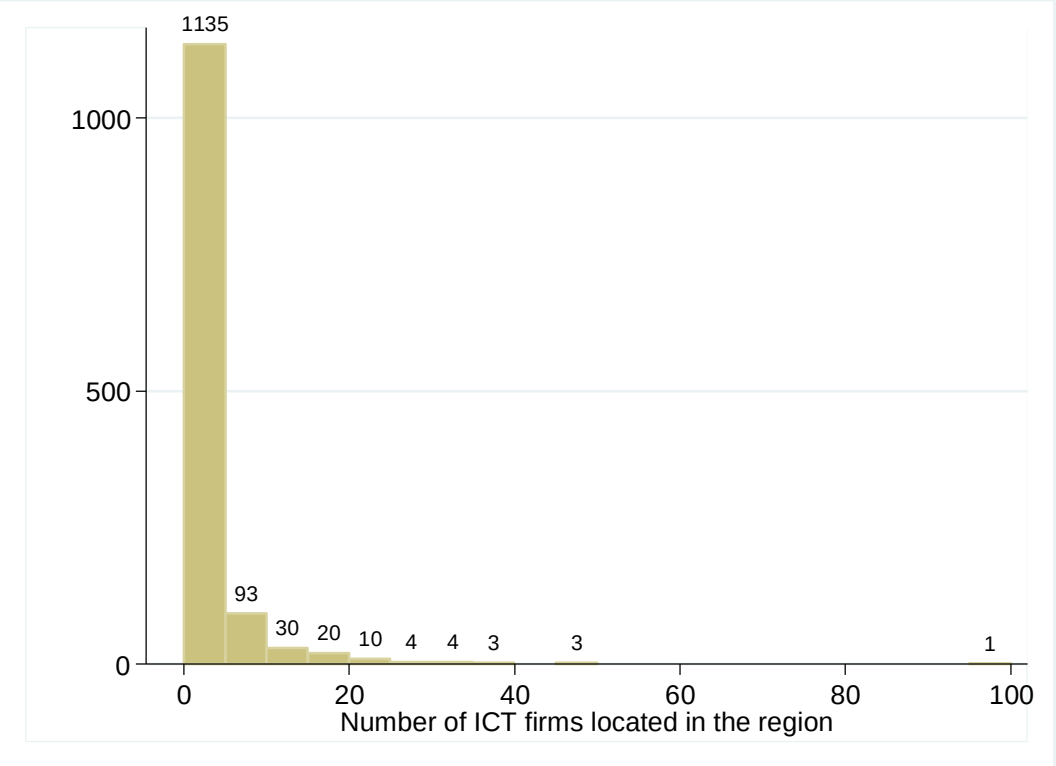


Table 72: Descriptive statistics of Location of ICT firms indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.84	5.75	33.06

5.3.5 ICT Employment

Table 73: Top ranking regions according to ICT employment indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DEA22	Bonn, Kreisfreie Stadt	100	12
2	FR101	Paris	33	3
3	DE122	Karlsruhe, Stadtkreis	21	4
4	FI181	Uusimaa	12	9
5	UKI12	Inner London - East	9	2
6	SE110	Stockholms lan	8	6
7	UKI21	Outer London - East and North East	6	151
8	FR108	Val-d'Oise	5	249
9	ES300	Madrid	5	28
10	UKJ11	Berkshire	5	26
11	NL332	Agglomeratie 's-Gravenhage	5	80
12	AT223	Ostliche Obersteiermark	4	522
13	DE212	Munchen, Kreisfreie Stadt	4	1
14	FR105	Hauts-de-Seine	4	13
15	DK032	Sydjylland	4	300
16	DE279	Neu-Ulm	4	92
17	NL230	Flevoland	4	280
18	DE711	Darmstadt, Kreisfreie Stadt	3	7
19	DK011	Byen Kobenhavn	3	24
20	DEB1B	Westerwaldkreis	3	264
21	ITC45	Milano	2	14
22	FI1A2	Pohjois-Pohjanmaa	2	58
22	DEB11	Koblenz, Kreisfreie Stadt	2	83
24	LU000	Luxembourg (Grand-Duche)	2	71
25	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	2	25
26	FR103	Yvelines	2	33
27	PL127	Miasto Warszawa	2	50
28	DEA46	Minden-Lubbecke	2	617
29	DEF0B	Rendsburg-Eckernforde	2	138
30	DE21B	Freising	2	57

Indicator description	
Indicator ID	AgBus 5
Name of indicator	ICT employment
What does it measure?	It measures the total employment in ICT firms in the observed region
Unit of measurement	Region's share in the total employment by ICT firms located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 52: Frequency of the ICT employment indicator values

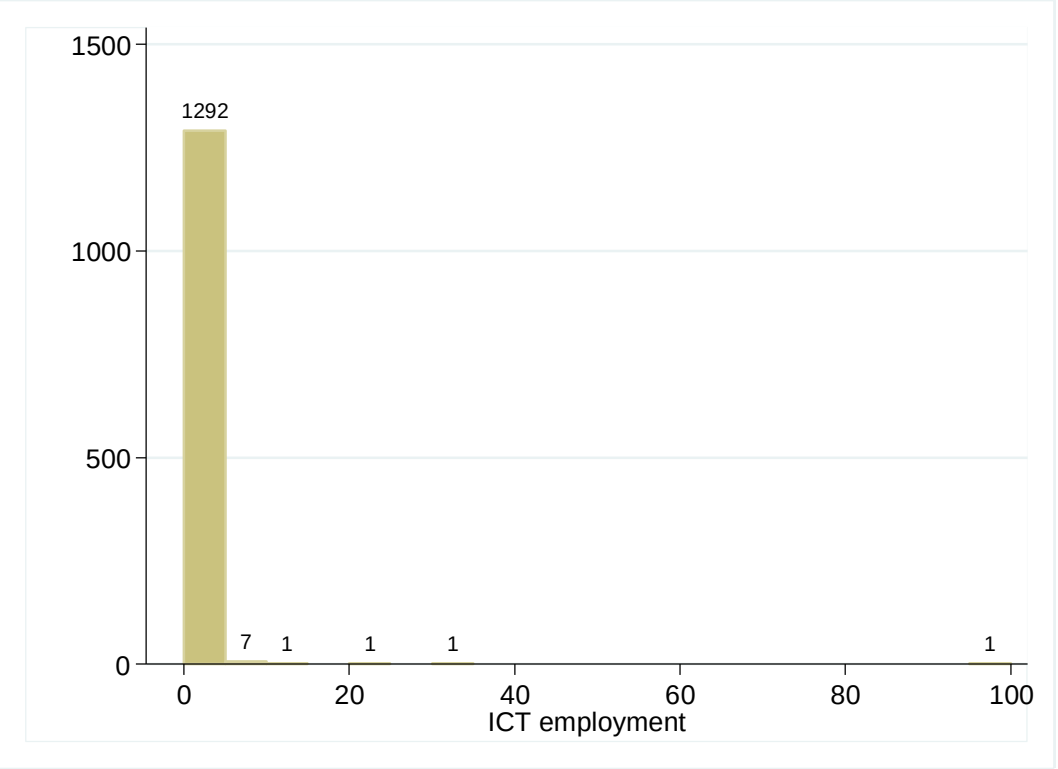


Table 74: Descriptive statistics of ICT employment indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.21	3.05	9.28

5.3.6 Growth in ICT Employment

Table 75: Top ranking regions according to Growth in ICT employment indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	PT171	Grande Lisboa	100	93
2	PL325	Rzeszowski	76	376
3	NL113	Overig Groningen	69	246
3	UKH31	Southend-on-Sea	69	257
3	DEA1B	Kleve	69	317
6	NL327	Het Gooi en Vechtstreek	61	133
6	SE213	Kalmar lan	61	491
8	FI1A2	Pohjois-Pohjanmaa	53	58
8	UKK12	Bath and North East Somerset, North Somerset and South Gloucestershire	53	69
8	DEB11	Koblenz, Kreisfreie Stadt	53	83
8	DK013	Nordsjaelland	53	102
8	DE222	Passau, Kreisfreie Stadt	53	123
8	AT312	Linz-Wels	53	142
8	FR718	Haute-Savoie	53	153
8	SK010	Bratislavsky kraj	53	260
8	ITC47	Brescia	53	383
8	UKL23	Flintshire and Wrexham	53	464
18	UKM25	Edinburgh, City of	46	20
18	DE125	Heidelberg, Stadtkreis	46	23
18	FR714	Isere	46	35
18	DEA23	Koln, Kreisfreie Stadt	46	43
18	SE121	Uppsala lan	46	47
18	DE929	Region Hannover	46	60
18	DE501	Bremen, Kreisfreie Stadt	46	112
18	DEA12	Duisburg, Kreisfreie Stadt	46	184
18	BE332	Arr. Liege	46	251
18	UKE42	Leeds	46	284
18	UKL18	Swansea	46	297
18	UKC23	Sunderland	46	363
18	DEE05	Anhalt-Bitterfeld	46	425

Indicator description	
Indicator ID	AgBus 6
Name of indicator	Growth in ICT employment
What does it measure?	It measures employment growth in ICT firms in the observed region
Unit of measurement	Growth rate in %
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 53: Frequency of the Growth in ICT employment indicator values

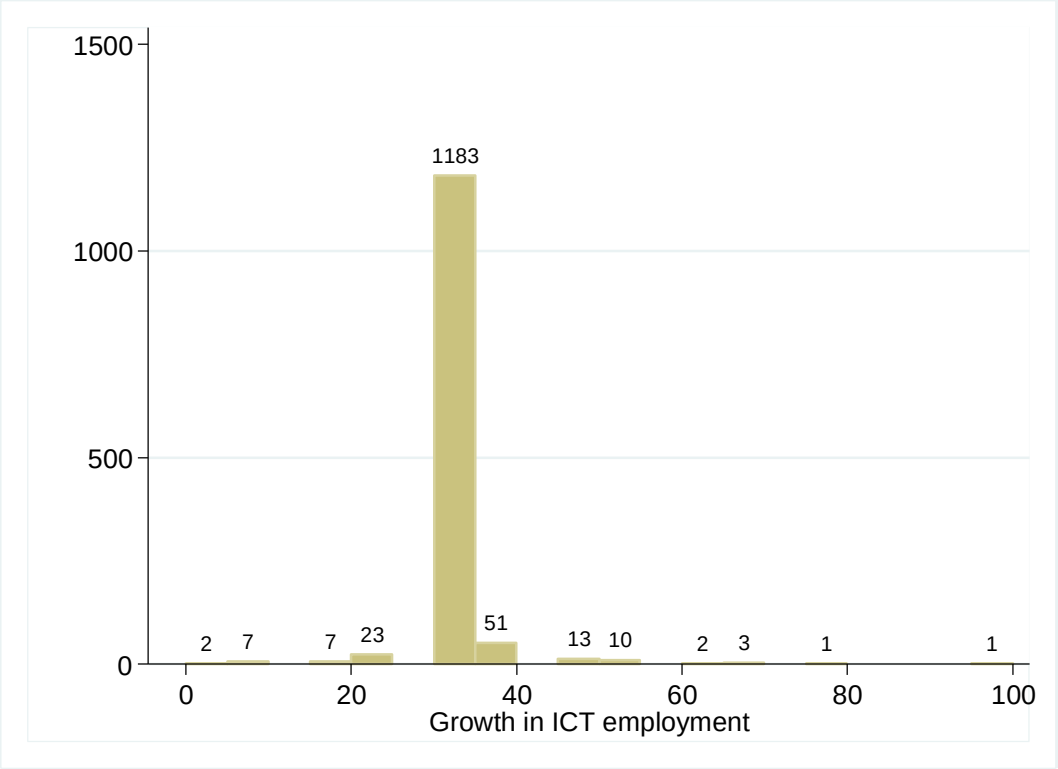


Table 76: Descriptive statistics of Growth in ICT employment indicator

Number of observations	Mean value	Standard deviation	Variance
1303	30.50	5.05	25.54

