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Boosting Regional Competitiveness in Turkey

An Introduction to the Economic Structure of Turkey's Regions

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Foreword

Regions play an increasingly important role in OECD economies. They are responsible for delivering policies that directly affect citizens' lives and the business environment. Accordingly, it is essential that policy makers and practitioners understand their economies and benchmark them with the most appropriate tools. The growing importance of regional and local policy makers also makes it ever more important to efficiently co-ordinate national and regional policies.

With wide disparities in the economic development of its regions Turkey is among the OECD countries now taking an active interest in regional development policies and regional competitiveness. In 2006, its Ministry of Development put in place 26 Development Agencies. Four years later they were fully operational. They carry out research, analysis and economic planning at the regional level, administer grant programmes directed at enterprises and educational institutions, and promote local investment through investment support offices (ISOs). The recently created Development Agencies are expected to deliver all-important regional economic development policies, while finding their place in the Turkish policy and institutional environment.

Against that background, the OECD conducted its project, Boosting Regional Competitiveness in Turkey, to improve regional and sectoral competitiveness policies and to make co-ordination between Development Agencies, the Ministry of Development and other relevant institutions more effective. The OECD implemented the 22month project (from November 2014 to September 2016), co-financed by the European Union and Turkey, in close collaboration with the Ministry of Development.

Project activities included primary and secondary data collection and analysis, together with numerous missions, workshops and training courses covering Turkey's 26 regions as well as in Ankara. In total, the project team was able to collect input from more than 600 participants. Project activities comprised four thematic components, plus a crucial capacity-building component that cut across all four. The four substantive components were:

- Component 1. Measuring, benchmarking and monitoring competitiveness in the regions through a tailored set of indicators.
- **Component 2. Identifying dominant and dynamic sectors in the country's 26 NUTS II regions through a standardised framework.**
- Component 3. Enhancing co-ordination between central institutions and Development Agencies.
- Component 4. Strengthening the spatial dimension in national sector competitiveness strategies.

In line with the project's four-component structure, its findings are examined in four thematic reports. This publication is the final report on project component 2. It aims to provide national and regional policy makers in Turkey with selected approaches to sectoral and structural analysis that could be applied for regional-level analysis. The report also includes results of initial analysis for Turkey's 26 regions and is meant as a possible starting point for further analyses and policy discussions.

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Acronyms and abbreviations

AHIKA	Ahiler Development Agency
ANKARAKA	Ankara Development Agency
BAKA	West Mediterranean Development Agency
BAKKA	Western Black Sea Development Agency
BEBKA	Bursa Eskisehir Bilecik Development Agency
BEEPS	Business Environment and Enterprise Performance Survey
CAGR	Compound annual growth rate
CUKUROVA	Cukurova Development Agency
DA	Development Agency
DAKA	East Anatolia Development Agency
DIKA	Tigris Development Agency
DOGAKA	East Mediterranean Development Agency
DOKA	Eastern Black Sea Development Agency
EU LFS	European Union Labour Force Survey
FIRAT	Euphrates Development Agency
GDP	Gross domestic product
GEKA	South Egean Development Agency
GMKA	South Marmara Development Agency
GVC	Global value chain
HHI	Herfindahl-Hirschman Index
ICT	Information and communication technologies
IKA	Silk road Development Agency
IoT	Internet of things
İSTKA	Istanbul Development Agency
ISO	Investment Support Office
IZKA	Izmir Development Agency
KARACADAĞ	Karacadağ Development Agency
KUDAKA	Northeast Anatolia Development Agency
KUZKA	North Anatolia Development Agency
LQ	Location quotient
MARKA	East Marmara Development Agency
MEVKA	Mevlana Development Agency
MoCT	Ministry of Culture and Tourism, Turkey
MoD	Ministry of Development, Turkey
MoSIT	Ministry of Science, Information and Technology, Turkey
NACE	The Statistical Classification of Economic Activities in the European Community
NUTS	Nomenclature of territorial units for statistics
OECD	Organisation for Economic Co-operation and Development
OKA	Middle Black Sea Development Agency
ORAN	Central Anatolia Development Agency
PAC	Project Advisory Committee
PIAAC	Programme for the International Assessment of Adult Competencies
PISA	Programme for International Student Assessment
RCA	Revealed comparative advantage
RDP	Regional Development Plan
SDBS	Structural and Demographic Business Statistics
SERKA	Serhat Development Agency
SME	Small and medium-sized enterprises
SNA93	System of National Accounts
STAN	Structural Analysis Database
SWOT	Strengths, Weaknesses, Opportunities and Threats
TiVA	Trade in Value-Added
TRAKYA	Thrace Development Agency
TUIK	Turkey Statistical Institute
VA	Value Added
WTO	World Trade Organisation
ZEKA	Zafer Development Agency

Executive Summary

In the past two decades Turkey experienced significant economic growth associated with changes in the structure of its economy. Structural changes included a relative decline in the importance of its manufacturing sector, while services expanded and agriculture continued to contribute significantly to employment and GDP. Despite its positive growth in absolute terms, the relative slow-down in the manufacturing sector raised some concerns among Turkish policy makers. The Tenth Development Plan (2014-2018) adopted in July 2013 seeks to address the challenge, focusing on high value-added and innovative sub-sectors in order to support and transform Turkey's manufacturing sector.

Designing such policies so that they are cost-efficient and respect market mechanisms requires careful analysis of national and regional economic structures. This report endeavours to provide such input to policy development: i) an overview of selected structural and sectoral analyses applicable at the regional level; and ii) first findings from basic regional structural and sectoral analyses in each of Turkey's 26 NUTS II regions.

Various economic indicators and analyses related to production, employment, trade or investment may show different aspects of how sub-sectors contribute to economic activity. Drawing on OECD and international practice as well as economic literature, this report looks at a selection of indicators and analyses suitable for the regional level. They are grouped into five areas:

- Economic structure and sector performance analysis;
- Interrelations between sub-sectors;
- Human capital;
- National and regional policy objectives;
- Private sector feedback.

The report then goes on to use some of the selected structural and sectoral analyses to conduct a basic assessment of Turkey's 26 regional economies in the form of 26 short regional profiles. It draws quantitative data and qualitative information from a variety of sources – e.g. official statistics, regional development plans and regional stakeholder workshops – to paint the most comprehensive picture possible. The report uses relative sub-sector specialization measures to develop a simple typology that helps uncover sub-sectors that play an important role in or could bring an interesting dynamic to each region.

The results are contrasting. A number of regions in the east are still mostly driven by primary activities in agriculture, with just over 10% of regional employment in manufacturing. At the other end of the spectrum in the west of the country, manufacturing accounts for over 40% of employment in a few regions. If agriculture is excluded, only one-third of regions have at least one manufacturing sub-sector among their ten sub-sectors that employ the most people, while another third have four or five manufacturing sub-sectors in their top ten sub-sectors.

Regions also vary in the sophistication of their manufacturing production measured by the intensity of research and development (R&D) activities. Although labour-intensive, low-technology manufacturing dominates in most regions, R&D-intensive sub-sectors account for about one-third of manufacturing employment in a few, including TR51 Ankara and TR41 Bilecik, Bursa and Eskişehir.

The report seeks to complement numerous existing analyses with a basic, harmonised approach allowing easy comparison between regions. Such an approach, however, comes with limitations, particularly when analysing regions with a complex economic structure that warrant much deeper examination. Accordingly, the report should be viewed not as sufficient in itself to inform sectoral policy making in the regions, but as a starting point for further analysis and discussion.

Introduction

In the 2000s, Turkey experienced sustained economic growth, with GDP almost doubling in real terms. The growth entailed structural change – i.e. reallocating economic activity across the three broad sectors of agriculture, industry and services (Herrendorf et al., 2013).

Each of Turkey's 26 regions has its own unique story of economic growth and structural change related to the diversity of regional geographies, factor endowments, economic structure and specialisation. *OECD Economic Surveys of Turkey* highlight two areas, each with its own growth characteristics – the "Anatolian Tiger" regions and the "Developed West". In the five Anatolian Tiger regions, rising employment in the industry and services sectors, even in rural areas with no previous industrial activity, has been key. In the nine regions of the Developed West, economic growth is underpinned largely by productivity increases in the industry and services sectors (OECD, 2014a).

The foundations of economic growth lie in a strong business environment, with the rule of law and appropriate regulations supporting competitive markets which foster innovation. *The 2014 OECD Economic Surveys of Turkey* spotlight the need for reform in regulation, taxation and the labour market. However, there is lively policy debate as to whether such prerequisite reform would result in efficient sectoral reallocation of economic activity and whether government intervention is merited. Of particular focus is how policy may facilitate the shift from agriculture to manufacturing, which could yield increasing returns to scale with cross-sectoral spillover effects. Indeed, determining the form of sector-related policy is of the utmost importance to prevent the misallocation of resources and corruption and to ensure effective policy support to individual sub-sectors.

Effective sector policy is based on broad analysis of the overarching economic structure and more in-depth probing of specific sub-sectors. The analysis results provide critical inputs to ground evidence-based policy design. This report offers an overview of foundational approaches to assessing and analysing the economic structure and sub-sector characteristics of Turkey's 26 regions.

Institutional framework

Levels of economic development, structure and specialisation vary widely from one region to another and can even vary widely within a given region. To strengthen and tailor policy support to regional environments, the Ministry of Development put in place 26 Development Agencies that became operational in 2010. There is a DA for each of the 26 NUTS II level regions and all have three main functions:

- research, analysis and planning;
- grant programmes for businesses and non-profit organisations;
- investment promotion and support through Investment Support Offices (ISOs).

Under the terms of Law No. 5449 that governs the Establishment, Co-ordination and Duties of Development Agencies in Turkish NUTS II Regions, the Ministry of Development is responsible for co-ordinating and overseeing the Development Agencies.

National development plans have provided guiding frameworks for Turkey's socio-economic development since 1963. Currently, the Tenth Development Plan (2014-18) aims to both maximise national income and reduce inter-regional disparities. It maps the road to the 2023 goals announced by the government during the 2011 elections and frames the Development Agencies work to draw up locally tailored regional development

plans (RDPs). RDPs are approved at the regional and national levels, both of which prioritise the manufacturing sub-sectors that the Development Agencies co-ordinate across policy areas. Sectoral analyses provide the base for selecting priority sub-sectors and designing policies for them.

The 26 Development Agencies conduct sectoral analyses in various ways. Their focus and the sophistication reflect a Development Agencies vision, the skill mix of its analysts and how closely it collaborates with local and national academic institutions and think tanks. The least developed regions with the lowest levels of economic diversification often rely on basic analyses of available resources and regional characteristics. More advanced regions tend to carry out more complex quantitative assessments, such as location quotient approaches, geographic concentration index and gravity based models. As a result, there is limited scope for comparison between regional analyses.

There are several arguments in favour of more harmonised analyses. First, the degree of sophistication and the reliability of analyses currently vary from one region to another. Harmonising them would help the least advanced regions close the gap by implementing best-in-class analyses. Second, different advanced regions often choose different methodologies – a harmonised approach would provide them with useful points of comparison. Finally, comparable results help bring out patterns and differences across and between regions.

Objectives of the report

This report comprises five chapters which describe and apply structural and sectoral analyses to provide input for policy development.

Chapter 1 offers an overview of selected structural and sectoral analyses applicable to the regional level. It looks at the different foundational approaches – which vary in subject, scope and depth – in order to assess different dimensions of economic structure and sector development. It aims to serve as a resource for the 26 Development Agencies as they select ways of analysing in greater depth aspects of their regional economic structure and sub-sectors.

Chapter 2 describes the analytical methods that the OECD team used to assess fundamental aspects of the 26 regional economic structures with a special focus on manufacturing sub-sectors. It also details how dominant and dynamic sectors are categorised. Its purpose is to complement the regional structural analysis methods already in use by the 26 Development Agencies as they seek ways of delving deeper into analysis of regional economic structure and sub-sectors.

The report also explores key features of the manufacturing sectors in OECD countries and Turkey – the subjects of Chapters 3 and 4, respectively. Its aim in so doing is to provide the 26 individual regions with higher-level comparisons and to inform discussion on regional comparative advantages.

