Bright Future for Black Towns

Economic performance and place-based characteristics of industrial regions in Europe

Comparative cross-national report

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Contents

Appendices

Tables and figures

1. Introduction[1]

This report presents the results of the first part of the European comparative project *Bright future for black towns: Reinventing European industrial towns and challenging dominant post-industrial discourses*, funded by JPI Urban Europe. The main goal of this project is to go beyond economy-driven post-industrial narratives, which are primarily suited to large cities with an economy dominated by the tertiary sector. Instead, we want to develop conceptual alternatives for the (re)development of former and present small and medium-sized industrial towns in Europe. Therefore, we aim to find out how varying (post)industrial narratives work to generate social innovations in national and European peripheries. We seek to identify the national context, societal phases, and traditions of social participation that influence post-industrial narratives in small and medium-sized industrial towns.

The overall research question of the project is:

> What are the socio-cultural specificities and place-based qualities of small European industrial towns and how are they generating social innovations in different fringes in Europe?

This question will be answered through quantitative and qualitative research. The present report discusses the results of the first stage of the research, which aims to provide an overview of the characteristics and geography of industry in Europe and within the five countries involved in the project (Slovenia, Romania, Finland, the Netherlands, and the United Kingdom). It seeks to answer the following three – interrelated – research questions:

1. What are the characteristics and performance of industrial regions in Europe?
2. What are the characteristics and performance of small- and medium-sized industrial towns in Slovenia, Romania, Finland, the Netherlands, and the United Kingdom?
3. What similarities and differences can be identified between small- and medium-sized industrial towns in these countries, and how does this relate to trends at the European level?

The following section presents the theoretical rationale for the project. It discusses the rise of post-industrial society and the (academic and policy) attention for large cities and culture-led development, and argues that small and medium-sized industrial towns are a largely overlooked but vital part of European urban and economic systems, and that these towns might benefit from a different, more context-sensitive approach.

[1] Theoretical framework developed by David Bole, Jani Kozina, and Jernej Tiran

1.1 Towards a post-industrial society?

The idea of the post-industrial society, as well as a constellation of related terms such as ‘service society’, ‘knowledge society’, and ‘information society’, achieved a prominent place in academic debates from the 1970s onwards as analysts sought to make sense of the ways in which modern forms of living and working were being transformed (Smart, 2011). The central thesis of the post-industrial paradigm, as outlined in the influential work of Bell (1973), is that economic life, production, and the world of work have been fundamentally transformed by innovations in information technology. In particular, in the second half of the twentieth century, in the more highly developed societies employment in manufacturing declined while professional, technical, and other service occupations increased in number, as developments in theoretical knowledge, information technology, and communications became the initiators of change (Smart, 2011). Accompanying this economic shift was a geographical one, as (large) cities found themselves at the focal point of new ‘post-Fordist’ economies characterized by a decisive shift away from materials-intensive manufacturing towards various kinds of high-technology, management, logistical, service, design, and cultural sectors (Scott & Storper, 2015). Meanwhile, manufacturing activities were relocated to suburban areas in a process that Phelps and Ozawa (2003, p. 592) call ‘selective decentralization’. Moreover, Scott (1982, p. 129) has noted not only the massive decentralization of industry from inner city to suburbs, but also the beginning of a major dispersal away from the metropolis altogether and out into the distant hinterland areas. The question then remains what the spatial, social, and economic implications of these developments are.

Many post-industrial urban models such as the global city (Sassen, 2001), the cultural city (Scott, 1997), and the creative city (Florida, 2005) paint a rather negative and gloomy picture of industrial activities in cities. It is sometimes implied that manufacturing should be avoided, or ‘upgraded’ by focusing on creativity and innovation. Such models and the urban policies that they inspire are arguably tailor-made for larger urban conurbations with a service-oriented economy, rather than for smaller towns with a more industrial profile. Indeed, policy prescriptions routinely overlook industry- and place-specific factors that enable or restrict the viability of manufacturing over time (Doussard & Schrock, 2015). Revitalization strategies are often more concerned with marketing and place branding than with generating effective urban change (Van Winden, 2010), or force culture-led development strategies without respecting local conditions (Cruickshank, Ellingsen & Hidle, 2013; Gainza, 2016; Gribat, 2013). It is then perhaps not surprising that the overall effects of such strategies are doubtful (Beekmans, Ploegmakers, Martens & Van der Krabben, 2015; Cleave, Arku, Sadler & Gilliland, 2017).

In this project, we think that post-industrial models and paradigms do not represent the final nor the complete endpoint of discussion about future urban development. Rather, we believe that they serve as a basis for critical reflection and can inspire further dialogue on the role of industry, particularly in smaller traditional manufacturing/mining towns across Europe. Industry remains important for the economic life of smaller towns, as recent research finds that 29 per cent of small towns within the European Union (still) have an industrial profile

(Hamdouch, Demaziere & Banovac, 2017) and some previously deindustrialized small and medium-sized cities are experiencing reindustrialization (Krzysztofik, Tkocz, Spórna & Kantor-Pietraga, 2016).

1.2 The role of small and medium-sized towns

Small towns are a predominant feature and a vital element of settlement systems in all developed countries (ESPON 1.4.1, 2016; Wirth, Elis, Müller & Yamamoto, 2016). They bridge metropolitan and rural areas and thus balance national and regional settlement systems (Filipović et. al., 2016; Hinderink & Titus, 1988; Maly, 2016; Steinführer et al., 2016). While population research shows the decline of smaller cities in comparison to mid-sized and larger cities from the 1960s onwards (Turok & Mykhnenko, 2007), it is often less well acknowledged that they also house a significant part of the population: around 56 per cent of Europe's urban population lives in small or medium-sized towns (CEC, 2011) and around 20 per cent lives in small towns (Steinführer et al., 2016).

Nevertheless, small towns have long been a rather neglected part of urban systems in scientific literature as well as in spatial planning policies. Only with the Europeans Spatial Development Perspective (ESDP, 1999), when the EU put polycentric development in the limelight of European spatial development goals, did small towns start to gain more attention in European and, consequently, national planning policies. This territorial cohesion discourse continued in subsequent policies and documents concerning European spatial planning, including the Green Paper on Territorial Cohesion (2008), the Europe 2020 Strategy for smart, sustainable and inclusive growth (2010), and the Territorial Agenda for the European Union 2020 (2011). Recently, we are also witnessing an increasing interest in small towns due to growing recognition of the importance of exchanges between rural and urban households, enterprises, and economies (Spasić & Petrić 2006).

However, the specific characteristics and territorial potential of small and medium-sized towns in Europe remain understudied (Servillo, Atkinson & Hamdouch, 2017). Existing literature either depicts these towns as facing economic and population decline and as being in need of policy action from outside to cope with economic transformation (in particular, transformation from an industrial to a post-industrial economy), or as idealized linkage between the urban and the rural with a number of advantages including a favourable living environment, lower costs of living, and the presence of dense social networks (e.g. Erickcek & McKinney 2006; Pink & Servon 2013; Wirth et al. 2016). These two conceptualisations also imply contrasting development scenarios, painting small towns as winners and losers in processes of polarization (Fulton & Shigley 2001). What the actual social, cultural, and economic specificities – which in turn are derived from specific industrial histories and the embeddedness of towns in regional and national urban systems (cf. Musterd & Gritsai, 2012) – of small industrial towns actually are, and what potential they offer for further evolvement either towards a sustainable maintenance of (neo)industrial character or towards new economic developments, remains an open question.

1.3 Structure of the report

This report is structured as follows: chapter 2 answer the first research question: *What are the characteristics and performance of industrial regions in Europe?* Based on analyses of Eurostat data, we discuss the prevalence and geography of industry in Europe and assess the relation between industry on the one hand and economic performance and urbanization on the other hand. Chapters 3 to 7 answer the second research question: *What are the characteristics and performance of small and medium-sized industrial towns in their respective national contexts?* Each chapter first introduces the national context through a brief overview of historical industrialization and deindustrialization and continues with an assessment of the economic performance of small and medium-sized industrial towns (hereafter: SMITs), which is then related to other, place-specific factors including demography, local culture, living conditions et cetera. Finally, chapter 8 seeks to answer the third research question: *What similarities and differences can be identified between small and medium-sized industrial towns in Europe?* through a synthesis of the European and national findings.

For the purpose of this report, we define industry as the sector of the economy that produces economic goods through the processing of raw materials (manufacture), or those branches that are involved in mineral extraction (mining) or construction. Industry can be subdivided based, for example, in the processing of materials and the production of discrete products, or into light and heavy industry. While we are here mostly concerned with the role of industry and industrial employment as it is captured in statistical definitions, we acknowledge that the role of industry as it pertains to the economic and social life of small and medium-sized towns is much broader and may also include, for example, services connected to industrial production or household work that is done within an ideology of male-breadwinner families.

2. Industrial regions in Europe

2.1 Data and methods

The purpose of this study is to explore the role of industry in the performance of European regions. In particular, this first investigation focuses on the geography of industrial regions and the relation between industry and economic performance and between industry and urbanization. In addition, attention is paid to interregional variation.

All data discussed in this chapter are retrieved from Eurostat/ESPON. These include variables relating to economic structure and performance, population size and demographic developments, urbanization and infrastructure, and environmental aspects (see Appendix I, Tables 1 and 2 for an overview of the datasets). Data were collected on the NUTS-2 and NUTS-3 regional levels, although the analyses focused mostly on the NUTS-3 (smaller) regional level. Most data referenced follow the 2013 NUTS classification, but please note that depending on the analysis, regions whose borders changed between classifications might be treated as missing. The NUTS-2 data include information on 323 regions located in 35 European countries and Turkey. Regional borders are drawn based on population size – between 800,000 and 3,000,000 – and existing administrative and/or statistical classifications. NUTS-2 regions contained on average almost two million (1,883,940) inhabitants in 2016, although this varies a great deal with the smallest region having a population of only 28,983 – Åland in Finland – and the largest – Istanbul in Turkey – over 14.5 million. The NUTS-3 data include information on 1621 regions located in 35 European countries and Turkey. Regional borders are drawn based on population size – generally between 150,000 and 800,000 – and existing administrative and/or statistical classifications. NUTS-3 regions contained on average 407,850 inhabitants in 2016, although this varies a great deal with the smallest region having a population of only 10,741 – El Hierro, one of the Canary islands – and the largest – Istanbul in Turkey – over 14 million.

Some general shortcomings of the data available should be mentioned. First, many variables were not available for all countries and/or regions. These variables were excluded from the analysis if their high number of missing values were expected to unduly influence the results. Second, variables describing the economic structure varied in their classification of industrial activity. The NACE classification divides economic activities into 21 sectors (and subsequently into subsectors). Sectors of relevance to this research include mining and quarrying (B), manufacturing (C), electricity, gas, steam, and air conditioning supply (D), water supply, sewerage, waste management and remediation activities (E), and construction (F). Of these sectors, manufacturing is by far the largest. Most variables used in this research refer only to manufacturing (C), while some refer to multiple sectors (e.g. B-E). In the text, it is indicated which sectors are referred to, however drawing conclusions across analyses using different variables becomes more complicated. In addition, these variables are not able to capture deindustrialized regions. Finally, data on urbanization are almost absent at the investigated regional scales. Classifications on a lower geographical level may better capture the characteristics of industrial regions with respect to their degree of urbanization, however, these were unfortunately not available.

2.2 Industry in Europe

Table 1 below presents descriptive statistics of the available indicators of industrial activity at the NUTS-3 regional level, including the share of employment and the Gross Added Value in industry (sectors B-E) and manufacturing (sector C), and the share of land used for industry and mining[2]. While the average share of the workforce employed in industry is 17.72 per cent, the range is relatively large with some regions having almost no industrial employment and others where industry is by far the most important economic sector. This is even more true for the share of industrial GVA.

Table 1. Descriptive statistics of industrial variables, relative share (NUTS3)

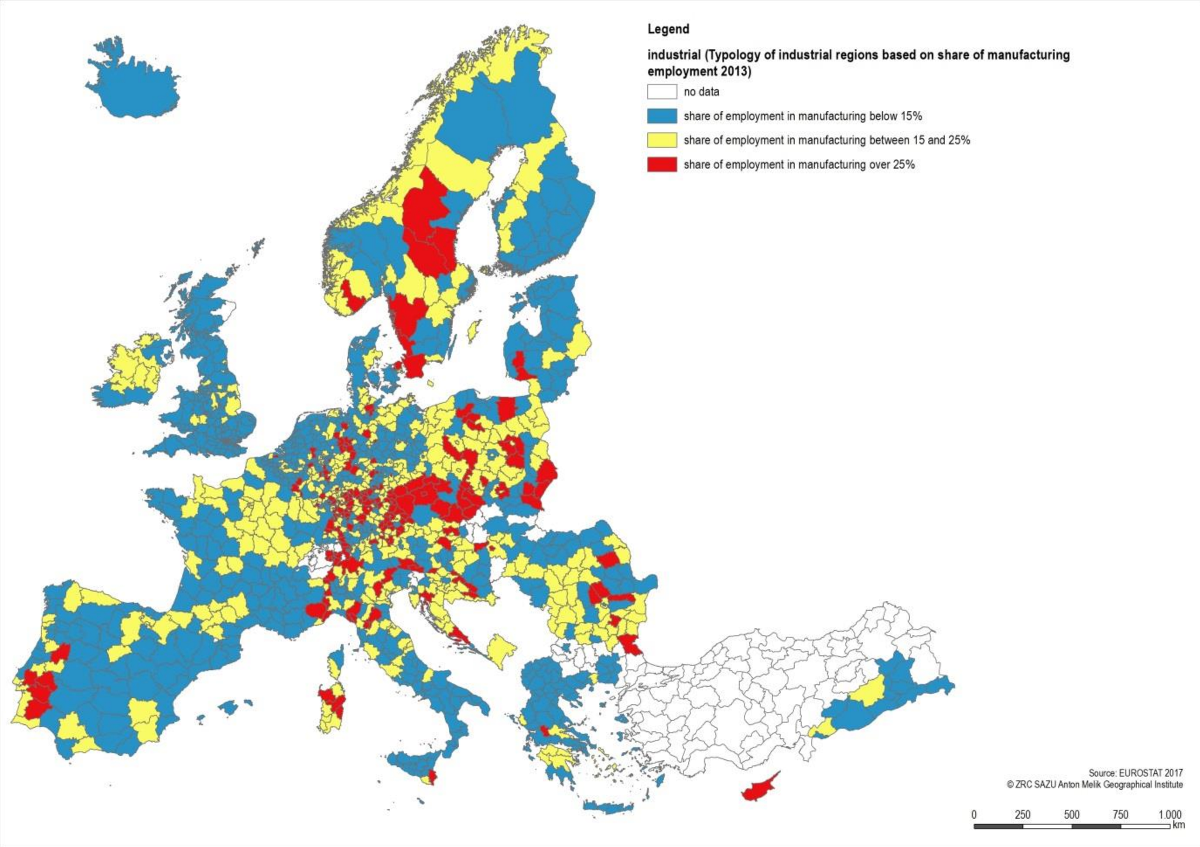
Variable	Mean	Standard deviation	Minimum	Maximum
% employment in industry (B-E) (2013)	17.72	8.33	2.28	49.71
% employment in manufacturing (2013)	16.15	8.31	1.08	49.06
% industrial GVA (B-E) (2014)	22.42	10.84	1.36	75.36
% manufacturing GVA (2014)	18.24	10.49	0.00[3]	74.47
% industrial land use (2006)	1.78	3.05	0.00	24.07
% mining land use (2006)	0.30	0.53	0.00	6.68

We distinguish two categories of industrial regions: those where a quarter or more of the population is employed in industry (hereafter called ‘industrial regions’) and those where between 15 and 25 per cent of the population is employed in industry (hereafter called ‘moderately industrial regions’). In 2013, 19.6 per cent or 269 out of 1096 regions could be classified as industrial. These regions are mostly located in Central and Eastern Europe (where 35.8 and 28.9 per cent of regions, respectively, are industrial regions) and additionally some regions in Northern and Southern Europe (15.5 and 12.9 per cent, respectively). Only 2.9 per cent of regions in Western Europe are industrial according to this definition (ten regions). These numbers are very similar when we only look at employment in manufacturing (see Figure 1). Almost a third of all regions (31.3%) can be described as moderately industrial. Looking at regional variation, this category is much more evenly distributed.

[2] Based on the Corine Land Cover classification, which uses topographic maps as well as aerial photography. ‘Industrial land use’ includes industrial, commercial, and transport sites, ‘mining land use’ includes mineral extraction, dump, and construction sites. For more information, please refer to the Corine reports (https://www.eea.europa.eu/publications/COR0).

[3] Two regions reported a negative manufacturing GVA in 2014 (Syracuse in Italy and Burgas in Bulgaria). In the calculation of percentage share, these regions have been set to zero.

Figure 1. Typology of industrial regions based on share of manufacturing employment (2013, NUTS3)

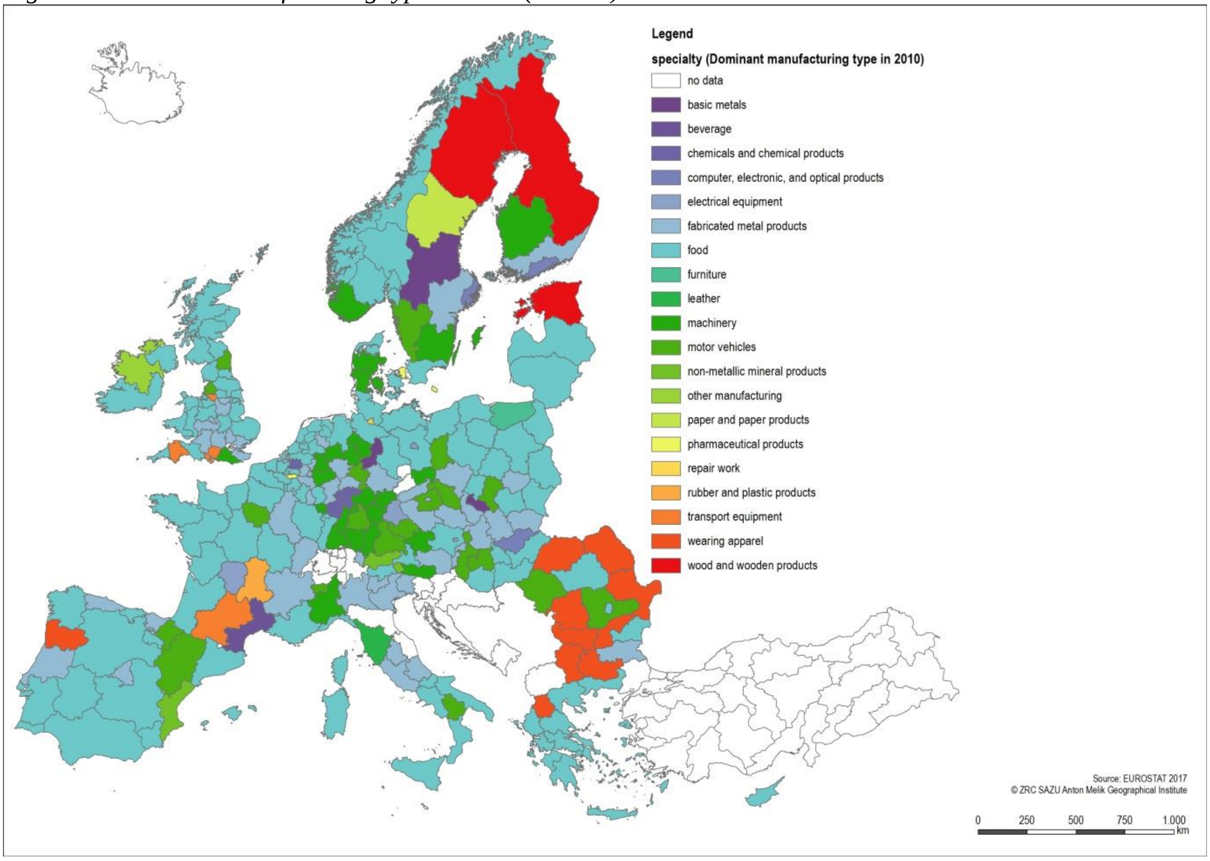


In order to find out more about regional variation in types of industry, we turn to the higher-scale NUTS-2 level. Here, we have data on 24 subsectors of manufacturing (data from 2010). We first consider the dominant industrial sub-sector in each region (workforce per subsector relative to the total manufacturing workforce)[4]. In most regions, either food industries (135 regions), fabricated metal products (51 regions), machinery (23 regions), or motor vehicle industries (21 regions) are dominant. It is notable that machinery industries are mostly dominant in German and Scandinavian regions, while the picture is more mixed for motor vehicle industries and fabricated metal products. Food industries is the predominant industry across European regions and regions where food industries are the dominant subsector are present in almost all countries (see Figure 2). Some other patterns on a smaller scale can also be discerned: wearing apparel industries dominate in Southern and Eastern Europe (Greece, Portugal, Romania, Bulgaria) and wood and paper industries in Northern Europe (Denmark, Finland, Sweden). Looking specifically at the countries involved in the Bright Future project, in both Slovenian regions fabricated metal products is the dominant industrial subsector, while in Finland (5 NUTS-2 regions), regionally dominant industrial sectors are food (1), wood (1), fabricated metal products (1), machinery (1), and computer products (1). In Romania (8 NUTS-2 regions), half of regions specialize in wearing apparel, two in food

[4] It should be noted that although one industry might be dominant in a particular region, this does not mean that this region does not also house other important industries. Moreover, some types of industry are more labour intensive than others. Finally, as dominance is measured relative to total manufacturing, this analysis does not provide information on the absolute but only on the relative size of industrial subsectors.

industries and two in motor vehicles. In the Netherlands (12 NUTS-2 regions), food industries (10) are very dominant, and in two regions fabricated metal products is the most prominent sector. Finally, in the UK (40 NUTS-2 regions), in almost half (21) of all regions the food industry is dominant, and additionally fabricated metals (9), transport (3), motor vehicles (2), machinery (1), and printing industries (1)[5].