5.3.7 Turnover by ICT Firms

Table 77: Top ranking regions according to Turnover by ICT firms indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DEA22	Bonn, Kreisfreie Stadt	100	12
2	FR101	Paris	25	3
3	DE122	Karlsruhe, Stadtkreis	19	4
4	FI181	Uusimaa	17	9
5	UKI12	Inner London - East	15	2
6	UKI21	Outer London - East and North East	15	151
7	SE110	Stockholms lan	9	6
8	NL332	Agglomeratie 's-Gravenhage	8	80
9	LU000	Luxembourg (Grand-Duche)	5	71
10	DEF0B	Rendsburg-Eckernforde	5	138
11	DE279	Neu-Ulm	4	92
12	ES300	Madrid	4	28
13	ITC45	Milano	4	14
14	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	4	25
15	DK011	Byen Kobenhavn	4	24
16	DEB1B	Westerwaldkreis	4	264
17	DEA47	Paderborn	3	74
18	NL414	Zuidoost-Noord-Brabant	2	8
19	DE212	Munchen, Kreisfreie Stadt	2	1
20	DE711	Darmstadt, Kreisfreie Stadt	2	7
21	DEE05	Anhalt-Bitterfeld	2	425
22	DK032	Sydjylland	2	300
23	FR108	Val-d'Oise	2	249
24	UKJ11	Berkshire	2	26
25	DE24A	Kronach	2	582
26	UKE31	Barnsley, Doncaster and Rotherham	2	392
27	FR105	Hauts-de-Seine	1	13
28	BE212	Arr. Mechelen	1	150
29	AT130	Wien	1	27
30	PT171	Grande Lisboa	1	93

Indicator description	
Indicator ID	AgBus 7
Name of indicator	Turnover by ICT firms
What does it measure?	It measures the average annual turnover by ICT firms in the observed region
Unit of measurement	Region's share in the total turnover by ICT firms located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 54: Frequency of the Growth in ICT employment indicator values

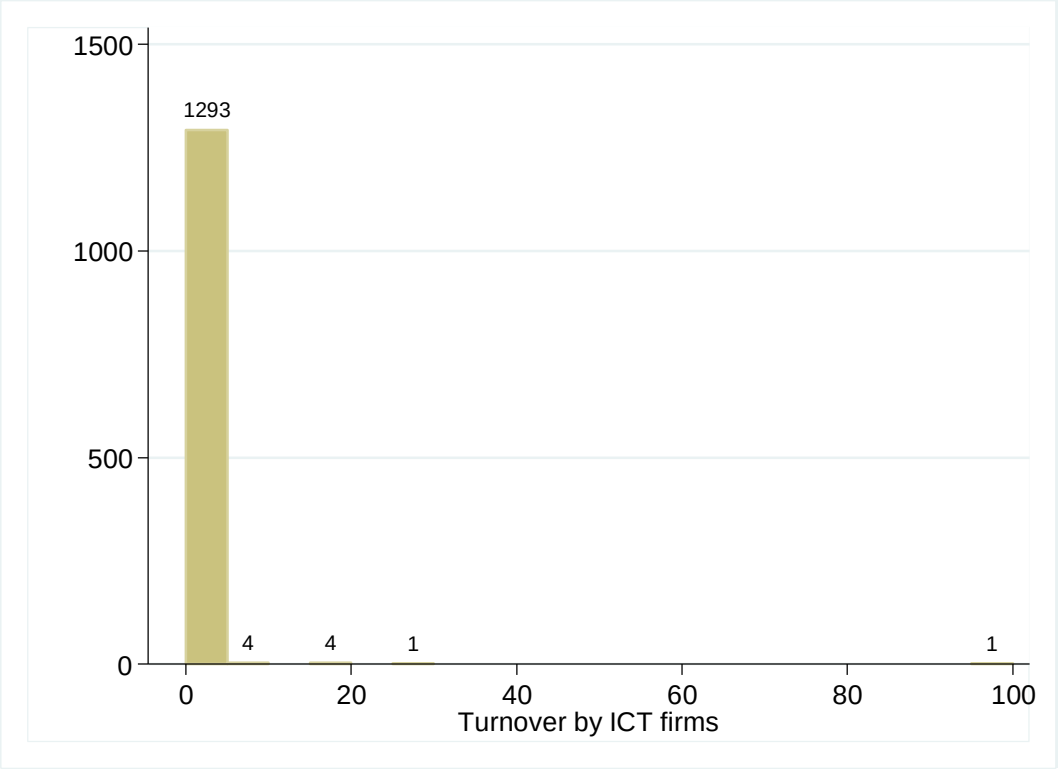


Table 78: Descriptive statistics of Growth in ICT employment indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.21	3.04	9.23

5.3.8 Growth in Turnover by ICT Firms

Table 79: Top ranking regions according to Growth in turnover by ICT firms indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DEA1B	Kleve	100	317
1	UKL23	Flintshire and Wrexham	100	464
3	FR718	Haute-Savoie	90	153
3	SK010	Bratislavsky kraj	90	260
3	PL325	Rzeszowski	90	376
6	DE21H	Munchen, Landkreis	81	22
6	DEA25	Aachen, Kreis	81	110
6	DE501	Bremen, Kreisfreie Stadt	81	112
6	UKH31	Southend-on-Sea	81	257
10	DE300	Berlin	72	15
10	DE711	Darmstadt, Kreisfreie Stadt	72	7
10	UKJ33	Hampshire CC	72	31
10	DE712	Frankfurt am Main, Kreisfreie Stadt	72	30
10	DEG03	Jena, Kreisfreie Stadt	72	39
10	DEA23	Koln, Kreisfreie Stadt	72	43
10	ITC11	Torino	72	56
10	DE929	Region Hannover	72	60
10	NL331	Agglomeratie Leiden en Bollenstreek	72	70
10	UKM34	Glasgow City	72	78
10	DEB11	Koblenz, Kreisfreie Stadt	72	83
10	UKJ12	Milton Keynes	72	98
10	DK013	Nordsjaelland	72	102
10	DEF02	Kiel, Kreisfreie Stadt	72	106
10	DEA41	Bielefeld, Kreisfreie Stadt	72	172
10	DEA12	Duisburg, Kreisfreie Stadt	72	184
10	DEB1B	Westerwaldkreis	72	264
10	UKL18	Swansea	72	297
10	ITD42	Udine	72	358
10	UKC23	Sunderland	72	363
10	ITC47	Brescia	72	383

Indicator description	
Indicator ID	AgBus 8
Name of indicator	Growth in turnover by ICT firms
What does it measure?	It measures turnover growth in ICT firms in the observed region
Unit of measurement	Growth rate in %
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 55: Frequency of the Growth in turnover by ICT firms indicator values

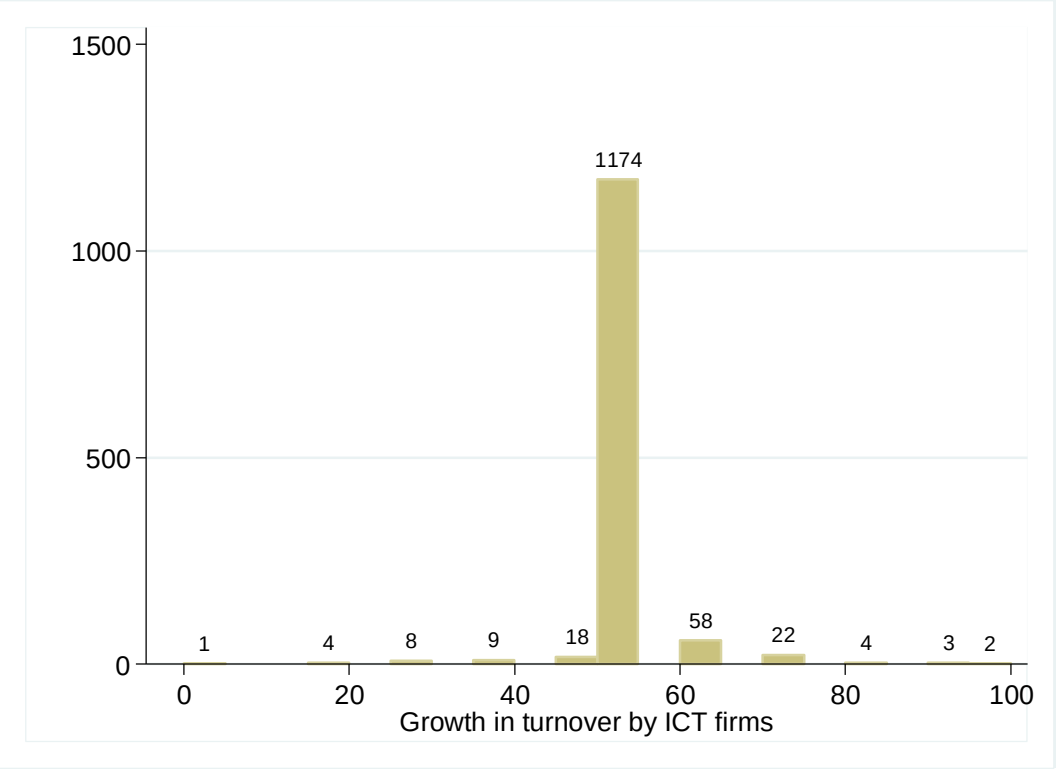


Table 80: Descriptive statistics of Growth in turnover by ICT firms indicator

Number of observations	Mean value	Standard deviation	Variance
1303	54.37	5.61	31.47

5.3.9 Number of New Investments in the ICT Sector

Table 81: Top ranking regions according to Number of new investments in the ICT sector indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE711	Darmstadt, Kreisfreie Stadt	100	7
2	UKI12	Inner London - East	44	2
3	FR101	Paris	29	3
4	UKN01	Belfast	24	338
5	UKE21	York	22	63
6	DK011	Byen Kobenhavn	21	24
7	UKJ11	Berkshire	20	26
8	NL326	Groot-Amsterdam	13	10
9	FR823	Alpes-Maritimes	12	77
10	DE212	Munchen, Kreisfreie Stadt	12	1
11	IE021	Dublin	12	16
12	UKH12	Cambridgeshire CC	10	5
13	UKK14	Swindon	10	293
14	FR716	Rhone	10	61
15	SE110	Stockholms lan	10	6
16	IE025	South-West (IRL)	10	121
17	IE012	Midland	9	611
18	UKM28	West Lothian	9	219
19	IE013	West	9	122
20	UKK11	Bristol, City of	8	48
21	DEA11	Dusseldorf, Kreisfreie Stadt	8	38
22	DE111	Stuttgart, Stadtkreis	8	21
23	UKM34	Glasgow City	7	78
24	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	7	25
24	UKG32	Solihull	7	663
26	HU101	Budapest	7	73
27	DEE01	Dessau-Rosslau, Kreisfreie Stadt	7	920
28	UKJ23	Surrey	7	29
29	UKJ12	Milton Keynes	6	98
30	IE023	Mid-West	6	205

Indicator description	
Indicator ID	AgBus 9
Name of indicator	New business investments in the ICT sector
What does it measure?	It measures the number of new investments in the ICT sector in the observed region
Unit of measurement	Region's share in the total number of new investments in the ICT sector to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	European Investment Monitor by Ernst & Young (Section 8.5)
Reference year(s) considered	2000-2011

Figure 56: Frequency of the Number of new investments in the ICT sector indicator values