As for Chapter 5, it seeks to identify the key attributes of the overarching economic structure and manufacturing sub-sectors in each of the 26 regions. The areas that it analyses – which include policy objectives, regional feedback, dominant sectors and features of economically dynamic sectors – closely mirror the methodology set out in Chapter 2. Its aim is to complement the analytical findings of the Development Agencies and inform the direction of future sectoral research.

Chapter 1

Overview of selected approaches to structural and sectoral analysis

This part considers some base approaches to assessing economic structure and sector development at the national and regional levels. It draws on economic literature and OECD practice from which it selects such key indicators of structural transformation and economic growth as comparative advantage, specialisation and international trade. The selection of approaches, which is broad in scope but not comprehensive, addresses five areas:

- economic structure and sector performance analysis;
- interrelations between sub-sectors;
- human capital;
- policy objectives;
- private sector feedback.

Chapter 1 is intended as a resource for the 26 Development Agencies (DAs) as they examine areas within sectoral analyses to research and seek out approaches to that end. The DAs can then select the most suitable and tailor them to regional economic structure and geographic characteristics.

1.1. Economic structure and sector performance analysis

The structure of an economic entity is determined by the composition and interaction of economic aggregates. How aggregates change in relation to their size over time constitutes economic structure dynamics (Jackson et al., 1990). As an economy evolves from agriculture to industry to services, a transformation mechanism kicks in and the nature of the economy changes. Understanding economic structure lies at the root of holistic sector-related and structural analyses. The particular ways in which different sectors contribute to the overall economic structure lay the foundation for closer scrutiny of individual sectors and sub-sectors.

In this first area of assessment, approaches draw on OECD analysis and tools, including the STructural ANalysis (STAN) database (Box 1), economic literature and UNIDO's Enhancing the Quality of Industrial Policy (EQuIP) project. Assessment of economic structure and sector performance addresses five topics:

- sector composition and dynamics;
- sub-sector structure and performance;
- technological intensity;
- global value chain integration;
- environmental impact.

Most indicators in each of the five topics can be considered in both static form (share, stock, etc.) and dynamic form (growth and total change). Many indicators can also serve as effective benchmarking tools, comparing a local economy with the national or global economy.

Box 1. The OECD Structural Analysis Database (STAN)

The OECD Structural Analysis (STAN) Database compiles 23 key indicators of economic activity for structural change analysis. The database uses data from activity tables in annual national accounts and sources such as national surveys. The indicator areas of the STAN database are key in structural analysis. The international standard definitions in the System of National Accounts (SNA93) are very closely reflected in the following definitions of key STAN areas (OECD, 2000).

- Production is an activity which uses the inputs of labour, capital, and goods and services to produce outputs of goods and services. Three indicators measure the value and volume of production by economic activity.
- Intermediate inputs consist of the goods and services consumed as inputs by a process of production, not including fixed assets. Three indicators measure the value and volume of intermediate inputs by economic activity.
- Value added is the value of the output less the values of inputs. Four indicators measure the value and volume of value added by economic activity.
- Labour is the work people do and a factor of production. Nine indicators measure the cost of labour and amount of employment by economic activity.
- Capital is all fixed assets – those that are not reduced with the production of an individual unit, e.g. machinery and equipment. Depreciation is not included. Six indicators measure the value and volume of capital by economic activity.
- Trade is exports and imports of products and services. Two indicators measure the value of exports and imports of goods by economic activity.
- Government effects include the rules and regulation that the government sets for all enterprises or those in a particular sector and the support that it provides to enterprises. One STAN indicator assesses taxes less subsidies on production by economic activity.
- Income is the surplus or deficit from production. Two indicators measure gross and net value of operating surplus by economic activity.

Indicators are available at the national level. However, depending on data availability and relevance for regional stakeholders, most indicators can be computed for the regional level.

Source: OECD (n.d.[c]), "Variables in STAN", www.oecd.org/sti/ind/STAN_var_list_EN.pdf.

Sector composition and dynamics

Sector analysis assesses the role of different aggregate macro-sectors in an economic entity so as to offer a general view of its structure and position it according to that structure. It supplies information on the role and relative weight of agriculture, industry and services. The key questions that can be addressed with sector analysis are: Where does an economy stand in terms of macro-economic structure and what is its production and export base? Analysis also allows the benchmarking of the economy on a national and global scale.

Selected indicators:

- Share of agriculture, manufacturing and services in total value added /employment;
- Share of export on total value added.

Sub-sector structure and performance

Sub-sector structure and performance analysis examines the structure of each macro-sector, highlighting specific features of tradable sectors. Each macro-sector is made up of a number of sub-sectors that differ in their particular characteristics and contributions to total production and employment. Analysing sub-sector performance and competitiveness trends over time affords insight into the composition of macro-sectors and structural change processes.

Selected indicators:

- sub-sector value added per worker;
- share of sub-sector in total sector value-added;
- share of sub-sector in total value-added;
- share of sub-sector in total sector export.

Analyses that use value-added as a key indicator are a valuable tool for assessing sector and sub-sector performance. However, analyses based on employment data may complement or, in the event of absent or limited data availability, serve as a proxy for value-added-based analyses.

Selected indicators:

- sub-sector employment;
- share of sub-sector employment in total sector employment;
- share of sub-sector employment in total employment;
- value-added per person employed.

In addition to these selected indicators, sectoral concepts afford additional insights that make it possible to position a sub-sector within the regional, national or global economy. Comparative industry maturity, economic diversification and specialisation are three such useful concepts.

Comparative industry maturity

Livesey (2012) introduces the concept of relative industry maturity by comparing a country's stage in the life cycle of an industry with other countries' positions in the life cycle of that same industry. The comparison can be represented in a four-by-four grid showing the stage of maturity of the home industry along the x axis and that of the industry worldwide along the y axis. Each box in the in the grid represents the comparative maturity of an industry in the home country relative to the global norm. Based on this method industries can be divided into seven groups:

- Industries that are at the early stages of emergence and growth both at home and globally.
- Industries which are at the stage of emergence or growth at home, but are better developed globally, though not yet at the stage of decline.
- Industries which are at the stage of growth or maturity at home, but are less well developed worldwide.
- Industries that are either in the mature or declining stage at home and where the same is true on the world scale.
- Industries where the home country is in maturity or decline but the world industry is emerging or growing.
- Industries where the home country is still emerging but are in decline worldwide.
- Industries which are growing in the home economy but are in decline on a world scale.

Economic diversification

Economic diversification is usually defined as the level of distribution of economic activity and employment across classes of industry (Attaran, 1987). While no strong empirical evidence suggests higher economic diversification has a positive impact on levels economic development, there is broad agreement that diversification promotes economic stability since the economy is less exposed to external shocks in any given industry (Malizia and Ke, 1993). The Herfindahl-Hirschman Index (HHI) is a tool commonly used to measure the concentration of businesses in a given sub-sector or the concentration of sub-sectors in a given sector.

The most common version of HHI is expressed as a sum of the squared market shares of all industries or sub-sectors thereof (Hirschman, 1980). The value of the index ranges between 0 and 100. The higher it is, the less diversified the economy and/or industry is. However, there are many variations of HHI to be found in the literature.

Relative sub-sector specialisation

Comparing how closely a sub-national economic structure matches the national economic structure also yields valuable information. The location quotient (LQ) is an analytical indicator which measures the relative concentration of a regional sub-sector relative to the nation as a whole. An LQ is calculated by taking a sub-sector's share of a regional total for a given economic indicator (value added, output, employment, etc.) divided by the sub-sector's share of the national level for the same indicator. A value of one signifies the region and nation are equally specialised in the given sub-sector, while a value greater than one denotes a regional concentration that is greater than the national one (U.S. Department of Commerce, n.d.). LQs are often used to indicate that sub-sectors can be exporting and importing sub-sectors. For example, if a sub-sector is relatively regionally concentrated, it may have the potential to be an exporting sector.

Technological intensity

Many economic entities still rely on simple, generally labour-intensive activities which generate limited value-added and few positive spill-overs for the rest of the economy. Economies that rely heavily on low-sophistication production can often be highly vulnerable to such external shocks as fluctuating commodity prices and competition from emerging economies.

Research and development (R&D) enables advances in economic structure towards more technology-intensive fields. Because different sub-sectors have different levels of technology, they demand tailored policies to support them and a different set of policies to help them transition towards more technology-intensive sub-sectors (Hatzichronoglou, 1997). Although technology has multiple components, R&D is an important factor with readily available data by which to classify industries. An indicator of sophistication is the intensity of R&D in production processes. The OECD proposes a five level classification of high, medium-high, medium, medium-low and low R&D-intensive sub-sectors for the OECD as a whole (Annex A). While keeping the same approach to sorting sub-sectors, the classification can be modified to better fit individual countries (OECD, 2016b).

Selected indicators:

- share of sub-sectors by R&D intensity in total sector value-added;
- share of sub-sectors by R&D intensity in total sector exports;
- share of sub-sectors by R&D intensity in total sector employment.

Global value chain integration

Global value chains (GVCs) have become a dominant feature of world trade, encompassing economies at all stages of development. The whole process of producing goods – and all intermediary steps – is increasingly carried out wherever the necessary skills and materials are available at competitive cost and quality. It is, therefore, critical for policy makers at national and regional levels to understand the role of their economies in this global process.

Analysing sub-sector positioning in GVCs may reveal valuable information that is relevant to positioning a region and its competitiveness in sub-sectors as well as uncovering the underlying drivers of their integration in the global economy.

Selected indicators:

- trade in semi-processed goods;
- ratio of raw materials imported against final goods exported;
- distance from key export markets;
- transit time to key export markets.

Revealed comparative advantage (RCA)

Sub-sectors can be compared internationally to assess their export performance. Revealed comparative advantage (RCA) is a widely used indicator which uses trade flows to assess the relative advantages and disadvantages of sub-sectors. RCA calculates, in a given country, sub-sector's share of total goods and services exports divided by the same sub-sector's shares of total exports of goods and services worldwide (OECD, 2013a). RCA can be a starting point for shedding light on what shapes observed trade patterns – e.g. factor endowments, total factor productivity and policies. However, because RCA depends on international trade data, applying it at the regional level overlooks domestic trade to other regions, so limiting the meaningfulness of results.

Product space analysis

Factors of production are the technology, skills, institutions and capital required to create a product. It is easier to adapt the factors that create an existing product to related products than to those that are not. However, determining how related a product or activity might be is a challenging task. Product space approaches takes an empirical view of similarity between products, focusing on correlations observed at the global level between export shares of different products. Such an approach can uncover relations between apparently unrelated economic activities, opening the way to targeted policy intervention (Hidalgo et al., 2007).

Box 2. **The OECD WTO TiVA Database**

Measuring Trade in Value Added (TiVA) is a joint initiative by the OECD and World Trade Organisation. The TiVA database contains 39 indicators designed to reflect the complex nature of trade interrelationship between countries, the domestic and foreign contributions to exports, and the importance of intermediate imports in exports. The TiVA database also seeks to better reflect the contribution made by services to the production of goods and to offer a different perspective on bilateral trade balances. The TiVA indicators are calculated for 57 economies (which include the OECD countries and Brazil, China, India, Indonesia, the Russian Federation and South Africa) and the years 1995, 2000, 2005, 2008 and 2009. They are broken down into 18 industries.

Source: OECD (n.d.[a]), TiVA Database, www.oecd.org/sti/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm.

Environmental impact

Sustainable use of natural resources balances current economic growth objectives with safeguarding their future availability and quality. Discussion of the environmental impact of economic development is increasingly at the centre of the policy agenda in OECD countries.

OECD environment statistics include sector-specific indicators which evaluate the environmental impact of different sub-sectors:

- air pollution and greenhouse gas emissions by sub-sector;
- waste generation by sub-sector.

1.2. Interrelations between sub-sectors

As economies develop, relationships and linkages between ever more specialised sub-sectors grow increasingly interdependent and complex. Examining linkages can reveal evidence of sub-sector clustering, value chains and production fragmentation. It can also highlight the limitations of targeted intervention on a single sub-sector, which applies to designing smart policies to foster sub-sector development.

