

Mapping for smart specialisation in transition countries: Moldova

*The economic,
innovative and scientific
potential in Moldova*

Summary of the report "Mapping of
economic, innovative and scientific
potential in the Republic of Moldova"
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Introduction

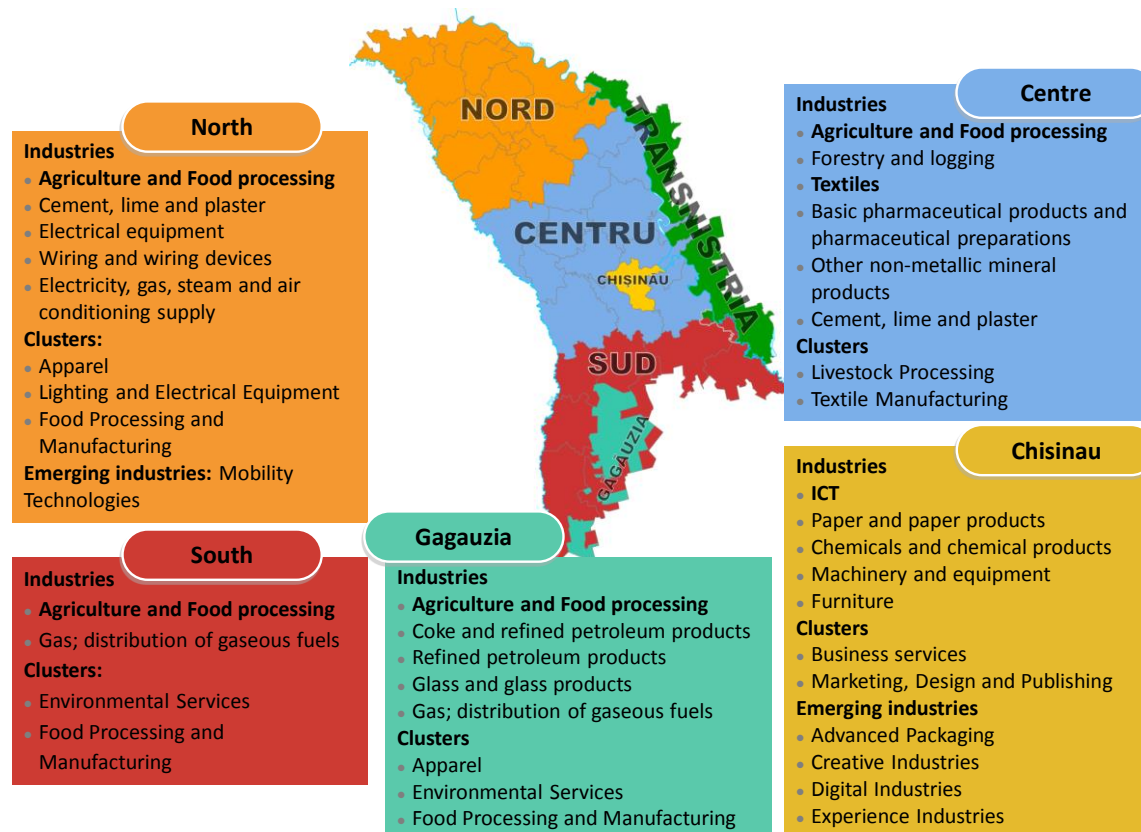
In support to the EU Enlargement and Neighbourhood countries the Joint Research Centre (JRC) of the European Commission has been carrying out activities on **smart specialisation** to identify the competitive strengths, opportunities and needs of these countries.

Smart specialisation is a place-based policy promoting regional economic transformation through investment in innovative activities in prioritised domains based on a strong evidence-base and stakeholder participation.

Improved innovation strategies following the smart specialisation approach have the potential to become the drivers of technology upgrading and broader innovations by providing a basis for developing unique competitive advantages for EU Enlargement and Neighbourhood countries.