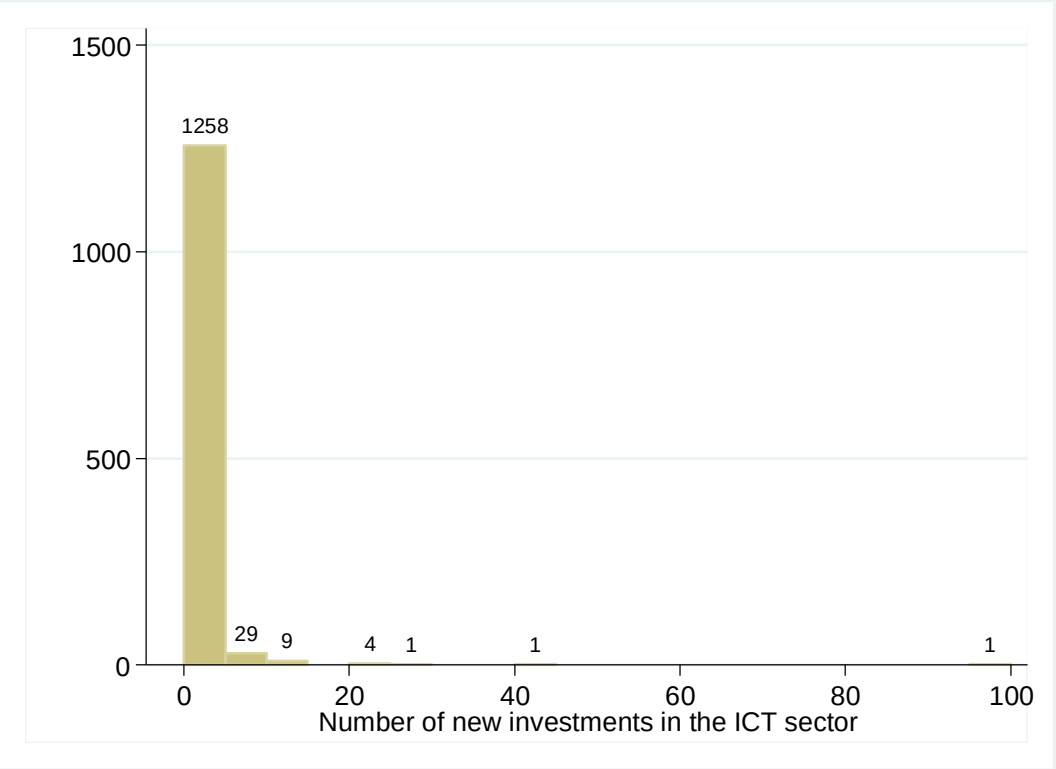


Table 82: Descriptive statistics of Number of new investments in the ICT sector indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.68	3.63	13.16

5.3.10 Outward ICT Business Internationalisation

Table 83: Top ranking regions according to Outward ICT business internationalisation indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE25C	Weissenburg-Gunzenhausen	100	118
2	NL326	Groot-Amsterdam	90	10
3	NL414	Zuidoost-Noord-Brabant	77	8
4	DE122	Karlsruhe, Stadtkreis	72	4
5	SE231	Hallands lan	69	166
6	AT342	Rheintal-Bodenseegebiet	56	125
7	DE718	Hochtaunuskreis	55	51
8	DEB11	Koblenz, Kreisfreie Stadt	50	83
9	DEB35	Mainz, Kreisfreie Stadt	48	44
10	NL324	Agglomeratie Haarlem	44	183
11	DK012	Kobenhavns omegn	39	41
12	DE735	Schwalm-Eder-Kreis	37	237
13	UKH12	Cambridgeshire CC	36	5
14	BE211	Arr. Antwerpen	34	54
14	LU000	Luxembourg (Grand-Duche)	34	71
16	NL333	Delft en Westland	33	17
17	DE711	Darmstadt, Kreisfreie Stadt	33	7
18	DEA22	Bonn, Kreisfreie Stadt	33	12
19	SE110	Stockholms lan	32	6
20	FR101	Paris	31	3
21	FI181	Uusimaa	30	9
22	BE242	Arr. Leuven	30	11
23	BE254	Arr. Kortrijk	30	162
24	IE021	Dublin	29	16
25	FR105	Hauts-de-Seine	29	13
26	DEG03	Jena, Kreisfreie Stadt	29	39
27	UKI12	Inner London - East	28	2
28	DK013	Nordsjaelland	27	102
29	DE138	Konstanz	23	53
30	DE21L	Starnberg	23	97

Indicator description	
Indicator ID	IntBus 1
Name of indicator	Outward ICT business internationalisation
What does it measure?	It measures the number of affiliates located abroad (outside the country) that are owned by ICT Scoreboard Headquarters located in a region
Unit of measurement	Region's share in the total number of affiliates located abroad that are owned by European ICT Scoreboard Headquarters to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 57: Frequency of the Outward ICT business internationalisation indicator values

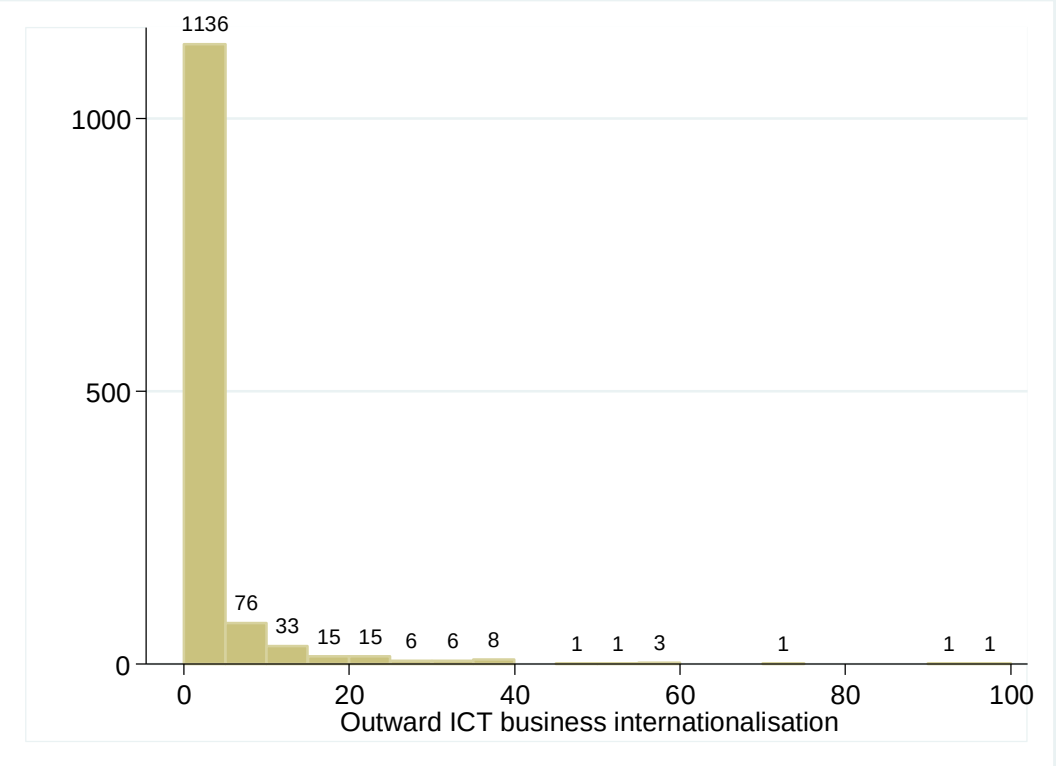


Table 84: Descriptive statistics of Outward ICT business internationalisation indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.39	7.49	56.14

5.3.11 Inward ICT Business Internationalisation

Table 85: Top ranking regions according to Inward ICT business internationalisation indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	IE021	Dublin	100	16
2	UKI12	Inner London - East	94	2
3	NL326	Groot-Amsterdam	72	10
4	DK011	Byen Kobenhavn	58	24
5	DE711	Darmstadt, Kreisfreie Stadt	58	7
6	UKJ31	Portsmouth	55	91
7	UKJ42	Kent CC	50	75
8	DE21B	Freising	45	57
9	DE21H	Munchen, Landkreis	39	22
10	AT130	Wien	39	27
10	DE137	Tuttlingen	39	157
12	LU000	Luxembourg (Grand-Duche)	38	71
13	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	37	25
14	UKJ12	Milton Keynes	36	98
15	DE122	Karlsruhe, Stadtkreis	36	4
16	CZ010	Hlavni mesto Praha	35	101
17	DK012	Kobenhavns omegn	34	41
18	DE212	Munchen, Kreisfreie Stadt	33	1
19	FR105	Hauts-de-Seine	33	13
20	SE110	Stockholms lan	32	6
21	DEG06	Eichsfeld	31	242
22	DEA11	Dusseldorf, Kreisfreie Stadt	30	38
23	DE712	Frankfurt am Main, Kreisfreie Stadt	29	30
23	BE241	Arr. Halle-Vilvoorde	29	135
25	UKK11	Bristol, City of	28	48
26	BE212	Arr. Mechelen	26	150
27	FI181	Uusimaa	26	9
28	PL127	Miasto Warszawa	26	50
29	UKH12	Cambridgeshire CC	24	5
30	NL310	Utrecht	24	46

Indicator description	
Indicator ID	IntBus 2
Name of indicator	Inward ICT business internationalisation
What does it measure?	It measures the number of affiliates located in a region that are owned by ICT Scoreboard Headquarters located abroad
Unit of measurement	Region's share in the total number of affiliates owned by foreign ICT Scoreboard Headquarters in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 58: Frequency of the Inward ICT business internationalisation indicator values

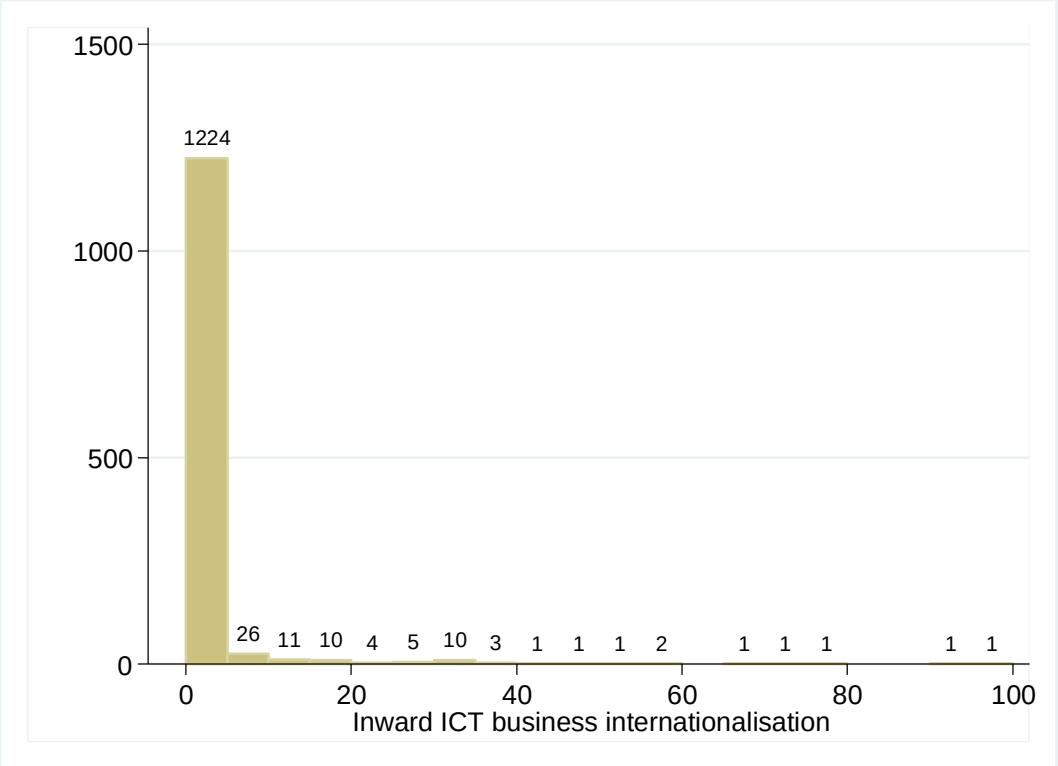


Table 86: Descriptive statistics of Inward ICT business internationalisation indicator

Number of observations	Mean value	Standard deviation	Variance
1303	1.50	7.34	53.96