Figure 2. Dominant manufacturing type in 2010 (NUTS2)



We continue by looking more broadly at differences between parts of Europe (Northern Europe, former socialist Central and Eastern Europe, Southern Europe, Western Europe, and non-former socialist Central Europe[6]). Performing a one-way ANOVA with the size of industrial subsectors relative to total manufacturing employment, we see that there are indeed significant differences in the relative size of these subsectors between European regions, with the exception of tobacco industries, pharmaceutical products, basic metals, and repair industries (see Appendix I, Table 3 for the model). Post-hoc tests[7] show that food industries make up a significantly larger share (again, please note this refers to relative, not absolute

[5] Totals do not count up to total number of regions due to missing values.
[6] The classification used here is adapted from that of the CIA World Factbook. Non-former socialist Central Europe includes Germany, Austria, Switzerland, and Liechtenstein. Former socialist (CEE) countries includes Albania, Bulgaria, Croatia, Czech Republic, Hungary, Romania, Poland, Estonia, Lithuania, Latvia, Macedonia, Montenegro, Slovakia, and Slovenia. Southern Europe includes Greece, Italy, Spain, Portugal, Cyprus, and Malta. Northern Europe includes Denmark, Sweden, Norway, Iceland, and Finland. Western Europe includes Ireland, the UK, France, Belgium, Luxembourg, and the Netherlands. Turkey is excluded.
[7] Games-Howell post-hoc tests were used.

size) of total manufacturing in Southern and Western Europe compared to Central and in particular to Eastern (post-socialist) Europe. Beverage industries are larger in Southern Europe compared to Northern, Central, and Eastern Europe. Wearing apparel and leather industries are larger in Southern and Eastern Europe compared to Western, Northern, and Central Europe. Wood and wooden products are stronger in Northern, Southern, and Eastern Europe than in Western or Central Europe, while furniture production is strong in Eastern and Southern Europe. Printing and chemical industries dominate in Western Europe and mineral and fabricated metal industries in Southern Europe. Southern Europe is significantly weaker in computer industries, while Central Europe is strong in electrical equipment, machinery, and motor vehicles. In conclusion, some degree of regional specialization is certainly discernible.

2.3 Industry and regional economic performance

At the NUTS-2 or larger regional level, there are several measures of economic performance available including regional GVA, GDP, (long-term) unemployment, and number of commuting/non-commuting workers, which provides an indication of the number of jobs available that are suited to the skills of the local population. Correlations between industrial and general economic performance indicators show mixed effects: both share of GVA in industry (sectors B-E, excluding construction), share of GVA in construction (F), and share of manufacturing (C) workforce are negatively correlated with economic performance in terms of overall GVA and GDP (share of GVA in manufacturing is not significant). However, these correlations are rather weak, ranging from $r= -.119$, $p<.05$ for the relation between share of manufacturing workforce and GVA to $r= -.293$, $p<.001$ for the relation between share of GVA in construction and GDP, and partial correlations show that they become insignificant once population development (percentage growth between 1990 and 2016) is controlled for. Share of industrial and manufacturing GVA and share of manufacturing workforce are also negatively correlated with the commuting ratio.

In contrast to these relationships, all industrial variables are negatively correlated with (and thus have a positive effect on) the share of unemployment: when industry increases, unemployment goes down. These correlations are also a bit stronger, ranging from $r= -.200$, $p<.01$ for the relation with share of GVA in construction to $r= -.372$, $p<.001$ for the relation with share of GVA in manufacturing, and remain significant when controlling for population development. The positive relationship (negative correlation) between industry and unemployment was also found at the NUTS-3 or smaller regional level ($r= -.185$, $p<.001$ for share of employment in industry excluding construction, and $r= -.193$, $p<.001$ for share of employment in manufacturing). Thus, in conclusion we can say that at this point, we do not have clear-cut evidence that regions that are more industrial perform worse economically than regions that are less industrial. In fact, with respect to unemployment the opposite seems to be the case.

Regression analyses[8] at the NUTS-2 level (see Appendix I, Table 4 for the model) with regional GVA and GDP-PPS (standardized to EU average) as dependent variables show mixed performance of industrial indicators and strong regional effects. In a first step, population, area size, density, and region (Western Europe is reference category) were added as control variables. Then, other economic variables were added in a second step. In the third and final model, industrial variables were added. Anova tests show that each step significantly improves on the previous one. While the model shows that share of GVA in industry is negatively related to overall GVA (b= -.740, p<.01), the opposite is true for the share of medium and high-tech manufacturing workforce (b=1.246, p<.05) and the number of industrial enterprises (b=.442, p<.05). Being a post-socialist Central or Eastern European country has a negative effect on GVA (b= -10.789, p<.001), while the opposite is true for being a non-former socialist Central European country (b=11.852, p<.05) and being a Northern European country (b=13.663, p<.05). In the model where regional GDP-PPS is the dependent variable, none of the industrial variables are significant.

Another indication of economic performance is a typology developed by the ESPON project ECR2 that measures resilience to the 2008-2011 financial crisis at the NUTS-3 regional level[9]. It characterizes regions as either not affected, recovered, not recovered but experienced economic upturn, or not recovered and still experiencing economic downturn. In contradiction to what might be expected from the regression analyses, Table 2 shows that moderately industrial (between 15 and 25% employment in industry) and especially industrial regions (over 25% employment in industry) outperform nonindustrial regions, as a higher share of these regions are either unaffected by or recovered from the economic crisis (see also Figure 2).

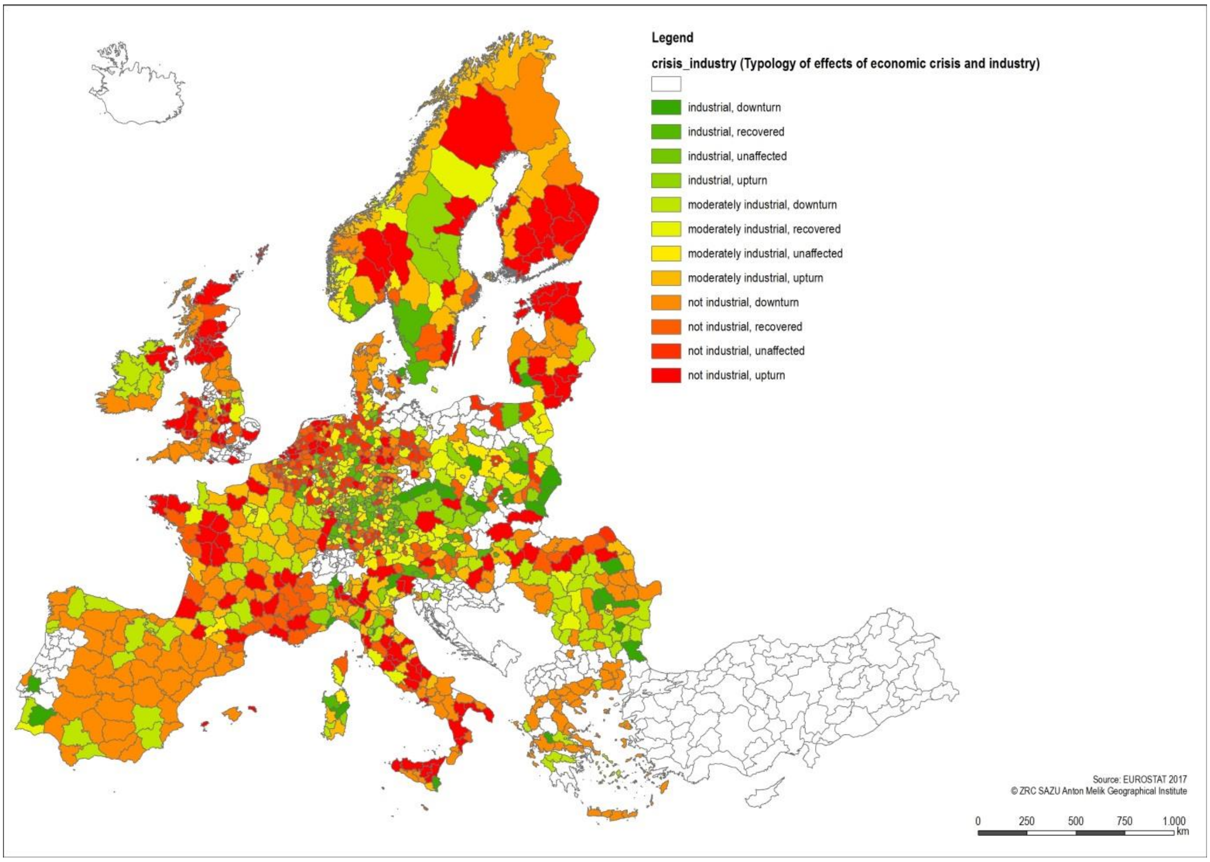
Table 2. Typology of effects of the economic crisis in European regions (NUTS3)

Category	***% all regions (N=1187)***	***% nonindustrial regions (N=611)***	***% moderately industrial regions (N=404)***	***% industrial regions (N=172)***
Unaffected	17.4	13.6	20.0	25.0
Recovered	25.0	21.1	27.0	34.3
Not recovered, economic upturn	28.0	31.4	26.0	20.3
Not recovered, economic downturn	29.6	33.9	27.0	20.3

[8] Stepwise OLS, missing values handled through pairwise deletion. Variables with VIF>5/tolerance below .2 excluded from the model.

[9] Typology of economic resilience after the financial crisis developed by the ESPON scientific project ECR2: Economic Resilience: Resilience of Regions. This typology is based on changes in GDP/GVA and employment. More information can be found in the scientific report: https://www.espon.eu/sites/default/files/attachments/Scientific_report.pdf.

Figure 3. Typology of effects of economic crisis and industry



2.4 Industry and urbanization

As was noted in the introduction to this chapter, regional data on the degree of urbanization at the European level are relatively scarce. The fifth Cohesion Report of the European Commission (2010) does introduce a few typologies of regions that are useful for this report, notably a typology of urbanity-rurality based on population density and remoteness, and a typology of metropolitan regions[10] (see Table 3). Comparing industrial (over 25% employment in industry, NACE sectors B-E) and moderately industrial (between 15 and 25% employment in industry, NACE sectors B-E) with nonindustrial regions, industrial regions are more often rural and intermediate regions close to a city than nonindustrial regions, and they are less likely than non-industrial regions to be predominantly urban or remote rural regions. Moderately industrial regions are more comparable to nonindustrial regions in their degree of urbanity.

Industrial regions are slightly more often second tier and smaller metro regions than are nonindustrial regions, while nonindustrial and moderately industrial regions are slightly more likely to be capital city regions. Together, these findings indicate that industry is more likely

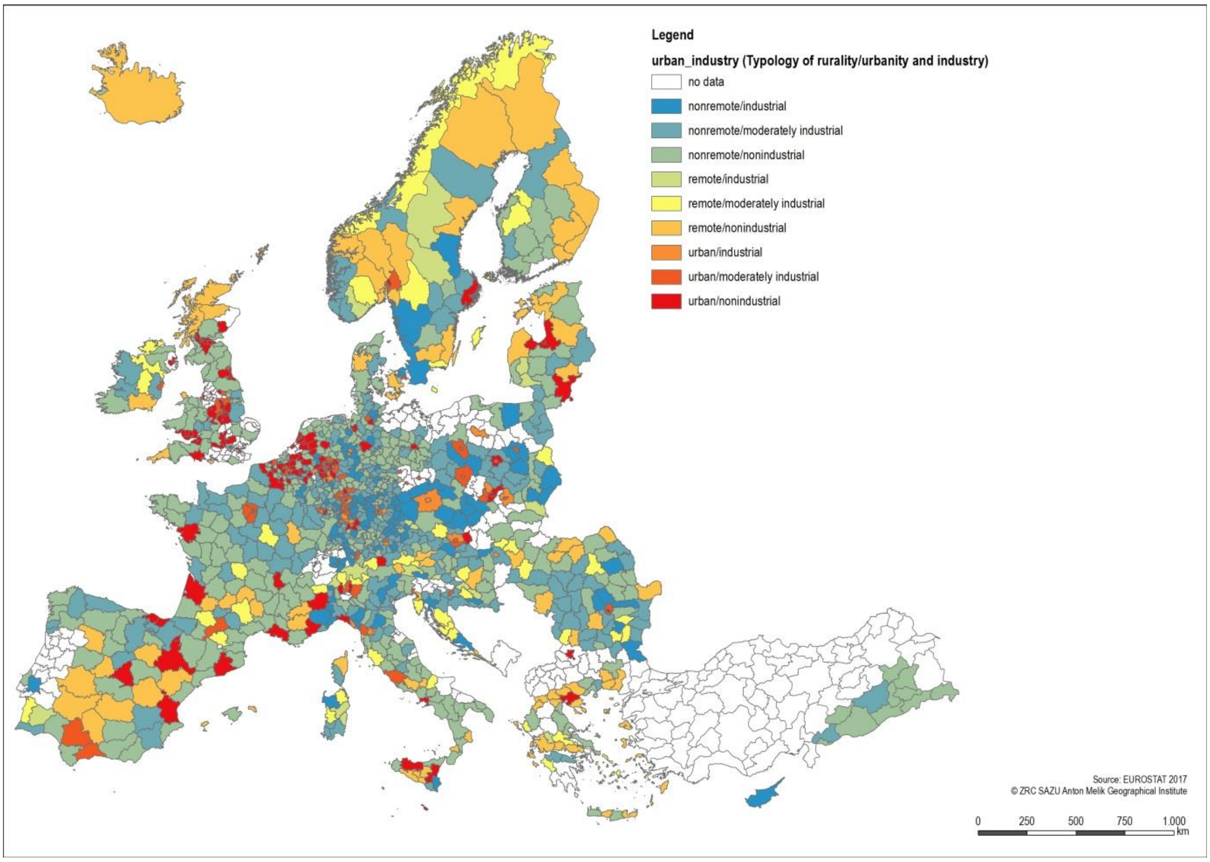
[10] For a detailed explanation of the methodology behind these typologies, please refer to the Guidance Document (https://www.espon.eu/tools-maps/regional-typologies).

to be found in areas that are not highly urban yet not highly rural either, or at least to be located in (the vicinity of) smaller cities or towns (see also Figure 3).

Table 3. Typology of urban and metropolitan regions in Europe (NUTS3)

Category	*% all regions (N=1197)*	*% nonindustrial regions (N=486)*	*% moderately industrial regions (N=461)*	*% industrial regions (N=250)*
Predominantly rural regions, remote	12.0	13.4	12.1	9.2
Predominantly rural regions, close to a city	26.9	24.7	28.4	28.4
Intermediate regions, remote	1.5	2.3	1.3	0.4
Intermediate regions, close to a city	37.3	37.0	34.1	43.6
Predominantly urban regions	22.3	22.6	24.1	18.4
Category	*% all regions (N=1185)*	*% nonindustrial regions (N=476)*	*% moderately industrial regions (N=460)*	*% industrial regions (N=249)*
Capital city regions	6.2	6.1	7.0	4.8
Second tier metro regions	11.6	10.1	13.0	12.0
Smaller metro regions	20.0	21.2	17.8	21.7
Other regions	62.2	62.6	62.2	61.4

Figure 4. Typology of rurality/urbanity and industry (NUTS3)



3. Small and medium-sized industrial towns in Slovenia

3.1 History of industrialization

History of (de)industrialization

The Slovenian territory experienced three waves of industrialization: the first at the transition from the 19th to the 20th century (coal), the second in the 1920s before the world economic crisis (electricity), and the third, especially distinctive wave after World War II (mass Fordist production). Small-scale manufacturing, specializing in textiles and glass, developed from the 16th Century onwards. The industrial boom in minding, smelting, brick-making, and glass works in the mid-18th Century led to the development of coal mining, which in turn spurred the industrial revolution of the second half of the 19th Century, when coal mining and newly constructed railroads enabled foreign goods to be competitive. The spatial distribution of industry followed a pattern called the 'industrial crescent', based on the location of coalmines and railways. Within this crescent industrial production diversified, while the rest of the country remained mostly rural. During the interbellum, electricity became very important and the number of industrial enterprises doubled. After 1945, industrial location patterns changed due to the socialist policy to industrialize regional centres. Rapid development of industry caused (im)migration and increases in population mobility. Industry reached its peak in the late 1970s with almost half of the Slovenian population employed in industry, and industrialization spread to small towns in the countryside. With the independence of Slovenia in 1991 and the introduction of a market economy deindustrialization accelerated while the role of the tertiary sector grew. Relatedly, the growth of cities was supplanted by the suburbanization of the countryside.

Current industrial structure

Since 2010, there has been a slight trend towards an increasing industrial workforce (which otherwise remains relatively stable around 26%) and industry still contributed a quarter of total national GVA in 2013. In particular the electro technical and machinery industries have become more important, and the industrial structure has further diversified. The biggest value is created by companies in electrical equipment, car industry, and basic metals. Deindustrialization has resulted in many derelict urban areas of industrial origin, as industry is now mostly concentrated small rural municipalities. While some towns managed to overcome the transitional period and have become even stronger industrial centres than in the socialist era, some have been crippled by unemployment and shrinkage. Small industrial towns are generally threatened by a low level of sustainability, excessive and old infrastructure, and environmental degradation.

Industrial heritage and policy strategies

In some cases, industrial heritage is recognized as an asset for developing new economic activities. There are no specific policies for the (re)development or the reindustrialization of SMITs. Local development strategies usually favour tourism, however some towns have shown signs of reindustrialization through partnering with multinational corporations. Many SMITs have a strong labour and trade union presence based on their traditional identity and cultural values.

3.2 Data and methods

The Slovenian analysis is based on the collection of 34 variables explaining employment, economic performance, demographic trajectories, living environment, and voting behaviour for 212 LAU2 units (*občine* or municipalities). Because of Slovenia's small size, the analysis is conducted solely on LAU2 units. The 12 existing NUTS3 units do not represent a sufficient size to carry out complex regional analysis. Besides, NUTS3 units in Slovenia are merely statistical entities and do not correspond to functional regions. Towns are defined based on previous research (Bole 2012; Bole, Nared & Zorn 2016; Rebernik 2007) and consider the specificities of the Slovenian urban system. Rural towns have a total population below 5,000, small towns between 5,000 and 20,000, medium-sized towns between 20,000 and 100,000, and large towns above 100,000. Municipalities with less than 5,000 inhabitants were classified as rural and were excluded from further analyses. The majority of analysed municipalities in Slovenia (84 of 102) have the population of less than 20,000, representing more than two fifths of the total population (40.97%). Small and medium-sized towns have more than one third of workplaces in industry, much more than large towns (16.85%).

All data statistically analysed and discussed in this chapter are retrieved from Statistical Office of the Republic of Slovenia or other public records. Altogether 34 indicators at the LAU2 local level were available and taken into consideration. There are 212 municipalities in Slovenia, so the dataset has almost no missing values. The indicators are divided into five groups: employment, economic performance, demographic trajectories, living environment and voting behaviour as the only indicator available for determining the political structure. For the typology of SMITs based on economic performance, we have combined indicators from the 'economic performance' group with the 'employment' group. Unfortunately, only one indicator is directly related to industry, i.e. share of employment in the secondary sector, which is defined as those employed in B (mining), C (manufacturing) and F (construction) sectors according to NACE classification. We excluded D (energy supply) and E (water and sewage supply) sectors, since this would significantly differ from the past research done in Slovenia and would not allow for historical comparability. But in any case, D and E sectors represent only 2.2% of the total employment or 6.5% of industrial employment (considering sectors from B to F), so results should be comparable. Appendix II, Table 1 provides an overview of the indicators used.

3.3 Industry and economic performance

In order to analyse correlation between industry and development indicators, correlation analysis by employing Pearson's coefficient was performed. Indicators share of high-tech companies, share of employed in medium and high-tech companies, and share of degraded urban areas were excluded from the initial analysis due to violation of the assumption of normal distribution. However, for these three indicators Spearman's coefficient was calculated as a non-parametric counterpart of Pearson's coefficient.

Looking at the correlations matrix (Appendix II, Table 2), we can see that industry is positively related with a majority of indicators measuring economic performance. The structure of industry in SMTs consists of more medium-tech, and medium-sized and big companies with more employees. The reason for that could probably be based in the heritage of the socialist period which favoured big industrial companies. Despite that the economic base of contemporary industrial structure is mostly medium-tech, it is still quite innovative (positive correlation with number of patents).

Industry is negatively related with commuting ratio, aging index, and average net usable area (m^2) per dweller. As expected, industrial SMTs present strong local employment centres. Because more of the housing stock originates from the socialist era, when construction of multi-storey blocks with smaller flats was a popular domain, industrial SMTs face a lower degree of dwelling surface per capita today. Surprisingly, industry is also negatively related with the aging index. Probably, we could associate this finding with a lower spatial mobility rate of Slovenian population and a higher fertility rate of industrial vs. post-industrial society.

In order to model the impact of industry on development indicators in SMTs in Slovenia, stepwise OLS regression analysis was performed[11]. Share of employment in the secondary sector was used as a dependent variable. The results (Table 4) show that share of employment in the secondary sector is positively associated with share of employed in medium and big companies and share of medium-tech companies. In contrary, it is negatively associated with aging index, average salary (gross), and population growth 1991–2016. In conclusion, the average SMIT will have large medium tech companies, and will also have a better young/old ratio (aging index) but a slight decrease of population, and lower average salaries (gross). By indicated regression model below it is possible to explain 61% of the variance of the dependent variable.

[11] Each step significantly improved on the previous one (*Sig F Change* < .05). Anova tests showed that the model is a significant fit of the data overall ($p < .05$). Errors in regression are independent (Durbin–Watson = 1.249). VIF values < 3, tolerance values > 0.4.

Table 4. Regression coefficients for share of employment in the secondary sector in Slovenia (N=100). SE between parentheses.