In 2016, the S3 Platform of the JRC has started a pilot project addressing the needs and gaps in research and innovation by supporting processes in three target countries outside the EU: Ukraine, Moldova and Serbia. The project has started with awareness raising, training activities and mapping of the economic, scientific and innovation potential in the target countries. In this report we summarise the outcome of the quantitative mapping for the Republic of Moldova. These results provide a basis to launch a series of discussion rounds among business, research, and government on the potential competitive strengths of Moldova. Below you will find a summary map of potential priority domains.

Mapping of the economic, scientific and innovation potential in the Republic of Moldova



Background information

Smart specialisation priorities need to be based on a sound analysis of the national and regional economies, aiming at assessing both existing assets and prospects for future development.

To identify the local assets the mapping exercise focuses on five regions in the Republic of Moldova:

- Municipality Chisinau (Chisinau)
- Nord (North)
- Centru (Centre)
- Sud (South)
- T.A.U. Gagauzia

The Pridnestrovian Moldavian Republic (Transnistria) is not included in the mapping exercise.

From the data below it can be seen that Chisinau, the capital region which is characterized by a high degree of urbanisation, stands out from the four more 'Rural regions' North, Centre, South, and Gagauzia.

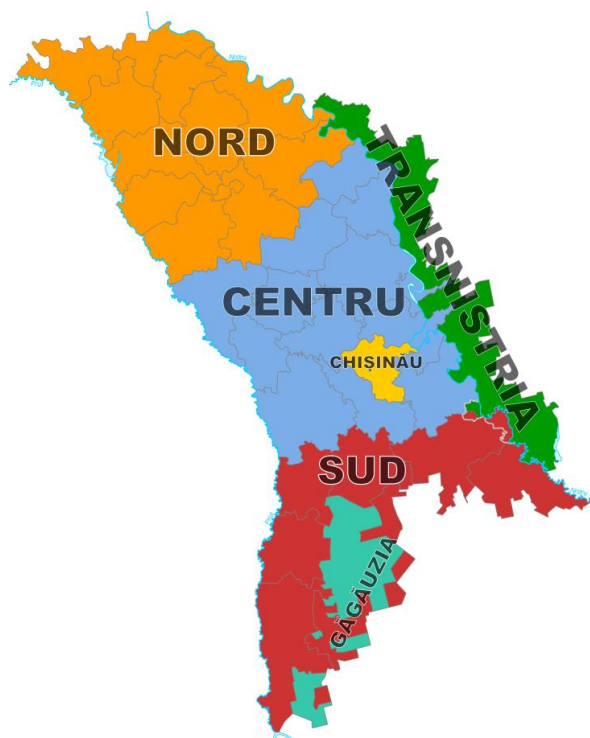


Table 1 summarises some key socio-economic differences between the regions in Moldova. Centre has the largest population, Gagauzia the smallest. Chisinau, the capital region, is highly urbanised (91%) compared to the other regions. Centre, surrounding Chisinau, is the least urbanised. Unemployment is lowest in Chisinau and highest in North. Employees in Chisinau earn more than employees in other regions; compared to South and Gagauzia even at least 50% more. North has an above average share of elderly people and also faces above average unemployment.

Table 1 Socio-economic differences between the regions of the Republic of Moldova

	Population	Below working age	Working age	Above working age	Urban	Rural	Registered unemployment	Average nominal monthly earning (Lei)
Chisinau	814147	14.2%	69.3%	16.6%	90.9%	9.1%	0.34%	5375.3
North	987475	16.7%	62.3%	21.0%	36.1%	63.9%	1.88%	3871.0
Centre	1057096	18.9%	64.7%	16.4%	19.6%	80.4%	1.21%	3719.5
South	532462	18.0%	65.0%	17.0%	26.5%	73.5%	1.15%	3527.3
Gagauzia	161876	18.7%	64.1%	17.2%	40.6%	59.4%	1.09%	3553.2
Moldova	3553056	17.0%	65.1%	17.8%	42.5%	57.5%	1.16%	4538.4

Data source: Statistical Yearbook of the Republic of Moldova 2016.