5.3.12 In-degree in ICT Business Network

Table 87: Top ranking regions according to In-degree in ICT business network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKI12	Inner London - East	100	2
2	ES300	Madrid	88	28
3	ITC45	Milano	80	14
4	DE212	Munchen, Kreisfreie Stadt	77	1
5	NL326	Groot-Amsterdam	71	10
6	AT130	Wien	69	27
7	IE021	Dublin	61	16
8	FR105	Hauts-de-Seine	60	13
9	DE600	Hamburg	55	87
10	SE110	Stockholms lan	55	6
11	PL127	Miasto Warszawa	52	50
12	DE300	Berlin	49	15
13	CZ010	Hlavni mesto Praha	46	101
14	FR101	Paris	44	3
15	DE712	Frankfurt am Main, Kreisfreie Stadt	42	30
16	DEA11	Dusseldorf, Kreisfreie Stadt	42	38
17	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	40	25
18	ES511	Barcelona	37	42
19	DK011	Byen Kobenhavn	36	24
20	FI181	Uusimaa	34	9
21	NL310	Utrecht	34	46
22	DE21H	Munchen, Landkreis	28	22
23	DE111	Stuttgart, Stadtkreis	26	21
23	DEA1C	Mettmann	26	86
25	DE122	Karlsruhe, Stadtkreis	26	4
26	DEA23	Koln, Kreisfreie Stadt	25	43
27	FR104	Essonne	24	62
28	DE711	Darmstadt, Kreisfreie Stadt	24	7
28	DK012	Kobenhavns omegn	24	41
30	FR103	Yvelines	22	33

Indicator description	
Indicator ID	NetBus 1
Name of indicator	In-degree in ICT business network
What does it measure?	It measures the total number of connections a region maintains with other regions whenever an ICT Scoreboard Headquarters located in that region owns an affiliate located in other
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 59: Frequency of the In-degree in ICT business network indicator values

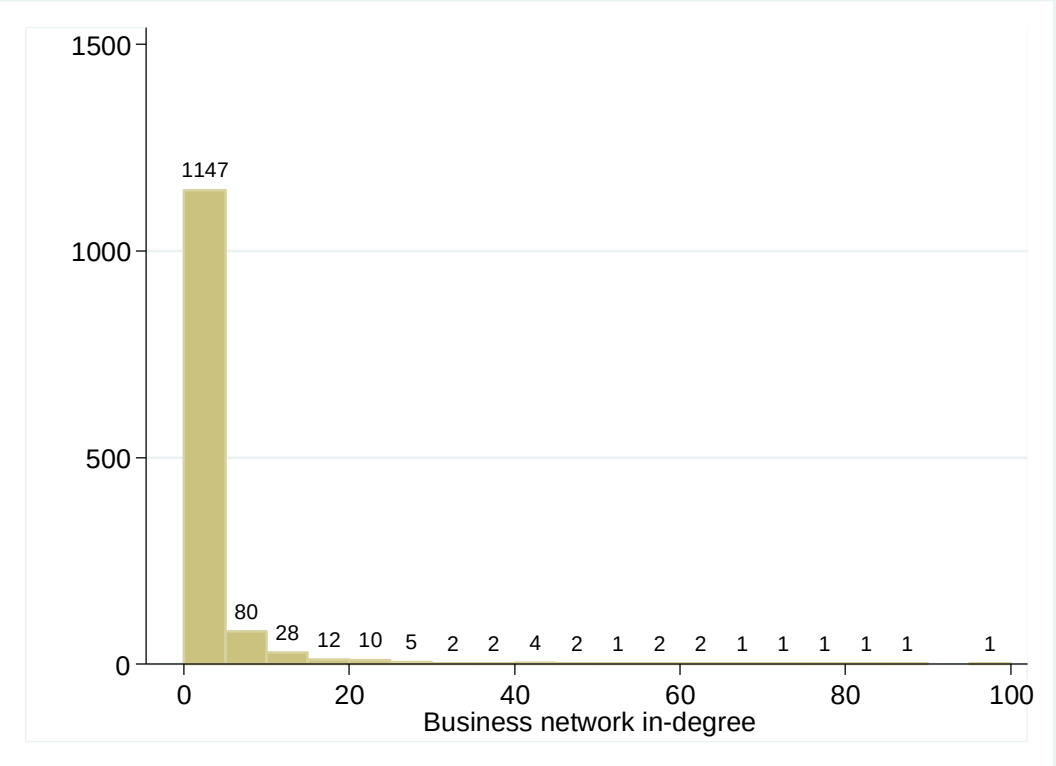


Table 88: Descriptive statistics of In-degree in ICT business network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.50	8.08	65.25

5.3.13 Out-degree in ICT Business Network

Table 89: Top ranking regions according to Out-degree in ICT business network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	NL326	Groot-Amsterdam	100	10
2	DE212	Munchen, Kreisfreie Stadt	85	1
3	FR101	Paris	76	3
4	DE711	Darmstadt, Kreisfreie Stadt	75	7
5	UKI12	Inner London - East	67	2
6	SE110	Stockholms lan	66	6
7	DE300	Berlin	65	15
8	FR105	Hauts-de-Seine	64	13
9	NL414	Zuidoost-Noord-Brabant	62	8
10	DE122	Karlsruhe, Stadtkreis	59	4
11	DE111	Stuttgart, Stadtkreis	56	21
12	FI181	Uusimaa	52	9
13	DE718	Hochtaunuskreis	51	51
14	ES300	Madrid	43	28
15	DE712	Frankfurt am Main, Kreisfreie Stadt	40	30
16	DEB15	Birkenfeld	37	245
17	DEA22	Bonn, Kreisfreie Stadt	36	12
18	IE021	Dublin	35	16
18	BE211	Arr. Antwerpen	35	54
20	UKH12	Cambridgeshire CC	35	5
21	FR103	Yvelines	34	33
22	NL310	Utrecht	33	46
23	DE25C	Weissenburg-Gunzenhausen	31	118
24	ITC45	Milano	31	14
24	NL332	Agglomeratie 's-Gravenhage	31	80
24	NL423	Zuid-Limburg	31	81
27	DK012	Kobenhavns omegn	29	41
28	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	29	25
28	DEA11	Dusseldorf, Kreisfreie Stadt	29	38
30	DE138	Konstanz	27	53

Indicator description	
Indicator ID	NetBus 2
Name of indicator	Out-degree in ICT business network
What does it measure?	It measures the total number of connections a region maintains with other regions by hosting affiliates owned by ICT Scoreboard Headquarters located in other regions
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 60: Frequency of the Out-degree in ICT business network indicator values

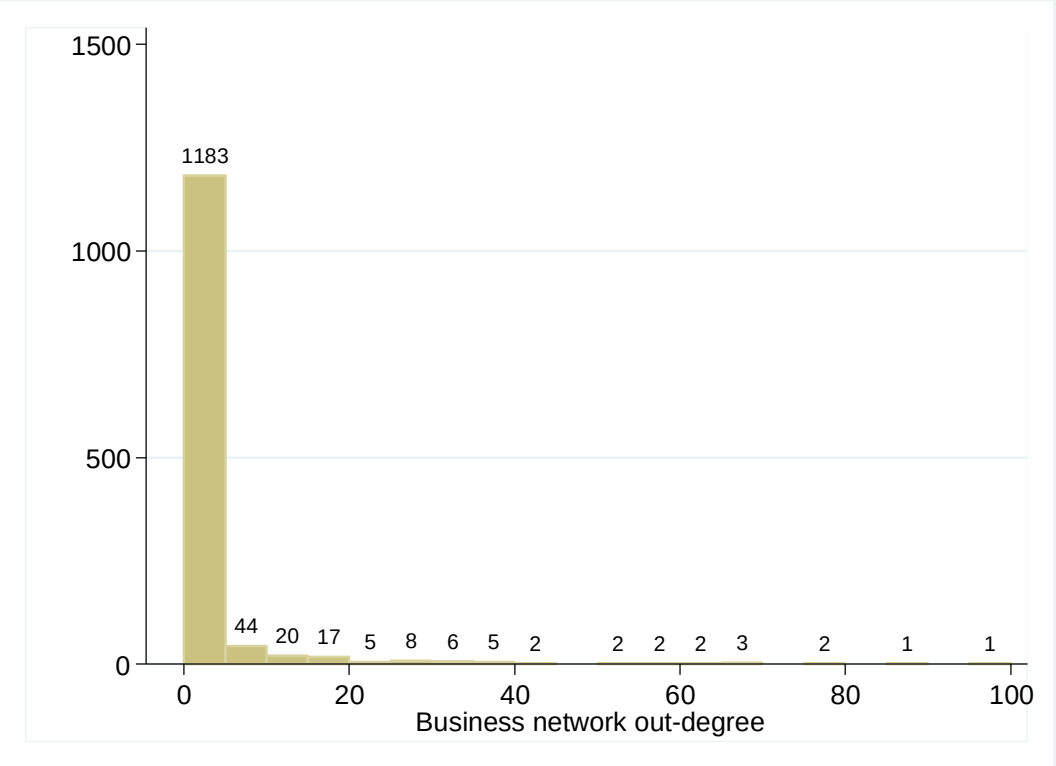


Table 90: Descriptive statistics of Out-degree in ICT business network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	2.06	8.33	69.43

5.3.14 Closeness Centrality in ICT Business Network

Table 91: Top ranking regions according to Closeness centrality in ICT business network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	NL326	Groot-Amsterdam	100	10
2	SE110	Stockholms lan	97	6
3	FR101	Paris	97	3
4	UKI12	Inner London - East	97	2
5	NL414	Zuidoost-Noord-Brabant	96	8
6	FR105	Hauts-de-Seine	96	13
7	DE122	Karlsruhe, Stadtkreis	96	4
8	DE718	Hochtaunuskreis	95	51
9	FI181	Uusimaa	95	9
10	DE212	Munchen, Kreisfreie Stadt	94	1
11	UKH12	Cambridgeshire CC	88	5
12	DE111	Stuttgart, Stadtkreis	88	21
13	DK012	Kobenhavns omegn	88	41
14	DE712	Frankfurt am Main, Kreisfreie Stadt	88	30
15	UKJ23	Surrey	87	29
16	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	87	25
17	ITC45	Milano	87	14
18	DEA22	Bonn, Kreisfreie Stadt	87	12
19	IE021	Dublin	86	16
20	FR103	Yvelines	86	33
20	SE231	Hallands lan	86	166
22	DE711	Darmstadt, Kreisfreie Stadt	85	7
23	BE242	Arr. Leuven	84	11
24	SE224	Skane lan	84	37
25	ES300	Madrid	84	28
26	BE211	Arr. Antwerpen	84	54
27	DE300	Berlin	83	15
28	LU000	Luxembourg (Grand-Duche)	83	71
29	DE138	Konstanz	83	53
30	DK013	Nordsjaelland	82	102

Indicator description	
Indicator ID	NetBus 3
Name of indicator	Closeness centrality in ICT business network
What does it measure?	It measures the average distance that each node is from all other nodes in the network
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 61: Frequency of the Closeness centrality in ICT business network indicator values

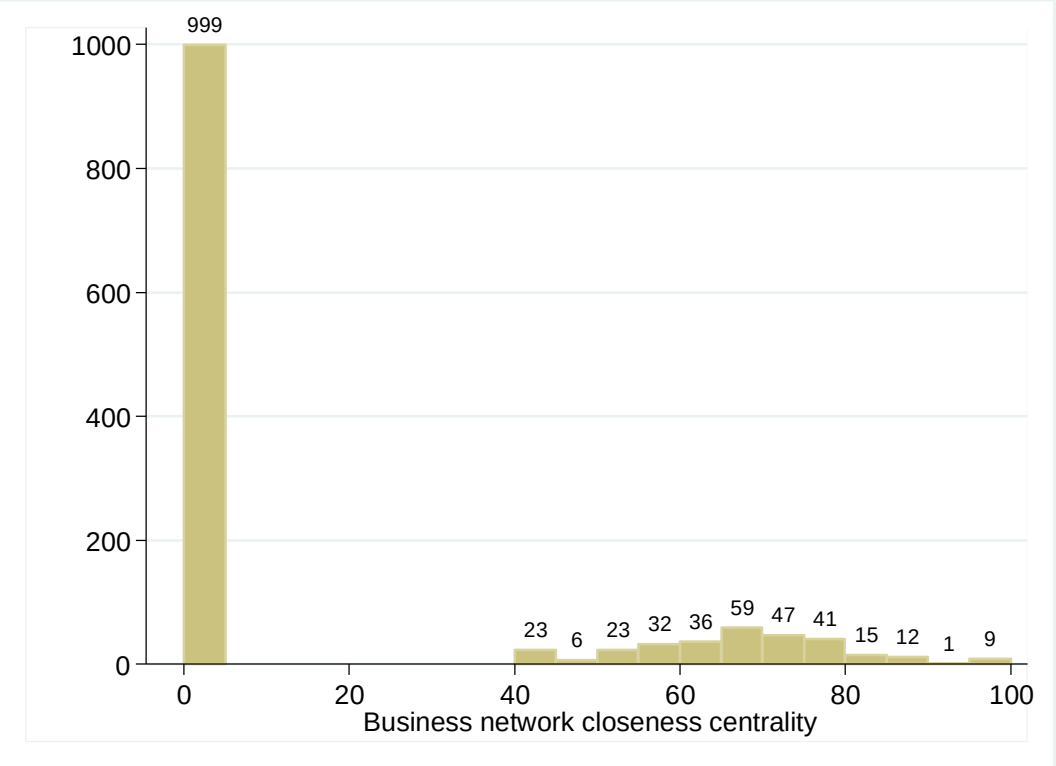


Table 92: Descriptive statistics of Closeness centrality in ICT business network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	15.53	28.82	830.72