	Unstandardized coefficients	**Standardized coefficients**
Constant	8.327 (11.584)	
Share of employed in medium and big companies_x*x	**.005** (.001)**	.517
Share of medium-tech companies	**10.952** (1.998)**	.370
Ageing index	**-.220** (.043)**	-.501
Average salary (gross)_1/x	**-50,869.424** (13,260.185)**	-.268
Population growth 1991-2016_log10(x+1)	**-51.789* (19.220)**	-.275
R^2	.605	

*significant at p<.05 **significant at p<.01; ***significant at p<.001 (two-tailed)

3.4 Typology of small and medium-sized industrial towns

We applied a further criterion of above-/below- average industrialization to flesh out SMITs in Slovenia. We decided to use a quantitative measure of a very pragmatic nature: to define above average industrial towns according to standard deviation. We use a 0.5 standard deviation measure, which cuts off about 30% of 'extreme' (below- and above-average) towns. The criteria are:

1) Population:

- a) Small town: 5,000–20,000 inhabitants
- b) Medium-sized town: 20,000–100,000 inhabitants
- c) Large town: > 100,000 inhabitants

2) Employment in the secondary sector (%):

- a) Under average industry: < Mean – 0.5 Standard deviation (34.68 – 15.84/2 = 26.76)
- b) Average industry: Mean ± 0.5 Standard deviation (26.76–42.60)
- c) Above average industry: > Mean + 0.5 Standard deviation (34.68 + 15.84/2 = 42.60)

According to the above criteria, there are 24 SMITs (21 small and 3 medium-sized industrial towns) in Slovenia (see Appendix II, Tables 3 and 4). They have 265,000 inhabitants or about 13% of the country's population. Because the above-mentioned classification has its limits and can only highlight present-day towns with above or below average industrial function, it disregards past industrial towns. Those exhibit average or below-average industrial employment, but have social, cultural, spatial, and identity ties and can be considered as a "derelict" type of industrial towns. To identify de-industrialized towns we compared the same data on industrial employment in 1991 and 2002. Those towns that were above average in industry in 1991 and 2002 according to the 0.5 standard deviation rule, but are now only average or even below-average, were marked as deindustrialized.

In order to derive a typology of SMITs based on their economic performance, multivariate statistics by using principal component analysis (PCA)[12] and cluster analysis (CA) was applied. We used 15 indicators measuring economic performance and applied it to 24 present SMITs. Deindustrialized SMITs were omitted from the classification, but were added later for making comparisons. Appendix II, Table 3 shows the component loadings after rotation. The indicators that cluster on the same components suggest that:

1) Component 1 represents the transformed socialist industry inherited from the past with a large share of medium and big companies. They are still well supported with investments and have a positive impact on emergence of high-growing companies.

2) Component 2 represents the highly profitable industry. Employees in medium and high-tech companies bring high added value and are highly paid.

3) Component 3 represents the promising and growing industry characterised with small and high-growing companies. The workforce comes from non-local areas. Innovation potential is not yet fully operationalised by high number of patents.

4) Component 4 represents the high-tech industry.

5) Component 5 represents the less successful industry, the only clear negative component characterised by large share of unemployment and foreign workforce and low share of high-growing companies.

In order to derive clusters based on principal component scores, we decided for a combination approach using a hierarchical CA[13] followed by a non-hierarchical CA[14]. This allows us to select the most appropriate solution in terms of the number of clusters, and then ensure the best possible allocation of cases to clusters (Fredline 2012, p. 215). Based on the k-means CA cluster 1 represents highly profitable industry, cluster 2 indicates promising and growing industry, cluster 3 is a combination of transformed socialist and high-tech industry, while cluster 4 reflects loadings on less successful industry (See Appendix II, Figure 1). The ANOVA test indicated that the first three components contributed more to the implemented cluster solution. Four SMITs were classified as unsuccessful towns, nine as those with highly

[12] We conducted a PCA on the 13 standardized indicators with orthogonal rotation (varimax). Two indicators were omitted from the analysis due to high correlation with other indicators ($r > .90$), i.e. share of long-term unemployed and share of medium-tech companies. Three indicators were previously transformed (share of high-tech companies, share of employed in medium and high-tech companies, number of patents 1991–2016 per 1000 inhabitants) due to violation of assumption of normal distribution (see Howell, 2010; Tabachnick & Fidell, 2007). The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis, KMO = .50 (‘mediocre’ according to Field, 2009), and majority KMO values for individual items were above the acceptable limit of .50 (Field, 2009). Bartlett’s test of sphericity χ^2 (78) = 105.74, $p < .05$, indicated that correlations between indicators were sufficiently large for PCA. Five components had eigenvalues over Kaiser’s criterion of 1 and in combination explained 74.50% of the variance.

[13] Hierarchical technique by using Ward’s method and Squared Euclidean distance was performed to select the number of clusters. The dendrogram indicated 3-6 clusters and the agglomeration schedule suggested a 6-cluster solution as the most appropriate one. However, 6 and 5-cluster solutions each extracted one cluster containing only one unit. So we decided the optimal version to be a 4-cluster solution.

[14] Non-hierarchical k-means clustering by using an Iterate and classify method was applied. In this way, the advantages of hierarchical method were complemented by the ability of the non-hierarchical method to refine the results by allowing the switching of cluster membership.

profitable companies, two as transformed socialist and high-tech industry towns and eight as promising and growing industrial towns (see Table 5).

Table 5. Cluster membership and the Euclidean distance to the cluster centre for SMITs in Slovenia.

Name of SMITs	Cluster	Distance	Name of SMITs	Cluster	Distance
Slovenske Konjice	Less successful SMITs	1.123	Železniki	highly profitable SMITs	2.194
Ribnica	Less successful SMITs	1.727	Šentjernej	highly profitable SMITs	2.540
Metlika	Less successful SMITs	1.818	Kidričevo	transformed socialist and high-tech SMITs	1.479
Šentilj	Less successful SMITs	1.953	Gornja Radgona	transformed socialist and high-tech SMITs	1.479
Hrastnik	Less successful SMITs	2.157	Slovenska Bistrica	promising and growing SMITs	.947
Idrija	highly profitable SMITs	1.374	Hoče - Slivnica	promising and growing SMITs	1.096
Zreče	highly profitable SMITs	1.503	Kanal	promising and growing SMITs	1.160
Škofja Loka	highly profitable SMITs	1.507	Ivančna Gorica	promising and growing SMITs	1.196
Ravne na Koroškem	highly profitable SMITs	1.561	Šmartno pri Litiji	promising and growing SMITs	1.791
Cerknica	highly profitable SMITs	1.659	Prebold	promising and growing SMITs	1.938
Velenje	highly profitable SMITs	1.903	Gorenja vas – Poljane	promising and growing SMITs	1.980
Ruše	highly profitable SMITs	2.102	Pivka	promising and growing SMITs	2.069

Characteristics of present and past SMITs in Slovenia

Economic performance and employment: Appendix II, Table 4 shows a breakdown of economic performance of SMITs in Slovenia. The results of a Kruskal-Wallis test[15] indicate statistically significant differences between clusters of SMITs in six indicators. Average salary (gross), added value per employee (net), investment index per capita, share of high-growing companies, and number of patents 1991–2016 per 1000 inhabitants are higher in the clusters of highly profitable SMITs and transformed socialist & high-tech SMITs. Those two clusters of SMITs indeed have the best economic performance and less successful SMITs of course have the worst. Comparison between SMITs and deindustrialized towns revealed statistical differences only in three indicators (see Appendix II, Table 5): as expected, SMITs have a higher share of employment in the secondary sector, a higher share of medium and big companies, and a higher share of employed in medium and big companies. No other

[15] A non-parametric counterpart of the one-way independent ANOVA.

economic performance indicators are statistically different, which indicates that deindustrialized towns are economically not better nor worse than their industrial counterparts.

Demographic trajectories: Appendix II, Table 5 shows a breakdown of demographic statistics of SMITs in Slovenia. The results of a Kruskal-Wallis test indicate no statistically significant differences between the variables except for the population growth 2010-2016. That was positive only in cluster 4 (promising and growing SMITs) but negative in other clusters. Comparison between SMITs and deindustrialised towns revealed statistical differences only in population in 2016. Deindustrialised towns are on average a bit bigger than SMITs, which leads to a conclusion of vertical disintegration where large towns deindustrialised and diversified their economic base before small and medium-sized ones.

Living environment: Appendix II, Table 6 shows a breakdown of living environment of SMITs in Slovenia. The results of a Kruskal-Wallis test indicate no statistically significant differences between the variables. Moreover, there are no statistical differences in indicators measuring the living environment even when comparing SMITs and deindustrialised towns. Despite non-significant results we can notice that the cluster of older transformed socialist SMITs has less new dwellings (built after 2007) and the highest share of dwellings with inappropriate infrastructure.

Voting behaviour: Appendix II, Table 7 shows breakdown of voting behaviour of SMITs in Slovenia. The results of a Kruskal-Wallis test indicate no statistically significant differences between the variables, as Slovenian party arena is, rather on economy, divided on urban-rural axis. As expected, voter turnout is slightly higher in towns with better economic performance (with promising and growing industry). Those towns have a slightly more right political orientation as most of them are located in traditionally right political environments with above average share of rural population.

Description of types of SMITs

In general we can say that economically the most successful types of SMITs are represented by two clusters: highly profitable towns and transformed socialist & hi-tech towns. This is a mix of older and newer industrial towns that grew considerably in the socialist era and managed not just to transform their “socialist-type” of manufacturing, but also grow new types of production. Their performance is based on one or two large companies. Their location is generally more remote and not close to highways (with some exceptions). But statistically they do not differ so much to other types of SMITs. It is true they have much better economic and employment statistics, but show very mixed results regarding population growth/decline: for instance, transformed socialist & high-tech towns have a negative population growth.

More favourable demographic and living environment statistics are attributed to promising and growing towns, which are located in suburban and even rural areas in Slovenia. Although they were industrialised in the socialist era, it seems that their growth is based on new high-tech production with smaller companies. Economically they do not preform best, but have the lowest unemployment rates and highest population growth. In contrast to the first two SMITs types, these towns are located near transportation nodes and closer to major cities. In terms of descriptive statistics they have the best living environment statistics and are more orientated towards voting for right-wing parties. This is perhaps due to the fact that because of their more recent economic success they do not have practices of labour unions and traditional left-wing workers movements.

Less successful towns generally have poorer demographic and living environment statistics (higher mortality index, more sick leave, etc.), but yet again those differences are statistically not significant. All of them are older industrial towns with major production plants. Those towns had a similar starting point as the "transformed socialist & high tech" towns, but after the 1990-ies they didn't transform their traditional production to a more high-tech direction. Those towns still have a high industrial employment, but in less innovative sectors such as the paper industry (Šentilj), textile industry (Metlika) or mining (Hrastnik). Worse living conditions can be observed on the basis of descriptive statistics, but interestingly voting behaviour does not differ from other towns.

Deindustrialized towns are a heterogeneous group. The biggest towns (medium-sized Kranj, Kamnik and Jesenice) lost their industries already in the first decade after independence, but the majority of other towns, which are typically smaller, were deindustrialized only in the last 15 years. Many of those towns already transformed either into the service sector economy or simultaneously became "satellite" or "suburban" towns with high share of daily commuters. Such towns are not considered to be problematic or shrinking – in fact some of them are fast growing, especially those closer to Ljubljana (Vrhnika, Logatec, Kamnik, Škofljica). Some towns are still experiencing shrinkage since they did not transform, nor became satellite towns. Those are older former industrial and mining centres (Trbovlje) that were affected by the last economic crisis, where many work-intensive factories were closed (Polzela, Ajdovščina). Because this groups is a mix of both shrinking and growing towns, their statistics is not significant – although we can distinguish among fully transformed and growing (post)industrial towns and transitional towns facing shrinkage.

4. Small and medium-sized industrial towns in Romania

4.1 History of industrialization

History of (de)industrialization

In the mid-19th Century, small factories are beginning but most of the production is still based on manual labour for domestic consumption. Factory development was hampered by the competition from goods manufactured abroad. In addition, long foreign domination isolated the Romanian territories from the economic flows of Europe, and the agrarian feudal political regimes persisted. During this period, also the first coal mines developed. From the mid-19th Century until WWI mechanization proceeded as well as the construction of ports. The iron and petroleum industries are developed. Large industrial urban centres are hindered in their development by the lack of communication routes and transport options. During the interbellum the steel and metal processing industries grow, as do the main industrial centres. The communist regime resulted in different industrial specializations developing in all regions of the country, focusing on heavy industry – iron and steel, machine building, extractive industry, chemical industry, construction and building materials, and textiles and food industries. At first the development of regional centres was prioritized, but since the 1980s there has also been industrialization of small and medium-sized towns (Ianoş, 2004). Industrialization policy targeted the rapid development of cities in all areas of the country, without taking into account economic efficiency. The collectivization of agriculture, among other factors, resulted in large-scale rural-urban migration. Underdevelopment of services and service-oriented economy in most cities have made these very dependent on industry, with a strong link between industrial activities and population growth. In the last decade of the 20th Century, cities have diminished their production mainly within the extractive industry. After 2000 the development of the tertiary sector is evident in Bucharest and big cities, while deindustrialization mostly affects small and medium-sized cities (below 50,000 inhabitants), and especially mono-industrial cities in Western and Southern Romania and in Moldova.

Current industrial structure

Heavy and extractive industries are in decline, while the food, beverages and tobacco industry is growing. Industry is characterized by frequent investor and location changes. Relocation often means the emergence of industrial parks and industrial activities are combined with services and creative industries (Cercleux et al., 2016). Cities are developing differently, from those who benefit from proximity to Western Europe, large cities focusing on services, port cities focusing on industry and tourism, and cities that are stagnating in terms of economic development.

Industrial heritage and policy strategies

Older industrial towns benefit from having industrial heritage sites, however this legacy also brings negative environmental effects. Some sites are classified as historical monuments and offer possibilities for industrial tourism. However, the reconversion of former industrial spaces – which can be adapted to new economic activities, demolished, or developed as industrial brownfields – is a very recent process and local development strategies often encounter obstacles such as lack of funding or political support (Cercleux, 2016).

4.2 Data and methods

The urban structure of Romania comprises 320 cities (of which 103 are included in the category of municipalities, 'municipii'), grouped according to the number of inhabitants in 5 main categories: very small towns (less than 10,000 inhabitants), small towns (between 10,001-20,000 inhabitants), medium-sized towns (between 20,001-50,000 inhabitants), large cities (between 50,001-100,000 inhabitants) and very large cities (over 100,000 inhabitants). Within the last category, we identify major regional cities and national level cities with a population of more than 300,000 inhabitants. In the analyses that follow, we refer to the following categories, which correspond for the most part to the typology of SMSTs - small and medium sized towns developed in the TOWN project (Servillo et al., 2014): small SMSTs (with a population less than 25,000 inhabitants), medium SMSTs (with a population between 25,001 and 50,000 inhabitants) and large SMSTs (with a population of more than 50,001 inhabitants, but considered by us of no more than 100,000 inhabitants); after these categories, the category of very large cities follows (more than 100,000 inhabitants). From the total number of towns in Romania, 72 per cent are small SMSTs, 13 per cent are medium SMSTs, 7 per cent are large SMSTs and 8 per cent very large cities. Inside the SMSTs 78 per cent are small SMSTs, 15 per cent medium SMSTs, and only 7 per cent large SMSTs.

More in detail, we focused on the analysis of the **industrial SMSTs**, called **SMITs** and we considered the towns, at the national level, with a share of the active population of over 50% and a population of up to 100 000 inhabitants in 1992.[16] Descriptive statistics of the variables used in the analyses can be found in Appendix III, Table 1.

[16] It should be mentioned that there are cases of towns in which the occupied population in industry exceeded the population of a town before 1989 and immediately after, a large part of the population occupied in industry coming from a few kms or even more, usually limiting their commuting to the county area.

4.3 Industry and economic performance

We conducted a multiple regression analysis (Stepwise Method), in which all indicators available were included (18) in order to see the strongest correlations with the population employed in the industry sector in 2011. The values were complete for all the used indicators (no missing values). The adjusted R^2 of our model is .554 with the $R^2 = .306$. This means that the linear regression explains 30.6 per cent of the variance in the data. The Durbin-Watson is d=1.282 which is between the two critical values of $1.5 < d < 2.5$. Therefore, we can assume that there is no first order linear auto-correlation in our multiple linear regression data. The linear regression's ANOVA test has the null hypothesis that the model explains zero variance in the dependent variable (in other words $R^2 = 0$). The F-test is highly significant (23.046), thus we can assume that the model explains a significant amount of the variance in urban active population employment in industry. Appendix III, Table 2 presents the full model. The six variables that correlate to the Urban active population employed in industry are Bathroom equipment of urban dwellings, Urban tertiary education, Urban employment rate, Urban average living area, Urban unemployment, and Mortality rate. They are the only significant and useful predictors in our model.

We find a non-significant intercept but highly significant bathroom equipment coefficient, which we can interpret as the need for the new employees to have more living space in the towns area (for every 15-unit increase in urban active population, we will see .022 additional units for the bathrooms per dwelling). We might also observe a negative correlation between urban tertiary education and urban active population employed in industry. The explanation comes from the fact that people with higher education tend to work in the tertiary sector more than in the industrial ones, and also tend to commute to towns with a more complex profile than the industrial one. The mortality rate is also significant, taking into consideration also that people employed in the industry sector tend to have a poorer health status especially due to pollution and the hard working conditions they have to face (for every 15-unit increase in the urban active population employed in industry, we have an increase of 0.612 units for the mortality rate). We can also see that bathroom equipment of urban dwelling has a higher impact than mortality by comparing the standardized coefficients (β=.556 versus β=.126).The impact of bathroom equipment compared to the tertiary education are pretty much similar (β=.556 versus β= -.561), with the specification that the first is a positive correlation and the second is a negative one (when one is increasing, the other one is decreasing). In terms of urban employment/unemployment, employment has a positive effect (b=.242, β=.293) on the share of urban active population employed in industry, while the share of unemployment is negative (b= -.565, β= -.120), meaning that as the share of urban active population in industry increases, unemployment decreases.

4.4 Typology of small and medium-sized industrial towns

Taking into account the economic performance of the Romanian SMITs (relying on know-how capacity and importance of exported production), 5 categories were established, respectively SMITs with: ***high economic performance***, ***medium-high economic performance***, ***medium economic performance***, ***medium-low economic performance*** and ***low economic performance***.

High economic performance SMITs

High economic performance is met in only 5.4 per cent (8) of all cases. Including mostly small SMITs (5 out of 8 towns), together with other 3 medium SMITs, these towns represent the most active urban industries at the moment, and are all located in the southern half of the country. In the high economic performance SMITs category, most towns have moderate negative values of the natural balance, which are close to the equilibrium stage: Ghimbav – Brașov county (manufacture of road transport vehicles) or Găeşti – Dâmbovița county (electrical equipment manufacturing). Two SMITs with high economic performance show positive values, registering a slight increase in population size (Mioveni – Argeș county and Năvodari – Constanța county). Most of the SMITs characterized by high economic performance (63%) show negative values of net migration: Cugir – Alba county (machinery and installations), Cernavodă – Constanța county (metal construction industry), et cetera. 37 per cent of the SMITs of this category have positive or close to equilibrium values in terms of natural balance, being characterized by a slight increase of the population: Năvodari – Constanța county (petroleum processing) or Moreni – Dâmbovița county (oil extraction). Regarding the values registered by the population aging indicator, it can be noticed that the share of the population over 65 is relatively low (Mioveni – road transport vehicles manufacturing, Năvodari – Constanța county crude oil processing and Cernavodă – Constanța county – metal construction industry) and medium (Otopeni – Ilfov county – food industry and Moreni – Dâmbovița county – oil extraction). Low and medium values of the elderly population are due to the positive dynamics of industrial activity that explains the large share of the employed population (Mioveni – Argeș county, Năvodari – Constanța county) or the large inflow of young people attracted (Otopeni – Ilfov county).

From a functional point of view, two SMITs fall into the category of road transport vehicles manufacturing, which is a traditional industrial branch at the national level. Although the car manufacturing industry has regressed in recent years compared to the 1990s, there are several functional centres at national level, one of which is a successful model: Mioveni – Argeș county (Dacia motor vehicles factory taken over by the French Renault company). It is also worth mentioning SMITs such as Moreni – Dâmbovița county and Năvodari – Constanța county, both of them with natural balance values close to zero and whose activity is related to oil exploitation and processing (a mineral resource whose exploitation is profitable due to the large amount of reserves).

Three of the SMITs with high economic performance have more than half of their employed population in industry occupied within the predominant industry, while the other SMITs register values of less than 25 per cent. Among the high economic performance SMITs, the metal and metal products industry is the predominant industry in two regions (for Cugir – Alba county and Cernavodă, Constanța county), as is the case for the manufacture of motor vehicles, trailers and semi- trailers (Mioveni – Argeș county and Ghimbav – Brașov county). Two other towns are occupied in the oil industry (Năvodari – Constanța county – manufacture of coke and refined petroleum products; Moreni – Dâmbovița county – the extraction of crude oil and natural gas), together with the manufacture of electrical equipment (Găești – Dâmbovița county) and food industry (Otopeni – Ilfov county). All these SMITs register very low unemployment rates (under 3%) with the exception of Moreni (Dâmbovița county), having an unemployment rate of 8.4 per cent, close to the general national level. Also, most of the mentioned SMITs record low levels of employees (under 50% for 5 towns) showing the predominance of local human resources and the high importance of industrial activities for the local economy. Two towns with high economic performance register very high values of employment (Otopeni – Ilfov county – over 90%, and Ghimbav – Brașov county – almost 112%) as an effect of developing their economy under the influence of two big cities – Bucharest and Brașov. These two SMITs received major foreign investments after 1990 due to their location nearby the two cities of strategic importance, so that they are attracting human resources from both the large cities nearby and the surrounding rural areas. Given their industrial background, the level of residential amenities, in terms of share of homes with bathrooms (rates of over 81%), is high as the communist industrialization of towns included also the construction of modern blocks of flats for the newly attracted workforce (large flows of labor force moved from the surrounding rural areas to the newly industrialized towns, and where therefore in need of permanent accommodation). The generally low educational level (under 18% of tertiary education attainment) of high economic performance SMITs raises concerns about the resilience of the population in the face of high economic changes and difficulties. Also, the main industrial workforce seems vulnerable under competitive market conditions as it is predominantly formed of low qualified people.