In economic terms, differences are even more pronounced. Although the share of population in Chisinau is about 23% of that of Moldova, Chisinau accounts for more than half of the registered economic activities in Moldova. The share of employment (including employed persons but excluding

self-employed and informal employment) in Chisinau is 60%, in the number of firms 65%, in turnover almost 73%, and in wages 68% (Table 2).

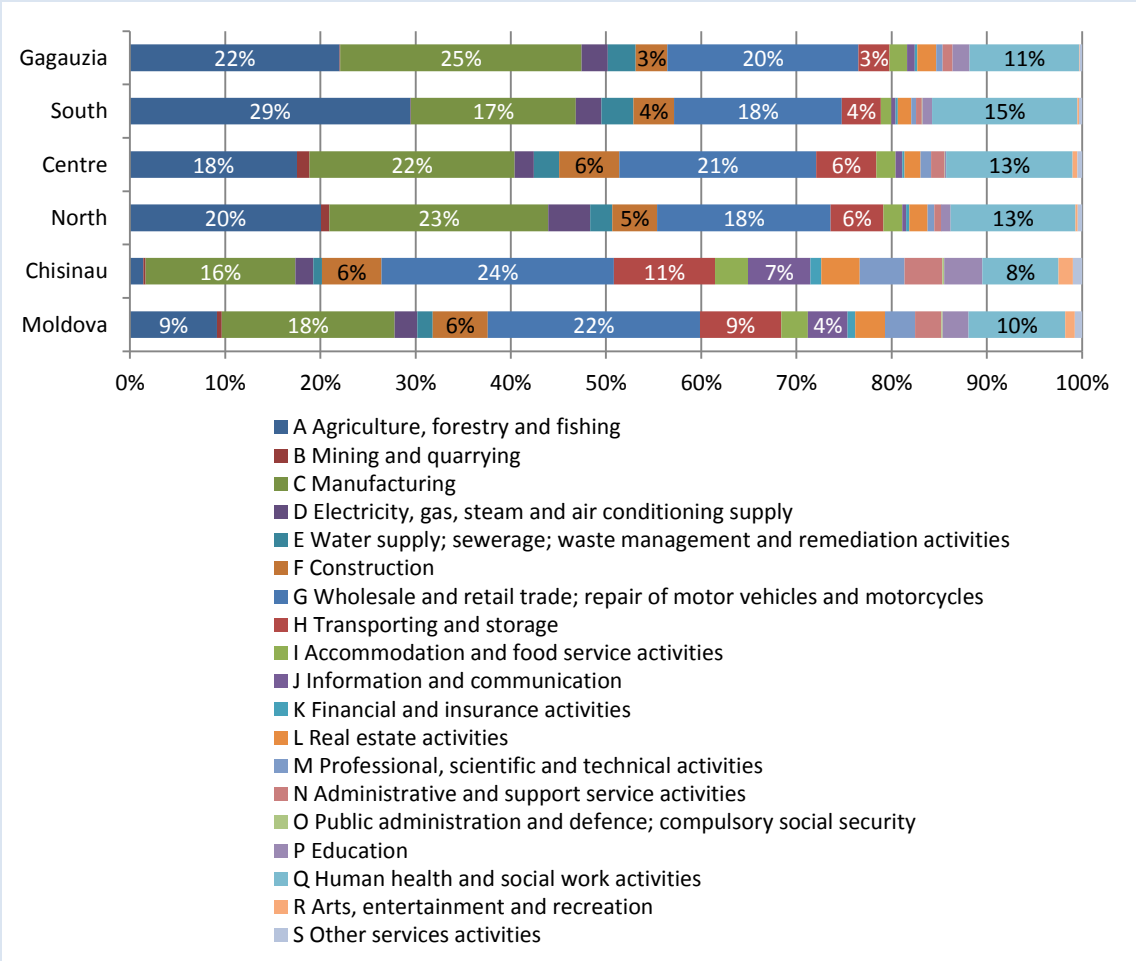
Table 2 Economic differences between the regions of Moldova

	Population	Employment	Firms	Turnover	Wages
Chisinau	22.9%	60.2%	65.0%	72.9%	68.2%
North	27.8%	17.0%	12.2%	11.8%	14.9%
Centre	29.8%	13.5%	14.9%	10.2%	10.2%
South	15.0%	6.4%	5.2%	3.0%	4.6%
Gagauzia	4.6%	3.0%	2.6%	2.1%	2.1%

Data: National Bureau of Statistics (NBS). Data for are averages for 2014-2016.