5.3.15 Betweenness Centrality in ICT Business Network

Table 93: Top ranking regions according to Betweenness centrality in ICT business network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	DE212	Munchen, Kreisfreie Stadt	100	1
2	UKI12	Inner London - East	99	2
3	NL326	Groot-Amsterdam	75	10
4	ES300	Madrid	47	28
5	FR101	Paris	47	3
6	FR105	Hauts-de-Seine	44	13
7	DE712	Frankfurt am Main, Kreisfreie Stadt	39	30
8	DE300	Berlin	37	15
9	DE122	Karlsruhe, Stadtkreis	35	4
10	ITC45	Milano	35	14
11	SE110	Stockholms lan	34	6
12	DE111	Stuttgart, Stadtkreis	31	21
13	DE711	Darmstadt, Kreisfreie Stadt	30	7
14	DE718	Hochtaunuskreis	26	51
14	DE600	Hamburg	26	87
16	AT130	Wien	23	27
17	IE021	Dublin	23	16
18	NL414	Zuidoost-Noord-Brabant	19	8
19	DEA11	Dusseldorf, Kreisfreie Stadt	18	38
20	FI181	Uusimaa	18	9
21	UKH12	Cambridgeshire CC	12	5
22	NL310	Utrecht	12	46
23	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	11	25
24	UKJ23	Surrey	10	29
25	DK011	Byen Kobenhavn	10	24
25	PL127	Miasto Warszawa	10	50
27	DK012	Kobenhavns omegn	9	41
28	DE21H	Munchen, Landkreis	9	22
28	DE25C	Weissenburg-Gunzenhausen	9	118
30	DEA22	Bonn, Kreisfreie Stadt	8	12

Indicator description	
Indicator ID	NetBus 4
Name of indicator	Betweenness centrality in ICT business network
What does it measure?	It measures the number of shortest paths in a network that traverse through that node
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 62: Frequency of the Betweenness centrality in ICT business network indicator values

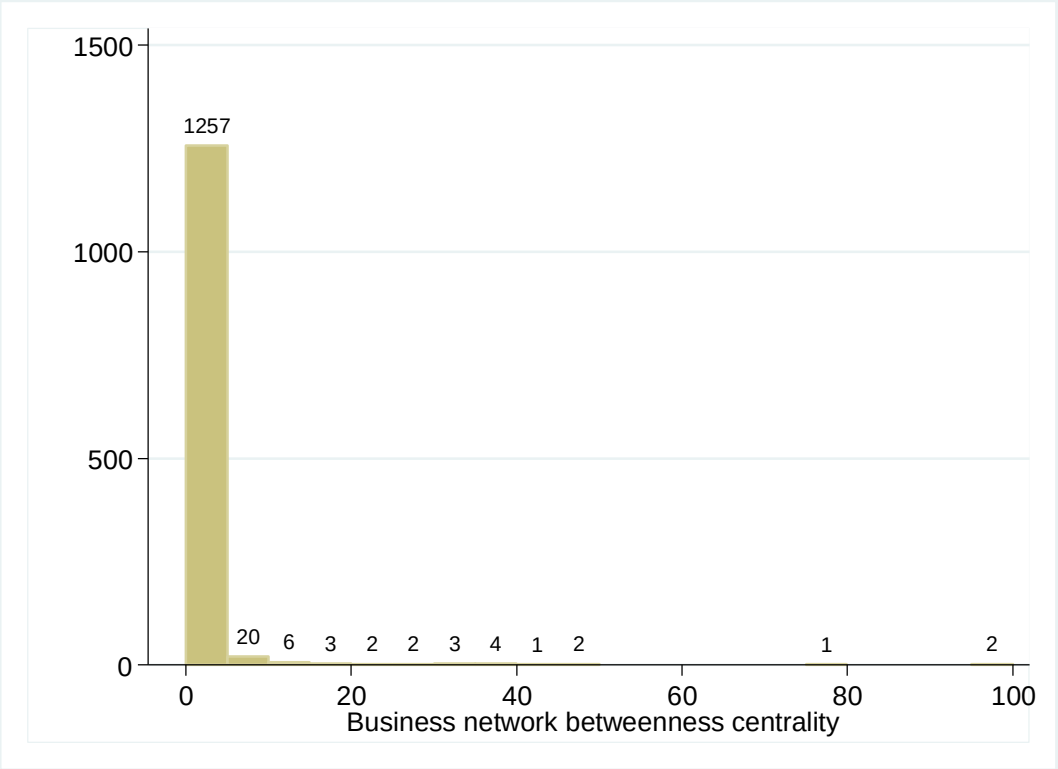


Table 94: Descriptive statistics of Betweenness centrality in ICT business network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.88	5.84	34.19

5.3.16 Eigenvector Centrality in ICT Business Network

Table 95: Top ranking regions according to Eigenvector centrality in ICT business network indicator

Rank	NUTS3 Code	Region name	Indicator Value	EIPE Rank
1	UKI12	Inner London - East	100	2
2	NL326	Groot-Amsterdam	61	10
3	IE021	Dublin	31	16
4	FR101	Paris	31	3
5	DEA11	Dusseldorf, Kreisfreie Stadt	30	38
6	FR105	Hauts-de-Seine	29	13
7	ITC45	Milano	26	14
8	DE212	Munchen, Kreisfreie Stadt	25	1
9	SE110	Stockholms lan	25	6
10	FI181	Uusimaa	20	9
11	BE100	Arr. de Bruxelles-Capitale / Arr. van Brussel-Hoofdstad	15	25
12	ES300	Madrid	14	28
13	NL310	Utrecht	14	46
14	ES511	Barcelona	13	42
15	UKG31	Birmingham	12	83
16	DK012	Kobenhavns omegn	12	41
17	PL127	Miasto Warszawa	11	50
18	HU101	Budapest	11	73
19	UKJ23	Surrey	11	29
19	UKJ12	Milton Keynes	11	98
21	FR104	Essonne	10	62
22	DEA1C	Mettmann	10	86
23	FR103	Yvelines	9	33
24	NL414	Zuidoost-Noord-Brabant	9	8
25	FR107	Val-de-Marne	8	124
26	DE300	Berlin	8	15
27	DE712	Frankfurt am Main, Kreisfreie Stadt	8	30
28	BE242	Arr. Leuven	8	11
28	CZ010	Hlavni mesto Praha	8	101
30	DE122	Karlsruhe, Stadtkreis	7	4

Indicator description	
Indicator ID	NetBus 5
Name of indicator	Eigenvector centrality in ICT business network
What does it measure?	It measures the importance of a node in a network, based on the importance of its direct neighbours
Unit of measurement	Rank between 0 and 1
Definition of ICT dimension	Based on NACE Rev. 2
Unit of observation	NUTS 3
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)
Reference year(s) considered	2005-2011

Figure 63: Frequency of the Eigenvector centrality in ICT business network indicator values

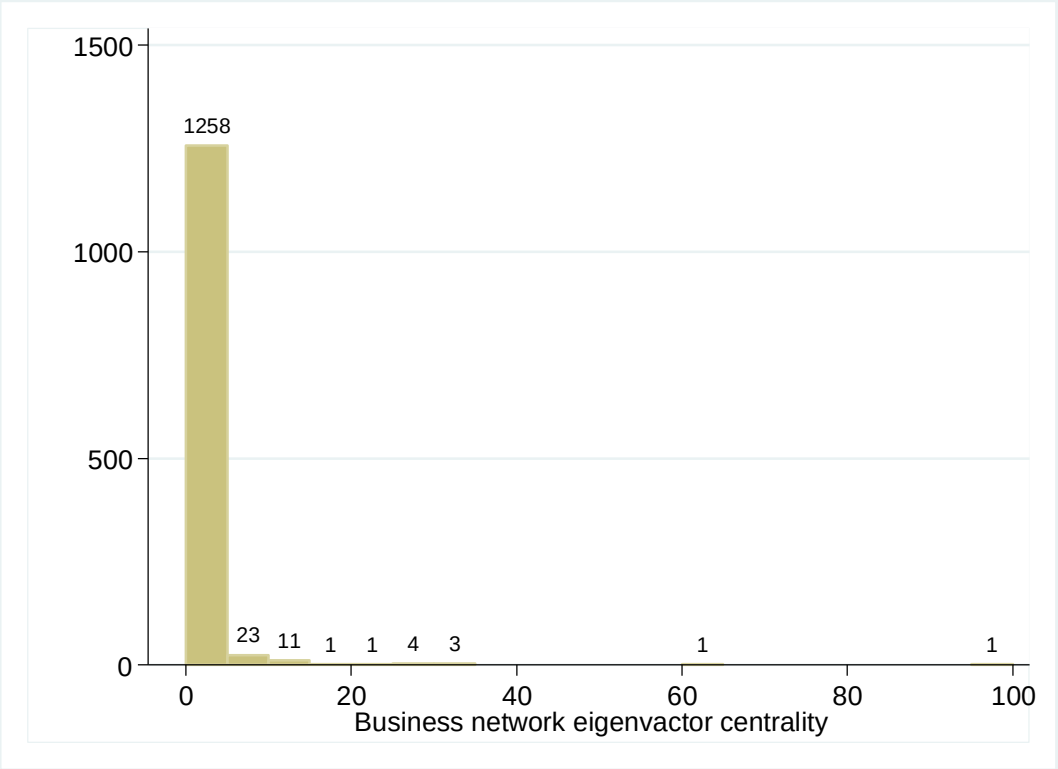


Table 96: Descriptive statistics of Eigenvector centrality in ICT business network indicator

Number of observations	Mean value	Standard deviation	Variance
1303	0.64	4.15	17.19

6. Annex I: EIPE Indicators

This section gives a complete overview of all the 42 indicators used in the EIPE rankings. They are presented together with a first indication of the data sources used and their time coverage. The indicators and their characteristics are further described in the next chapter of this report. A detailed description of specific methodologies applied to elaborate each indicator, as well as the data sources used, is given in detail in the Annexes. For methodological details, please refer to the second EIPE Report (De Prato and Nepelski 2013a).

6.1 ICT R&D Activities Indicators

6.1.1 ICT R&D Agglomeration Indicators (AgRD)

The indicators concerning the agglomeration of ICT R&D activity are listed and described in Table 97. With 13 different measurements, they cover a broad range of aspects related to inputs and outputs in R&D, and to the presence of major knowledge production public and private organisations.