Medium-high economic performance SMITs

Medium-high economic performance towns form 13.51 per cent of all SMITs in Romania, and are located across the country. They include small and medium towns evenly (50% of towns fall into the 'medium' category). One third of them register a slight upward trend in terms of population growth. Most of them are county seats. In this sub-category, towns with heavy industry are included: Bistriţa – Bistrița- Năsăud county (manufacture of road transport vehicles), Zalău – Sălaj county (metallurgical industry), but also light industry: Sfântu Gheorghe – Covasna county (food industry), Miercurea Ciuc – Harghita county (textile industry).

More than half of the SMITs characterized by medium-high values of economic performance record negative values of the natural balance: Fieni – Dâmbovița county, Ocna Mureş – Alba county (electrical equipment manufacturing) or Topoloveni – Argeș county, (road transport vehicles). Nearly half of them have moderate negative values (below 1 ‰) and show a population stagnation trend: Râșnov – Brașov county (machinery and equipment), Medgidia – Constanța county (metallic constructions and metallic products) etc. They mostly (75%)

register negative values of net migration: Plopeni – Prahova county (machinery and equipment), Câmpia Turzii – Cluj county (metallurgical industry), Curtea de Argeș – Argeș county (textile industry). A quarter of the SMITs included in this category have low positive values of the net migration (Sebeş – Alba county: wood prefabricated, made of wood and cork) and moderate values (Bistrița – Bistrița-Năsăud county: road transport vehicles manufacturing, Râşnov – Brașov county: machinery and equipment manufacturing). These SMITs are characterized by a positive trend in terms of population growth as a result of the positive values of the natural balance. Higher positive values of internal migration are recorded in Voluntari (located near the capital city that attracts young people, Ilfov county) and Rădăuţi (a town in the North-East Development Region, Suceava county, characterized by a traditional demographic behavior favorable to high birth rates). The ageing level is comparable to that of the total population with medium values (over 10%). These are small SMITs, with a slow evolution of the population (Ocna Mureș – Alba county – electrical equipment manufacturing), or are located in areas where the demographic ageing started earlier than in other parts of the country (e.g. Salonta – Bihor county, in the Western part of Romania).

With the exception of two towns (Câmpia Turzii – Cluj county and Bumbești-Jiu – Gorj county), for all other towns the principal industrial activity represents less than 40% of the share of employed people in industry. Woodworking, manufacture of wood and cork products, except furniture, and the manufacture of motor vehicles, trailers and semi-trailers are the main industries of medium-high economic performance SMITs. Most of these towns register low unemployment rates (under 3%), highlighting their better adaptability and the good performance of their industrial activities under the market economy. Only three SMITs have higher unemployment rates, with Câmpia Turzii (Cluj county) reaching the top value in this category (4%), as, despite large foreign industrial investments over the last decade, it still has some time to go before reaching full recovery after the closure of its large factory in the wire industry – currently, its main economic activities are maintained in the metallurgical industry. Among towns with shares of under 45% employees, Voluntari (Ilfov county) reaches values of over 60% given its location close by Bucharest and the massive investments of international corporations that opened offices there in the last 20 years – large amounts of people living in Bucharest work in Voluntari for these companies, mainly occupied in the tertiary sector (specific support services for their clients). Three medium-high economic performance towns gather very low shares of employees (under 15%) – Ocna Mureș (Alba county), Râșnov (Brașov county), Câmpia Turzii (Cluj county) – highlighting difficulties within the employment and local investment sectors, together with issues related to informal economy and the massive daily commuting of the population to work in other localities. Urban housing amenities register high values referring to bathrooms, so that all medium-high economic performance SMITs record over 70% shares of households equipped with bathrooms, of which 7 towns reach values over 90%. But, the tertiary education attainment enters the national low levels with only 4 towns of this category surpassing 20% share of people that finished university studies.

Medium economic performance SMITs

25.67 per cent of SMITs in Romania record a medium economic performance level, with a general distribution across the country and with Bacău, Brașov, Dâmbovița and Ilfov as concentration areas (with 4 towns each). Almost half of the towns in this category are small SMITs, while 9 are large SMITs. 68 per cent recorded negative values in terms of natural balance (half of which have moderate negative values). Most of them belong to some industrial sectors that have regressed: textile industry (Buhuşi – Bacău county, Târgu Secuiesc – Covasna county), chemical industry (Victoria – Brașov county), machinery and equipment manufacturing (Câmpina and Azuga – Prahova county). One third has a positive population growth trend (especially the county seats: Alba Iulia – Alba county, Slatina – Olt county, or towns with a high proportion of Roma population: Săcele – Brașov county, as well as some urban centres located in the North-East Region, traditionally characterized by a positive population growth trend: e. g. Vaslui – Vaslui county). From the perspective of ageing population they present a mosaic picture: along with industrial centres with very small shares of the population over 65 years in the total population (Rovinari – Gorj county - coal exploitation, Vaslui – Vaslui county - clothing manufacture), there are 30 towns with medium values (Titu – Dâmbovița county - rubber and plastics products manufacturing, Fieni – Dâmbovița county - electrical equipment manufacturing); and two towns with relatively high values: Borsec – Harghita county - beverages production, Câmpina – Prahova county - machines and equipment manufacturing). Most of them show a demographic pattern of decrease for most of them (76%): Onești – Bacău county, Făgăraș –Brașov county (chemical industry), Roman – Neamț county, Râmnicu Sărat – Buzău county (textile industry), Fieni – Dâmbovița county (electrical equipment manufacturing), Târgovişte – Dâmbovița county, Slatina – Olt county (metallurgical industry). The SMITs with medium values of economic performance register also positive net migration figures (24%): Alba Iulia – Alba county (food industry), Ștefăneşti – Argeș county (road transport vehicles manufacturing) et cetera. This group of SMITs concentrates the highest positive values registered by industrial centres such as: Bragadiru, Pantelimon, Popeşti-Leordeni (food industry centres) whose positive migratory trajectory is due to their location in the proximity of the capital city (Ilfov county), which means they attract inflows of young population as a result of the specific urban suburbanization phenomenon.

Only 3 of these medium economic performance towns have their share of employed people occupied in the main industrial activity. Borsec (85.9%, Harghita county), internationally recognized for its bottled mineral water, registers the largest value of this type among SMITs at national level. The predominant industries are: food industry; manufacture of motor vehicles, trailers and semi-trailers and the manufacture of clothing. Unemployment registers values of only below 5 per cent, evidencing the good practices within the economy of these towns which is more complex and based on different economic activities. But, the general low share of employees among the total population (mostly under 40%) shows important informal economic activities and self-employment at the household level. Only 5 medium economic performance towns reach more than 40% of employees, of which Borsec (Harghita county) surpasses 57%, due to its successfully ongoing industrial activity in the manufacture of beverages sector. In terms of quality of life, all these towns evidence good and very good values in relation to housing amenities – with the exception of Ștefănești (Argeș county), which has maintained its predominant rural features, all others have shares of bathrooms/household of over 70 per cent, of which almost half surpass the value of 90 per cent. The medium economic performance of these towns is also reflected in the slightly increased shares of tertiary attainment which reach up to 40% in the case of Bragadiru (Ilfov county) – together with Popești- Leordeni (29.60%, Ilfov county), these towns owe these good values to neighbouring Bucharest, the capital, the largest city and the most important university centre in Romania.

Medium-low economic performance SMITs

Medium-low economic performance towns (19.59% of SMITs) are equally distributed across Romania in terms of location and are mostly small SMITs. Most (79%) record a decrease in the population growth rate: Hunedoara – Hunedoara county, Câmpulung – Argeș county, Brad – Hunedoara county (road transport vehicles manufacturing), Petroșani – Hunedoara county (coal extraction). It is observed that 45 per cent of the total number of towns have moderate negative values in terms of natural balance, showing a slight decrease in terms of the population number, predominantly in towns with a light industry profile: Huşi – Vaslui county (travel goods and leather goods manufacturing), Siret – Suceava county (wood processing) Mizil – Prahova county, Călăraşi – Călăraşi county, Dorohoi – Botoșani county (textile industry), Pașcani – Iași county (food industry). The overwhelming majority (93%) registered negative values in terms of net migration: Călăraşi Călăraşi county, Turnu Magurele – Teleorman county, Mizil – Prahova county, Mărășești – Vrancea county (clothing manufacturing), Drăgăşani – Vâlcea county (metal constructions industry and metal products), Balş – Olt county (food industry). Only two SMITs have positive net migration figures: Brad – Hunedoara county (has experienced a change in the industrial specialization over the last few years as a traditional centre of extractive industry currently with production related to the road transport vehicles manufacturing), Siret – Suceava county (wood processing). They are mostly characterized by a small and medium share of the population over 65 in the total population: Jimbolia – Timiș county (computer manufacturing, electronics and optical products), Fălticeni – Suceava county (clothing manufacturing), Carei – Satu Mare county, Urlați – Prahova county (food industry). Only one city has a higher share of the elderly population (Brad – Călăraşi county - road transport vehicles manufacturing).

Their main industrial activities include manufacture of clothing; manufacture of leather goods; food industry; manufacture of motor vehicles, trailers and semi-trailers; woodworking, manufacture of wood and cork products, except furniture. But only 8 medium-low economic performance towns surpass the value of 40% for the share of employees in the main industrial activity of the town. Only Petroșani (Hunedoara county) reaches values of over 53.8 per cent of employees in the extraction of upper and lower coal. The proportion of towns with unemployment rates higher than 4 per cent is larger than in the case of medium and medium-high economic performance towns, including 5 towns, out of which Mărășești (Vrancea county) is notable because of its high unemployment of almost 8% – the manufacture of clothing faced many challenges in Romania especially after the economic crisis in the competition with lower-paid markets in Asia. In the same time, this town registers the lowest number of employees (10.25%) within this category which reaches generally low values of below 35%, as an effect of transition economic restructuring and of the economic crisis cuts. Mărășești (Vrancea county) remains the town with the most difficulties among medium- low economic performance SMITs as it has the lowest quality of urban living in relation to the share of bathrooms among households (less than 55%), while it also registers a very low tertiary attainment (under 6%). Three other towns have less than 70 per cent shares of bathrooms at household level, and the tertiary attainment levels fail to reach even the value of 19 per cent.

Low economic performance SMITs

The category of SMITs characterized by low economic performance shows a trend of population decline: most towns have negative natural balance (63%) and negative moderate values (22%). The SMITs belonging to this sub-category have different functional profiles: extracting industries (Abrud – Alba county, Motru – Gorj county, Petrila – Hunedoara county), wood processing (Nehoiu – Buzău county), metallurgical industry (Oțelu Roșu – Caraș-Severin county), cars, machinery and equipment manufacturing (Olteniţa – Călăraşi county), and textile industry (Cehu Silvaniei – Sălaj county).

Most of these are small SMITs (less than 25,000 inhabitants), and their industrial activity declined either as a result of the economic restructuring process or of the poor economic competitiveness (many of which were declared urban centres as a result of the intensive industrialization during the communist regime): e.g. Scornicești – Olt county, Nucet and Ștei – Bihor county. A small share of SMITs (15%) shows positive values in terms of natural balance (not exceeding 2‰) and registers a slight increase in population. Most SMITs in this sub-category have different functional profiles: road transport vehicles manufacturing (Vulcan – Hunedoara county, Cisnădie și Tălmaciu – Sibiu county), textile industry (Vlăhiţa – Harghita county), food industry (Bălan – Harghita county), et cetera. SMITs with low economic performance are mostly characterized by negative net migration values. It is noteworthy that most SMITs specialized in light industry have registered lower population losses (the negative values of net migration are lower): Baia de Arieş – Alba county, Vlăhiţa – Harghita county (clothing manufacturing), Bocșa – Caraș-Severin county, Baraolt – Covasna county, Filiaşi – Dolj county (food industry), plus centres of the furniture industry: Baia Sprie, Cavnic, wood processing centres: Anina – Caraș-Severin county, Nehoiu – Buzău county, Miercurea Nirajului – Mureș county. The moderate decrease in the population of these industrial towns is explained by the fact that most of them have experienced changes in their industrial profile: until mid-2000 they were centres of heavy or extractive industries affected by the economic restructuring process, and after the conversion, many of them are currently active in the light industry sector (e.g. Baia de Arieş – Alba county, Baia Sprie and Cavnic – Maramureș county, Bocșa – Caraș-Severin county etc.). On the other hand, one may notice SMITs with larger decreases in population, due to the large number of people who emigrated. Most of them are still functional centres of heavy and mining industries: Olteniţa – Călărași county (machinery and equipment manufacturing), Motru and Ţicleni – Gorj county, Petrila and Uricani – Hunedoara county (extractive industry), Vulcan – Hunedoara county (road transport vehicles manufacturing). Among the SMITs with positive values in terms of net migration are those in the light industry sector: Băicoi – Prahova county, Nucet – Bihor county (food industry), Băbeni – Vâlcea county (textile industry) and centres of the heavy industry sector: Cisnădie – and Tălmaciu – Sibiu county, Dărmăneşti – Bacău county (road motor vehicles manufacturing), Buşteni – Prahova county, Bolintin-Vale – Giurgiu county (machinery and equipment manufacturing). Most (90%) have small and medium values of population over 65 relative to the total population: Bălan – Harghita county (food industry), Uricani – Hunedoara county (coal extraction), Drăgăneşti-Olt – Olt county (machines and equipment manufacturing). 10 per cent of SMITs with low economic performance register a high share of the population over 65 in the total population: in Prahova county - Breaza, Buşteni (machinery and equipment manufacturing), and Slănic (extraction industry).

The 53 SMITs of low economic performance are spread all over the country in terms of location. But this category of SMITs seems to concentrate in certain counties: Prahova and Hunedoara include 7 and respectively 6 towns of low economic performance, while Sibiu (4 towns), Vâlcea (4 towns), and Alba, Caraş-Severin, Harghita and Maramureș (with 3 towns each), are the other cluster areas. Including mostly small SMITs and only 4 medium SMITs, these low economic performance towns encounter different types of industries, predominantly based on the exploitation of local resources. The manufacture of motor vehicles, trailers and semi-trailers, woodworking, manufacture of wood and cork products (except furniture), food industry, extraction of upper and lower coal, manufacture of clothing and the manufacture of machinery and equipment represent the main industrial activities of low economic performance SMITs. For only 8 towns, the predominant industrial activity gathers the largest share (over 50%) of the employed people in industry. High levels of unemployment (over 5%) are registered only in the case of 5 towns, while Nehoiu (Buzău county) differentiates itself with a share of 8.20% unemployed people – the local economy is mainly based on the industrial activities of low-valued wood exploitation (woodworking, manufacture of wood and cork products, except furniture). In the case of low economic performance SMITs, the general share of employees is below 40 per cent (for 12 towns it is between 5% and 10%), highlighting the underperformance of the local economy through very low local attraction and through the insufficient use of local human capital. Inadequate housing conditions represent a characteristic of low economic performance SMITs while the majority of towns in this category (73.58%) have less than 80 per cent households with bathroom (of which 8 towns record less than 50% houses with bathrooms), a situation that reflects both the preservation of low rural life standards anterior to industrialization and the inefficiency of industrial activities and of the market economy. The qualification of the workforce is also very low given that the tertiary attainment within these towns is under 16 per cent.

5. Small and medium-sized industrial towns in Finland

5.1 History of industrialization

History of (de)industrialization

Compared to many other European countries, Finland industrialized late. In the 19th Century is was a predominantly agricultural country, and industry focused on lumber products and shipbuilding, which affected the development of many western coastal towns. The first phase of industrialization started in the mid-19th Century until the independence of Finland in 1917. Exports increased and investments in infrastructure led to the development of interior towns. The Russian revolution and independence of Finland closed of the border with the Soviet Union and as exports became more geared towards western markets, they also became more one-sidedly focused on wood and wood products. Cultural, governmental, and economic activities were concentrated in urban and core areas, especially in Helsinki. At the same time, many small towns grew due to industrialization and new railways, and many small towns started developing a working-class counter-culture. After WWII, Finland was rapidly transformed into an industrial country with a strong welfare state. Industry became more diverse and capital-intensive, with a significant role for state-owned companies. Industry was to be located in the central towns of peripheral regions. While the forest industry remained the biggest export sector until the 1980s, metal industry gained in importance as did automation and electronics production, as well as the chemical industry. Intensifying global competition, the collapse of the Soviet Union, and the deep recession in Finland in the first half of the 1990s greatly affected the bigger industrial sectors. Population growth and employment became very much concentrated in only a few urban areas, while mid-sized towns without a strong presence of R&D or higher education institutions did not perform as well.

Current industrial structure

In recent years, the forest industry has returned to modest growth while the overall manufacturing industry decreased in size resulting in a loss of jobs. Some towns are experiencing large investments while others have not been able to recover after factory closures. We can distinguish between SMITs that were dominated by the forest industry, but developed into a combination of forest and metal/machinery industry and that have a favourable location and broader industrial base, SMITs with a strong and still prevailing dominance of forest industry which are suffering from high unemployment, and SMITs created by strong state-led industrial and regional policies, which largely depend on capital-intensive process industry.

Industrial heritage and policy strategies

The strong working-class culture that was characteristic of many older SMITs has decreased but is still present in some towns. Newer SMITs do not have as much industrial heritage or identity. Policy strategies have shifted from strong state involvement in industrialization and associated urbanization towards market-based development and prioritizing the economic competitiveness of localities.

5.2 Data and methods

The Finnish analyses are based on existing literature and statistics, including data collected from an urban network study (Kaupunkiverkko, 2015) and Statistics Finland (www.stat.fi). The levels and degrees of urbanization in Finland can be investigated using the concept of *district*. According to Antikainen and Vartiainen (2002) '[t]he concept refers to agglomerations of municipalities that are grouped together according to their functional orientation in order to reflect the actual daily operational conditions of people, enterprises, and community organizations. In the urban context, the concept of district refers to functional urban regions (FUR).' Finland has 311 municipalities, but as Antikainen and Vartiainen (2002) note, most of these municipalities are too small in spatial terms for comprehensive analyses of regional development trends. On the other hand, the concept of *region* as an alternative for spatial unit analysis is too heterogeneous to demonstrate actual patterns in Finnish society. Through the concept of *district*, economic activity and service production can be mapped out more efficiently.

However, the concept of *district* does not acknowledge regional differences within districts. Therefore, negative development trends may characterize some residential areas in Helsinki, while prospering villages may be found in remote areas (Kaupunkiverkko, 2015). Moreover, the success of the districts is explored only in quantitative terms. Hence, qualitative development, such as sociocultural elements, are not taken into consideration, albeit they have an indirect impact on the population and the economy.

Finnish districts are divided into groups based on their size and functionality (see Appendix II, Table 1 for an overview). The 30 districts range from just over 11,000 to almost 400,000 inhabitants (with Helsinki as an outlier at almost 1.5 million inhabitants) and are categorized in terms of district strength compared to the national average. A comparison of district strength, economic versatility, and net migration highlights the fact that over half of the districts are diverse university towns or towns near the metropolitan area. These districts are strong and economically versatile. The others, which are regional centres and small-town districts, belong to a lower classification in terms of size and strength. The districts specialize either in a certain industry, in private or public service activity, or have a mixed economic profile. Almost half (14) districts specialize in an industry, and all the small-town districts, except for Savonlinna, are industrial.

The future prospects of the districts are a combination of net migration, development of employment, and unemployment rate. As table 1 points out, 13 districts are graded as good, while 17 are satisfactory or passable. District location and accessibility affect future prospects. For example, the good economic development of the metropolitan area has affected its neighbours, such as Hämeenlinna, Porvoo, and Riihimäki. On the other hand, the good future prospects of Pietarsaari and Kokkola, which are located in the western coast, are due to the benefits of their developing industry.

5.3 Typology of small and medium-sized industrial towns

Industrial towns in Finland can be grouped into three major categories: SMITs with a combination of the forest and the metal/machinery industry, SMITs with a strong presence of forest industry, and heterogeneous SMITs. However, these SMITs can be divided into new groups according to their current economic performance. In this case, the economic performance is connected to unemployment rate[17].

Strong, well-performing SMITs

As Table 5 highlights, Finnish SMITs can be divided in three categories. Firstly, strong, well-performing SMITs are the towns where the unemployment rate is the same as or lower than national average (=13.7%). These towns (Porvoo, Pietarsaari, Uusikaupunki, Naantali, Kokkola, Harjavalta) are located in Western and Southern coast or Southern Finland. Pietarsaari and Kokkola were originally largely sawmill and port towns, but now they have a metal and machinery industry (besides forest-industrial production) as well. However, Kokkola has not had a forest industry for a long time; instead, it has had a chemical industry. Porvoo and Naantali have oil refining, chemical industry, and the production of electric equipment. Uusikaupunki has car assembly. Moreover, Harjavalta has basic metal and energy industry.

One of the common feature of these towns is that they have experienced a strong increase in industrial development and have had a low unemployment rate. Some of these towns have gained new investments. Furthermore, the towns have managed to improve their economic versatility. Demographically, Porvoo, Naantali, and Kokkola has had positive population growth whereas many other SMITs in Finland has suffered decrease of inhabitants.

It is noteworthy that most of the strong, well-performing SMITs are heterogeneous SMITs (with the exception of Pietarsaari and Kokkola). These type of SMITs are young and mostly depended on a capital-intense process industry and their development has been volatile. It can be argued that these towns do not appear as SMITs in the traditional sense. They do not have an industrial heritage, a strong working-class mentality, or a sense of community. The historical thinness of the working-class mentality is reflected in people's support for political parties. This kind of SMITs has given less support to left-wing parties than other SMITs. Typically, the heterogeneous SMITs include towns that provide relatively high support to right-wing parties, but not the populist party.

Stable, middle-of-the-road SMITs

Secondly, stable, middle-of-the-road SMITs are towns where the unemployment rate is higher than national average but lower than 20 %. This is the biggest group and its towns are located all over Finland. In this category, the part of the towns have succeeded relatively well and indicated the signs of the positive development while others have faced difficulties.

Most of the middle-of-the-road SMITs have had a decreasing population, except for Valkeakoski, Pori, and Salo. For instance, Valkeakoski's proximity to Tampere and its

[17] The unemployment rate as an indicator of economic performance is partly misleading because it does not recognize for instance investments that a particular town has gained.

relatively low share of pensioners could be the reason for its population growth. Also, over 37% of its labour force are out-commuters.