Differences in economic structures, using the average 2014-2015 employment shares of NACE one-digit industries in the regional economies, are shown in Figure 1. Employment shares in Agriculture, forestry and fishing in the *Rural regions* are much higher than average, whereas in Chisinau this share is far below average. Employment shares in Manufacturing in the *Rural regions* are close to or above average, whereas in Chisinau this share is below average.

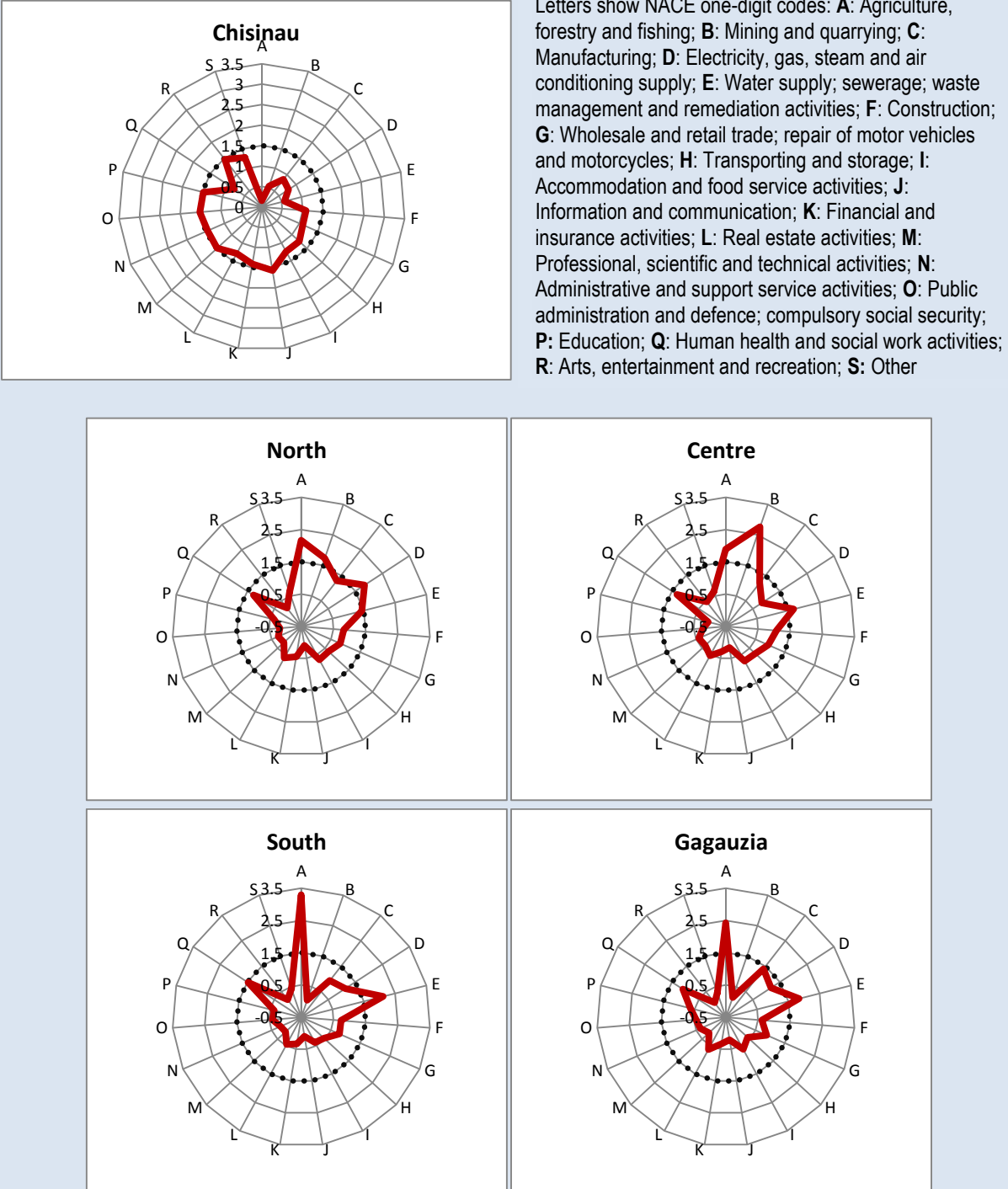
Figure 1: Economic structure of the regions in the Republic of Moldova