Table 97: ICT R&D Agglomeration indicators (AgRD)

Indicator ID	**AgRD 1**	**AgRD 2**	**AgRD 3**	**AgRD 4**	**AgRD 5**	**AgRD 6**
Name of indicator	Universities ranked in the QS University Ranking	Academic ranking of a Computer Science faculty	Employer ranking of a Computer Science faculty	Citations ranking of a Computer Science faculty	R&D expenditures by ICT firms	ICT FP7 funding
What does it measure?	Measures the number of universities in QS university ranking	Measures the performance of the Computer Science faculty according to the academic ranking of QS	Measures the performance of the Computer Science faculty according to the employer ranking of QS	Measures the performance of the Computer Science faculty according to the citations ranking of QS	Measures the average annual amount spent on R&D in the ICT sector	Measures the amount received for research in ICT R&D
Unit of measurement	Region's share in the total number of EU ranked universities to a region's share in the EU population	The highest rank of a Computer Science faculty in the academic ranking	The highest rank of a Computer Science faculty in the employer ranking	The highest rank of a Computer Science faculty in citations ranking	Region's share in the R&D expenditures by ICT firms in the EU to a region's share in the EU population	Region's share in the total EU ICT FP7 funding to a region's share in the EU population
Definition of ICT dimension	None	Computer science faculty			Based on NACE Rev. 2	ICT areas of the FP7 programme
Unit of observation	NUTS 3					
Source	QS World University Rankings by QS (Section 8.1)				Company level information: Orbis by Bureau Van Dijk (Section 8.7)	ICT FP7 by EC DG CONNECT (see Section 8.2)
Reference year	2011				2005-2011	2007-2011

(continued): ICT R&D Agglomeration indicators (AgRD)

Indicator ID	AgRD 7	AgRD 8	AgRD 9	AgRD 10	AgRD 11	AgRD 12
Name of indicator	**ICT FP7 participations**	**ICT FP7 funding to SMEs**	**ICT FP7 participations by SMEs**	**Location of ICT R&D centres**	**Ownership of ICT R&D centres**	**Scientific publications in Computer Science**
What does it measure?	It measures the total number of ICT R&D FP7 projects to which organisations, located in the observed region, have participated to	It measures the total amount of ICT R&D FP7 funding given to SMEs located in the observed region	It measures the total number of ICT R&D FP7 projects to which SMEs, located in the observed region, have participated to	It measures the total number of ICT R&D centres located in the observed region	It measures the total number of ICT R&D centres owned worldwide by companies located in the observed region	It measures the total number of scientific publications , in the Computer Science area produced by organisations located in the observed region
Unit of measurement	Region's share in the total number of ICT FP7 participations to a region's share in the EU population	Region's share in the total EU ICT FP7 funding to SMEs to a region's share in the EU population	Region's share in the total number of ICT FP7 SMEs participations to a region's share in the EU population	Region's share in the total number of R&D centres located in the EU to a region's share in the EU population	Region's share in the total number of R&D centres owned by EU firms to a region's share in the EU population	Region's share in the total number of publications in Computer Science to a region's share in the EU population
Definition of ICT dimension	ICT areas of the FP7 programme			Based on HIS iSuppli classification of the major "semiconductors influencers"		Computer Science as defined by Web of Science® classification of Research Areas
Unit of observation	NUTS 3					
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)			R&D Centre location by IHS iSuppli (Section 8.4)		Bibliometrics: Web of Science b Thomson Reuters (Section 8.3)
Reference year(s) considered	2007-2011			2012		2000-2012

6.1.2 ICT R&D Internationalisation Indicators (IntRD)

To address the issue of internationalisation of ICT-related R&D activity in NUTS 3 level spatial units across the EU, a distinction between in- and outward internationalization of R&D activities based in a location is made.

Table 98: ICT R&D Internationalisation indicators (IntRD)

Indicator ID	IntRD 1	IntRD 2
Name of indicator	Outward ICT R&D internationalisation	Inward ICT R&D internationalisation
What does it measure?	It measures the number of ICT R&D centres located abroad (outside the country) that are owned by companies' headquarters located in a region	It measures the number of ICT R&D centres located in a region that are owned by foreign companies
Unit of measurement	Region's share in the total number of R&D centres located abroad that are owned by companies' headquarters located in the EU to a region's share in the EU population	Region's share in the total number of R&D centres owned by foreign companies in the EU to a region's share in the EU population
Definition of ICT dimension	Based on HIS iSuppli classification of the major "semiconductors influencers"	
Unit of observation	NUTS 3	
Source	R&D Centre location by IHS iSuppli (Section 8.4)	
Reference year	2012	

6.1.3 ICT R&D Networking (NetRD)

A set of networking measures addressing R&D activity has been constructed, which relies on the network analysis of the locations of ICT FP7 programme participants. Below, the key elements of the network are described. ICT R&D networking indicators are listed in Table 99. For a full description of the methodology of network analysis and the indicators applied, see the second EIPE Report (De Prato and Nepelski 2013a). The data source on ICT FP7 programmes is described in Section 8.2.

Network design: A straightforward way of representing the locations of ICT FP7 programme participants as a network is through drawing a line connecting two different regions whenever two organizations from these regions participate in the same ICT FP7 programme (Cassi et al. 2008). Thus, knowing the location of each participant, we can build a directed network. In a formal way, we identify our set of nodes, *V*, as the regions where ICT FP7 programmes partners are located, and the set of arcs, *A*, as the bilateral relationships that exist whenever an organization from one region participates in a ICT FP7 programme together with an organization from a different region.[2]

Actors: NUTS 3 regions located in the EU 27.

Relationships: A link between two regions exists whenever an organization from one region participates in an ICT FP7 programme together with an organization from a different region.

Data source: The analysis is conducted using the data on ICT FP7 programmes by DG Connect and is described in Section 8.2.

Network measures: According to the above defined methodology, based on the number of connections between regions and a subsequent analysis of these connections, indicators are constructed. These are listed and described in Table 99.

[2] In the following, we focus our attention on bilateral relationships between regions and do not take into account loops, i.e. when a company's R&D centre and headquarter are located in the same region.

Table 99: ICT R&D Networking indicators (NetRD)

Indicator ID	NetRD 1	NetRD 2	NetRD 3	NetRD 4
Name of indicator	**Degree in ICT R&D network**	**Closeness centrality in ICT R&D network**	**Betweenness centrality in ICT R&D network**	**Eigenvector centrality in ICT R&D network**
What does it measure?	It measures the total number of connections a region maintains with other regions through organizations participating in common ICT FP7 projects	It measures the average distance that each node is from all other nodes in the network	It measures the number of shortest paths in a network that traverse through that node	It measures the importance of a node in a network, based on the importance of its direct neighbours
Unit of measurement	Rank between 0 and 1.			
Definition of ICT dimension	ICT areas of the FP7 programme			
Unit of observation	NUTS 3			
Source	ICT FP7 by EC DG CONNECT (see Section 8.2)			
Reference year	2007-2012			

6.2 ICT Innovation Activities Indicators

6.2.1 Agglomeration of Innovation (AgIn)

As in the case of R&D activities, the set of indicators used to quantify and map innovation across the EU is composed of indicators dealing with agglomeration of innovation activity in NUTS 3 level spatial units. To the extent allowed by the availability of indicators and data, a mix of measures capturing the input and outputs of innovation activities is proposed. Table 100 lists and describes all the indicators.

Table 100: ICT Innovation Agglomeration indicators (AgIn)

Indicator ID	AgIn 1	AgIn 2	AgIn 3
Name of indicator	**Investment in intangibles by ICT firms**	**Venture Capital financing of ICT firms**	**ICT patents**
Unit of measurement	Average annual amount in Euro per 1000 inhabitants	Total amount in Euro per 1000 inhabitants	Number of ICT patents per 1000 inhabitants
Unit of observation	NUTS 3		
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)	Venture Capital: VentureSource by Dow Jones (Section 8.8)	Patent data: REGPAT by OECD (Section 8.6)
Reference year	2005-2012	2000-2012	2000-2009

6.2.2 Internationalisation of ICT Innovation (IntIn)

Regarding the internationalization of innovation, patent-based indicators are used. The analysis uses measures of internationalisation that are based on the presence of inventors residing in different regions of the world. An international patent application is defined in the analysis presented here as one that includes at least two inventors residing in different countries. Using this methodology, we use the concept of internationalisation of innovation measured by international

co-invention. This concept is used to construct a relative measure of international collaboration between inventors.

The data on regional patents represents the input to innovation activities and the relevant data originates from the Regpat database (see Section 8.6).

Table 101: ICT Innovation Internationalisation indicators (IntIn)

Indicator ID	IntIn 1
Name of indicator	International co-inventions
What does it measure?	It measures the number of international ICT patents, i.e. patents with at least two inventors residing in different countries, and attributes to the observed region the (fractional) count) of those patents for which at least one inventor is residing in the region.
Unit of measurement	Region's share in the total number of international ICT patents in the EU to a region's share in the EU population
Definition of ICT dimension	Based on the OECD definition of ICT following IPC taxonomy (OECD 2008b).
Unit of observation	NUTS 3
Source	Patent data: REGPAT by OECD (Section 8.6)
Reference year(s) considered	2000-2009

6.2.3 Networking in ICT Innovation (NetIn)

A set of networking measures addressing innovation activity has been constructed, which relies on the network analysis of the location of inventors based in different locations and jointly developing ICT inventions. Below, the key elements of the network are described. ICT Innovation Networking indicators are listed in Table 102. For a full description of the methodology of network analysis and indicators applied, see the second EIPE Report (De Prato and Nepelski 2013a).

Network design: To construct a network depicting the concept of innovation networking, a network of technological collaborations between inventors based on patent data has been built. The methodology was proposed by Breschi, Cassi and Malerba (2007) and used by De Prato and Nepelski (2012). This approach uses the information that each patent application has: a list of inventors, i.e. the people who developed a particular invention, and information about their place of residence.

Actors: NUTS3 regions located in the EU27 and TL3 regions in the remaining OECD countries.

Relationships: An intuitive way of representing the set of inter-regional or international co-inventions by using patent data as a network is to draw a line connecting two regions that share a patent developed by their residents. By doing this for the entire pool of co-inventions, we are able to construct a network of technological collaborations.

The relationship between different locations can be described as the total sum of co-inventions developed by inventors residing in different regions. According to (Guellec and Van Pottelsberghe de la Potterie 2001), the total number of patents co-invented by residents of region *i* in collaboration with researchers in other regions is

$$CoInn_i = \sum_{j \neq i} CoInn_{ij} . \quad (1)$$

Data source: The analysis is conducted using the data on REGPAT by OECD (see section 8.6).

Network measures: In the above context, based on the number of connection of a region, we can define the measures of regions' centrality. All indicators listed in Table 102.

Table 102: ICT Innovation Networking indicators (NetIn)

Indicator ID	NetIn 1	NetIn 2	NetIn 3	NetIn 4
Name of indicator	**Degree in ICT innovation network**	**Closeness centrality in ICT innovation network**	**Betweenness centrality in ICT innovation network**	**Eigenvector centrality in ICT innovation network**
What does it measure?	It measures the total number of connections a region maintains with other regions through joint inventions	It measures the average distance that each node is from all other nodes in the network	It measures the number of shortest paths in a network that traverse through that node	It measures the importance of a node in a network, based on the importance of its direct neighbours
Unit of measurement	Rank between 0 and 1	Rank between 0 and 1	Rank between 0 and 1	Rank between 0 and 1
Definition of ICT dimension	Based on the OECD definition of ICT following IPC taxonomy (OECD 2008b).			
Unit of observation	NUTS 3 for EU and TL3 for the remaining OECD countries			
Source	REGPAT by OECD, see section 8.6			
Reference year(s) considered	2000-2009			

6.3 ICT Business Activities Indicators

6.3.1 Agglomeration of Business Activities (AgBuss)

As in the case of the R&D and innovation activities, the set of indicators used to quantify and map business across the EU is composed of indicators related to agglomeration of business activity in NUTS 3 spatial units. In addition, to the extent allowed by the availability of indicators and data, a mix of measures capturing the input and outputs of business activities is proposed. Table 103 lists the relevant indicators.