On the other hand, towns, such as Kouvola and its region, which includes Kouvola, Anjalankoski, Kuusankoski, and Myllykoski, has faced great difficulties. Kouvola and its region is one of the industrial centres that has been very dependent on the forest industry. These SMITs either have focused strictly on the forest industry or have not been able to develop into a more versatile industrial base. Although the Kouvola region is located in southern Finland, which means that it is quite near the metropolitan area and has good connections, its development has been slow. Its population has decreased because of out-migration. As the youth have moved to other towns and cities, the region's age structure has become skewed. Hence, its economic dependency ratio has increased and is higher than the national average. The restructuration of the forest industry has led to an increased unemployment rate, which is higher than the national level.

In recent years, however, the forest industry has (due to strong demand for pulp and board in Asia) been able to return to modest growth and investments. Some recent huge investment decisions and export statistics seem to suggest that the almost decade-long competitiveness and demand crisis of key export industries has come to its end. This has affected some of the SMITs. Realistic growth opportunities exist for some segments of the industries, but they will materialise only if global growth gains clearly more pace and Finland can better its competitiveness. Even though their development turn out to be positive, they will not increase their personnel in Finland very much, as their markets are global and many of their operations take place elsewhere.

Relatively unsuccessful SMITs

Thirdly, SMITs that are relatively unsuccessful are located Northern and Eastern Finland (Kemi, Kemijärvi, Lieksa), inland (Äänekoski), and Southern coast (Kotka). One of the common denominator of these towns is high unemployment rate (over 20%). Moreover, all SMITs in this category has a negative population growth and high percentage of pensioners. These SMITs are linked to one or two industrial sectors and are unable to diversify their industrial production. Therefore, they are also socioeconomically fragile towns that have weak prospects for positive development.

These SMITs have strong working-class mentality and they sustain the image that is based on their industrial history. Their industry is based on one or two sectors and they have not been eager to diversify their industrial production. Moreover, especially Kemijärvi and Lieksa are located in the remoted areas far from big towns or regional centres. For that reason, the location as such has been one obstacle in the development of these towns. Although these SMITs are relatively unsuccessful if we are only looking at the unemployment rate as an indicator of economic performance, at least one SMIT (Äänekoski) in this category has been a target for a massive investment. Metsä-Group started to build a bio product mill in 2015 and it came into operation in August 2017. This has affected the unemployment rate of Äänekoski that was 17.1% beginning of 2017.

Table 6. Characteristics of SMITs in Finland

Category	Town	Economic performance	Size and location			Demographic trajectory		Working-class culture
		Unemployment rate, 2014 (Finland, 2014 = 13.7%)	Location	Size (population, 2015)	Commuting, 2014 (%)	Population growth (2000–2015)	Share of pensioners, 2014 (Finland, 2014 = 24.6%)	
Strong, well-performing SMITs								
	Porvoo	10.4	Southern coast	49928	35.2	4959	22.5	Weak
	Pietarsaari	11	Western coast	19436	24.4	–200	28	Strong
	Uusikaupunki	11.1	Southern coast	15510	20.7	–1509	31.8	Strong
	Naantali	11.7	Southern coast	18961	62.3	2218	26.7	Weak
	Kokkola	11.8	Western coast	47570	12.2	3388	24.4	Strong
	Harjavalta	13.7	Southern Finland	7296	37.7	–581	33.9	Weak
Stable, middle-of-the-road SMITs								
	Rauma	14.3	Western coast	39809	21.6	–1192	27.8	Strong
	Raahe	14.6	Western coast	25165	10.9	–1601	26.9	Weak
	Valkeakoski	15.2	Southern Finland	21332	37.2	839	28.9	Strong
	Kouvola	16.3	Southern Finland	85855	14.8	–5695	30.7	Strong
	Mänttä-Vilppula	16.3	Central Finland	10604	22.9	–2134	36.4	Strong
	Pori	16.7	Western coast	85363	17.1	790	28.5	Strong
	Salo	17.6	Southern coast	53890	22.4	1286	28	Weak
	Tornio	17.7	Northern Finland	22199	19.5	–418	24.5	Strong
	Imatra	18	Inland	27835	24.9	–2828	33.4	Strong
	Kajaani	18.2	Inland	37622	12.8	–1290	26.3	Strong
	Jämsä	18.2	Central Finland	21542	17.4	–3481	32.9	Strong
	Kaskinen	19.3	Western Coast	1285	45.6	–279	39.1	Weak
	Varkaus	19.4	Inland	21638	20.3	–3252	33.2	Strong
Relatively unsuccesful SMITs								
	Lieksa	20.6	Eastern Finland	11772	9.9	–3436	40.1	Strong
	Kotka	20.8	Southern coast	54319	17.6	–527	29.7	Strong
	Äänekoski	21.1	Inland	19646	23.9	–1067	29.4	Strong
	Kemi	22.5	Northern Finland	21758	23.7	–1931	31.7	Strong
	Kemijärvi	23.4	Northern Finland	7766	20.5	–2718	41.2	Strong

6. Small and medium-sized industrial towns in the Netherlands

6.1 History of industrialization

History of (de)industrialization

In comparison to neighbouring countries the UK, Germany, and Belgium, industrialization in the Netherlands was late and gradual, starting only during the final decades of the 19th Century. Prosperity during the Golden Age (17th Century), relatively advanced technology as well as the wealth taken from the colonies had made the Dutch elites relatively complacent. Moreover, there was political instability due to wars with Britain and occupation by France (Mokyr, 2004). From the 18th to the mid-19th Century there was some early industrialization, often powered by windmills. Industrialization was closely related to historical strengths including agricultural industry, modern shipbuilding and industries relating to the exploitation of the colonies. Improved transport routes resulted in further development of these industries, while the Rotterdam harbour profited from the unification of Germany in 1871. In the 1890-1930 period, employment in industry increased and the sector diversified. Notably, graphical and chemical industries developed. Industrial production was concentrated in the western provinces, with the exception of textile and leather manufacturing. After WWII industry became a focal point of government policy as it was seen as a means towards rebuilding a war-wrecked nation. Furthermore, coal mining became of major importance for the economy of the southern Limburg province. Planned incomes policy and regional deconcentration of industry resulted in an industrial boom with 32 per cent of the population employed in industry during peak year 1963. In the 1970s large-scale deindustrialization started and the mines were closed. The policy of regional deconcentration was gradually abandoned and replaced by a focus on the larger cities and existing industrial strongholds (Atzema & Wever, 1999).

Current industrial structure

Currently, industry is nowhere the dominant sector and production is mainly export-oriented. Important sectors are chemical and food industries, as well as industries relating to the Rotterdam harbour. Industry is mostly labour-extensive and productivity is high. Industry has lost importance in the west because of strong urbanization, although ICT-dependent industries are mostly found in urban areas. Fordist industries are more often located in more peripheral areas (Capasso et al., 2016). The urban system of the Netherlands is dominated by small and medium-sized cities, only 31 cities/municipalities have more than 100,000 inhabitants.

Industrial heritage and policy strategies

Industrial heritage is present in many towns that today no longer have an industrial profile, for example in the former mining towns in the South. However, material remains of the industrial past are relatively scarce. National and local policy strategies stress the own responsibility of localities to develop economic alternatives to industry, for example based on tourism. Market-based policies stimulate competition between places.

6.2 Data and methods

The Dutch analyses are based on data retried from Statistics Netherlands (CBS, www.cbs.nl) and the national broadcasting association (NOS) for data on voting behaviour. An overview of variables collected can be found in Appendix V, Table 1. The main level of analysis is that of the municipality. The municipality is the third layer of governance in the Netherlands (after the national government and the 12 provinces). In recent decades, multiple rounds of mergers have decreased the number of municipalities. While some municipalities are equal to the population of a (large) city, others are a collection of small villages. Most municipalities, especially in more sparsely populated provinces, can perhaps best be described as consisting of a small- or medium-sized town and the surrounding countryside. The municipal classification of 2017 is used, which divides the Netherlands into 388 municipalities[18] of between 941 (Schiermonnikoog) and 844,947 (Amsterdam) inhabitants. Depending on the year of availability, municipalities whose borders changed recently – mostly due to mergers of smaller municipalities – might have missing values on some variables.

Statistics Netherlands provides a definition of large cities/municipalities as being all municipalities with more than 100,000 inhabitants (this includes the 'big four' or G4-municipalities with more than 250,000 inhabitants, and 27 municipalities of between 100,000 and 250,000 inhabitants). Thus, most (357 or 92%) of Dutch municipalities are either small or medium-sized. Moreover, a measure of urbanity is provided that distinguishes five categories ranging from 'very highly urban' (2,500 or more addresses per square km) to 'not urban' (fewer than 500 addresses per square km). For the purpose of this study, we distinguish between 1) rural areas, 2) small and medium-sized towns, and 3) highly urban municipalities by means of a cluster analysis (see Appendix V, Table 2).[19] Small and medium-sized towns are the largest group (303 out of 388 municipalities) which corresponds to common understandings of the Netherlands as having a polycentric urban system which consists mostly of smaller and mid-range cities. In contrast, 53 municipalities can be classified as rural/non-urban and 28 as highly urban. To identify SMITs, we further divide these municipalities based on their economic structure (employment in agriculture, industry, commercial and non-commercial services)[20] (see Appendix V, Table 3). Industry is here defined as including mineral extraction, manufacturing, energy supply, water supply and waste management, and construction (NACE categories B-F). Manufacturing is by far the largest industrial subsector. 99 out of 303 municipalities can be classified as SMITs (28 are agricultural, 86 are oriented towards commercial, and 62 towards non-commercial services). Average employment in industry in these municipalities is 25.6 per cent in 2015 – with a low of 17 and a high of 50 per cent – significantly higher than the Dutch average of 14 per cent. The average SMIT has 32,897 inhabitants in 2017, but the smallest (Zoeterwoude) has only 8,367 while the largest (Emmen) has 107,490.

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[18] The Caribbean islands of Bonaire, Saba, and St. Eustatius are sometimes also considered to be municipalities, but these are not included in the present analysis

[19] Two-step clustering, using the minus log likelihood to compute distances between clusters. Clustering based on number of inhabitants, population density, and degree of urbanity. The optimal number of clusters is determined automatically.

[20] Using two-step clustering based on share of employment among the working population in 2015, and using the minus log likelihood to compute distances between clusters. The optimal number of clusters is determined automatically.

6.3 Industry and economic performance

Bivariate correlations show that there is a moderate negative correlation between share of employment in industry and household income (standardized for household size), meaning that as industrial employment increases, household income goes down ($r = -.293$, $p < .001$). However, the correlation between share of employment in industry and degree of unemployment is also negative although the effect is less strong ($r = -.174$, $p < .01$), meaning that as employment goes down as share of employment in industry increases. Similarly, the correlation between the share of employment in industry and the share of households with a low income for one ($r = -.223$) and four years ($r = -.234$). This could indicate that municipalities with more employment in industry have a more inclusive labour market resulting in a flatter income distribution, with lower overall incomes but fewer very low incomes and low unemployment.

In order to test these assumptions we build a multiple regression model to assess the relation between share of employment in industry and household income (2014), and between share of employment in industry and unemployment (2016), controlling for a host of compositional characteristics (the full model can be found in Appendix III, Table 2). In a first step share of employment in agriculture, industry, and commercial services was added to the model (non-commercial services is reference category). The results show that employment in industry has a significant negative ($b = -.098$, $\beta = -.291$, $p < .001$) effect on household income, while employment in commercial services has a positive ($b = .038$, $\beta = .135$, $p < .05$) effect and employment in agriculture is not significant. In the next step, demographic, urbanization and locational controls were added (see Appendix V, Table X for the full model). Employment in industry remains negatively related to household income ($b = -.069$, $\beta = -.206$, $p < .001$) while employment in commercial services is no longer significant.

In the model with unemployment, when only economic structure characteristics are added, employment in industry has a significantly negative ($b = -.012$, $\beta = -.158$, $p < .01$) effect on unemployment relative to non-commercial services (as this share goes up, unemployment goes down), as does employment in agriculture ($b = -.068$, $\beta = -.344$, $p < .001$) and in commercial services ($b = -.007$, $\beta = -.110$, $p < .05$). In the full model, employment in industry remains negatively related to degree of unemployment ($b = -.008$, $\beta = -.103$, $p < .01$) as is employment in commercial services ($b = -.007$, $\beta = -.112$, $p < .01$), while employment in agriculture is no longer significant.

On the whole, we can therefore conclude that the relation between industry and economic performance in Dutch municipalities is mixed: while there is a negative relationship with household income, the presence of industrial employment seems to have a positive effect on overall employment.

6.4 Typology of small and medium-sized industrial towns

In this section, we will zoom in on the characteristics of SMITs. Using a two-step cluster analysis[21], we construct three different types of SMITs based on their household income in 2014, degree of unemployment in 2014, and in/decrease in unemployment between 2008 (just before the financial crisis) and 2014. We distinguish between SMITs that perform well economically, middle-of-the-road SMITs with an average economic performance, and relatively unsuccessful SMITs. Table 7 below provides some characteristics of the three different types. Strong SMITs are the largest category: almost half of all SMITs can be categorized as 'strong'. These SMITs have a higher average household income, lower unemployment, and a lower increase in unemployment compared to all SMITs and to the Dutch average. Conversely, weak SMITs have a lower average household income, higher unemployment, and a sharper increase in unemployment between 2008 and 2014 compared to all SMITs and to the national average. Average SMITs are in the middle but still score slightly above the Dutch average. All differences in economic performance between the types are significant. It is also noteworthy that strong SMITs are comparatively smaller, while weak SMITs have the most inhabitants on average. The difference in population size between strong and weak SMITs and between average and weak SMITs is significant, while that between average and strong SMITs is not.

Table 7. Typology of small and medium-sized industrial towns in the Netherlands

Type	Population (2014)	Share of employment in industry (2015)	Average household income (2014)	% Unemployment (2014)	Δ Unemployment (2008-2014)
Strong SMITs (N=50)	27,262	26.10	25,880	4.09	1.93
Average SMITs (N=34)	31,766	26.12	25,000	4.63	2.37
Weak SMITs (N=15)	50,641	22.40	22,873	5.54	2.75
All SMITs (N=99)	32,403	25.55	25,122	4.50	2.21
The Netherlands	16,829,289	14.0	24,600	5.20	2.60

In the following, each type of SMIT is introduced in more detail. Results reported represent significant differences in the means of categories, based on one-way ANOVA and Tukey post-hoc tests.

Strong, economically well-performing small and medium-sized industrial towns

The population composition of strong SMITs does not differ from the other types in terms of age composition. Strong SMITs have a lower share of migrants with a non-Western background compared to both average and weak SMITs. They have a higher share of owner-occupied housing and a lower share of (social) rental housing. Average housing value is

[21] Using the minus log likelihood to compute distances between clusters. The optimal number of clusters is determined automatically.

significantly above that of weak SMITs, but does not differ from that of average SMITs. Compared to weak SMITs, strong SMITs have a higher gross and net labour market participation. In terms of economic structure, they have a higher share of jobs in agriculture and a lower share of jobs in non-commercial services than weak SMITs. Considering industrial subsectors, they have a higher share of jobs in construction compared to both average and weak SMITs, a lower share of jobs in waste management compared to average SMITs, and a lower share of jobs in mineral extraction compared to weak SMITs. In terms of nearness to health services, the picture is mixed: strong SMITs have more hospitals in the vicinity than weak SMITs, but fewer GPs. Politically, strong SMITs have a higher turnout than weak ones and are more right-wing oriented: they are less likely to vote for the Labour Party or the Green Party than weak SMITs and less likely to vote for the Socialist Party than both weak and average SMITs. Conversely, they are more likely to vote for the right-wing Liberal Party than weak SMITs. In terms of their location within the Netherlands, strong SMITs are concentrated in the Western and Central (15 out of 50) and the Southern (18 out of 50) provinces. Notably, all SMITs in Zeeland, Midden-Limburg, and Zuid-Limburg belong to this category. There are also strong SMITs in the Northern provinces (10 out of 50, notably in the region around Zwolle) and in the East of the Netherlands (7).

Average, middle-of-the-road small and medium-sized industrial towns

Average SMITs are 'in the middle' in terms of economic performance. In terms of population composition, they have more residents with a non-Western migrant background than strong SMITs, while the difference with weak SMITs is not significant. They have a lower share of owner-occupied housing relative to strong SMITs, and a higher share of (social) rental housing, and the opposite is true compared to weak SMITs. Average housing values are lower compared to strong SMITs and higher compared to weak ones. Both gross and net labour market participation are higher compared to weak SMITs, while the difference with strong SMITs is not significant. Average SMITs have a lower share of jobs in non-commercial services and a lower share of jobs in mineral extraction compared to weak SMITs, and a higher share of jobs in waste management and a lower share of jobs in construction compared to strong SMITs. Politically, they have a higher turnout compared to weak SMITs, they are more likely to vote for the right-wing Liberal Party and less likely to vote for the Labour Party than weak SMITs, and they are more likely to vote for the Socialist Party than strong SMITs. In terms of location, average SMITs are located across the country, but mostly in the South (2 in Noord-Limburg and 13 in Noord-Brabant) and North (9 in Twente, Groningen, Drenthe, IJsselvechtstreek) and East (8 in Achterhoek, Nijmegen and Veluwe), as well as 2 in the West (Gorinchem and Noord-Holland Noord).

Weak, economically relatively unsuccessful small and medium-sized industrial towns

Weak SMITs perform 'worse' across the board in terms of economic performance. They house more residents with a non-Western migrant background than strong SMITs. Shares of owner-occupied housing are lower, shares of rental housing are higher, and average housing value is lower compared to both other types. Gross and net labour participation are also both lower than in the other two types. Weak SMITs have more jobs in mineral extraction and non-commercial services compared to both strong and average SMITs, and less jobs in agriculture and construction compared to strong SMITs. Compared to strong SMITs, they have less hospitals but more GPs in the vicinity. Election turnout is lower and weak SMITs are more left-wing: they are more likely to vote for the Labour Party compared to both average and strong SMITs, more likely to vote for the Green Party or the Socialist Party compared to strong SMITs, and less likely to vote for the Liberal Party than both other types. In terms of location, this type of SMIT is mostly located in the North of the Netherlands (labour market regions Friesland, Groningen, Drenthe and Twente) (12 out of 15). The remaining three are located in the South (Noord-Limburg and Noordoost-Brabant), and one in the Western province Zuid-Holland (Gorinchem).

In conclusion, we can say that these differences can mostly be related to size and degree of urbanity, which is highest in weak SMITs and lowest in strong SMITs. We do not have indications that specific aspects of industry are related to their varying performance, although there are some differences in the prevalence of industrial subsectors between the types. A significant drawback of this study is the relatively low importance of industry for employment in the Netherlands as a whole: even in those towns we have called industrial, industry is often not the dominant sector in terms of employment. As was already noted by Atzema and Wever (1999) 18 years ago, the Netherlands has no ‘proper’ industrial areas (anymore). Our data do not allow us to go back in time far enough to capture processes of deindustrialization, as these started already in the 1960s. As a result, towns and cities may have a long industrial history that arguably still affects their contemporary identity, yet be classified as a non-industrial municipality within the present study.

7. Small and medium-sized industrial towns in the United Kingdom[22]

7.1 History of industrialization

History of (de)industrialization

Industrialization of England started in the late 18th Century. The first industrialization period involved the growth of manufacturing and extractive industries along major transport corridors. In particular cotton production and textile manufacturing played an important role (More, 2014). The second industrialization period or the 'technological revolution' during the late 19th and early 20th Century was characterized by the development of new applications for and diffusion of existing innovations, as well as new inventions (Freeman & Louçã, 2002). The spatial distribution of industries highlighted the regional character of different sectors: shipbuilding in coastal areas, metal production in the towns of Sheffield, Corby and the area of Teesside, and collieries in the North of England and the West Midlands. Especially in the North of England, industrialization was combined with rapid urbanization as urban areas developed around transport networks and raw materials. The North/South divide was the dominant spatial pattern in industrial England and is still prevalent today, as is the dominance of London as major metropolis. Large-scale deindustrialization started in the 1960s and accelerated in the 1980s. The brunt of deindustrialization and unemployment was born by the older industrial areas in the North and West of England, while a post-industrial economy developed in the South-East. Thatcherite policies of deregulation and privatization further impacted on deindustrialization.

Current industrial structure

Present-day England is dominated by the tertiary and increasingly the quaternary economy (Herbert & Thomas, 2012), while industry has declined from contributing 34 per cent of GDP during the peak of the industrial revolution to only 13 per cent in 2016. Surviving industries are amongst others car and motor sports, shoe, clothing, and textile manufacturing, and food and beverage manufacturing. There is a trend towards more service-oriented manufacturing as well as high-tech manufacturing and creative industries, which are disproportionally located in the South East, particularly around Greater London. Although some industry is or was located in small and medium-sized towns, there is no definitive classification of such towns and they may differ significantly in terms of their size, population, unemployment rates, development, industrial heritage, economic strategies and linkages to political and civil society.

Industrial heritage and policy strategies

In some places, industrial history is reimagined to commemorate former industry, or former industrial sites are repurposed. As the post-industrial economy developed primarily in the South, it was held up in political discourse as a model for the North to emulate, or to justify calls for more resources and greater decentralization in the North. However, regional disparities are more complex, with pockets of prosperity in the North and extensive inequalities in the South (Green, 1998), as well as significant industry in Greater London.

[22] This discussion will focus only on England

7.2 Data and methods

The distinction between a village, town and city is not definitive in terms of population size, area or economy. The European Spatial Planning Observation Network (ESPON, 2013) defines an SMT as an area with ‘a population density between 300 and 1500 inhabitants per km² and/or between 5000 and 50,000 inhabitants.’

In the English context, we define an SMT as an area with 5,000-75,000 inhabitants which is also recognized as a town by administrative borough or charter status and we identify 644 of these. By this definition, just over a quarter (27%) of the population of England in 2011 could be classified as residing in a small or medium town[23].Small and medium towns (SMTs) in England have on average of 22,160 inhabitants, although this varies considerably.