For the past 70 years, input-output approaches built on the basic Leontief approach have analysed interdependencies between economic sectors within national economies and at international level. The approaches determine where inputs to a sector in a given region originate and where the output goes. They thereby show which sectors are directly and indirectly important to each other in role and magnitude. Certain approaches bring out specific aspects of intra-sector trade dynamics such as productivity and the environment. The literature commonly highlights three key advantages of input-output analysis:

- The availability of comprehensive, consistent data.
- The nature of input-output analysis makes it possible to analyse the economy as an interconnected system of sub-sectors that affect one another, both directly and indirectly, tracing structural change back through interconnections between industries.
- The design of input-output tables makes it possible to break down structural change and so identify the sources, direction and magnitude of change.
- However, input-output tables make assumptions that lead to limitations. Three should be kept in mind when interpreting the results of analysis:
- The basic input-output analysis assumes constant returns to scale.
- Each industry is assumed to produce only one type of product, and each product within the sub-sectors is assumed to be the same.
- Technical coefficients are assumed to be fixed – in other words, the amount of an input required to produce one unit of each output is constant over time and across economic entities.

The basic Leontief input-output approach is constructed from economic data for a specific geographic area (nation, state, region, etc.). Because of the detailed structure of the data and demanding construction procedure, tables are usually prepared by national statistical offices for national economies only. However, for large economies with significantly diverse regions, constructing, or at least estimating, regional input-output tables would enable more precise analysis of regional economies and their structure. Kowalewski (2015) summarises key methods of compiling regional input-output tables according to the quality and availability of regional data. LQ and gravity model are among the approaches.

- **Location quotient** approaches adjust the national technical coefficient according to the availability of domestic inputs. The result is regional input-output technical coefficients – a function of the LQ and the national technical coefficient. However, the literature suggests various LQ approaches with different strengths and limitations depending on the research focus and availability of data.
- **Gravity model** approaches estimate commodity flows between regions. They begin with the amount of goods produced at an origin that is attracted to an amount of goods at destination, where the distance between the two reduces the flow. The fit of this basic model is improved with the addition of proxies for such trade frictions as political borders and common language. Many iterations and specifications have been proposed to help the gravity model fit specific purposes. The model can estimate inter-regional trade flows by considering the output of a good in the region of origin, the value of the good purchased in the destination region, and the distance between the two regions (Miller and Blair, 2009).

1.3. Human capital

Human capital facilitates increased productivity and economic competitiveness. A well-educated, skilled workforce boosts labour productivity and social inclusion. As a result of technological progress, low-skilled and – increasingly – repetitive mid-skilled jobs are being automated, while the demand for jobs that require greater technical and/or interpersonal skills is growing (the rise in demand for interpersonal abilities is observed even in low-skilled activities like elder care).

A population's level of attainment in education and skills is fundamental to determining the viability of manufacturing sub-sectors and their development potential (OECD, 2013b). Different manufacturing sub-sectors call for different skill levels and qualifications. For example, producing information and communication technology or pharmaceuticals calls for highly skilled workers.

Skills demanded by the labour market inform policy across education – from primary to higher education, and on through lifelong learning. Indicators related to the highest level of educational attainment, skills and qualifications all reveal different aspects of human capital related to labour productivity and suitable sectors. This section describes a variety of approaches to assessing national, regional and sectoral human capital through key indicators and analysis tracked by some data sources. The methodologies and data sources described are a selection of OECD tools, not a comprehensive list of all those available.

Qualification mismatch analysis

Qualification mismatch analysis seeks to assess how closely the highest level of education that a person has obtained matches their occupation and its qualification profile. Analysis can show at a glance occupations where employees are over-qualified and those where they are under-qualified. It also reveals the key attributes of employees themselves. Such findings can inform labour policy to better match skills and occupations. However, the analysis does not capture variations in the abilities of individuals with the same qualifications. Nor does it capture the additional complexities for jobseekers of finding work outside their field of expertise (OECD, 2011).

Skills gap analysis

Assessments of skills levels measure people's ability to work in certain occupations. Aligning the skills obtained through education and training with those required in sub-sectors and occupations yields positive labour market outcomes where individuals and businesses leverage existing skills. However, aggregate mismatches between skills and occupations affect labour productivity through inefficient allocation of resources, making it more difficult for productive firms to attract skilled labour (Adalet McGowan and Andrews, 2015). The first step in addressing skills gaps – skills that are in short supply in the labour force – is to identify them at the sub-sector level.

Skills anticipation

Skills anticipation uses quantitative and qualitative methods to assess future skill needs. It focuses on the various links between education and work to inform how education policy matches future labour markets and how individuals make career choices (Wilson, 2013). Despite their widespread use, much variation in their approach and effectiveness persists. The main challenge in skills anticipation is the actionability of results, which often come in aggregated form or, sometimes, by type of skill.

1.4. Policy objectives and private sector feedback

National, sectoral and regional development strategies all aim to facilitate sustainable economic growth and increase well-being. Strategies and action plans

are the roadmap that policy makers use to update their policy objectives and differ in scope, depth and approach. National strategies are centrally co-ordinated and greater resources are available for implementing them. Regional strategies naturally reflect regional priorities and contexts more closely. They are especially important in large, regionally diverse countries, where they tailor policies to a region's particularities and local citizen engagement.

Ideally, strategies should be consistent, complementary and mutually reinforcing in pursuit of their goals (see BRC in Component 3, *Enhancing Co-ordination Between Central Institutions and Development Agencies*). Achieving strategy alignment and coherence across tiers of government and sub-sectors requires concerted co-ordination, which depends in turn on good communication and clearly allotted responsibilities.

A defining feature of high-quality public governance is civil society participation. Government strategies and policies aim to improve the well-being of their citizens. Accordingly, direct consultation with civil society and the private sector are key to shaping policies to their needs and priorities.

When designing policies specifically for certain sub-sectors, direct private sector feedback on externalities and challenges to enterprise development provides critical direction. In fact, the economist Dani Rodrik posits that "the right model for industrial policy is … strategic collaboration between the private sector and the government with the aim of uncovering where the most significant obstacles to restructuring lie and what type of interventions are most likely to remove them" (2004).

Combining analyses

As stated at the beginning of Chapter 1.1, the different types of analysis introduced above set the scene for examining performance in sector composition and dynamics, sub-sector structure and performance, technological intensity, global value chain integration and environmental impact. Indicators and approaches can be tailored to a variety of analyses and combinations thereof to meet policy makers' objectives. The UNIDO EQuIP project (Box 3) suggests different collections of key indicators and analyses for structural analysis relating to the main pillars of industrial development – economic performance, social performance, and environmental performance.

Box 3. **UNIDO EQuIP toolbox**

As part of its project on Enhancing Quality of Industrial Policies (EQuIP), the United Nations Industrial Development Organisation (UNIDO) developed a comprehensive set of tools to enable policy makers to analyse and benchmark manufacturing sectors in an economy. Although UNIDO originally developed the tools for national analysis, they also lend themselves to use on the regional level. The toolbox prioritises quantitative diagnostic methods which help to spotlight intersections between the social, environmental and economic pillars of inclusive, sustainable industrial development. To that end, seven tools are widely used:

In industrial competitiveness and economic performance industrial capacity, tools 1 to 4 (sub-sector competitive performance; industrial and export intensity; domestic and export diversification) and tool 7 (global value chains).

In social inclusiveness, tool 5 (industrial employment and poverty alleviation).

In environmental sustainability, tool 6 (greening industry; energy and material efficiency).

Tool 8 (industrial capabilities) and tool 9 (industrial organisation and firm profiling at sub-sector level) cover the input side which relates to the drivers of performance, framework conditions and structural issues.

Source: UNIDO/GIZ (2015), "Enhancing the Quality of Industrial Policies", www.equip-project.org/.

Chapter 2

Methodology of analyses conducted

2.1. Introduction

This part overviews the analyses that the OECD project team used in 2014-16 to assess economic structure and sub-sector development at the regional level in Turkey. The selected analyses draw on the approaches described in Chapter 1, with the emphasis on simplicity and data availability. As well as describing key features of regional economic structures and sub-sectors, the methodology of the analysis conducted focuses on the manufacturing sector which Turkish policy makers' have prioritised because of its strategic economic importance. Therefore, it does not consider trade-related sub-sectors such as retail and wholesale, transport, or sub-sectors driven by public investment and construction. And, despite the strategic importance of agriculture in many regions of Turkey, it, too, is beyond the scope of this report.

Manufacturing sectors may have increasing returns to scale with cross-sectoral spillover effects that warrant particular policy attention (Herrendorf et al., 2013). Evidence first shows that manufacturing drives productivity growth and plays a key role in economic transformation, even though services now also account for a substantial share. Manufacturing is also an important source of R&D and innovation, themselves widely acknowledged factors in boosting productivity growth. A final point: most exports are related to manufacturing. So a weak manufacturing sector leads to a higher share of imported products, which in turn affects the balance of trade (De Backer et al., 2015).

In sub-sector performance, analysis identifies "dominant" sub-sectors in manufacturing and services sectors and the key features of "dynamic" manufacturing sub-sectors. The dominant sub-sectors account for large shares of regional employment and the region is relatively more specialised in those sectors than the national average. Service sub-sectors are included in the analysis of "dominant" sub-sectors because they can be an important feature of the general economic structure, which in turn shapes the landscape for manufacturing sub-sectors. Dynamic sub-sectors have positive attributes (like regional specialisation that is greater than the national average or a relatively skilled workforce) which may translate into future growth.

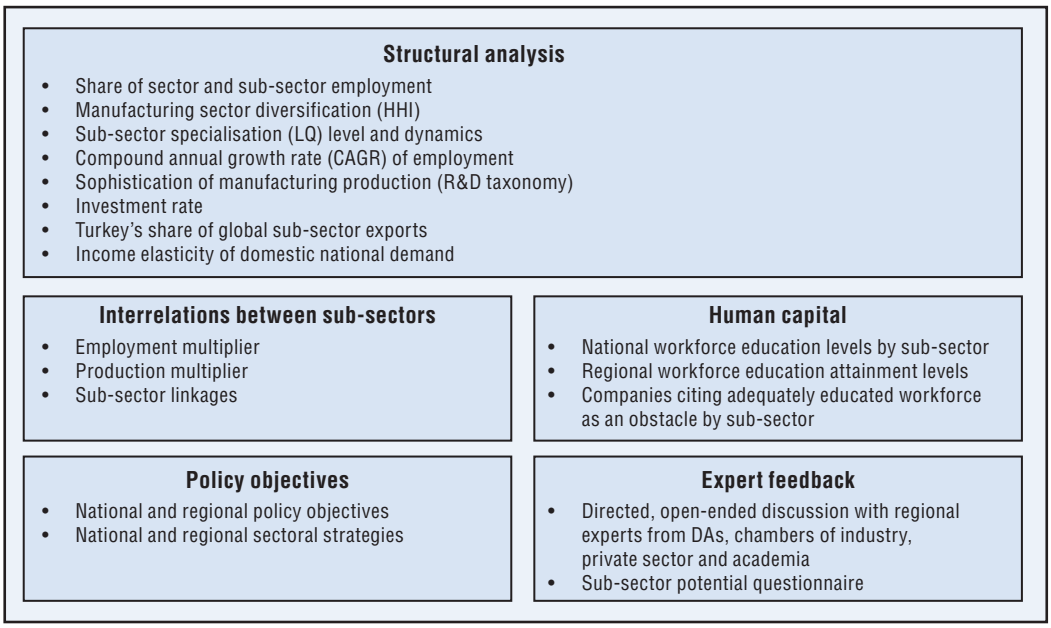
This part of report is designed to provide the 26 DAs with supplementary information on their regional economic structures and sub-sectors. The baseline analyses that it proposes are intended to complement the sectoral analyses already conducted by DAs. They seek not to offer a comprehensive inventory of analyses, but to inform further research direction in support of the regional sector-related policy design process.

The "case for manufacturing" also rests on three types of positive spillover effects, both direct and indirect, that the manufacturing sub-sectors have on an economy. Furthermore, the share of manufacturing is higher in Turkey than the OECD average.

Areas covered

The overview in Chapter 1 identified five key areas of analysis that yield a broad picture of regional economic structure and manufacturing sub-sectors. All five inform each other and can be assessed individually or in parallel.