Table 103: ICT Business Agglomeration indicators (AgBuss)

Indicator ID	AgBuss 1	AgBuss 2	AgBuss 3	AgBuss 4	AgBuss 5
Name of indicator	**Location of ICT Scoreboard Headquarters**	**Ownership of ICT Scoreboard affiliates**	**Location of ICT Scoreboard affiliates**	**Location of ICT firms**	**ICT employment**
What does it measure?	It measures the number of ICT Scoreboard Headquarters located in the observed region	It measures the number of ICT Scoreboard affiliates owned worldwide by ICT Scoreboard Headquarters located in the observed region	It measures the total number of ICT Scoreboard affiliates located in the observed region	It measures the number of ICT firms located in the observed region	It measures the total employment in ICT firms in the observed region
Unit of measurement	Region's share in the total number of ICT Scoreboard Headquarters located in the EU to a region's share in the EU population	Region's share in the total number of ICT Scoreboard affiliates owned by EU ICT Scoreboard Headquarters to a region's share in the EU population	Region's share in the total number of ICT Scoreboard affiliates located in the EU to a region's share in the EU population	Region's share in the total number of ICT firms located in the EU to a region's share in the EU population	Region's share in the total employment by ICT firms located in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2				
Unit of observation	NUTS 3				
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)				
Reference year(s) considered	2008	2008	2008	2008	2005-2011

Indicator ID	AgBuss 6	AgBuss 7	AgBuss 8	AgBuss 9
Name of indicator	**Growth in ICT employment**	**Turnover by ICT firms**	**Growth in turnover by ICT firms**	**New business investments in the ICT sector**
What does it measure?	It measures employment growth in ICT firms in the observed region	It measures the average annual turnover by ICT firms in the observed region	It measures turnover growth in ICT firms in the observed region	It measures the number of new investments in the ICT sector in the observed region
Unit of measurement	Growth rate in %	Region's share in the total turnover by ICT firms located in the EU to a region's share in the EU population	Growth rate in %	Region's share in the total number of new investments in the ICT sector to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2			
Unit of observation	NUTS 3			
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)			European Investment Monitor by Ernst & Young (Section 8.5)
Reference year(s) considered	2005-2011	2005-2011	2005-2011	2000-2011

6.3.2 Internationalisation of ICT Business Activities (IntBuss)

The internationalization of business activity is proxied by information on the location of business affiliates owned by companies belonging to the ICT Scoreboard, which themselves are based abroad. The details of the indicator measuring the level of internationalisation of business activity in a region are given in Table 104.

Table 104: ICT Business Internationalisation indicators (IntBuss)

Indicator ID	IntBuss 1	IntBuss 2
Name of indicator	**Outward ICT business internationalisation**	**Inward ICT business internationalisation**
What does it measure?	It measures the number of affiliates located abroad (outside the country) that are owned by ICT Scoreboard Headquarters located in a region	It measures the number of affiliates located in a region that are owned by ICT Scoreboard Headquarters located abroad
Unit of measurement	Region's share in the total number of affiliates located abroad that are owned by European ICT Scoreboard Headquarters to a region's share in the EU population	Region's share in the total number of affiliates owned by foreign ICT Scoreboard Headquarters in the EU to a region's share in the EU population
Definition of ICT dimension	Based on NACE Rev. 2	
Unit of observation	NUTS 3	
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)	
Reference year(s) considered	2008	

6.3.3 Networking in ICT Business Activities (NetBuss)

A set of networking measures addressing the business activity has been constructed, which relies on the network analysis of the location of companies belonging to the ICT Scoreboard and their affiliates. Below, the key elements of the network are described. ICT Innovation Networking indicators are listed in Table 105. For a full description of the methodology of network analysis and indicators applied, see the second EIPE Report (De Prato and Nepelski 2013a).

Network design: In order to address the issue of networking in the context of business activity, a network of international affiliates is created. A natural way of constructing a network of foreign affiliates is through the ownership and location relationship. A line between each pair of regions is drawn whenever a firm from one region owns an affiliate in another region, or vice versa. Thus we illustrate the destination of expansion of multinational enterprises (MNEs) and the location of business activities. This allows us to track the existence of business relationships between regions. By doing this for all the regions owning and hosting MNE subsidiaries, we are able to create a unique map of ownership and location of business affiliates.[3]

Actors: NUTS 3 regions located in the EU27 and TL3 regions in the remaining OECD countries.

Relationships: A link between two regions exists whenever a company from one region invests in a new business activity in a different region. The direction of a link goes from a region where the investing company is located to the region in which investment is made.

Data source: The analysis is conducted using the EIM data on foreign investments (see Section 8.5).

[3] In the following, we focus our attention on bilateral relationships between regions and do not take into account loops, i.e. when a company's new investment and headquarter is located in the same region.

Network measures: In the above context, based on the number of incoming and outgoing connection to and from a region, the measures of regions' centrality are listed in Table 105.

Table 105: ICT Business Networking indicators (NetBuss)

Indicator ID	Net Bus 1	Net Bus 2	Net Bus 3	Net Bus 4	Net Bus 5
Name of indicator	**In-degree in ICT business network**	**Out-degree in ICT business network**	**Closeness centrality in ICT business network**	**Betweenness centrality in ICT business network**	**Eigenvector centrality in ICT business network**
What does it measure?	It measures the total number of connections a region maintains with other regions whenever an ICT Scoreboard Headquarters located in that region owns an affiliate located in other regions	It measures the total number of connections a region maintains with other regions by hosting affiliates owned by ICT Scoreboard Headquarters located in other regions	It measures the average distance that each node is from all other nodes in the network	It measures the number of shortest paths in a network that traverse through that node	It measures the importance of a node in a network, based on the importance of its direct neighbours
Unit of measurement	Rank between 0 and 1				
Definition of ICT dimension	Based on NACE Rev. 2				
Unit of observation	NUTS 3 for EU and TL3 for the remaining OECD countries				
Source	Company level information: Orbis by Bureau Van Dijk (Section 8.7)				
Reference year(s) considered	2008				

7. Annex 2: Composite Indicators

The selected indicators, their measurement and the resulting multiple rankings represent an abundance and diversity of information that is impossible to analyse at first glance. In order to provide synthetic comparable results for further analysis and interpretation, the information contained in individual indicators needs to be aggregated. This is done by constructing, step by step, a final composite EIPE indicator and sub-indicators reflecting three dimensions of ICT activity, i.e. R&D, innovation and business.

7.1 Normalization and Rescaling of Data

Before aggregating the information, one needs to deal with the problem that most indicators can be incommensurate with others, and have different measurement units. For example, the number of patent applications is expressed per capita, while the share of ICT R&D centres owned by companies from a region and located there is expressed as a percentage of the total number of R&D centres owned by companies from a region.

To deal with this problem, indicators are made comparable by converting them to the same measurement scale, by transforming them in pure, dimensionless, numbers (OECD-JRC 2008). This is a normalization process. After this, composite indicators are constructed. Below both methodologies applied in this study are described in detail.

In order to normalise the data used in this study, a standardization method, i.e. z-scores, is used. This method is the most commonly used because it converts all indicators to a common scale with an average of zero and standard deviation of one (EC-JRC 2005). The average of zero means that it avoids introducing aggregation distortions stemming from differences in indicator means. The scaling factor is the standard deviation of the indicator across the units of observations, i.e. in the context of the current study NUTS 3 regions.

In a more formal way, the normalized score of a raw score *x* is

$$z = \frac{x - \mu}{\delta}. \tag{2}$$

where μ is the mean of observations across the regions and δ is the standard deviation across the regions. The quantity *z* represents the distance between the raw score and the population mean in units of the standard deviation.

The advantage of z-scores over other normalisation methods is that an indicator with extreme values will have an intrinsically greater effect on the composite indicator. This behaviour is desirable in the current study, as there is an intention to reward exceptional performance, that is, if an extremely good result on few indicators is thought to be better than a lot of average scores.

In the next steps, the normalized scores are further rescaled in order to avoid the negative scores and to assure the incorporation of the indicators variability in the results. This is done through the *minmax* rescaling procedure, whose formula is:

$$Nx_{rj} = \frac{x_{rj} - x_{j,\min}}{x_{j,\max} - x_{j,\min}} \times 100. \tag{3}$$

where Nx_{rj} is the normalised and rescaled value of indicator *j* in the territorial unit *r*, x_{rj} is the normalised raw value of indicator *j* in the territorial unit *r*, $x_{j,\min}$ and $x_{j,\max}$ are the minimum and maximum values of indicator *j*.

This method has found its way into a number of policy-oriented projects. For example, z-scores are used for the two composite indicators of the knowledge-based economy, published by the European Commission in Key Figures 2003-2004, for the environmental sustainability index developed at Yale University, and for the internal market index 2002 (EC-JRC 2005).

7.2 European ICT Poles of Excellence Composite Indicators

When it comes to constructing the Composite Indicator to aggregate all measurements for the elaboration of a final ranking of EIPE, there are two steps.

First, composite sub-indicators are created, one for each of the activities: R&D, Innovation and Business. Second, an EIPE composite indicator is constructed, aggregating the values of the three earlier sub-indicators into a final one.

An important issue related to the construction of composite indicators is the one of weighting. Unfortunately, no agreed methodology exists to weight individual indicators (EC-JRC 2005). In particular the context of the current study does not make the choice of a weighting scheme easy, as there is no theoretical framework that could say which indicator would be more influential than others. Considering this, it is proposed that equal weighting will be used in the process of constructing composite indicators.

Three intermediate sub-indicators are organized along the three activities defined in the second EIPE Report (De Prato and Nepelski 2013a), i.e.:

- **R&D sub-indicator** comprises of all relevant indicators included in Section 6.1 normalized and equally weighted.
- **Innovation sub-indicator** comprises of all relevant indicators included in Section 6.2 normalized and equally weighted.
- **Business sub-indicator** comprises of all relevant indicators included in Section 6.3 normalized and equally weighted.

In the second step, all information is synthesised into one composite indicator by aggregating the values of the three earlier sub-indicators. Sub-indicator values are equally weighted. The values of the final index are standardized with the MiniMax procedure.

8.1 Annex 3: Data Sources

8.1 QS World University Rankings by QS

The Computer Science and Electronic Faculties rankings originate from the QS World University Rankings®, which was formed in 2008 to meet the increasing public interest for comparative data on universities and organisations, and the growing demand for institutions to develop deeper insight into their competitive environment.[4] The QS World University Rankings® currently considers over 2,000 and evaluates over 700 universities in the world, ranking the top 400. Like any ranking at the global level, it is constrained by the availability of data from every part of its scope. When attempting to exercise evaluations at a more granular level this becomes even more complex. There are, however, some indicators that transcend the direct involvement of the institutions and can be better stratified by subject discipline.

Based on natural groupings, response levels and expert advice, the ranking includes 52 subject disciplines among which there is the Computer Science subject considered appropriate for the EIPE study. To construct measures of faculty performance, the QS uses its proprietary datasets that enable to drill down by subject area, namely academic and employer reputation surveys and the Scopus data for the Citations per Faculty indicator in the global rankings. These have been combined to produce the results. In detail, each of the faculty ranking pieces can be described in the following way:

- **Academic Reputation** survey is the centrepiece of the QS World University Rankings® since their inception in 2004. In 2010, it drew upon over 15,000 respondents to compile the results. In the survey, respondents are asked to identify the countries, regions and faculty areas that they have most familiarity with and up to two narrower subject disciplines in which they consider themselves expert. For EACH of the (up to five) faculty areas they identify, respondents are asked to list up to ten domestic and thirty international institutions that they consider excellent for research in the given area. They are not able to select their own institution. The threshold for academic respondents that any discipline must reach for publishing the results in that discipline has been set in year one at 150. The analysis places an emphasis on international reputation over domestic – domestic responses are individually weighted at half the influence of an international response. This is a global exercise and will recognize institutions that have an international influence in these disciplines. Weightings are also applied to balance the representation by region.
- **Employer reputation** survey considers the students' employability as a key factor in the evaluation of international universities and in 2010 drew on over 5,000 responses to compile the results for the overall rankings. The employer survey works on a similar basis to the academic one only without the channelling for different faculty areas. Employers are asked to identify up to ten domestic and thirty international institutions they consider excellent for the recruitment of graduates. They are also asked to identify from which disciplines they prefer to recruit. From examining where these two questions intersect, a measure of excellence in the given discipline is inferred. Employers seeking graduates from any discipline are weighted at 0.1 and those from a parent category (i.e. Social Sciences) are weighted at 0.25 relative to the weight of a direct response for the subject area. Also this analysis places an emphasis on international reputation over domestic, with domestic responses carrying half the individual weighting of international responses.
- **Citations per Faculty** takes into account the size of an institution, while allowing observing its penetration the global research landscape. The data for citations originate from Scopus by Elsevier E.V.[5] Papers in Scopus are tagged with an ASJC (All Science Journal Classification) code which identifies the principal foci of the journal in which they were

[4] More information under: http://www.topuniversities.com (last accessed 01.02.2012)

[5] More information under http://www.scopus.com (last accessed 01.02.2012)

published. When aggregated together these totals per faculty and their associated citations provide an indicator of volume and quality of output in the given discipline.