For data purposes, each town is considered in terms of its constituent Middle Layer Super Output Areas (MSOAs). MSOAs are a subnational geography employed by the ONS to gather statistics at a local level and is defined as an area with 5,000-15,000 inhabitants and 2,000-6,000 households. There are 6791 MSOAs in England and although these have no administrative function, they are a spatial equivalent to the Second Level Local Administrative Units (LAU2) specified in the research question.

Our analysis restricts the definition of ‘industrial’ activity to sectors A-F of the ONS categorisation. This covers: (A) employment and economic output from agriculture, forestry and fishing; (B) mining and quarrying; (C) manufacturing; (D) electricity, gas, steam and air conditioning supply; (E) water supply, sewerage, waste management and remediation; and (F) construction. These sectors (A-F) combined represent 20% of employment in England.

Since 1990, the percentage of UK GDP accounted for by the manufacturing industry has fallen by half to just over 11% (Reynolds, 2017). Despite this, it remains a key contributor to the economic activity of SMTs, accounting for 6.2% of all businesses and 10% of all employment in SMTs. This is slightly higher than the national figures of 5% and 8% respectively (House of Commons Library, 2017).

Based on the percentage of the population employed in sectors A-F, SMTs are seen to be on average more industrial than the country as whole, even before a distinction is drawn between ‘industrial’ and ‘non-industrial’ towns. The A-F industrial workforce in SMTs is 30.7%, compared with 12.1% nationally.

The trend of SMTs having a more industrial workforce than England as a whole holds for all sectors and sub-sectors A-F. 10.3% of SMT residents work in the manufacturing industry, compared to 5.7% of the English population.

[23] According to ONS statistics, the population of England in 2011 was 53,010,000

7.3 Industry and economic performance

Table 8 below presents some preliminary regression analyses with the industrial workforce (as a percentage of the total workforce) and the number of registered enterprises in sectors AF per thousand inhabitants in a town as dependent variables (see Appendix VI, Table 1 for the bivariate correlations).

Rather than a binary of ‘industrial/non-industrial,’ both sets of regression models here consider the industrial nature of a town on a spectrum. In the first set of models, we assume the more industrial a town is the higher the proportion of the workforce employed in sectors A-F, In the second set of models, the number of AF enterprises per thousand inhabitants in a town is taken as a proxy for how industrial the town is.

Table 8. Regression coefficient for industrial workforce in England (2011, n=644) and AF enterprises per thousand inhabitants (2011, n=644). SE between parentheses.

	Industrial workforce			AF enterprises		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	**-16.675*** (3.199)**	**-18.183*** (4.506)**	-6.954 (5.394)	21.796* (8.506)	-4.739 (12.465)	-8.168 (15.454)
Economically active population	**0.298*** (0.038)**	**0.280*** (0.056)**	**0.287*** (0.055)**	0.154 (0.101)	**0.618*** (0.154)**	**0.769*** (0.155)**
Unemployment rate	-0.336* (0.153)	**-1.099*** (0.195)**	**-0.949*** (0.190)**	**3.160*** (.408)**	**2.070*** (0.539)**	**2.461*** (0.535)**
% no qualifications	**0.584*** (0.051)**	0.332 (0.072)	**0.342*** (0.072)**	**-0.569*** (0.137)**	-0.487* (0.200)	-0.562** (0.204)
Workforce AB %	0.276 (0.291)	-0.227 (0.275)	**-**	**-4.033*** (0.773)**	**-3.867*** (0.761)**	**-**
Workforce C %	**1.176*** (0.059)**	**1.042*** (0.056)**	**1.107*** (0.59)**	0.016 (0.156)	-0.092 (0.155)	-0.274 (0.168)
Workforce DEF %	0.223 (0.119)	0.084 (0.117)	**-**	**-1.195*** (0.318)**	-0.539 (0.323)	-
Social grade C2		**0.308*** (0.074)**	**0.303*** (0.072)**		**-1.083*** (0.204)**	**-1.288*** (0.199)**
Social grade DE		**0.345*** (0.058)**	**0.333*** (0.056)**		**0.710*** (0.160)**	**0.676*** (0.159)**
Brexit vote			**-0.112*** (0.029)**			0.107 (0.083)
Turnout			-0.081* (0.035)			-0.214* (0.101)
R^2	0.580	0.633	0.598	0.175	0.240	0.211

*significant at p<0.05 **significant at p<0.01 *****significant at p<0.001** Not significant

Although these are preliminary results and our analysis is not yet complete, our emerging findings suggest that a larger industrial workforce is associated with a slightly larger economically active population. As can be seen in two of our models, this is also associated with a lower unemployment rate.

When the workforce is broken down by sector, there is only a significant correlation between the manufacturing industry and the industrial nature of a town. Our results tell us that towns with a higher proportion of employment in manufacturing have a higher industrial workforce. However, this was not observed in other industrial sectors. This may be due to the dominance of the manufacturing industry within the UK economy.

The values of R^2 for the models based on AF enterprises per thousand inhabitants are notably lower than the values for the equivalent models dependent on industrial workforce. From the higher R^2 values and also the number of coefficients which are found to be statistically significant in the following models, we conclude that the size of the industrial workforce, rather than the number of businesses in a town, is a stronger explanatory factor in the nature of SMTs. This should be taken into account in any further analysis.

7.4 Typology of small and medium-sized industrial towns

Below is the first iteration of a typology of SMITs in England. We used a two-step cluster method[24] to construct five types of SMITs based on the following three indicators:[25] share of employment in industry[26]; net weekly household income; unemployment and population growth between 2001 and 2011.[27] All data are drawn from the Bright Futures Work Package 2 RQ3 – England dataset shared in August 2017.

Here we distinguish between SMITs that perform ‘very well’, and ‘well’ economically, SMITs with medium economic performance (medium performing), and relatively unsuccessful SMITs (low and very low). The table above provides some characteristics of the five different types. The high performing SMITs are defined by those with highest average household weekly incomes and lowest unemployment.

The largest quantity of SMITS belong to the lowest performing categories - with 44.3% in the ‘low performing’ category and 18.9% in the ‘very low performing’ category. The highest performing SMITs represent the smallest clusters (14% for the ‘very high performing’ and 7.6% for ‘high performing’ clusters). A summary of the main observations from the five types can be found below:

- In terms of weekly income, we observe a significant gap between ‘high performing’ SMITs, and ‘medium’ to ‘low performing’ SMITS – the medium to low performing SMITs are both below the SMIT and English average.
- The lower performing SMITS have a higher than average share of employment in industry than is average for all SMITS, while the medium and high performing SMITS have progressively lower than average shares of employment in industry.

[24] Using the minus log likelihood to compute distances between clusters. The optimal number of clusters is determined automatically.
[25] Selected based on Dutch example to enable comparison
[26] Based on A-F categories in line with UK Office of National Statistics (ONS) definitions. See p.12 of WP2 RQ3 for England for more details
[27] Based on the last census

- The figures for unemployment do not consistently follow the same trend as the performance ranking. High performing, and 'low performing' SMITs are all below the unemployment average for all SMITs. In addition to these clusters, the medium performing SMITs are also below the national figure for unemployment, and only the 'very low' performing SMITs exceed the national average for unemployment.
- Finally the trends of population growth are similarly inconsistent with the SMIT ranking. All SMITs are slightly higher than the national average for population growth. The percentage increase for 'high performing' SMITs stands at 32.3%, almost five times larger than the national average. We also observe lower population growth in the highest performing and lowest performing SMITS when compared to both the SMIT and national average population growth. Only the medium performing SMITs showed a similar level of growth to the national and overall SMIT sample average.

Table 9.Cluster analysis of British SMITs

Type	Population (2011) N	Share of employment in industry (AF)[1] (2011) %	Net weekly household income (2017) £	Unemployment (2011)[1] %	Population growth %
Very high performing SMITs (N=90)	24,723.24	23.35	868.89	4.04	6.94
High performing SMITs (N=49)	14,978.90	28.62	634.29	5.12	32.3
Medium performing SMITs (N=97)	52,125.08	29.32	567.89	6.37	7.02
Low performing SMITs (N=284)	14,564.52	31.06	567.48	4.66	4.8
Very low SMITs (N=121)	19,235.27	37.09	513.64	8.4	4.4
All SMITs (N=641)	22,670	30.65	595.81	5.57	7.48
England	65,648,000	-	605	7.5	7.1

8. Conclusion

This report represents a first foray into the specific qualities of European industrial regions and small- and medium-sized industrial towns. We aim to provide a more in-depth description of these towns, which is sensitive to national and regional variations and pays attention to not only economic characteristics but also to other aspects of life that are of vital importance to residents of these towns. These include for example social and political, locational and environmental aspects, and demographic composition and trends. Therefore, we have distinguished three research questions:

1. What are the characteristics and performance of industrial regions in Europe?
2. What are the characteristics and performance of small- and medium-sized industrial towns in Slovenia, Romania, Finland, the Netherlands, and the United Kingdom?
3. What similarities and differences can be identified between small- and medium-sized industrial towns in these countries, and how does this relate to trends at the European level?

Both the European regional analysis and the national analyses of SMITs have uncovered significant variation, as well as some interesting parallels. Below, we provide an answer to our three research questions by briefly restating some of the most important findings and drawing attention to divergences and similarities between countries.

8.1 European industrial regions

In order to answer the first sub-question we have defined and mapped industrial regions in Europe, performed regression analyses modelling the impact of industry on economic performance, looked at the impact of the financial crisis on industrial and non-industrial regions, and considered the relation between industry and industrialization.

We should first note the impact of regional variation. Regions with more than a quarter of the population employed in industry are mostly found in Central and Eastern Europe, while Western European countries are today much less industrial. Regional effects also clearly emerged from the regression analyses, which showed that in particular former socialist Eastern European countries perform worse on economic and demographic measures, while also being more industrial than Europe as a whole. On the other hand, in particular Germany has many industrial regions that show strong economic performance. Some distinctions could also be made regarding the predominant types of manufacturing in different parts of Europe (e.g. chemical industries in Western, wood processing in Northern, and manufacturing of clothes in Southern Europe). Thus, one should keep in mind that relations explored in this report might differ between regions, giving credence to the idea of a typology of European industrial regions according to geography. Although there is only one variable describing urbanization in the dataset, we can see that industry is overrepresented in rural or intermediate regions that are close to a city, rather than within urban or remote areas. This supports the idea that small- and medium-sized towns offer better circumstances for industrial production than are either large towns or small and rural villages.

In terms of economic performance results are mixed, but overall do not seem to confirm the idea that industrial regions perform worse economically than non-industrial regions. While correlations between industry and economic performance indicators were generally negative (at NUTS-2 regional level), these effects disappear once population development is taken into account. The regression model shows a negative relationship between GVA in industry and overall GVA, but positive effects of share of medium- and high-tech manufacturing workforce and number of industrial enterprises, in addition to strong regional effects. Furthermore, for both NUTS-2 and NUTS-3 regions share of employment in industry is significantly correlated with share of unemployment, so that unemployment decreases when share of employment in industry increases. Finally, moderately industrial and industrial regions were more likely to be unaffected by or recovered from the recent economic crisis than were nonindustrial regions.

8.2 Industry and economic performance at the national level

We have modelled the relation between industry and economic performance indicators in Slovenia, Romania, the Netherlands, and the United Kingdom (England only). Please note that due to differences in data availability, results are not strictly comparable. For example, the industrial sectors for which data are available differ between countries. Nevertheless, some broad similarities can be discerned, which also correspond to the relations found at the European level. This section only discusses general results, for more detail please refer to the chapters of the individual countries.

In Slovenia, the share of employment in industry (NACE sectors B, C, and F) is positively related to the share of employment in medium and big companies, and to the share of medium-tech companies. Share of employment in industry is negatively related to the ageing index, average salary, and population growth over the 1991-2016 period.

In Romania, share of the urban active population employed in industry relates positively to bathrooms per dwelling and to the mortality rate, while there is a negative relation with unemployment and urban tertiary education.

In the Netherlands, share of employment in industry (NACE sectors B-F) is negatively related to household income and unemployment. In addition, there is a negative bivariate correlation between share of employment in industry and the share of households with a low income for one and for four years.

In the UK/England, share of industrial workforce (NACE sectors A-F) and number of industrial enterprises (A-F) is positively related to the share of economically active population and negatively related to share of unemployment.

Comparing these four analyses and the European analyses, we note that share of employment in industry is negatively related (=has a positive effect on) unemployment in Romania, the Netherlands, and the UK, as well as for European regions in general. However, in Slovenia and the Netherlands a negative relation was also found between share of industrial employment and average salary/household income. This seems to indicate that regions that have more industrial employment fare better in terms of inclusion in the labour market, but offer predominantly lower-paying jobs compared to regions with a different economic profile.

8.3 Differences and similarities across and within countries

While the previous sections discussed economic performance of industrial regions in general, this section is concerned with the performance of small- and medium-sized industrial towns. In each country, a typology of SMITs was developed of between three and five categories, according to their economic performance.

In Slovenia, a distinction was made between highly profitable SMITs, promising and growing SMITs, transformed socialist and high-tech SMITs, and less successful SMITs. In addition, a category of deindustrialized SMITs was added. Highly profitable and transformed socialist and high-tech SMITs perform best economically, while weak SMITs performed worst. Deindustrialized towns did not perform worse or better economically than other types of SMITs. In terms of demographic developments, deindustrialized towns are a bit bigger while promising and growing SMITs are the only type to register population growth between 2010 and 2016. In terms of location, highly profitable and transformed socialist and high-tech SMITs are usually more remote. No significant differences were found for other dimensions, such as political orientation.

In Romania, five types of SMITs were distinguished: high, medium-high, medium, medium-low, and low-performing towns. High-performing towns have a relatively young population and low unemployment, a high level of residential amenities and a relatively low educational level. Medium-high performing towns similarly generally have low unemployment, high level of residential amenities and relatively low educational levels compared to the national average. Medium performing towns are highly diverse in terms of ageing index and industrial activity. They mostly have a negative natural balance (shrinkage), low unemployment but also low economic activity. Medium-low performance towns are mostly small and have a negative migration balance. They have slightly higher unemployment levels and lower residential quality. Finally, low-performing towns show a trend of population decline. Many have experienced changes in economic profile from heavy or extractive industry to light industry. They are further characterized by inadequate housing conditions and a lowly educated population.

In Finland, the analysis distinguishes between strong, average, and weak SMITs. Strong SMITs have experienced a strong increase in industrial development and have had a low unemployment rate. They are mostly heterogeneous in terms of industrial sector and do not have a strong industrial or working-class identity, being relatively right-wing (but not populist) in political orientation. They are mostly located on the coast. Stable, average SMITs are located all over the country. Many have a decreasing population and have an economy based in the forest industry. There are opportunities for development, but positive future trends are not guaranteed. Weak, relatively unsuccessful SMITs have high unemployment, negative population growth, and a high degree of pensioners. Their industry is based on one or two sectors. These towns have a strong working-class mentality and are relatively remote in terms of their location.

In the Netherlands a distinction was also made between strong, average, and weak SMITs. Strong SMITs were found to be more rural in orientation; they have fewer inhabitants overall, a higher share of jobs in agriculture, a higher share of owner-occupied housing and higher housing values, and fewer migrants than weak SMITs. Politically, they are more right-wing oriented. They are overrepresented in the western, central, and southern provinces. Average SMITs are 'in-between' in most characteristics. Compared to strong SMITs, they have a higher share of jobs in waste management and a lower share of jobs in construction. They are located across the country. Weak SMITs are largest population-wise and have the most characteristics that are generally associated with urbanity in the Netherlands: more migrants, higher shares of rental housing and lower housing values, and lower labour market participation, lower election turnout and a more left-wing political orientation. Compared to the other two types, they have more jobs in mineral extraction and in non-commercial services. Location-wise, this type of SMIT is mostly located in the northern provinces and to a lesser extent in the south of the country.

In the UK/England, five categories are distinguished: very well and well performing towns, medium-performing towns, and low and very low performing towns. Most towns are either low or very low performing. In terms of income, there is a significant gap between high performing and medium to low performing SMITs, while in terms of unemployment the picture is less clear. All types have higher growth rates than the national average, in particular the high performing group. Finally, share of employment in industry is highest among the very low performing group and lowest among the very high performing one.

While it is difficult to compare these national typologies, some general remarks can be made. The figures for England seem to be an exception to the general trend that SMITs record less population growth than the national average or than similar non-industrial towns, as here all five types of SMIT have growth figures at or above the national average (data for the Netherlands not available). In the Netherlands, the most successful (and also the most industrial) type of SMIT is also the most rural one – and comparatively weak SMITs are most urban of the three types and the least industrial. In contrast, in the UK high performing SMITs are less industrial than low performing ones. In Slovenia and Romania, different types of SMITs can be related to historical trajectories of industrialization during the communist era – a specific form of historical development not present in the other three cases. However, in Finland as well, distinctions can be made according to type of industry and diversification of the economic base. Overall, the national analyses show a remarkable degree of diversity across but especially also within countries.

9. References

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Appendix I. Supplementary materials to the European regional analysis

Table 1. Descriptive statistics of the NUTS-2 level dataset (statistics refer to most recent year available, unless otherwise indicated)

Variables	NUTS version	Year	Units	No. of cases	Mean	Standard deviation	Minimum	Maximum
Area	2013	2015	Km2	318	17,908	22,708	13	227,150
Density	2013	1990-2015	People/km2	320	432.91	1,182.78	3.1	11040.3
Population	2013	1990-2016	People	323	1,883,940	1,659,548	28,983	14,657,434
GDP PPS per person	2013	2000-2015	Euro	275	27,510	12,991	8,400	167,500
GDP PPS per person	2013	2000-2015	%EU average	275	95.29	44.97	29	580
Regional employment	2013	2012-2016	People (1,000)	317	754.32	669.57	15.3	5480.7
Commuters	2013	2012-2016	People (1,000)	276	68.78	78.17	1.0	666.8
Unemployment	2013	1999-2016	% of 20-64	317	8.50	6.07	2.1	31.2
Long-time unemployment[28]	2013	1999-2016	% of unemployment	303	40.28	14.98	13.8	80.9
NACE total	2013	2008-2016	People (1000)	318	814.53	685.15	15.8	5551.4
A_B[29]	2013	2008-2016	People (1000)	298	53.34	83.27	1.8	747.6
HTC[30]	2013	2008-2016	People (1000)	292	32.85	39.64	0.5	373.7
C[31]	2013	2008-2016	People (1000)	311	129.96	138.40	2.9	1384.7
C_HTC_MH[32]	2013	2008-2016	People (1000)	296	129.96	54.95	0.7	425.3
C_HTC_M[33]	2013	2008-2016	People (1000)	293	39.69	46.96	0.6	380.2
C_HTC[34]	2013	2008-2016	People (1000)	208	11.87	11.61	0.7	74.3
C_LTC_MH[35]	2013	2008-2016	People (1000)	311	84.15	96.32	2.9	1180.7
C_LTC_M[36]	2013	2008-2016	People (1000)	303	35.24	35.58	1.4	340.4
C_LTC[37]	2013	2008-2016	People (1000)	310	49.93	66.68	2.2	922.7
D-F[38]	2013	2008-2016	People (1000)	317	66.67	52.06	1.3	431.5

28 More than 12 months
29 Agriculture, forestry and fishing; mining and quarrying
30 High-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services)
31 Manufacturing
32 High and medium high-technology manufacturing
33 Medium high-technology manufacturing
34 High-technology manufacturing
35 Low and medium low-technology manufacturing
36 Medium-low technology manufacturing
37 Low-technology manufacturing
38 Electricity, gas, steam and air conditioning supply; water supply and construction

GVA[39]	2013	2000-2014	Million Euros	284	44,931	53,259	1,137	581,419
Industrial[40] **GVA**	2013	2000-2014	Million Euros	284	8,463	9,403	57	70,600
Manufacturing GVA	2013	2000-2014	Million Euros	267	7,103	8,548	11	6,2548
Construction GVA	2013	2000-2014	Million Euros	284	2,426	2,420	64	24,329
Industrial enterprises	2013	2008-2014	Mean Number	255	7,319	10,986	0	89,317
Construction enterprises	2013	2008-2014	Mean Number	255	10,808	16,862	0	111,810
Employment ind. Enterprises	2013	2008-2014	Mean Number	160	137,487	152,411	281	1,106,979
Employment con. Enterprises	2013	2008-2014	Mean Number	160	60,966	62,139	1080	420,601
New ind. enterprises	2013	2008-2014	Mean Number	160	878	841	6	3,872
New con. Enterprises	2013	2008-2014	Mean Number	160	1,804	1,913	25	12,777
Deceased ind. Enterprises	2013	2008-2014	Mean Number	160	885	910	8	4,745
Deceased con. Enterprises	2013	2008-2014	Mean Number	160	1,820	2,146	22	13,651
High-growing ind. enterprises[41]	2013	2008-2014	Mean Number	145	126	132	0	906
High-growing con. Enterprises	2013	2008-2014	Mean Number	145	75	80	0	532

[39] At basic prices
[40] Excluding construction
[41] More than 10% growth in employment

Table 2. Descriptive statistics of the NUTS-3 level dataset (statistics refer to most recent year available, unless otherwise indicated)