Figure 1. **Economic structure and sub-sector areas of analysis**



- **Structural and performance analysis** examines the defining features of sectors and sub-sectors at the national and regional levels as prerequisites to further analysis. It considers overall static activity levels, recent changes and relative sector concentrations of employment, investment and trade.
- Analysis of **interrelations between sub-sectors** identifies linkages between sub-sectors and seeks out those that interact closely with a region's key sub-sectors. It also estimates the availability of data on production inputs in the region and, using employment and production multipliers, how certain sub-sectors might affect a region's employment and production.
- Analysis of **human capital** considers whether the labour force has the skills levels and qualifications to successfully meet demand in sub-sectors. Such analysis also compares levels of educational attainment by sub-sector and region.
- Analysis of **policy objectives** scrutinises current national and regional strategies to understand what policy makers consider their sub-sector and regional development priorities to be. National strategies seek to co-ordinate sub-sectors across regions, while regional strategies shape policy measures so that they align more closely with local conditions and goals.
- **Expert feedback** analysis seeks regional stakeholders' views and guidance. Especially important is uncovering what the private sector considers to be existing barriers and potential policy options.

A number of limitations must be borne in mind. First, although the same analyses were applied to each region for consistency and ease of comparison, they cannot, by their very nature, accommodate regions' defining features. In particular, they may overlook the complexity of the economies in the most developed regions. Second, they use the latest version of the European industrial activity classification, NACE Rev. 2, which is designed to provide a standard in sector analysis. In practice, however, firms often engage in several types of economic activities that span categories. Third, data were not always available at the NUTS II level. Analysis had to adjust accordingly, sometimes relying on data aggregated at the NUTS I level for NUTS II regions.

2.2. Structural analysis

Structural analysis area assesses the key features of sectors at the national and regional levels to lay the foundations of further analysis. It uses the following indicators. Refer to Annex B for indicator formulas.

Share of employment by sector

The share of employment by sector measures the contribution of agriculture, industry and services sectors to total regional employment in 2014. Data on the size of the manufacturing sector refer to 2012.

Share of employment by sub-sector

The share of employment measures what share people of all the employed in a region were working in a given sub-sector in 2013. This indicator gauges the relative weights of different sub-sectors in a region's economy.

Herfindahl-Hirschman Index

The Herfindahl-Hirschman Index (HHI) measures diversification in the manufacturing sector in a given region in 2013. The indicator is calculated from employment data and scores diversification on a scale of 0 to 100. The higher an HHI value is, the higher the concentration of the manufacturing sector in a given region.

Location quotient

The location quotient (LQ) indicator compares regional economic structures with the national economic structure in 2013. It measures whether employment in a given sub-sector and region is more or less concentrated than the national average in the same sub-sector. The indicator is calculated from employment statistics in the absence of value-added data. While LQ does not directly measure comparative advantage, this report uses it as a proxy for comparative advantage because it is often associated with a greater concentration of sub-sector employment and sub-sector specialisation.

This report classifies as "dominant" those regional sub-sectors which account both for a large share of regional employment (among top 10 sub-sectors for employment) and score above one against the LQ indicator which measures regional specialisation.

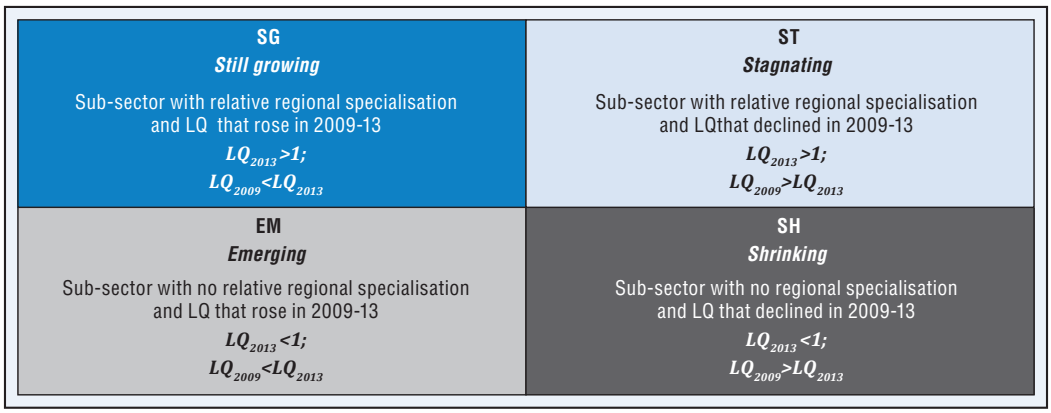
Changes in location quotient value

The change in LQ value between 2009 and 2013 shows how the relative concentration of a sub-sector has evolved. Because the LQ value is a ratio of two ratios (share of regional sub-sector employment divided by share of national sub-sector employment), the reasons for changes in value should be interpreted with care. An LQ value change can be the result of changes at the regional or national level.

This report uses the LQ value and the LQ value change to classify sub-sectors into four groups (Figure 2).

- "**Still growing**" (SG). Denotes sub-sectors with a rising LQ that was greater than 1 in 2013.
- "**Stagnating**" (ST). Denotes sub-sectors with a declining LQ that was greater than 1 in 2013.
- "**Emerging**" (EM). Denotes sub-sectors with a rising LQ that was lower than 1 in 2013.
- "**Shrinking**" (SH) Denotes sub-sectors with a declining LQ that was lower than 1 in 2013.

Figure 2. **Sub-sector classification by LQ value and change**



Compound annual growth rate (CAGR) of employment

The compound annual growth rate (CAGR) of employment complements the share of employment indicator by measuring whether employment in a sub-sector grew, fell or was constant between 2009 and 2013. However, because it is an average, it does not show volatility across the year and is very sensitive to the time frame considered.

Investment rate

The investment rate considers cumulative fixed capital formation per employee over the period 2009-13. It measures investment per employee in a given sub-sector and region relative nationwide investment per employee in the same sub-sector. It shows whether the sub-sector as a whole has been investing in fixed assets in the recent past compared to the sub-sector national average. However, the 2008 crisis and recovery in its aftermath have affected investment, which suggests that data from the 2009 and 2013 period have to be considered carefully.

Turkey's share of global sub-sector exports

The national share of global sub-sector exports divides the value of national exports from a sub-sector by the total global value of exports from the same sub-sector. The result indicates how Turkey performs on global world markets. Reported sub-sector export which originally complied with NACE Rev.1 codes data are harmonised with NACE Rev.2 sub-sector classification. Furthermore, data for NACE Rev.2 sub-sector classes C.13 to C.15 (textiles, apparel and leather) and codes C.17 to C.18 (paper and printing) are aggregated.

Income elasticity of domestic national demand

The final indicator, income elasticity of domestic demand, considers how domestic consumption – domestic production minus exports plus imports – changed in relation to the change in GDP. It complements the other five supply-side indicators with a measurement of domestic demand. Looking ahead, domestic demand elasticities can be used as simple estimates of short-term future demand trends. Sub-sector export and import data, which originally complied with NACE Rev.1 codes, are harmonised with NACE Rev.2 sub-sector classifications up to the highest possible extent.

2.3. Interrelations between sub-sectors

An analysis based on an input-output model goes beyond the analysis of separate sub-sectors and estimates interdependencies between sub-sectors at the national and regional levels. The indicators it uses are:

- employment multiplier;
- production multiplier;
- linkages between sub-sectors.

Like most countries, Turkey has only official data for national-level input-output tables. Out of the available options for drawing up regional input-output tables, this report used the LQ method based on employment data because they were available and consistent with the structural analysis method. In this case the LQ can be viewed as a measure of the ability of a sub-sector in a region to meet the demand from other sub-sectors and final demand in the region. Ability to meet demand is measured in the following way: if a sub-sector is less concentrated in the region than nationwide, it is seen as less capable of satisfying regional demand for its output, and its direct regional input coefficients are created by reducing the national coefficients accordingly. Conversely, if a sub-sector is more heavily concentrated in the region than in the nation, then it is assumed that the sub-sector's national input coefficients apply to the region. The regional surplus produced by the sub-sector may be exported to the rest of the nation.

Regional multipliers can be interpreted in two ways:

- To estimate linkages between sub-sectors in the national economy and to identify those closely connected. This information may be relevant to policy makers when they seek to identify sub-sectors with further development potential, e.g. those that are closely connected with dominant sub-sectors in the region.
- To evaluate the effect, in a particular sub-sector, of a dollar´s worth of final use (or production) on production, employment and value added in the whole regional economy. The importance of such a sub-sector is gauged not only by its direct effects on production, employment, and value added but by its complex linkages with and indirect effects on other industries within the region.

2.4. Human capital

Analysis of human capital compares levels of educational attainment by sub-sector with educational attainment by region. This report considers three indicators of educational attainment to provide a rough estimate of future and current skill gaps in the regions. The indicators are:

- the distribution of education levels in the workforce by sector at the national level in 2013 using European Labour Force Survey (EU LFS) data;
- distribution of education levels in the workforce by NUTS II region in 2013 using data from the Turkish Statistics Institute (TUIK);
- the share of companies citing the unavailability of adequately educated and trained staff as an obstacle in the 2014 Business Environment and Enterprise Performance Survey (BEEPS V) at the NUTS I level.

This report uses the first two indicators together to evaluate how the distribution of education levels within a region compares to the average distribution of education levels by sector at the national level. The objective is to gain initial insights into whether a region's labour force is likely to be skilled enough to sustain the economic growth of dominant and dynamic sub-sectors.

To gauge skills mismatches, the third indicator measures the share of companies that cite inadequate levels of education and skills in the workforce as an obstacle. In 2014, the BEEPS V survey interviewed more than 1 200 companies in different sectors and regions in Turkey. While it revealed gaps in levels of skills and education, its findings did not specify which skills or levels of education were undersupplied. However, the BEEPS V data do point to the need for further research into which skills are lacking. As the survey did not refer to an official NACE classification, all the information that it yielded should be seen as an estimation. Furthermore, the data are available at the NUTS I level.

As data on sectors in regions are unavailable, distributions of educational levels allow only broad comparisons between sectors and regions. The findings of the three indicators in human capital analysis should therefore be treated as the basis for further research when designing specific education and labour policies at the regional level for individual or types of sectors.

The results for Turkey of the upcoming OECD Programme for the International Assessment of Adult Competencies (PIAAC) will prove especially valuable. The PIAAC surveys adult skills in over 40 countries. The key skills areas in information-rich economies and societies are literacy, numeracy and problem-solving (OECD, n.d.[b]). The results profile skills by age, gender, education level, language background and occupation. Turkey took part in the second round of the PIAAC survey from 2012 to 2016 with the results recently published.

2.5. Policy objectives

Policy objectives area seeks to understand what Turkish policy makers consider their sectoral and regional development priorities to be. Analysis conducted comprised of a qualitative review of Turkey's government strategies at national, regional and sub-sector levels, which it then rounded with regional workshops (see Chapter 2.6., "Expert feedback").

Plans studied included national and regional documents. Turkey's Tenth Development Plan (2014-18) sets medium-term priorities. The plans aim to develop policies to increase regional productivity and contribute to national development, competitiveness and employment. Priority areas are more consistent, effective central policies, a development environment based on local dynamics, increased institutional capacity at the local level and accelerated rural development (OECD, 2014b). As for regional development plans, they define the mid-term strategies of regions. First-generation plans were drawn up in 2010, with the latest versions spanning the period 2014-23.

The analysis carried out by the project team reviewed the prioritised sub-sectors in government strategies at all levels and specialisations: the Tenth Development Plan, national strategies related to sector policies (the Industrial Strategy, the Incentive Scheme, the Official Exports Strategy and the SME Strategy), and each of the RDPs prepared by the 26 DAs.

2.6. Expert feedback

The project team drew on expert feedback to interpret existing analysis and to guide it in its work on sector interlinks and skills needs. To that end, it built on initial data analysis and collected additional information. The team designed a tailor-made qualitative method for facilitating discussion of regional sector development and gathering experts' interpretations of its foundational analysis of regional sector-related data. Two feedback-collection formats took a holistic view of the regional expert outlook: i) discussions, which allowed experts to air more complex, individual ideas and ii) surveys, which addressed all participants and structured and ranked the essential information that they provided.