The scores in each category are aggregated through adaptive compilation. First of all, the publication of a given subject table is not dependent on all three indicators reaching their thresholds. In most cases, a minimum of two indicators in order to present a final list is required. Weightings are based on publications patterns and level of employer interest in the given subject area. Weightings are not applied evenly between indicators for different disciplines, but are set relative to the pertinence of the indicator to the discipline and the depth of data available to evaluate it.

Aggregation, similarly to the approach used in the overall QS World University Rankings® a z-score is calculated for each indicator with the results scaled between 0 and 100 and then combined with the weightings as follows:

- Academic: 40%
- Employer: 30%
- Citations: 30%

8.2 ICT FP7 by EC DG Connect

The Framework Programmes for Research and Technological Development, also called Framework Programmes or abbreviated FP1 through FP8, are funding programmes created by the European Union in order to support and encourage research in the European Research Area (ERA). FP7 spans through the period between 2007 and 2013.

The analysis of the Framework Programme 7 programmes and participants is based on the database provided by the DG Connect in November 2011, which is not available publically. In the current report, information on the FP7 is used and concerns only the Information and communication technologies (ICT) areas. The list of instruments through which projects were financed includes: CSA-ERA-PLUS, CSA-CA, CP-SICA-INFSO, CP-FP-INFSO-FET, CSA-SA, CP-IP, NoE, CP-CSA, CP-IP-INFSO-FET, CP-FP-INFSO, CP-FP, CSA-SA-INFSO-FET and CSA-CA-INFSO-FET.

8.3 Bibliometrics: Web of Science by Thomson Reuters

Web of Science is an online academic citation index provided by Thomson Reuters. It is designed for providing access to multiple databases, cross-disciplinary research, and in-depth exploration of specialized subfields within an academic or scientific discipline. As a citation index, any cited paper will lead to any other literature (book, academic journal, proceedings, etc.) which currently, or in the past, cites this work. In addition, literature which shows the greatest impact in a field covered by Web of Science, or more than one discipline, can be selectively obtained. For example, a paper's influence can be determined by linking to all the papers that have cited it. In this way, current trends, patterns, and emerging fields of research can be assessed. Web of Science has indexing coverage from the year 1900 to the present.

Regarding the coverage, it encompasses over 11,000 journals selected on the basis of impact evaluations. This selection includes open-access journals and over 12,000 conferences each year (2009), spanning multiple academic disciplines. Coverage includes the sciences, social sciences, arts, and humanities, and across disciplines. For the purpose of the EIPE exercise, journals classified in the Computer Science research area are considered.

8.4 R&D Centre Location by IHS iSuppli

The data used for the purpose of identification of R&D centre locations originates from the 2011 IHS iSuppli database, a company-level dataset dedicated to observe the internationalization of R&D. It includes a list of R&D centres belonging to a number of high-tech companies together with their exact location and additional information on the type of R&D activity performed in these centres.

The data on R&D locations was collected by IHS iSuppli, an industry consultancy,[6] with the aim of mapping R&D locations and activities of companies considered as the major semiconductor influencers, i.e. the main users of semiconductors or, in other words the largest manufacturers of applied electronic and microelectronic products. In order to check how representative the sample is, we compared it to the R&D Scoreboard, a list of top 2000 R&D investors in Europe and the rest of the world,[7] and the list of companies filing their patents at the USPTO. The results of this checks revealed that the firms contained in the dataset represent nearly 30% of the 2008 R&D budget of all companies included in the R&D Scoreboard and more than 30% of all patent applications filed to the USPTO in 2009. This way we are assured that the sample is representative for the population of large high-tech multinational firms. Even if the characteristics of the dataset do not allow for building time series and, the dataset itself represents a unique collection of data for its coverage with a great level of details provided.

8.5 European Investment Monitor by Ernst & Young

The European Investment Monitor (EIM) is a unique monitor of foreign investment in Europe by companies from all over the world, except for investments in the home country. Since 1997, data is collected for all European countries and is published on a quarterly basis. Up to 2011, it includes over 40,000 observations.

The EIM identifies the project-based foreign inward investment announcements that are new, expanding, or co-located in an international context.[8] When the consulting group discovers a new project, they track it in order to determine the exact location at the city level. Projects included in the database have to comply with several criteria to be considered as international investments. There are no minimum investment size criteria, but the number of investments where less than 10 jobs are created.

The basic description of each investment project described by the EIM data includes the name of the firm, the parent company name, the name and the origin country of the parent company, the sector and both the country and the city of location. It also includes the function of each investment (unit of production and different service activities, such as headquarters, research & development centres, logistics, or sales & marketing offices).

The EIM is a recognized as a comprehensive industry standard tracking investment projects across Europe. It is a business information tool used by both professionals involved in corporate location strategy and inward investment issues and academic researchers (De La Tour et al. 2011). It is a benchmark for government and private sector organizations wishing to identify trends in jobs and industries, business and investment. The data collected by the EIM enables to:

- Review developments and movements in the inward investment marketplace, identify emerging sectors, industries and clusters,
- Benchmark regions and develop location strategies,
- Undertake in-depth, wide-ranging data analysis; for example: Which is Europe's most popular location for headquarters investments? What is the scale and nature of investment from South Korea? Or what is Germany's market share of pharmaceutical investment?

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6 More information under: http://www.isuppli.com (last accessed 01.02.2012)

7 More information under: http://iri.jrc.ec.europa.eu/research/scoreboard_2010.htm (last accessed 01.02.2012)

8 The EIM excludes mergers and acquisitions or joint ventures (unless these result in new facilities, new jobs created), licence agreements, retail and leisure facilities, hotels and real estate investments, utility facilities including telecommunications networks, airports, ports or other, fixed infrastructure investments, extraction activities (ores, minerals or fuels), portfolio investments (i.e. pensions, insurance and financial funds), factory / production replacement investments (e.g. a new machine replacing an old one, but not creating any new employment), not-for-profit organisations.

8.6 Patent Data: REGPAT by OECD

The OECD REGPAT database presents patent data that have been linked to NUTS3 regions according to the addresses of the applicants and inventors. The data have been regionalised at a very detailed level so that more than 2 000 regions are covered across OECD countries.

When compiling or analysing indicators with regionalised patents, it is necessary to have some characteristics of patents and some rules in mind, so as to make the best use of the information and not misinterpret the indicators. The data from the REGPAT database, are constructed along the following principles:

- *Inventor v. owner region*: Patent data can be regionalised on the basis of the address of either the inventor or the holder. The inventors address usually indicates where the invention was made while the owners address indicates where the holder has its headquarters. These two concepts have obviously different economic interpretation, especially as many patents are filed by large companies having several establishments located in different regions and countries.
- *Fractional v. whole counting*: Patents usually have several inventors and can have several owners. When regionalising patents, a patent with, say, inventors in two regions can be either attributed wholly to the two regions, or shared (with a total of shares of 100%) between the two regions. As a significant proportion of patents have inventors from different regions it is important to specify what rule is used, and when one is better, to use it. For instance, when comparing the performance of regions it is recommended to use fractional accounting, which i) attributes to each region its actual contribution to the invention; ii) when summed over all regions gives a total of 100%. On the other hand, when compiling an indicator like share of patents with co-inventors from another region, it is recommended to use whole counting both at the numerator and the denominator.
- *Priority year*: It is the year of first filing for a patent; it is the closest to the actual date of invention, and should therefore be used as the reference date when compiling patent indicators aimed at reflecting technological achievements. Other dates (national application, publication or grant) are dependent on administrative procedures and can be one to ten years after the invention and thus misleading when interpreting the data.

The methodology developed to identify regions on the basis of addresses of the patents inventor(s) or applicant(s) consists of an iterative procedure that matches postal codes and/or town names, identified in the addresses, with regions using a set of lookup tables (such as a postal code - NUTS3 correspondence).

8.7 Company-level Information: ORBIS by Bureau Van Dijk

Corporate Innovation, R&D and ownership structure information is retrieved by the JRC-IPTS Information Society Unit and contains comprehensive information on around 600 individual multinational firms. In general, concerning the company information, it includes among others such indicators as company name and sector of activity (NACE 4 digits), location of the company at detailed geographical level (city and/or NUTS2 region), structure of ownership, balance sheet data (assets, capital stock, number of employees, etc.) and R&D expenditures.

This information was combines information included in the following sources:

- The 2011 "EU Industrial R&D Investment Scoreboard", which presents information on the top 1000 EU companies and 1000 non-EU companies investing in R&D in 2010. The Scoreboard includes data on R&D investment along with other economic and financial data from the last four financial years.[9]

[9] More information under: http://iri.jrc.ec.europa.eu/research/scoreboard_2010.htm (last accessed 01.02.2012).

- ORBIS (Bureau Van Dijk), which contains comprehensive information on companies worldwide.

Regarding the selection of companies out of the ORBIS database and the construction of indicators on the number of employees, turnover, intangible and R&D expenditures at the NUTS 3 level, the following criteria were applied:

- Geographic coverage: EU 27;
- The ICT industry was defined according to the NACE Rev 2 definition of the ICT sector (OECD 2007);[10]
- Company status: Active companies;
- Type of entities: Industrial companies
- In order to avoid double-counting, separate searches were run using a filter on consolidation code. First, companies with consolidated accounts only and then companies with unconsolidated accounts only were selected.
- Time coverage between and 2011, the last available date.

8.8 Venture Capital: VentureSource by Dow Jones

Dow Jones VentureSource provides comprehensive data on venture-backed and private equity-backed companies – including their investors and executives – in every region, industry sector and stage of development throughout the world. This database contains information on venture capital transactions, the financed companies and the financing firms. The data are largely self-reported y VC firms, but several plausibility checks are conducted by the database providers. According to Kaplan et al. (20022002), who provide a detailed overview of this database and compare it with an alternative source of information which is Venture Economics, the VentureSource data are generally more reliable, more complete, and less biased than the Venture Economics data.

[10] Primary codes only include: 261 - Manufacture of electronic components and boards, 262 - Manufacture of computers and peripheral equipment, 263 - Manufacture of communication equipment, 264 - Manufacture of consumer electronics, 268 - Manufacture of magnetic and optical media, 4651 - Wholesale of computers, computer peripheral equipment and software, 4652 - Wholesale of electronic and telecommunications equipment and parts, 582 - Software publishing, 611 - Wired telecommunications activities, 612 - Wireless telecommunications activities, 613 - Satellite telecommunications activities, 619 - Other telecommunications activities, 6201 - Computer programming activities, 6202 - Computer consultancy activities, 6209 - Other information technology and computer service activities, 6311 - Data processing, hosting and related activities, 6312 - Web portals, 9511 - Repair of computers and peripheral equipment, 9512 - Repair of communication equipment.

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Abstract
The EIPE Atlas presents the results of the empirical mapping of ICT activity in Europe and the ranking of the top European NUTS 3 regions based on their performance in EIPE Composite Indicator (EIPE CI), together with the ranks for the individual 42 indicators which contributed to the building of the EIPE composite indicators. The report offers a snapshot of the performance of regions that are identified as the main locations of ICT activity in Europe. It is meant to provide a comprehensive picture of how ICT activity is distributed across Europe and where its main locations are. This information is expected to give a better overview of the European ICT landscape, activity and actors in each location and to reveal their strengths and weaknesses.

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