Variables	NUTS version	Year	Units	No. of cases	Mean	Standard deviation	Minimum	Maximum
Area	2013	2015	km2	1451	3,906.93	7,055.95	13	105,205
Density	2013	1990-2015	People/km2	1480	559.92	1,423.67	1.20	20,923.60
Population	2013	1990-2016	People	1492	407,850.35	599,928.01	10,741	14,657,434
GDP PPS pp	2013	2000-2014	Euro	1381	26,056.41	16,327.66	4,600	350,900
GDP PPS pp	2013	2000-2014	% EU avg.	1381	94.55	59.25	17	1,273
Regional employment	2013	2000-2014	People (1,000)	1368	166.06	206.64	3.3	3,017.4
Unemployment	2013	1999-2009	% of 20-64	1461	8.41	4.16	1.3	29.2
Industrial employment[42]	2013	2000-2013	People (1,000)	1364	26.70	27.67	0.2	357.6
Manufacturing employment	2013	2000-2013	People (1,000)	1268	23.29	25.21	0.1	330.4
Construction employment	2013	2000-2013	People (1,000)	1364	10.82	11.54	0.2	133.4
GVA[43]	2013	2000-2014	Million Euros	1369	9,320.96	14,964.41	170.9	185,755.84
Industrial[44] **GVA**	2013	2000-2014	Million Euros	1362	1,756.87	2,253.65	6.38	27,626.60
Manufacturing GVA	2013	2000-2014	Million Euros	1285	1,467.65	1,965.23	0.00	24,489.60
Construction GVA	2013	2000-2014	Million Euros	1363	503.11	650.85	1.71	7,901.60
Industrial enterprises	2013	2008-2014	Mean Number	1478	1229.54	2705.40	0.00	34,022.86
Construction enterprises	2013	2008-2014	Mean Number	1478	1814.98	4352.05	0.00	74,902.43
New industrial enterprises	2013	2008-2014	Mean Number	865	157.75	274.12	0.00	3,216.25
New construction Enterprises	2013	2008-2014	Mean Number	867	318.27	553.29	0.00	7,821.25
Deceased industrial Enterprises	2013	2008-2014	Mean Number	867	158.13	293.46	0.00	4,207.00
Deceased construction Enterprises	2013	2008-2014	Mean Number	867	326.73	678.61	0.00	9,416.00
High-growing industrial enterprises[45]	2013	2008-2014	Mean Number	815	22.36	34.01	0.00	313.00
High-growing construction enterprises	2013	2008-2014	Mean Number	816	13.01	22.04	0.00	281.43
Urban land	2006	1990, 2000, 2006	% of total land	1245	7.79	9.79	0.05	68.51
Industrial land	2006	1990, 2000,	% of total land	1245	1.78	3.05	0.00	24.07

42 NACE sectors B-E
43 At basic prices
44 NACE sectors B-E
45 More than 10% growth in employment

		2006						
Mining land	2006	1990, 2000, 2006	% of total land	1245	0.30	0.53	0.00	6.68
CO2 emissions[46]	2006	2000, 2008	Thousand tons	1353	2989.30	4591.52	0	41,710
Particulate matter	2006	2009	Yearly average conc.	1331	15.22	4.64	0	56
Potential population	2006	2008	Ppl. within 50 km (1,000)	1321	248.06	258.79	0	1,584.77
Accessibility by rail	2010	2011	St. to nat. average	1347	88.86	27.95	0.1	184.20
Accessibility by road	2006	2001, 2006	St. to ESPON-average	1347	108.34	65.96	0.6	234.3
Urbanity/rurality	2006	2009	Typology, 5 categories	-	-	-	-	-
Metropolitan regions	2006	2009	Typology, 4 categories	-	-	-	-	-
Industrial regions	2006	2009	Typology, 4 categories	-	-	-	-	-
Economic resilience	2010	2011	Typology, 4 categories	-	-	-	-	-

[46] From territorial fossil fuel combustion

Table 3. One-way ANOVA of differences in size of manufacturing subsector as a share of total manufacturing per European region

		Sum of Squares	Df	Mean Square	F	Sig.
Food	Between Groups	3328,379	4	832,095	13,316	,000
	Within Groups	16497,151	264	62,489		
	Total	19825,530	268			
Beverage	Between Groups	72,565	4	18,141	3,864	,005
	Within Groups	1140,970	243	4,695		
	Total	1213,534	247			
Tobacco	Between Groups	,570	4	,142	1,266	,285
	Within Groups	18,681	166	,113		
	Total	19,251	170			
Wearing apparel	Between Groups	1686,545	4	421,636	23,093	,000
	Within Groups	4400,243	241	18,258		
	Total	6086,788	245			
Leather	Between Groups	145,338	4	36,335	10,306	,000
	Within Groups	680,409	193	3,525		
	Total	825,747	197			
Wood	Between Groups	432,497	4	108,124	11,486	,000
	Within Groups	2428,791	258	9,414		
	Total	2861,288	262			
Paper	Between Groups	110,409	4	27,602	9,936	,000
	Within Groups	716,714	258	2,778		
	Total	827,123	262			
Print	Between Groups	288,686	4	72,172	13,176	,000
	Within Groups	1424,174	260	5,478		
	Total	1712,860	264			
Chemicals	Between Groups	287,030	4	71,758	7,499	,000
	Within Groups	2459,261	257	9,569		
	Total	2746,291	261			
Pharma-ceuticals	Between Groups	117,811	4	29,453	1,698	,152
	Within Groups	3573,913	206	17,349		
	Total	3691,724	210			
Rubber and plastic	Between Groups	223,972	4	55,993	5,885	,000
	Within Groups	2483,344	261	9,515		
	Total	2707,316	265			
Mineral	Between Groups	493,433	4	123,358	17,498	,000
	Within Groups	1832,956	260	7,050		
	Total	2326,389	264			
Basic metals	Between Groups	89,317	4	22,329	1,668	,158
	Within Groups	3226,324	241	13,387		
	Total	3315,641	245			
Fabricated metals	Between Groups	329,702	4	82,425	6,083	,000
	Within Groups	3577,384	264	13,551		
	Total	3907,086	268			
Computers	Between Groups	388,172	4	97,043	10,844	,000
	Within Groups	2326,772	260	8,949		
	Total	2714,944	264			
Electronics	Between Groups	466,530	4	116,633	16,199	,000
	Within Groups	1886,390	262	7,200		
	Total	2352,920	266			
Machinery	Between Groups	2773,934	4	693,483	41,707	,000
	Within Groups	4323,173	260	16,628		
	Total	7097,107	264			
Motor vehicles	Between Groups	807,147	4	201,787	5,890	,000
	Within Groups	8736,427	255	34,260		
	Total	9543,574	259			
Transport	Between Groups	191,625	4	47,906	3,286	,012

equipment	Within Groups	3090,733	212	14,579		
	Total	3282,358	216			
Furniture	Between Groups	287,482	4	71,871	12,732	,000
	Within Groups	1445,079	256	5,645		
	Total	1732,561	260			
Other	Between Groups	55,481	4	13,870	3,392	,010
	Within Groups	1067,136	261	4,089		
	Total	1122,617	265			
Repair	Between Groups	49,237	4	12,309	1,424	,226
	Within Groups	2247,438	260	8,644		
	Total	2296,675	264			

Table 4. Regression coefficients for regional GVA (2014, N=284) and GDP-PPS relative to the EU average (2015, N=275). SE between parentheses. Analyses for GVA use data from 2014, analyses for GDP use data from 2015 or most recent year available.

	GVA			**GDP-PPS**		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Constant	-4.251 (3.696)	**-39.628*** (6.924)**	**-32.614*** (8.028)**	**27.082*** (1.792)**	**36.821*** (3.202)**	**35.903*** (4.888)**
Area[a]	**-.422* (.167)**	-.222 (.139)	-.140 (.143)	-.105 (.091)	-.152 (.081)	-.100 (.088)
Density[a]	**5.793*** (1.471)**	-1.611 (1.584)	-2.416 (1.580)	**5.202*** (.805)**	**5.274*** (.760)**	**5.213*** (.787)**
Population[a]	**.028*** (.001)**	**.027*** (.001)**	**.025*** (.001)**	-	-	-
Post-socialist	**-27.202*** (4.728)**	**-12.608** (4.300)**	**-10.789*** (4.817)**	**-8.483** (2.628)**	**-5.250* (2.572)**	-5.454 (3.607)
Central	**15.983** (4.863)**	8.013 (4.146)	**11.852* (4.814)**	**5.846* (2.704)**	3.864 (2.462)	.820 (3.129)
Southern	-8.662 (4.708)	2.788 (5.035)	-3.381 (5.464)	-4.804 (2.620)	3.089 (2.863)	4.911 (3.094)
Northern	**27.299*** (6.970)**	**13.291* (5.920)**	**13.663* (5.869)**	7.367 (3.786)	4.223 (3.303)	2.681 (3.422)
GDP PPS[a]		**1.417*** (.158)**	**1.415*** (.154)**		-	-
GVA[a]		-	-		**.060*** (.016)**	**.092*** (.025)**
Unempl		-.295 (.325)	-.081 (.345)		**-.485* (.210)**	**-.661* (.262)**
Longtime unempl		-	-		**-.192* (.079)**	-.142 (.103)
Commuting ratio		12.033 (10.089)	11.535 (10.145)		-11.019 (5.714)	**-14.037* (6.021)**
% industrial GVA			**-.740** (.262)**			.016 (.180)
% m/h tech workforce			**1.246* (.611)**			.118 (.385)
Industrial enterprises[a]			**.442* (.197)**			-.138 (.130)
High-growing industrial enterprises[a]			-			-6.936 (8.440)
R^2	.802	.870	.878	.430	.608	.622
F change	**119.163*** **	**135.308*** **	**110.507*** **	**14.323*** **	**17.076*** **	**12.444*** **

*significant at p<.05 **significant at p<.01; ***significant at p<.001 (two-tailed)
a divided by 1,000

Appendix II. Supplementary materials to the Slovenian regional analysis

Table 1. Indicators used in the statistical analyses

Group of indicators	Indicator	Year	N	Mean	Standard deviation	Minimum	Maximum
Employment	Commuting ratio	2015	212	68.04	15.38	16.10	90.50
	Average salary (gross)	2015	212	1364.64	149.12	1021.51	2348.26
	Added value per employee (net)	2015	212	33962.34	8057.85	3682.75	61992.77
	Share of employment in the secondary sector	2015	212	34.68	15.84	5.60	84.10
	Share of unemployed	2015	212	11.84	3.94	4.60	24.90
	Share of long-term unemployed	2015	212	6.04	2.57	1.60	15.10
	Share of foreign workforce	2015	212	5.36	3.73	0.00	18.85
	Share of medium-tech companies	2015	212	0.92	0.73	0.00	4.02
Economic performance	Share of high-tech companies	2015	212	0.16	0.28	0.00	1.67
	Share of medium and high-tech companies	2015	212	1.08	0.82	0.00	4.60
	Share of employed in medium and high-tech companies	2016	212	3.61	6.81	0.00	38.31
	Share of medium and big companies[47]	2015	212	0.93	0.60	0.00	2.75
	Share of employed in medium and big companies	2016	212	31.80	23.43	0.00	81.02
	Investment index per capita[48]	2015	212	1.61	1.54	0.03	9.81
	Share of high-growing companies[49]	2015	212	0.29	0.32	0.00	1.41
	Number of patents 1991–2016 per 1000 inhabitants	1991–2016	212	0.00	0.00	0.00	0.01
	Population in 2016	2016	212	9736.74	22259.60	372.00	288307.00
Demography	Population growth 1991–2016	1991–2016	212	0.05	0.18	-0.33	1.07
	Population growth 1991–2000	1991–2000	212	0.01	0.06	-0.22	0.26
	Population growth 2000–2010	2000–2010	212	0.03	0.10	-0.19	0.70
	Population growth 2010–2016	2010–2016	212	0.00	0.04	-0.16	0.23
	Ageing index[50]	2016	212	128.90	32.99	62.70	274.40
	Average net usable area (m^2) per Dweller	2015	212	28.75	2.33	22.50	36.60
Living environment	Finished dwellings 2007–2016 per 1000 inhabitants	2007–2016	210	14.65	9.13	1.80	64.60

[47] More than 50 employees.
[48] In € / inhabitant; data for the municipalities Destrnik in Sv. Andraž v Sl. Goricah is from 2014.
[49] Companies that have above 10 % employee growth rate.
[50] The ratio between 65+ year-olds and 0–15 year-olds, multiplied by 100.

	Share of dwellings without appropriate basic infrastructure[51]	2015	212	6.58	4.37	1.30	30.90
	Share of dwellings built before 1946	2015	212	23.98	8.86	4.84	57.24
	Share of degraded urban areas	2011	212	0.00	0.00	0.00	0.01
	Days of sick leave per employee[52]	2016	211	14.45	2.80	8.44	29.35
	Mortality index	2016	211	1048.68	232.64	577.27	2211.45
	Convicted adults and minors 2006–2015 per 1000 inhabitants	2006–2015	211	3.20	1.65	0.00	10.87
Voting behaviour[53]	Voter turnout on parliamentary elections	2014	212	49.25	5	32	64
	Share of vote for left-wing parties on parliamentary elections	2014	212	12.78	4.91	4.62	41.78
	Share of vote for centrist parties on parliamentary elections	2014	212	45.01	7.96	23.02	61.49
	Share of vote for right-wing parties on parliamentary elections	2014	212	38.91	10.60	13.10	67.81

[51] Basic infrastructure elements: internal toilet, bathroom, water, and electricity.
[52] Average number of calendar days of incapacity for work per worker. The days taken by the selected personal doctors on the certificate of a physically justified absence from work are taken into account.
[53] Votes for political parties were summed up in three groups (left, centrist, right) according to parties' position on the left-right scale, defined with public opinion surveys and parties' membership in European political parties. Only parties with more than 2 % votes were taken into consideration.

Table 2. Correlation matrix between industry and development indicators

Group of indicators	Indicator	Share of employment in the secondary sector
Employment	Commuting ratio	**-.208***
	Average salary (gross)_1/x	.019
	Added value per employee (net)_log10x	.052
	Share of employment in the primary and tertiary sector	**-1,000****
	Share of unemployed_log10x	-.049
	Share of long-term unemployed _log10x	-.024
	Share of foreign workforce_log10(x+1)	-.072
Economic performance	Share of medium-tech companies	**.456****
	Share of high-tech companies	.106
	Share of medium and high-tech companies_log10(x+1)	**.401****
	Share of employed in medium and high-tech companies	.193
	Share of medium and big companies	**.502****
	Share of employed in medium and big companies_x*x	**.588****
	Investment index per capita_log10x	.139
	Share of high-growing companies	.141
	Number of patents 1991–2016 per 1000 inhabitants_sqrtx	**.239***
Demography	Population in 2016_1/x	-.033
	Population growth 1991-2016_log10(x+1)	-.095
	Population growth 1991-2000_log10(x+1)	-.052
	Population growth 2000-2010_1/(x+1)	.104
	Population growth 2010-2016_1/(x+1)	.087
	Aging index	**-.221***
Living environment	Average net usable area (m^2) per dweller	**-.286****
	Finished dwellings 2007–2016 per 1000 inhabitants_log10x	-.009
	Share of dwellings without appropriate basic infrastructure_log10x	-.104
	Share of dwellings built before 1946_sqrtx	-.163
	Days of sick leave per employee	.157
	Mortality index	.024
	Convicted adults and minors 2006–2015 per 1000 inhabitants	.019
Voting behavior	Voter turnout on parliamentary elections	.031
	Share of vote for right-wing parties on parliamentary elections	.125
	Share of vote for left-wing parties on parliamentary elections	-.091
	Share of vote for centrist parties on parliamentary elections	-.074

* Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 3. Rotated component matrix (N=24)

	Rotated component loadings				
	Transformed socialist industry	Highly profitable industry	Promising and growing industry	High-tech industry	Unsuccessful industry
	1	2	3	4	5
Investment index per capita	**.873**	.056	-.135	-.172	-.084
Share of medium and big companies	**.805**	.024	-.366	.008	.189
Share of high-growing companies	**.533**	-.242	**.478**	-.173	**-.437**
Average salary (gross)	-.044	**.884**	-.176	.030	-.057
Share of employed in medium and high-tech companies	.294	**.736**	.026	.132	.060
Added value per employee (net)	-.209	**.713**	.061	.257	-.102
Number of patents 1991–2016 per 1000 inhabitants	-.025	-.031	**.802**	-.157	.082
Share of employed in medium and big companies	**.468**	-.116	**-.694**	-.126	-.189
Commuting ratio	-.276	-.131	**.692**	.280	-.167
Share of high-tech companies	-.172	.123	.086	**.852**	-.143
Share of medium and high-tech companies	-.050	.372	-.050	**.798**	.219
Share of unemployed	.096	-.217	-.022	.251	**.835**
Share of foreign workforce	-.084	.083	.104	-.355	**.662**
Eigenvalues	2.17	2.13	2.04	1.82	1.53
Share of variance	16.70	16.41	15.70	14.00	11.73

Note: Component loadings over .40 appear in bold

Table 4. Breakdown of economic performance of SMITs and deindustrialized towns in Slovenia.

Clusters		Commuting ratio	Average salary (gross)	Added value per employee (net)	Share of employment in the secondary sector	Share of unemployed	Share of long-term unemployed	Share of foreign workforce	Share of medium-tech companies	Share of high-tech companies	Share of medium and high-tech companies	Share of employed in medium and high-tech companies	Share of medium and big companies	Share of employed in medium and big companies	Investment index per capita	Share of high-growing companies	Number o patents 1991–201 per 1000 inhabitant
1	Mean	53.1000	1335.2980	31882.1029	48.9200	13.7800	7.5600	8.0220	1.2642	.0565	1.3207	3.9615	1.4875	51.0164	1.3967	.1587	.00146
	SD	6.11269	63.19776	4639.25442	3.63277	3.17364	2.62640	5.20083	.74544	.08796	.82865	5.45528	.36312	5.08135	.66266	.20242	.000533
	Minimum	46.90	1255.43	26398.17	46.20	9.60	4.90	2.80	.43	.00	.43	.00	.85	42.42	.52	.00	.000
	Maximum	61.60	1431.13	37679.24	55.20	17.60	10.30	16.53	2.40	.20	2.61	10.72	1.78	55.19	1.95	.49	.001
2	Mean	48.9000	1515.2833	40742.5103	54.7333	10.2333	5.0222	5.6378	1.3656	.2014	1.5671	13.7412	1.5931	60.3914	2.8394	.1792	.00396
	SD	14.06556	114.06802	6183.02400	7.54354	3.29735	1.65437	1.33122	.31043	.30537	.44616	11.49824	.33029	11.85437	1.20673	.19998	.002598
	Minimum	26.90	1311.81	32661.87	44.40	5.40	2.50	3.04	1.00	.00	1.00	.00	1.03	46.92	.91	.00	.001
	Maximum	68.80	1695.78	52048.18	68.80	16.10	7.60	7.07	1.90	.89	2.24	37.37	2.14	81.02	4.42	.60	.009
3	Mean	52.2500	1324.2700	30121.5989	65.4000	12.8000	6.3000	2.2400	.7755	.1610	.9365	7.6814	2.5848	69.0986	5.2021	.5848	.00166
	SD	15.06137	132.72394	3452.82856	17.67767	4.52548	2.68701	1.61220	.49744	.22773	.72517	10.68642	.23955	9.14137	1.30933	.37151	.000156
	Minimum	41.60	1230.42	27680.08	52.90	9.60	4.40	1.10	.42	.00	.42	.13	2.42	62.63	4.28	.32	.001
	Maximum	62.90	1418.12	32563.12	77.90	16.00	8.20	3.38	1.13	.32	1.45	15.24	2.75	75.56	6.13	.85	.001
4	Mean	68.5125	1395.3350	39835.3450	51.5500	10.6250	5.5125	5.6938	1.1982	.2318	1.4300	7.7229	.9694	46.4385	1.6476	.3633	.00109
	SD	8.16516	107.12369	6884.17156	9.55465	2.74161	1.54867	3.35194	.40161	.13343	.50688	11.53491	.24677	8.07623	1.07425	.13539	.000413
	Minimum	52.50	1180.78	34056.02	42.70	5.20	2.10	1.39	.71	.00	.81	.00	.64	35.75	.58	.23	.000
	Maximum	78.00	1485.51	52212.10	67.80	12.80	6.80	10.47	1.86	.46	2.32	26.59	1.40	58.18	3.90	.64	.001
Total SMITs	Mean	56.5917	1421.8858	37709.1277	53.3500	11.3167	5.8208	5.8700	1.2395	.1780	1.4175	9.1927	1.4459	54.5129	2.3385	.2701	.00229
	SD	13.50310	124.88331	7038.66690	9.06796	3.29356	2.03854	3.32228	.46441	.21426	.56629	10.56485	.53153	11.58487	1.47604	.22401	.002055
	Minimum	26.90	1180.78	26398.17	42.70	5.20	2.10	1.10	.42	.00	.42	.00	.64	35.75	.52	.00	.000
	Maximum	78.00	1695.78	52212.10	77.90	17.60	10.30	16.53	2.40	.89	2.61	37.37	2.75	81.02	6.13	.85	.009
6	Mean	57.3263	1387.6074	34490.2063	36.8895	12.9368	7.0158	6.1932	1.0824	.1783	1.2607	7.0093	1.0736	41.1354	1.5637	.2587	.0017
	SD	12.10766	98.85537	4475.90613	4.60095	4.24228	2.80085	2.04531	.36207	.18967	.39505	7.28439	.30507	9.98238	1.04673	.15721	.00121
	Minimum	34.50	1185.93	26371.92	26.20	8.50	4.50	3.19	.61	0.00	.72	0.00	.61	21.61	.03	.08	.00
	Maximum	81.60	1584.81	44070.57	42.50	23.90	13.90	9.94	1.99	.75	2.31	27.75	1.60	56.78	3.76	.59	.00

1 = less successful SMITs (N = 5); 2 = highly profitable SMITs (N = 9); 3 = transformed socialist and high-tech SMITs (N = 2); 4 = promising and growing SMITs (N = 8);
6 = deindustrialized towns (N = 19)

Table 5. Breakdown of demographic statistics of SMITs and deindustrialized towns in Slovenia.