A total of 24 expert group meetings covering all 26 regions were held between winter 2015 and spring 2016, with an average of 30 participants in total from DAs, provincial investment support offices, local chambers of commerce, the private sector and academia. Each meeting consisted of three main parts:

1. An overview of:
   - the national and regional economic structures;
   - recent trends in the manufacturing sector of the region – dominant sub-sectors, fast growing sub-sectors, trends in Turkey's manufacturing;
   - national and regional strategies with the emphasis on sector priorities.
2. Guided, open-ended discussion with regional experts that addressed the following questions:
   - What are the dominant sub-sectors in the region and how do you assess recent trends in and prospects of those sub-sectors?
   - What are the emerging sub-sectors with high-growth potential?
   - Do shortlisted dominant and emerging sub-sectors fit the region's defining characteristics (e.g. labour supply and natural resources)?
   - Do shortlisted sub-sectors fit the region's public policy objectives?
3. Sector detail survey
   - When discussions were complete, all the participants filled out a questionnaire. It was designed to collect regional insiders' views of their region's economic structure and manufacturing sub-sectors. Participants were asked to rate the growth potential of the 24 NACE manufacturing sub-sectors from 1 (low) to 4 (high). They identified the sub-sectors with the greatest growth potential and described seven key factors:
   - a skilled labour force;
   - information clusters in the region and neighbouring regions;
   - regional networks of suppliers;
   - scientific and technological infrastructure;
   - the presence of natural resources in the region and the neighbouring ones;
   - local demand for products produced;
   - national demand for products produced.

Both formats of qualitative information collection – the discussion and survey – informed data interpretation and the direction of future analysis. The open-ended responses which expressed more complex ideas brought important nuances to the understanding of the sub-sectors considered. Analysis of survey responses yielded better understanding of the views of all respondents.

2.7. Ways forward

The approach proposed here covers only some of the tools, methods and indicators listed in Chapter 1. It could, in fact, be expanded to include other relevant analytical directions and options including the level of geographic area, depth of subject analyses and regional priorities. The availability of existing and new quality data is a key pre-condition to expanding analyses. For example, data on sub-sector specific workforce skill needs at the regional level, data on sub-sector value-added at the regional level and data at the provincial level could take the conducted analyses deeper. As previously mentioned, the recently published OECD Programme for the International Assessment of Adult Competencies (PIAAC) results for Turkey will prove especially valuable in assessing workforce skill levels.

Approaches can be tailored to factor in the important role that geography plays in shaping the form of economic development through factors such as resource endowment, distance to markets, climate and density of settlement. Regional policy makers would benefit from considering these geographic factors when selecting the subject and form of future analysis.

Proximity to market and high-settlement density are associated with improved productivity opportunities through increased competition and greater economies of scale. Agglomeration effects can result in higher productivity, higher employment rates and higher levels of per capita GDP. However, they can be tempered with diseconomies of scale, congestion costs and oversupply of labour. Three main channels facilitate agglomeration economies:

1. sharing local public goods and facilities, access to a greater variety of inputs, narrower specialisation, and a deep and broad labour market;
2. matching between firms and workers, and more buyer and seller matching opportunities;
3. learning through generating, diffusing and accumulating technologies and skills (Duranton and Puga, 2004).

Conversely, low density economic entities are often characterised by production concentrated in relatively few sectors since they can't reach critical mass in many sectors. This translates into thinner backward and forward linkages and greater dependence on any given firm along the supply chain. Areas that are far from markets with low densities can improve road infrastructure between smaller cities to emulate the benefits that arise from economies of agglomeration.

These characteristics translate into the types of manufacturing associated with high and low density areas.

Most manufacturing tends to be "mature" in product-cycle terms. There are important exceptions to this rule, but cutting-edge manufacturing tends to be concentrated in large cities and to shift into more rural places where one or both of two conditions hold. The first is that proximity to some primary resource is important (e.g. the structure of transport costs is such that it is better to produce close to the resource rather than to the consumer market). The second is that the technology is mature enough that producers' main concern is cutting production costs – in short, production often shifts to more distant places when sectors are in decline. Where the latter motivation prevails, the tendency is to favour rural areas with good connections to major markets but low labour and real estate costs (OECD, 2015c).

All economic entities can contribute to increasing high-productivity employment through favourable business environments with competitive markets, business and research base connections, deep product and labour markets through internal and external connections, and policy co-ordination. However, the policy design and analyses to support it must be tailored to individual regional characteristics and priorities.

Chapter 3

Selected manufacturing trends in the OECD

A defining feature of economic development is the structural transformation of a traditional economy dominated by primary activities into a modern economy where high-productivity activities in manufacturing play an important role (Naudé and Szirmai, 2012). In the aftermath of the global economic crisis of 2008, the debate on the roles of manufacturing and services as sources of growth has reasserted itself on the policy agenda of OECD countries. The long-term process of de-industrialisation has irreversibly resulted in falling employment in manufacturing and a declining share of manufacturing in overall economic activity in OECD economies, which include Turkey (De Backer et al., 2012).

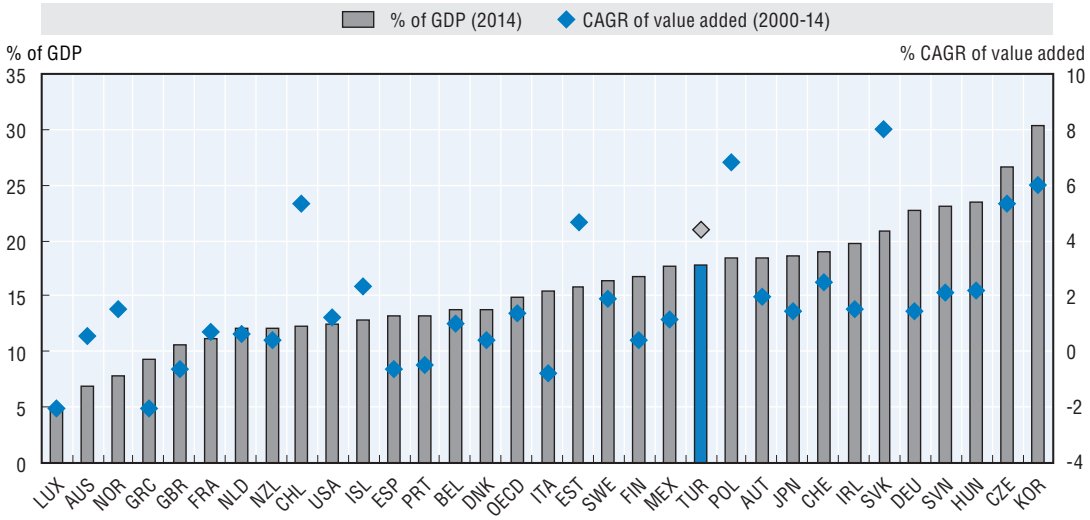
3.1. Role of the manufacturing sector in OECD economies

Although OECD countries' share of global manufacturing has been declining over recent decades, they still accounted for almost 60% of world manufacturing value added in 2012. The fragmentation of international manufacturing production has given rise to a division of labour where OECD countries have become increasingly specialised in marketing activities such as research and development (R&D), design, and innovation, etc. while some emerging countries have become more specialised in actual manufacturing and assembly. In other words, OECD countries specialise in the production of ideas, concepts and services (often higher value-added activities), but less so in the production of physical goods (ibid.).

Despite deindustrialisation, manufacturing still plays an important role in OECD economies. It contributed an average of 15% of national GDP in 2014, ranging from less than 5% in Luxemburg to over 30% in Korea. Turkey is among the OECD countries where, at almost 18%, manufacturing accounts for a relatively high proportion of manufacturing in GDP at almost 18% (Figure 3).

De-industrialisation reflects, in essence, the declining importance of manufacturing in national economies relative, for example, to the services sector. However, manufacturing production and value added have not necessarily contracted in absolute terms. From 2000 to 2014, most OECD countries experienced modest growth in manufacturing value added. The Slovak Republic, Poland and Korea, though, out-performed the OECD average, while in OECD countries hard hit by the crisis – Italy, Portugal, Spain and Greece – as well as the United Kingdom and Luxemburg manufacturing value added fell. As for Turkey, it enjoyed relatively strong growth with a compound annual growth rate of 4.4% (Figure 3).

Figure 3. **Manufacturing sector growth and contribution to GDP, 2014**
Manufacturing as percentage of GDP (left axis) and CAGR of value added (right axis)

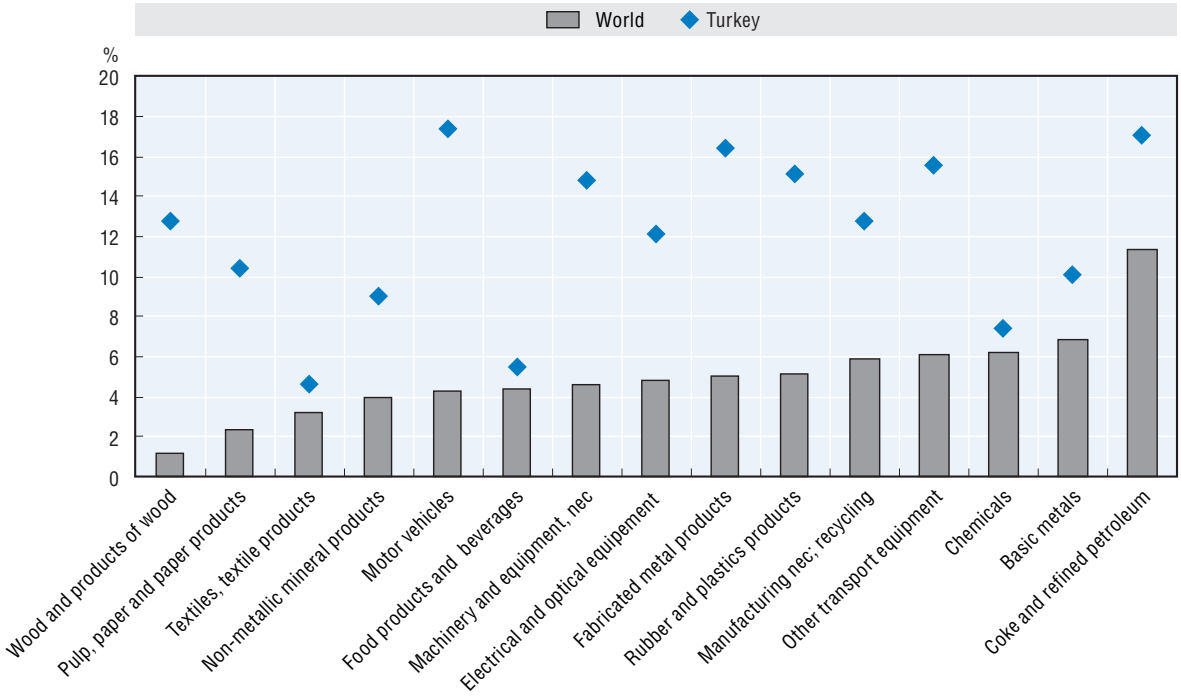


Source: World Bank (2014), "World Development Indicators", http://data.worldbank.org/data-catalog/world-development-indicators.

Global trade (based on export data) in all manufacturing sub-sectors grew from 1995 to 2011. The CAGR of global exports varies between 1.2% in the wooden products sub-sector and 11.3% in the coke and refined petroleum products sub-sector. Turkey outperformed the global growth rate in all subsectors. Export growth was slightly above the global average in textiles, foods products and non-metallic mineral products. Motor vehicles and transport equipment, fabricated metal products, and coke and refined petroleum products boasted the strongest export growth (Figure 4).

Figure 4. **Export growth by manufacturing sub-sector worldwide and in Turkey, 1995 to 2011**

Compound annual growth rates



Source: OECD WTO (2015), "Measuring Trade in Value Added Database", www.oecd.org/sti/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm.