Note: the letter before the industry name shows the corresponding NACE one-digit code.

Differences in economic structures are also evident from a comparison of specialisation patterns using 2014-2015 employment shares of NACE one-digit industries, as shown in Figure 2 comparison of the radar graphs shows that the specialisation pattern of **Chisinau is significantly different from those of the Rural regions**. Comparing the Rural regions, North and Centre are slightly different from South and Gagauzia, with a specialisation in Mining and quarrying.

Figure 2: Specialisation patterns of the regions in the Republic of Moldova



Specialisation is calculated using Location Quotients.

Methodology

The mapping assesses three main dimensions for smart specialisation and innovation policy: economic, innovative and scientific potential. For mapping economic potential, regional data have been used. In absence of regional data on scientific and innovation potential, we use national indicators linking results of analysis to the economic mapping.

To assess **economic potential** the mapping identifies industries with both proven strengths and a potential to drive economic transformation. For the economic mapping, data include number of employed persons, number of firms, total turnover and total wages. The economic mapping identifies industries where regions have a critical mass of activities and specialisation for employment and turnover, for which size and location quotient for sector in the regional economy are above pre-defined threshold values, and where wages are sufficiently high. Cluster analysis using the European Cluster Observatory data and methodology was added to verify the mapping of economic potential.

For the mapping of the **innovative potential** ideally innovation survey data should be used. As for Republic of Moldova innovation survey data is not being collected the following available indicators have been applied:

- Geographical distribution of national inventors
- Geographical distribution of applicants
- Patent applications for 35 technology fields
- Percent of firms that introduced a new product/service
- Percent of firms whose new product/service is also new to the main market
- Percent of firms that introduced a process innovation
- Percent of firms that spend on R&D
- Percent of firms using technology licensed from foreign companies

The mapping of the **scientific potential** uses a descriptive analysis of the below mentioned indicators linking these to the results of the economic mapping. The following indicators are available:

- Distribution of scientific publications by domain
- Researchers by R&D activity
- Share of PhD holders by R&D activity
- Admissions, students, and graduates – secondary vocational education
- Admissions, students, and graduates – post-secondary vocational education
- Admissions, students, and graduates – tertiary education
- Graduates tertiary education, by cycle and fields of study
- Number of education institutions
- Specialisation of post-secondary vocational education institutions
- Specialisation of tertiary education institutions

Results of the mapping: potential priority domains for smart specialisation

The potential priority domains for smart specialisation have been identified in the economic mapping. For **Chisinau ICT** is the most important economic area; other areas of importance include **Manufacture of paper and paper products, Manufacture of chemicals and chemical products, Manufacture of glass and glass products, Manufacture of machinery and equipment (not elsewhere classified), and Manufacture of furniture**. The cluster analysis, using more detailed employment data and definitions from the European Cluster Observatory, confirmed the importance of **ICT**.

For North, Centre, South and Gagauzia comparable priority areas for smart specialisation have been identified. For all four regions **Agriculture and Food processing** are very important, but there are some differences as to which specific industries are included. **Textiles, Apparel, Footwear and Leather (TAFL) and Renewable energy** are also priority areas for smart specialisation in several of these four regions. The cluster analysis has confirmed several of these areas, e.g. **Apparel and Food processing for North, Livestock processing and Textile manufacturing for Centre, Environmental services and Food processing for South, and Environmental services and Food processing for Gagauzia**

For assessing the innovation potential patent data have been used. It should be noted that patents are an imperfect proxy for measuring innovation as they mostly measuring R&D-based innovation activities in particular in manufacturing industries and in the future innovation survey at the firm level using questions from the Community Innovation Survey, which is used in all EU Member States should be added to the analysis. Most patent activities are in Chisinau accounting for about 85% of Moldovan patent applications. Patent applications can be broken down into different technology fields, but their relevance for measuring innovation capabilities to support the identified economic domains is limited. However, the fact that **Food chemistry** is among the technology fields with most patent applications does seem to support the development of **Agriculture and Food processing**.