Clusters		Population in 2016	Population growth 1991-2016	Population growth 1991-2000	Population growth 2000-2010	Population growth 2010-2016	Aging index
1	Mean	10001.40	.0013	-.0003	.0166	-.0169	127.6800
	SD	2628.841	.09229	.02618	.03881	.03728	27.66183
	Minimum	8339	-.16	-.04	-.05	-.08	101.20
	Maximum	14623	.08	.03	.06	.01	171.70
2	Mean	13065.33	.0266	.0184	.0080	-.0018	116.9889
	SD	9003.225	.08833	.03791	.04057	.02215	22.15634
	Minimum	6395	-.13	-.05	-.06	-.03	90.90
	Maximum	32747	.16	.06	.08	.04	151.50
3	Mean	7458.00	-.0572	-.0108	-.0205	-.0267	145.4500
	SD	1426.941	.04722	.05427	.00820	.01280	10.25305
	Minimum	6449	-.09	-.05	-.03	-.04	138.20
	Maximum	8467	-.02	.03	-.01	-.02	152.70
4	Mean	10289.25	.1204	.0296	.0557	.0255	112.1500
	SD	7218.548	.15497	.04499	.07808	.03755	28.96560
	Minimum	5007	-.18	-.03	-.10	-.06	67.50
	Maximum	25413	.34	.09	.15	.06	162.30
Total SMITs	Mean	11034.38	.0456	.0158	.0233	.0021	119.9750
	SD	6963.810	.12262	.03937	.05767	.03458	25.64896
	Minimum	5007	-.18	-.05	-.10	-.08	67.50
	Maximum	32747	.34	.09	.15	.06	171.70
6	Mean	16906.63	.1042	.0301	.0490	.0052	128.7421
	SD	10852.487	.28500	.07172	.10638	.06365	29.55987
	Minimum	6135	-.16	-.05	-.06	-.07	81.00
	Maximum	56115	1.07	.26	.35	.23	196.10

1 = less successful SMITs (N = 5); 2 = highly profitable SMITs (N = 9); 3 = transformed socialist and high-tech SMITs (N = 2); 4 = promising and growing SMITs (N = 8); 6 = deindustrialized towns (N = 19)

Table 6. Breakdown of living environment statistics of SMITs and deindustrialized towns in Slovenia

Clusters		Average net usable area (m^2) per dweller	Finished dwellings 2007–2016 per 1000 inhabitants	Share of dwellings without appropriate basic infrastructure	Share of dwellings built before 1946	Share of degraded urban areas	Days of sick leave per employee	Mortality index	Convicted adults and minors 2006–2015 per 1000 inhabitants
1	Mean	27.3600	18.4400	4.8000	21.3222	.001350	15.7080	1193.7500	4.4880
	SD	1.49265	8.86217	.73824	2.97991	.0011725	2.08875	115.76950	.70361
	Minimum	25.30	5.90	3.80	18.56	.0003	12.31	1102.00	3.89
	Maximum	29.40	27.30	5.80	26.27	.0033	18.00	1358.36	5.65
2	Mean	27.7889	12.2111	3.4222	17.6792	.000725	14.2256	936.7200	3.4933
	SD	1.33739	4.38476	2.08793	8.65236	.0014611	2.83543	115.51610	1.68688
	Minimum	26.20	4.60	1.30	4.84	.0000	9.18	775.47	1.62
	Maximum	30.60	19.60	8.10	29.40	.0041	18.59	1112.04	6.09
3	Mean	29.4500	10.7000	4.8500	16.4894	.000066	15.4750	1095.8450	4.5250
	SD	.49497	7.49533	.49497	6.93386	.0000934	1.32229	133.39569	1.52028
	Minimum	29.10	5.40	4.50	11.59	.0000	14.54	1001.52	3.45
	Maximum	29.80	16.00	5.20	21.39	.0001	16.41	1190.17	5.60
4	Mean	28.5250	19.4875	6.4375	27.2333	.000277	13.8975	1022.0588	2.3550
	SD	2.20762	6.32059	3.04065	14.03466	.0003277	1.92292	228.79651	.97458
	Minimum	25.20	5.80	3.80	13.95	.0000	9.70	753.05	1.15
	Maximum	31.00	26.40	13.00	57.24	.0009	15.57	1378.01	4.15
Total SMITs	Mean	28.0833	15.8083	4.8333	21.5237	.000651	14.5292	1031.9746	3.4071
	SD	1.69748	6.96375	2.47187	10.43826	.0010961	2.30462	182.50124	1.48862
	Minimum	25.20	4.60	1.30	4.84	.0000	9.18	753.05	1.15
	Maximum	31.00	27.30	13.00	57.24	.0041	18.59	1378.01	6.09
6	Mean	28.1000	12.4789	3.9526	21.2312	.001207	13.6795	1022.4242	3.7400
	SD	1.97765	5.62164	1.70860	8.31777	.0017326	2.58494	193.19318	1.71738
	Minimum	24.30	4.00	1.30	9.71	0.0000	9.42	600.05	1.43
	Maximum	31.80	26.40	6.80	44.38	.0061	18.32	1430.73	7.48

1 = less successful SMITs (N = 5); 2 = highly profitable SMITs (N = 9); 3 = transformed socialist and high-tech SMITs (N = 2); 4 = promising and growing SMITs (N = 8); 6 = deindustrialized towns (N = 19)

Table 7. Breakdown of voting behaviour of SMITs and deindustrialized towns in Slovenia

Clusters		voter turnout	share of vote for right-wing parties	share of vote for left-wing parties	share of vote for centrist parties
1	Mean	48.3120	35.5520	14.4220	47.1520
	Std. Deviation	2.61506	15.04285	6.50548	9.87998
	Minimum	44.43	13.10	8.84	33.91
	Maximum	51.47	54.70	21.64	61.49
2	Mean	51.4922	36.7844	15.1444	44.6544
	Std. Deviation	3.48736	10.83907	3.69848	8.06711
	Minimum	46.20	20.77	11.04	31.68
	Maximum	57.78	51.83	20.99	56.32
3	Mean	47.2600	36.9050	13.8300	45.1650
	Std. Deviation	2.47487	11.50463	3.21026	5.46594
	Minimum	45.51	28.77	11.56	41.30
	Maximum	49.01	45.04	16.10	49.03
4	Mean	51.0325	40.3163	10.9275	44.9313
	Std. Deviation	3.54308	10.30793	2.90733	9.96901
	Minimum	46.92	26.60	7.54	30.48
	Maximum	56.49	53.45	16.69	59.42
Total SMITs	Mean	50.3238	37.7150	13.4788	45.3096
	Std. Deviation	3.45129	11.04889	4.32348	8.49206
	Minimum	44.43	13.10	7.54	30.48
	Maximum	57.78	54.70	21.64	61.49
6	Mean	49.2674	33.1384	14.4589	49.1437
	Std. Deviation	5.11431	6.87241	3.98023	5.52467
	Minimum	37.89	17.82	9.60	37.14
	Maximum	56.82	43.53	25.08	59.27

1 = less successful SMITs (N = 5); 2 = highly profitable SMITs (N = 9); 3 = transformed socialist and high-tech SMITs (N = 2); 4 = promising and growing SMITs (N = 8); 6 = deindustrialized towns (N = 19)

Appendix III. Supplementary materials to the Romanian regional analysis

Table. 1 Descriptive statistics of analyzed variables (refers to most recent year available)

	Mean	Std. Deviation	N
Urban active population employed in industry 2011 %	25,562884	10,1552158	320
Aging population share (2014)	13,175214	2,8454582	320
Demographic dependency rate (2014)	39,565720	6,5727146	320
Birth rate(2014)	8,432920	2,0825212	320
Mortality rate(2014)	10,009336	2,0971711	320
Natural demographic balance (2014)	-1,576416	2,7565330	320
Net migration (2014)	-43,41	753,706	320
Total population (2014)	39445,49	130360,013	320
Water network coverage degree (2014)	6,639511	4,2274300	320
Sewage coverage degree (2014)	3,866011	2,9958886	320
Modernized urban roads (2014)	4,399724	2,3164678	320
UGC (2014)	23,677817	46,7850492	320
Residential construction (2014)	17,873008	57,0449111	320
Bathroom equipment of urban dwellings (2011)	71,469398	20,3787034	320
Urban tertiary education (2011)	12,376836	6,1818442	320
Urban employment rate (2014)	21,042658	12,3007093	320
Urban unemployment(2014)	3,007812	2,1531711	320
Urban average living area (2014)	18,325128	4,3069566	320

Table 2. Regression coefficients for urban active population employed in industry in 2011. SE between parentheses.

	Unstandardized coefficients	Standardized coefficients
Constant	15.251 (4.571)	
Bathroom equipment of urban dwellings (2011)	**.277** (.038)**	.556
Urban tertiary education (2011)	**-.922*** (.124)**	-.561
Urban employment rate (2014)	**.242*** (.054)**	.293
Urban average living area (2014)	**-.414*** (.136)**	-.176
Urban unemployment (2014)	**-.565** (.257)**	-.120
Mortality rate (2014)	**.612* (.293)**	.126
R^2	.306	
F change	**23.046*** **	

*significant at p<.05 **significant at p<.01; ***significant at p<.001 (two-tailed)

Appendix IV. Supplementary materials to the Finnish regional analysis

Table 1. Finnish districts

Typology 1	Typology 2	District	Population (2013)	Strength of the district[54] (0–28) (0=bad, 28=excellent)	Economic versatility (2015) (0–7, 0=bad, 7=excellent)	Functional specialisation (2012) (1=industry, 2=private service activity, 3=public service activity, 4=diversified)[55]	Net migration (2010–2013) (%)	Unemployment rate (2013) (%) (National average (2013)=7,6%)	Future prospects[56]
A Metropolitan area	A1	Helsinki	1 465 354	28	7	2	2,71	9,6	Good
A2 Neighbourhoods of metropolitan area	A2	Hämeenlinna	94 332	4	4	3	1,68	11,15	Good
	A2	Porvoo	58 440	2	2	1	0,71	9,49	good
	A2	Riihimäki	46 467	1	1	4	1,39	10,93	good
B Diverse university towns	B1	Tampere	386 902	20	7	1	2,68	15,25	good
	B1	Turku	318 590	19	7	4	2,33	12,94	good
B1: Strength 15–20 B2: Strength 13–15 B3: Strength 10–12	B2	Oulu	238 703	15	7	4	1,98	15,69	satisfactory
	B2	Jyväskylä	178 407	14	7	4	1,66	16,55	satisfactory
	B2	Kuopio	131 680	13	7	3	2,29	11,90	good
	B2	Lahti	202 424	13	7	1	1,05	15,13	satisfactory
	B3	Seinäjoki	126 519	12	7	1	1,43	10,50	good
	B3	Joensuu	124 032	11	7	3	1,07	16,11	satisfactory
	B3	Pori	139 106	10	7	1	0,46	14,09	satisfactory
	B3	Vaasa	99 963	10	7	1	2,01	8,63	good
C Regional centres	C1	Lappeenranta	89 335	8	6	4	0,97	14,01	good
	C1	Rovaniemi	65 369	7	4	3	0,33	16,05	satisfactory
C1: Strength 6–8 C2: Strength 4–5	C1	Kokkola	52 706	6	5	1	0,33	10,44	good
	C1	Kouvola	93 907	6	5	3	–0,19	14,99	satisfactory
	C1	Rauma	65 533	6	5	1	–0,11	11,19	satisfactory
	C2	Kotka-Hamina	86 938	5	4	4	0,87	17,07	satisfactory
	C2	Mikkeli	73 222	5	4	4	0,51	13,39	satisfactory
	C2	Kajaani	56 767	4	3	3	–1,56	16,98	passable
D Small-town districts	D1	Pietarsaari	49 874	2	2	1	–0,27	6,99	good
	D1	Kemi-Tornio	59 718	2	2	1	–1,49	18,06	satisfactory
	D1	Ylä-Savo	56 792	2	2	1	–1,06	15,36	satisfactory
	D1	Imatra	42 917	1	1	1	–0,56	15,07	passable
	D1	Salo	63 624	1	1	1	–0,57	16,17	passable
	D1	Savonlinna	48 111	1	1	4	–0,79	15,74	passable
	D1	Varkaus	32 277	1	1	1	–2,20	16,76	passable
Special case	E1	Maarianhamina	11 393	3	2	2	2,75	5,01	good

[54] The strength of the district is determined by the following statistics: population, appreciation of the industrial production, revenue of the accommodation and nutrition activity or transportation, revenue of the trade, local administration position, university town, location of the headquarters of the 500 biggest firms.

[55] Functional specialization is the share of employed individuals in each field of operation in the relation to all employed individuals. This includes only employed persons and does not consider the qualitative aspects (e.g., history, mentality) of each town. Therefore, many towns may have an industrial image, albeit they do not have industrial production anymore. In this sense, many relatively big districts (e.g., Tampere, Lahti) are considered industrial. Tampere is an example of an industrial town that has a long industrial history and a strong industrial identity. Unlike table 2, table 1 presents many towns that are not considered industrial (e.g., Kajaani, Kotka-Hamina, Kouvola). The main reason for this difference is that table 1 includes employed persons only, whereas table 2 takes into account industrial history and the image of the town.

[56] Future prospects is determined by the following statistics: net migration, development of employment, unemployment rate.

Appendix V. Supplementary materials to the Dutch regional analysis

Table 1. Overview of collected data

Category	Variable	Year(s)	N	National average[57]
Population	Population	1995-2017	314-388	17,081,507
Population	Youth dependency ratio[58]	2015	384	38
Population	Old age dependency ratio[59]	2015	384	29.9
Population	% Western migrants[60]	2015	384	9.6
Population	% Non-Western migrants[61]	2015	384	12.1
Urbanization	Population density (people/km2)	2015	384	502
Urbanization	Predominant degree of urbanization[62]	2015	388	Very urban
Urbanization	% Population living in extremely urban areas	2000-2016	338-387	23.0
Urbanization	% Population living in very urban areas	2000-2016	338-387	24.8
Urbanization	% Population living in moderately urban areas	2000-2016	338-387	17.3
Urbanization	% Population living in not very urban areas	2000-2016	338-387	17.4
Urbanization	% Population living in non-urban areas	2000-2016	338-387	17.4
Housing	Housing stock	2012-2016	380-387	7,641,323
Housing	% Owner occupied housing	2012-2016	380-387	56.2
Housing	% Total rental housing	2012-2016	380-387	42.5
Housing	% Rental housing owned by housing corporations	2012-2016	380-387	29.5
Housing	Average housing value (WOZ)	2016	387	209,000
Economic – general	Standardized average household income (Euros/year)	2009-2014	374-384	24,600
Economic – general	% Low income households (more than 1 year)[63]	2014	384	10.1
Economic – general	% Low income households (more than 4 years)	2014	384	3.4
Economic – general	Welfare recipients – excluding pensioners	2015	384	1,668,910
Economic – general	Gross labour market participation[64]	2003-2016	387	70.0
Economic – general	Net labour market participation[65]	2003-2016	387	65.8
Economic – sectors	Total number of businesses	2015	384	1,418,820
Economic – sectors	Number of businesses in industry[66]	2015	384	215,745
Economic – sectors	% Employment in agriculture, forestry, and fishing	2008-2015	291-345	1
Economic – sectors	% Employment in industry	2008-2015	368-344	14
Economic – sectors	% Employment in commercial services	2008-2015	369-382	52
Economic – sectors	% Employment in non-commercial services	2008-2015	369-383	33
Economic - sectors	Jobs in agriculture, forestry, and fishing x 1000	2010-2015	290-345	95.9
Economic - sectors	Jobs in industry x 1000	2010-2015	373-344	1,102.5
Economic – sectors	Jobs in mineral extraction x 1000	2010-2015	4-271	11.0
Economic – sectors	Jobs in manufacturing x 1000	2010-2015	153-196	735.5
Economic – sectors	Jobs in energy supply x 1000	2010-2015	7-193	27.0
Economic – sectors	Jobs in water supply and waste management x 1000	2010-2015	36-138	32.3
Economic – sectors	Jobs in construction x 1000	2010-2015	366-364	296.8
Economic – sectors	Jobs in commercial services x 1000	2010-2015	374-382	4,081.9
Economic – sectors	Jobs in non-commercial services x 1000	2010-2015	374-383	2,566.7
Amenities	Number of hospitals within 20km	2015	384	5.0
Amenities	Number of primary care physicians within 3km	2015	384	9.3

[57] Refers to the most recent year available; refers to average of entire country, not average of municipal scores
[58] The number of 0-19-year-olds (youth) related to the number of 20-64-year-olds (the potential labour force)
[59] The number of 65+ year-olds (pensioners) related to the number of 20-64-year-olds (the potential labour force)
[60] First and second generation migrants from Western countries (Europe except Turkey, North America, Australia and New Zealand, Indonesia, and Japan)
[61] First and second generation migrants from non-Western countries (Latin-America, Africa, Asia excluding Indonesia and Japan, and Turkey)
[62] Extremely urban: more than 2,500 addresses/km2. Very urban: between 1,500 and 2,500 addresses/km2. Moderately urban: between 1,000 and 1,500 addresses/km2. Not very urban: between 500 and 1,000 addresses/km2. Not urban: less than 500 addresses/km2.
[63] Equivalent to an income of 9250 Euros/month in 2000 price level; excludes student households and households with income over less than one year
[64] Share of potential work force (employed and unemployed)
[65] Share of employed population (more than 12 hours/week)
[66] Mineral extraction, manufacturing, energy supply, water supply and waste management, and construction

Accessibility	Distance to train station (km)	2015	384	5.0
Accessibility	Distance to main road (km)	2015	384	1.8
Accessibility	Number of cars per 1000 persons	2016	387	423
Politics	% Turnout parliamentary elections March 2017	2017	388	81.4
Politics	% Votes for liberal party (VVD)	2017	388	21.2
Politics	% Votes for radical populist party (PVV)	2017	388	13.0
Politics	% Votes for Christian-democrats (CDA)	2017	388	12.4
Politics	% Votes for social liberal party (D66)	2017	388	12.2
Politics	% Votes for green party (GroenLinks)	2017	388	9.1
Politics	% Votes for socialist party (SP)	2017	388	9.1
Politics	% Votes for social democrat/labour party (PvdA)	2017	388	5.7

Table 2. Aspects of the selected clusters – population and urbanity[67]

Cluster	Inhabitants	Density	% Extremely urban	% Very urban	% Moderately urban	% Not very urban	% Not urban
1 (N=28)	170,901	3,258	56.72	29.81	8.93	3.36	1.18
2 (N=81)	64,860	1,459	11.53	48.15	21.96	11.83	6.54
3 (N=121)	25,113	284	0.18	2.28	13.11	42.73	41.71
4 (N=53)	15,827	155	0.00	0.00	0.68	17.15	82.16
5 (N=101)	29,129	616	0.44	17.15	36.86	27.68	17.88

Table 3. Centroids of the selected clusters – labour market structure

Cluster	Agriculture	Industry	Commercial services	Non-commercial services
1 (N=62)	0.92	12.11	42.66	44.08
2 (N=28)	10.36	16.18	50.11	23.14
3 (N=99)	2.09	25.55	45.52	26.88
4 (N=86)	1.43	14.85	59.19	24.62

[67] Please note that the category 'small and medium-sized towns' is made up out of clusters 2, 3, and 5

Table 4. Regression coefficients for standardized household income and degree of unemployment. SE between parentheses. All data use most recent year available.

	Standardized household income (2014)		**Unemployment in % (2016)**	
	Model 1	Model 2	Model 1	Model 2
Constant	**25.833*** (.891)**	-2.140 (5.786)	**4.434*** (.202)**	**11.269*** (.901)**
% Employment in agriculture	.039 (.044)	-.059 (.035)	**-.068*** (.010)**	-.012 (.007)
% Employment in industry	**-.098*** (.018)**	**-.069*** (.014)**	**-.012** (.004)**	**-.008** (.003)**
% Employment in commercial services	**.038* (.015)**	-.007 (.011)	**-.007* (.003)**	**-.007** (.002)**
Total population[a]		-.003 (.002)		.000 (.000)
Old age dependency ratio		**.189*** (.026)**		**-.029*** (.005)**
Unemployment		**-1.319*** (.283)**		-
Household income (st.)		**-**		**-.047*** (.010)**
% Non-Western population		**.205*** (.040)**		**.048*** (.007)**
% Very urban population		.002 (.007)		-.001 (.001)
% Moderately urban population		**.021* (.007)**		**.003* (.001)**
% Not very urban population		.010 (.007)		.001 (.001)
Density		.000 (.000)		**.000** (.000)**
% Rental housing owned by housing corporations		**-.083*** (.019)**		**.010** (.004)**
Net labour market participation		**.400*** (.061)**		**-.084*** (.011)**
Number of hospitals within 20km		**.199*** (.041)**		.004 (.008)
Number of primary care physicians within 3km		**.114* (.048)**		**.021* (.009)**
Distance to train station (km)		-.024 (.017)		**-.010** (.003)**
Distance to main road (km)		.004 (.040)		.005 (.008)
Number of cars per 1000 persons		.003 (.003)		.000 (.001)
R^2	.126	.647	.145	.758
F change	**16.325*** **	**33.132*** **	**19.143*** **	**56.572*** **

*significant at p<.05 **significant at p<.01; ***significant at p<.001 (two-tailed)
a divided by 1,000

Appendix VI. Supplementary materials to the British regional analysis

Table 1. Correlation coefficients between industrial and demographic variables in SMTs; 2011 data, n=644

	Econ. activity	Unemp. rate	Ind wkforce.	AB workforc e	C wkforce	DEF Wkforce	% no quals.	% 5+ GCSEs	% degree	C2	DE	Leave vote (%)	Turnout (2015)
Unemployment rate	-.541*												
Industrial workforce	-.059	.243*											
% employed in sectors AB	-.124*	-.060	.155*										
% employed in sector C	-.051	.173*	.683*	.147*									
% employed in sectors DEF	-.110*	.127*	.224*	.142*	.108*								
% no qualifications	-.560*	.756*	.484*	.110*	.295*	.249*							
% 5+ A*-C GCSEs	.383*	-.727*	-.516*	-0.82*	-.325*	-.283*	-.920*						
% with a degree	.342*	-.594*	-.531*	-.115*	-.325*	-.312*	-.837*	.946*					
% social grade C2	-.188*	.325*	.552*	.194*	.320*	.379*	.622*	-.707*	-.766*				
% social grade DE	-.488*	.809*	.510*	.116*	.334*	.161*	.844*	-.843*	-.760*	.602*			
Leave vote – Brexit (%)	-.163*	.302*	.261*	.202*	.404*	.391*	.371*	-.364*	-.362*	.309*	.340*		
Turnout 2015	.072	-.255*	--.172*	.067	-.112*	.060	-.219*	.248*	.240*	-.157*	-.233*	-.210*	
Businesses per 1000 people	.022	.233*	-.109*	-.274*	-.042	-.173*	.011	-.084*	-.021	-.186*	-.141*	.011	-.106*

*significant at p<.01; cells shaded not significant at any level.