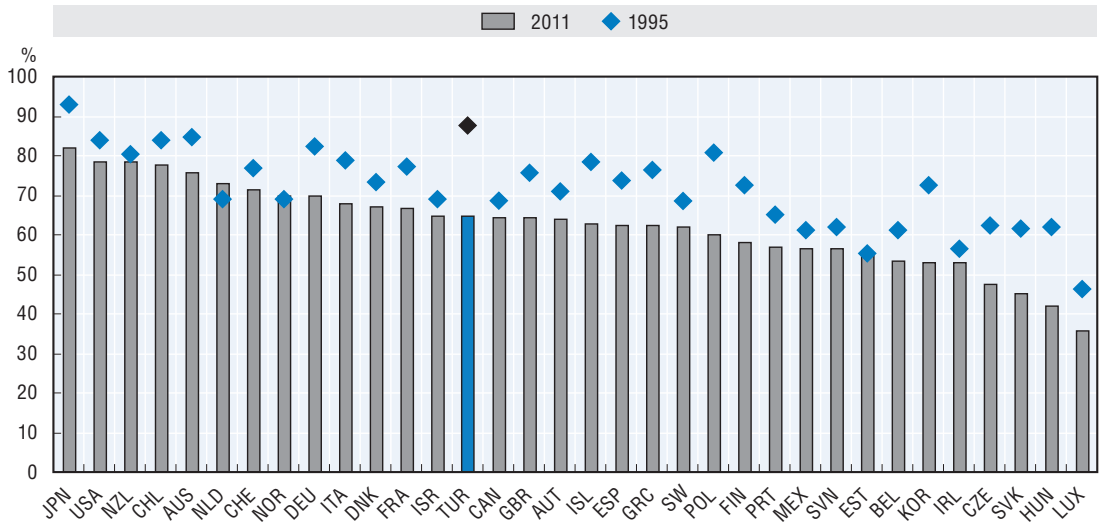
In recent decades, international trade in both the manufacturing and services sectors has climbed to unprecedented levels. The international fragmentation of production has spread rapidly, with intermediate products now representing about 50% of world trade in manufacturing goods. Global value chains (GVCs) have become a dominant feature of world trade, encompassing developing, emerging and developed economies. The whole process of producing goods – from raw materials to finished products – is increasingly carried out wherever the necessary skills and materials are available at competitive costs and quality.

The share of total export value made up of domestic value added in the manufacturing sector indicates how engaged countries are in GVCs and the value added gains from a country's exports. The measure is simply defined as the difference between gross output at basic prices and intermediate consumption at purchasers' prices as a percentage of total value.

In the OECD, the share of total export value made up of domestic value added in the manufacturing sector in 2011 varies from 35% in Luxemburg to 82% in Japan (Figure 5). With 65% of domestic value added over gross export, Turkey is among the countries with relatively high shares of domestic value added. However, trends in share of domestic value added in gross exports show that Turkey suffered the greatest decrease in share of value added in gross exports among OECD countries (22.8%). Domestic value added in gross exports has declined substantially for most of the OECD countries indicating a rise of foreign value added in their gross exports.

Figure 5. **Domestic value added of gross exports in the manufacturing sector, 1995 and 2011**

Percentage of total export value



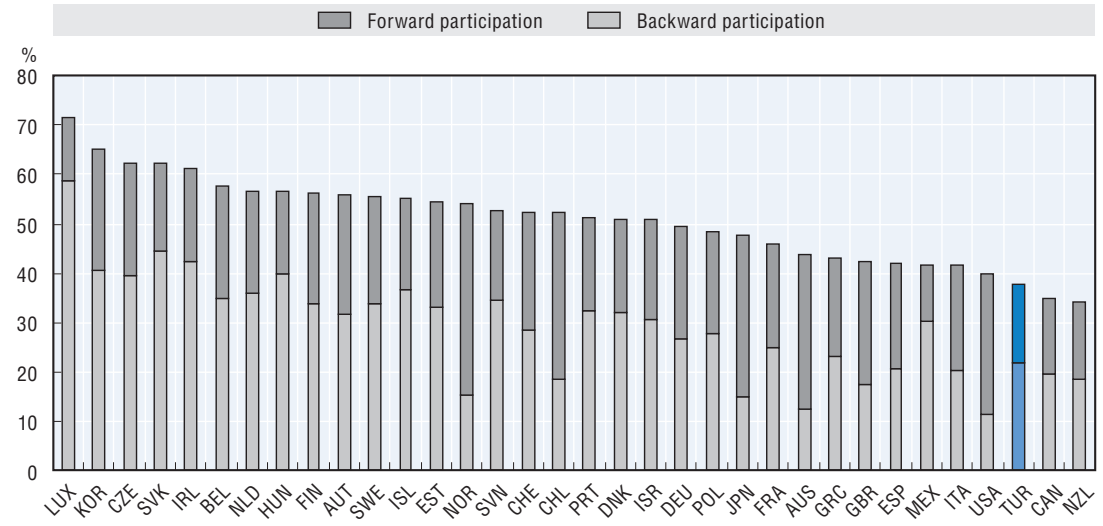
Source: OECD WTO (2015), "Measuring Trade in Value Added Database", http://www.oecd.org/sti/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm.

Forward and backward participation rates in GVCs are key indicators of a countries' involvement in vertically fragmented production. It measures backward participation –the value of imported inputs in the overall exports of a country – as well as forward participation – percentage of exported goods used as imported inputs to produce other countries' exports. The combination of those two measures offers a comprehensive assessment of a country's involvement in GVCs (De Baker and Miroudot, 2013).

Figure 6 depicting the Participation Index, suggests that small open economies (e.g. Luxembourg, Czech Republic, Slovak Republic) source more inputs from abroad than large economies. On the other hand, forward participation is distributed relatively evenly across all OECD countries. However, De Baker and Miroudot (2013) showed that the Participation Index is less correlated with the size of countries than the import content of exports.

Figure 6. **Global value chain forward and backward participation rate, 2009**

Percentage of country's gross manufacturing exports



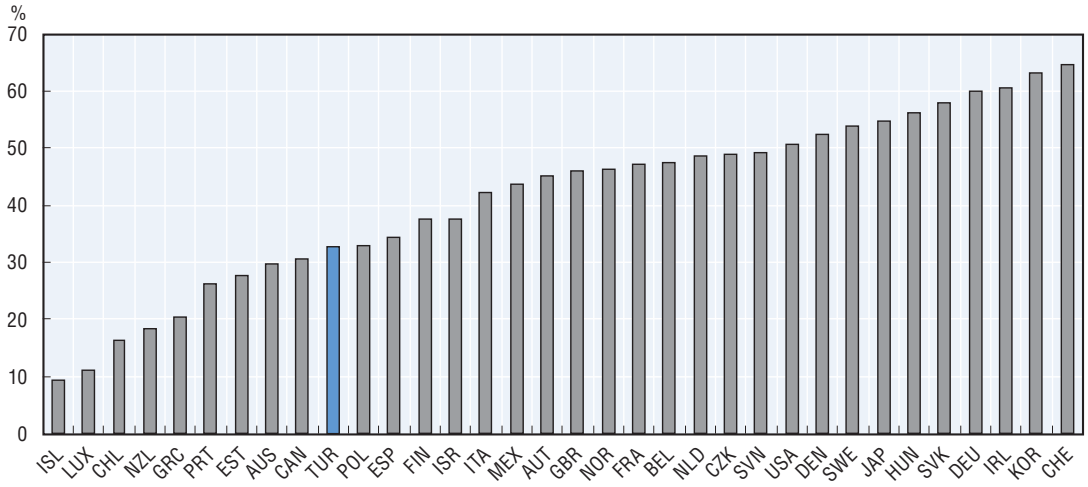
Source: OECD WTO (2015), "Measuring Trade in Value Added Database", http://www.oecd.org/sti/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm.

De-industrialisation has not affected all manufacturing sub-sectors to the same degree. Over the past 30 years, a steadily increasing share of OECD manufacturing employment has come from R&D-intensive manufacturing sub-sectors (Figure 7). Relatively fewer jobs have been lost in those sub-sectors – chemicals, machinery and transport equipment – than in others like textiles, plastics and basic metals. However, strong R&D-intensive manufacturing sub-sectors do not necessarily indicate high levels of R&D expenditure, since the share of imported intermediate goods is not taken into account.

The contribution of R&D intensive manufacturing sub-sectors differs across the OECD countries. Switzerland, Korea, Ireland and Germany have the highest share of value added generated by high or medium-high intensive R&D manufacturing sub-sectors. At just over 30% of total manufacturing value added, the share of R&D intensive manufacturing sub-sectors in Turkey is relatively low compared to its OECD peers.

Figure 7. **Value added in high and medium-high R&D intensive manufacturing sub-sectors, 2013**

Percentage of total value added in manufacturing



Source: UNIDO, Industrial Statistics Database, www.unido.org/resources/statistics/statistical-databases.html.

3.2. Manufacturing development trends

Major science and technology-driven changes in the production of goods and services are currently unfolding, while others – possibly more significant still – are on the horizon. Information and communication technologies (ICTs) such as the Internet of things (IoT), 3D printing, industrial biotechnology and nanotechnology have the potential to dramatically change the outlook of production in the next 10 to 15 years – and even support a new industrial revolution. The convergence between the different technologies is particularly likely to distinguish this revolution from "normal" technological advances and heralds disruptive change (OECD, 2015b).

The next production revolution will bring substantial economic and social changes with important implications for policy making. What, for example, will be the impact on labour markets? Will production still create jobs in the future, where they will be created and what type will they be? Tapping into the next production revolution requires action on many levels and in many different areas. Unlocking the potential of emerging and enabling technologies, in particular, requires policy development on a number of fronts, from commercialisation to regulation and the supply of skills through education.

Against this fast-changing background, UNIDO (2013) divides the competitive manufacturing systems of the future into six types:

- **Distributed manufacturing**. Manages operations across widely distributed production environments. Needs to adapt to serving a global customer base and recognise market opportunities when they arise.
- **Rapidly responsive manufacturing**. Able to respond quickly to changes in market conditions, customer preferences, innovation and social requirements.
- **Complex manufacturing**. As the fragmentation of manufacturing activity and the pace of technological innovation increase, manufacturers will require even more complex manufacturing designs, products, processes and operations.
- **Customized manufacturing**. As demand grows for personalized products and services, so does the need to produce an increasingly heterogeneous mix of products in large or small volumes.
- **Human-centred manufacturing**. Adapts to changes in workforce demographics in order to secure necessary skills and provide fulfilling jobs and safe working environments.
- **Sustainable and innovation-receptive manufacturing**. Able to quickly incorporate R&D developments into the production processes and safeguard the environment.

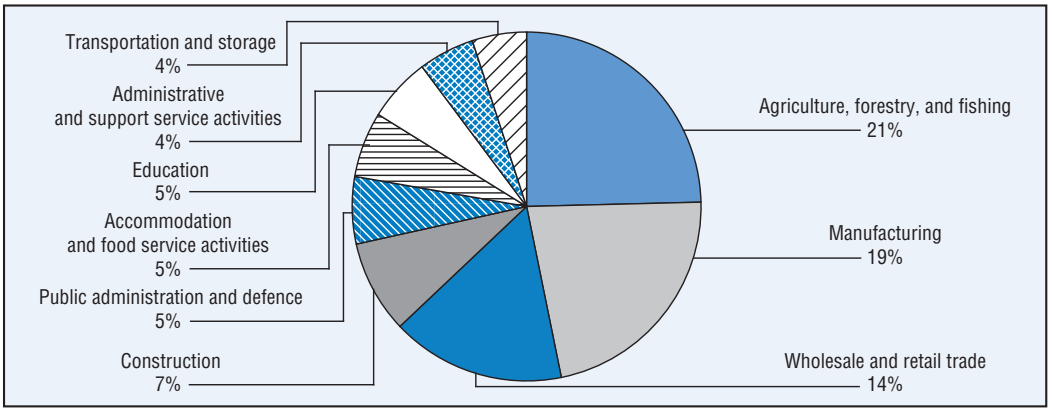
Chapter 4

Selected manufacturing trends in Turkey

4.1. Role of the manufacturing sector in Turkey

Although Turkey's economy is dominated by the industry and services sectors, agriculture still significantly contributes to GDP and accounts for 21% of total employment. The manufacturing sector in Turkey represents 19% of employment and chiefly makes products with low-and medium-technology content, although new sectors such as the automotive and electronics industries are growing. In the wake of the 2008 global economic and financial crisis, recovery saw the construction sector experience strong growth, contributing 7% to total employment in 2014. As for the services sector, it also grew, particularly in sectors related to finance and tourism. In 2014, it accounted for 50% of total employment.