For scientific potential the output of international publications is relevant for the identified economic domains with relatively more publications in **Agricultural and Biological Sciences, Energy, and Environmental Sciences**.

The education system shows a concentration of activities in Chisinau, in particular for higher education, hosting about 90% universities and other institutions in higher education. Relevant specialisations are being taught at least by one of these institutions. For post-secondary education there is a lack of specialised courses in **Agriculture and Food processing**.

Table 3 summarises the potential priority domains for smart specialisation.

Table 3: Potential priority domains for smart specialisation

	Economic potential					Scientific potential	Innovation potential
	Chisinau	North	Centre	South	Gagauzia		
Agriculture and Food processing		X	X	X	X		
A01 Crop and animal production, hunting and related service activities		X	X	X	X	International publications: Agricultural and biological sciences	
A011 Growing of non-perennial crops		X		X	X		
A014 Animal production			X				
A02 Forestry and logging			X				
A021 Silviculture and other forestry activities			X				
C10 Manufacture of food products		X				International patents: Food chemistry patents National patents: Wine, Foods, Planting	
C101 Processing and preserving of meat and production of meat products			X				
C104 Manufacture of vegetable and animal oils and fats		X					
C105 Manufacture of dairy products		X					
C106 Manufacture of grain mill products, starches and starch products				X	X		
C107 Manufacture of bakery and farinaceous products				X			
C108 Manufacture of other food products		X					
C11 Manufacture of beverages				X	X		
Textile, Apparel, Footwear and Leather goods (TAFL)		X	X				
C13 Manufacture of textiles			X				
C139 Manufacture of other textiles			X				
C141 Manufacture of wearing apparel, except fur apparel		X					
C143 Manufacture of knitted and crocheted apparel			X				
C152 Manufacture of footwear			X				
ICT	X						
J61 Telecommunications	X						
J612 Wireless communications	X						
J62 Computer programming, consultancy and related activities	X						
C26 Manufacture of computer, electronic and optical products	X					International publications: Computer science	
C265 Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks	X						
Renewable energy		X		X	X		
D Electricity, gas, steam and air conditioning supply		X				International publications: Energy	
D352 Manufacture of gas; distribution of gaseous fuels through mains				X	X		
Other							
C17 Manufacture of paper and paper products	X						
C172 Manufacture of articles of paper and paperboard	X						
C19 Manufacture of coke and refined petroleum products					X		
C192 Manufacture of refined petroleum products					X		

	Economic potential					Scientific potential	Innovation potential
	Chisinau	North	Centre	South	Gagauzia		
C20 Manufacture of chemicals and chemical products	X					International publications: Chemistry, Chemical engineering	
C203 Manufacture of paints, varnishes and similar coatings, printing ink and mastics	X						
C21 Manufacture of basic pharmaceutical products and pharmaceutical preparations			X			International patents: Pharmaceuticals	
C212 Manufacture of basic pharmaceutical preparations			X				
C23 Manufacture of other non-metallic mineral products			X				
C231 Manufacture of glass and glass products	X				X		
C235 Manufacture of cement, lime and plaster		X	X				
C27 Manufacture of electrical equipment		X					
C273 Manufacture of wiring and wiring devices		X					
C28 Manufacture of machinery and equipment not elsewhere classified	X						
C31 Manufacture of furniture	X						
C33 Repair of installation of machinery and equipment	X						
C331 Repair of fabricated metal products, machinery and equipment	X						
K662 Activities auxiliary to insurance and pension funding	X						
M Professional, scientific and technical activities	X						