Figure 8. **Sectors' shares of employment in Turkey, 2014**

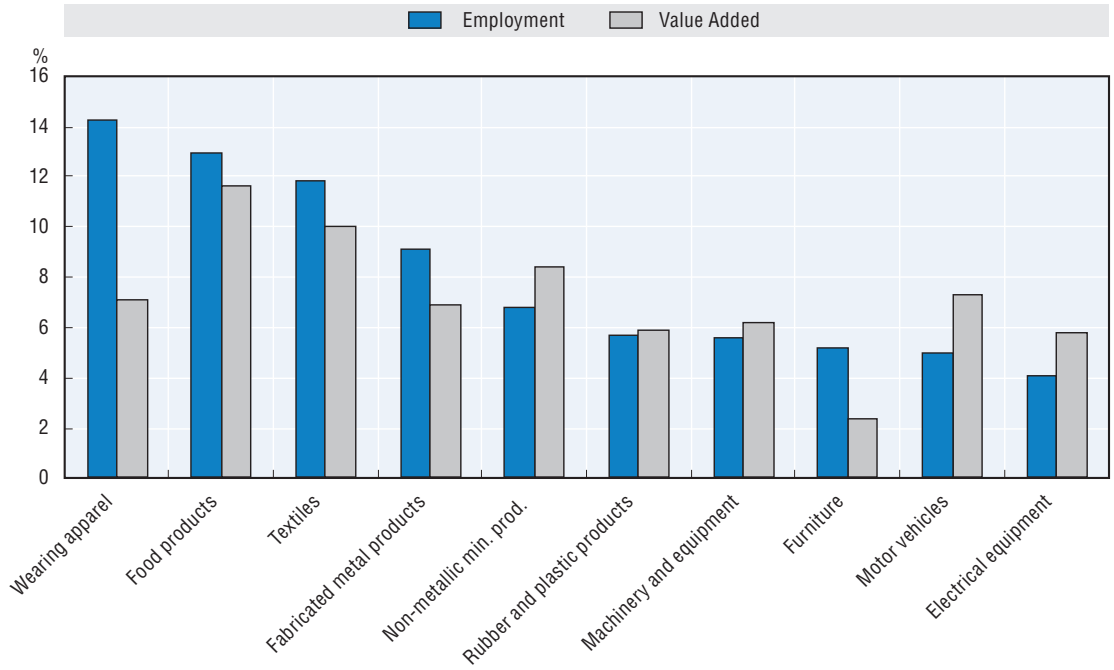


Source: TUIK (2015), "Statistics by items", www.turkstat.gov.tr/Start.do.

Manufacturing in Turkey is still chiefly driven by traditionally strong sub-sectors. Despite rising competition from Asian markets, wearing apparel and textile remain the backbone of Turkish manufacturing, accounting for 14% and 12% of total employment in the sector, respectively, and 26% combined. Yet they contribute less than 17% of manufacturing's total value added. Food processing – which benefits from a strong agricultural basis – is the second largest manufacturing sub-sector in Turkey, employing 13% of the workforce and generating 12% of total value added in manufacturing. As for the production of mineral products such as ceramics and glass – a traditionally strong sub-sector – it represents 7% of total manufacturing employment.

New higher value-added sub-sectors are also emerging, driven by domestic demand, proximity to the EU market and a skilled labour force. The automotive and electrical equipment sub-sectors are vital contributors to post-crisis economic growth. Turkey became the 15th largest automotive manufacturer in the world and employment in the automotive sector increased by 40% in the period from 2009 to 2014 (Republic of Turkey Prime Ministry Investment Support and Promotion Agency, n.d.). The electrical equipment sector has also enjoyed strong growth in employment and value added.

Figure 9. **The ten largest manufacturing sub-sectors in Turkey, 2013**
Percentage of manufacturing employment and value added



Source: TUIK (2015), "Statistics by items", www.turkstat.gov.tr/Start.do.

In the wake of the 2008 economic crisis, manufacturing in Turkey enjoyed growing domestic demand. Formal employment in the sector increased by 36% in 2009-13 and all sub-sectors – except other transport equipment (C.30) and tobacco products (C.12) – experienced growth in employment. Traditionally large sectors that create most of the jobs in manufacturing have recorded solid employment growth ranging from 7.7% in food products (C.10) to 11.5% in non-metallic mineral products (C.23).

Table 1. **Trends in Turkey's manufacturing sub-sectors**

NACE	Sector	Share of total employment (2013) (%)	CAGR employment (2009-13) (%)	Tenth Development Plan priority	Incentive scheme beneficiary	Estimated increase of domestic demand in 2016 (%)	Estimated increase of domestic demand in 2017 (%)	Share of TUR on global export 1995 (%)	Share of TUR on global export 2011 (%)
C.14	Wearing apparel	4.0	8.3	●		5.3	6.3	2.53	3.16
C.10	Food products	3.5	7.7	●		6.1	7.2	0.99	1.18
C.13	Textiles	3.2	9.9	●		7.8	9.3	2.53	3.16
C.25	Fabricated metal products	2.5	9.1	●		7.3	8.6	0.33	1.69
C.23	Non-metallic min. prod.	1.9	11.5		●	7.3	8.7	1.14	2.44
C.28	Machinery and equipment	1.5	10.3	●	●	10.0	11.9	0.20	0.85
C.22	Rubber and plastic products	1.5	7.7			7.3	8.7	0.38	1.65
C.31	Furniture	1.5	9.4	●		2.4	2.9	0.35	0.97
C.29	Motor vehicles	1.3	8.1	●	●	6.3	7.5	0.23	1.51
C.27	Electrical equipment	1.1	8.2	●	●	4.9	5.9	0.14	0.40
C.24	Basic metals	1.0	6.9	●	●	7.8	9.3	0.97	1.57
C.16	Wood and products of wood and cork, except furniture	0.6	1.7			5.9	7.0	0.13	0.73
C.20	Chemicals and chemical products	0.5	4.1	●	●	5.5	6.6	0.35	0.43
C.15	Leather and related products	0.5	10.5			7.1	8.4	2.53	3.16
C.32	Other manufacturing	0.5	7.4		●	2.4	2.9	0.35	0.97
C.18	Printing and reproduction of recorded media	0.5	2.8			2.4	2.8	0.14	0.46
C.33	Repair and installation of machinery and equipment	0.4	14.7						
C.17	Paper and paper products	0.4	8.3			8.4	10.0	0.14	0.46
C.21	Basic pharmaceutical products and pharmaceutical preparations	0.2	0.9	●	●				
C.26	Computer, electronic and optical products	0.2	5.0	●	●	4.9	5.9	0.14	0.40
C.30	Other transport equipment	0.2	-6.9	●		0.7	0.9	0.09	0.36
C.11	Beverages	0.1	6.1			6.1	7.2	0.99	1.18
C.19	Coke and refined petroleum products	0.1	5.5		●	5.7	6.7	0.33	0.74
C.12	Tobacco products	0.0	-26.0			-0.5	-0.6		

Note: Reported sub-sector export data, which originally complied with NACE Rev.1 codes data are harmonised with NACE Rev.2 sub-sector classification. Export data for NACE Rev.2 sub-sector codes C.13 to C.15 and codes C.17 to C.18 are aggregated.
Source: Adapted from TUIK (2015), "Statistics by items", www.turkstat.gov.tr/Start.do and OECD/WTO (2016), "Trade in value added", OECD-WTO: Statistics on Trade in Value Added (database), DOI: www.dx.doi.org/10.1787/data-00648-en.
Incentives Scheme adopted as Decree No. 3305 on 18 July 2012.

Positive trends can also be observed in emerging sectors focused on more sophisticated manufacturing. In the period 2009-13, CAGR of employment was 8.1% in motor vehicles (C.29), 8.2% in electrical equipment (C.27), and 10.3% in machinery and equipment (C.28).

Based on the OECD forecast of GDP growth in Turkey (OECD, 2016c) and the income elasticity of consumption in the period 200913, domestic consumption by sector can be roughly estimated for 2016 and 2017. Domestic demand for manufactured products appears set for overall growth, with the strongest increases in machinery and equipment (C.28) at 10.0% and 11.9% respectively. Paper products (C.17) and textiles (C.13) follow.

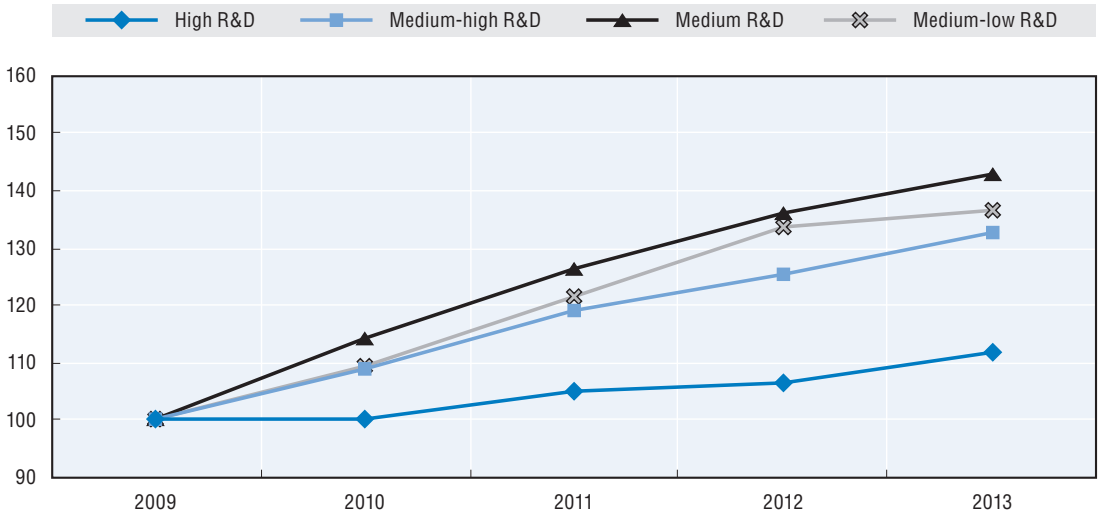
The EU is Turkey's main trading partner, accounting for 39% of total trade, followed by the neighbouring economies of the Middle East, the Gulf and Eurasia (OECD et al., 2016). Turkey's presence in GVCs has increased rapidly in recent decades. All its manufacturing sub-sectors increased their shares of exports between 1995 and 2011. In 2011, exports of textiles (C.13), wearing apparel (C.14) and leather and related products (C.15) accounted for 3.16% of total global export of those products – a rise of 0.63 percentage points compared to 1995. Turkey is also an important global exporter of non-metallic mineral products

(C.23) with 2.44% of global export in 2011, rubber and plastic products (C.22), with 1.65%, and basic metals (C.24), at 1.57%. Motor vehicles (C.29) recorded an outstanding increase in export in 2011, when they represented 1.51% of global exports of motor vehicles. Compared to 1995, Turkey's share of total motor vehicle exports increased seven-fold.

Despite positive trends in sophisticated manufacturing sub-sectors, those with medium and medium-low R&D intensity outperformed sectors that called on R&D more intensively in 2009-13 (Figure 10). The greatest increase in employment came in medium R&D-intensive sub-sectors at 42%, followed by medium-low with (36%). Sub-sectors classified as highly R&D intensive recorded an increase in employment of 11%.

Figure 10. **Employment growth by manufacturing R&D intensity group in Turkey, 2009-13**

Measured against index in 2009 of 100



Source: TUIK (2015), "Statistics by items", www.turkstat.gov.tr/Start.do.

4.2. Sector linkages

Turkey's economic structure, composed of interdependent sub-sectors, is complex and dynamic. Investigating interlinks between sectors can reveal evidence of clustering, value chains and production fragmentation. Such elements of the economic structure impinge directly on the design of policies which affect sector development.

National input-output analysis identifies closely interrelated sub-sectors. It shows the impact of a one dollar increase in final demand of a given sub-sector on another sub-sector's total production. For example, the agricultural sector in Turkey is closely related to food products (C.10), beverages (C.11), wood products (C.16), and accommodation and food services (I.55. and I.56). Table 2. shows the sub-sectors that are closely related to the five sub-sectors of high importance in Turkey (see Table D.4 for details).

Table 2. **Selected linkages between sub-sectors**

Agriculture (A.1, A.2, A.3)	Food products and beverages (C.10, C.11)
	Wood and products of wood (except furniture) (C.16)
	Accommodation and food services (I.55, I.56)
Textile and textile products (C.13, C.14)	Other manufacturing (including furniture and repair and installation of machinery) (C.31, C.32, C.33)
	Leather and related products (C.15)
	Paper and paper products and printing (C.17)
Food products and beverages (C.10, C.11)	Acommodation and food services (I.55, I.56)
	Leather and related products (C.15)
	Agriculture (A.1, A.2, A.3)
Basic metals and fabricated metal products (C.24,C.25)	Other manufacturing (inluding furniture and repair and instalation of machinery) (C.31, C.32, C.33)
	Machinery and equipment n.e.c. (C.28)
	Motor vehicles and transport equipment (C.29, C.30)
Other non-metallic mineral products (C.23)	Construction and construction services (F.41, F.42, F.43)
	Real estate activities (L.68)
	Basic metals and fabricated metal products (C.24,C.25)

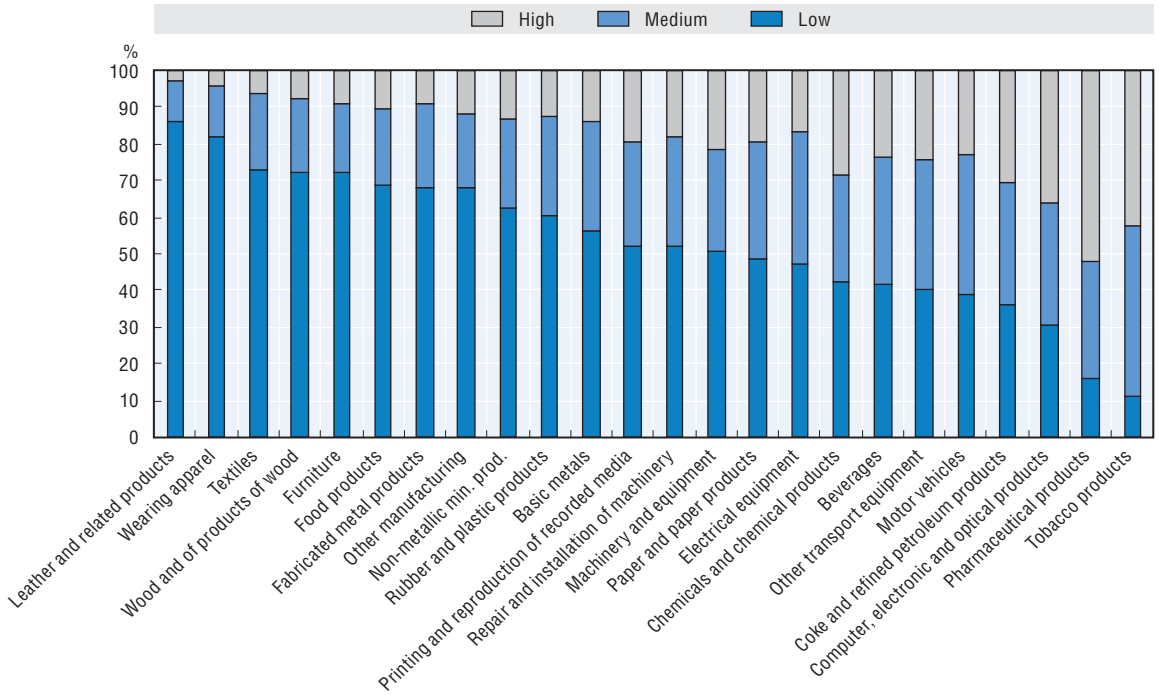
Source: Adapted from Timmer et al. (2015), "An Illustrated User Guide to the World Input–Output Database: the Case of Global Automotive Production", Review of International Economics, 23: 575–605, dx.doi.org/10.1111/roie.12178.

4.3. Human capital

Ensuring a good match between skills acquired in education and on the job and those required in the labour market is essential to making the most of investment in human capital and promoting strong, inclusive growth (OECD, 2011). Educational attainment and, by implication, labour force qualifications are seen increasingly as a determinant of economic outcomes not just for individuals, but also for enterprises and economies (OECD, 1989).

In 2014, basic pharmaceutical products (C.21), tobacco (C.12), and computer, electronics and optical products (C.26) were the sub-sectors that employed the highest shares of highly educated people in Turkey. Those with the lowest shares of highly educated employees were leather (C.15), wearing apparel (C.14) and textiles (C.13) (Figure 11).

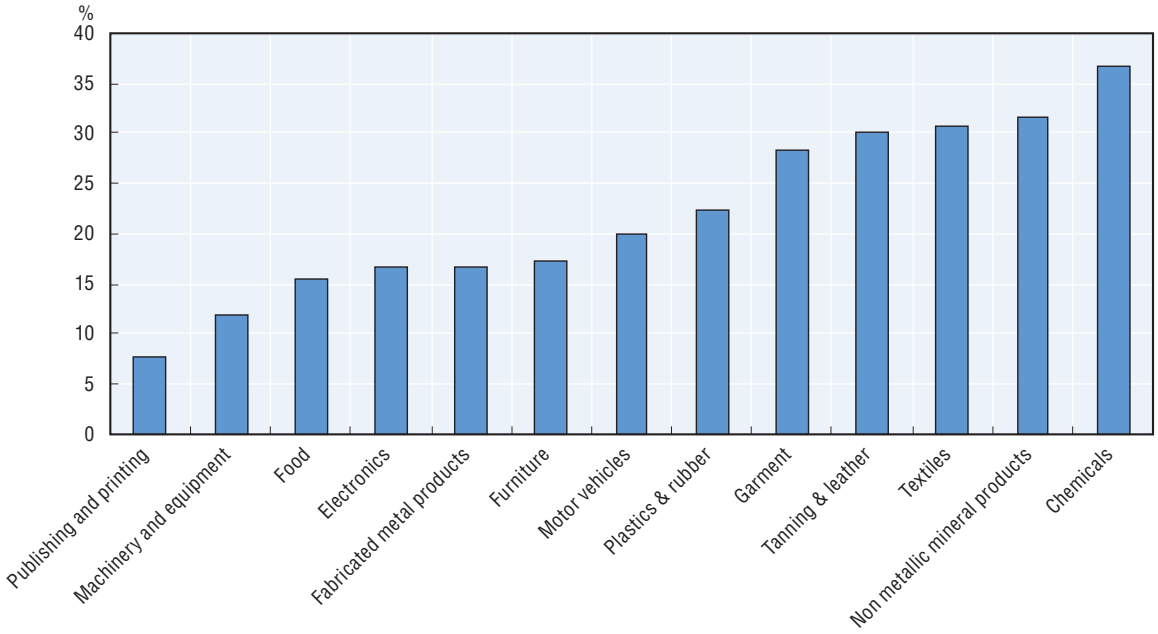
Figure 11. **Workforce educational attainment by manufacturing sub-sector, 2014**



Source: Eurostat (2015), "EU Labour Force Survey", ec.europa.eu/eurostat/web/lfs/overview.

One way to assess any skill gaps is to directly survey companies. In the 2014 Business Environment and Enterprise Performance Survey (BEEPS V), over 25% of manufacturing companies cited the lack of adequately educated labour as an obstacle. The distribution of companies voicing the complaint varied across manufacturing sub-sectors. The largest share, at almost 40%, was in the chemical products sector, while the publishing, printing and recorded media sub-sector had the lowest share (Figure 12).

Figure 12. **Companies struggling to find adequately educated workers by sub-sector, 2014**



Source: EBRD/World Bank, "BEEPS V", ebrd-beeps.com/.

4.4. National policy objectives

National development plans have provided guiding frameworks for Turkey's socio-economic development since 1963. Historically, its five-year development plans all aim to both maximise national income and reduce inter-regional disparities. The Tenth Development Plan maps the path to the 2023 goals announced by the government during the 2011 elections. The plan is built on three main chapters. The first chapter displays an overall introduction and a summary of global development trends. The second chapter defines objectives in four key areas: i) qualified people and strong society, ii) innovative production and steady high growth, iii) liveable places and sustainable environment, and iv) international co-operation for development. Finally, the third chapter sets out programmes and their targets, performance indicators, programme components and stakeholders.

The Tenth Development Plan envisions strong, stable growth through improved competitiveness facilitated by policies that put the emphasis on productivity, production processes, value added, infrastructure investment, foreign direct investment, education and R&D. The plan prioritises strategic sectors for policy co-ordination. They include agriculture (livestock and fishing), mining, renewable energy (hydroelectric), various tourism sectors and numerous manufacturing sub-sectors – such as chemicals, textiles, furniture, non-mineral products, metals, electric-electronic, machinery, automotive, shipbuilding, defence and aerospace, and food processing. The Tenth Development Plan does not establish any hierarchy among priority sectors.

Chapter 5

Regional profiles: Economic structure and manufacturing sub-sectors

This part summarises key findings from OECD analyses of the structure of the 26 NUTS II regional economies in Turkey. The information in each regional profile is drawn from OECD analysis, regional expert feedback and regional development plans. Not all sub-sectors are analysed in every region. Only manufacturing sub-sectors that account for more than 0.1% of total regional employment are considered. Each regional profile consists of five parts:

- An introduction, which overviews a region's strengths, weaknesses and particular features.
- The regional policy objectives set out in the regional development plan.
- Regional expert feedback, which summarises key conclusions from the expert group meetings held in each region.
- Dominant sub-sectors, i.e. the relatively larger and more regionally concentrated sub-sectors identified by OECD analysis and regional expert feedback.
- Dynamic manufacturing sub-sectors, i.e. those sub-sectors identified by OECD analysis as having elements that suggest growth potential.

Finally, each regional profile concludes with a table that summaries key manufacturing sub-sector statistics. The tables divide the sub-sectors into five groups. One is based on shares of employment and LQ value, while four groups are built on LQ value and recent change (i.e. changes between 2009 and 2013). The five groups are:

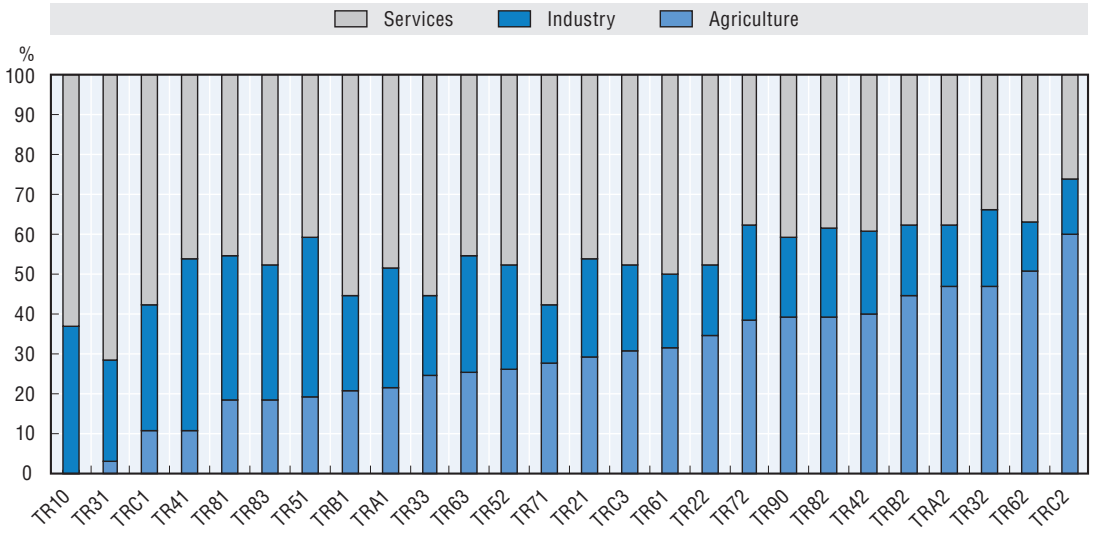
- "**Dominant**" (DO). Denotes sub-sectors with large shares of regional employment (in the top 10 sub-sectors for employment) and an LQ of over 1.
- "**Still growing**" (SG). Denotes sub-sectors with a rising LQ that was greater than 1 in 2013.
- "**Stagnating**" (ST). Denotes sub-sectors with a declining LQ that was greater than 1 in 2013.
- "**Emerging**" (EM). Denotes sub-sectors with a rising LQ that was lower than 1 in 2013.
- "**Shrinking**" (SH) Denotes sub-sectors with a declining LQ that was lower than 1 in 2013.

The regional profiles appraise at a glance the regional economies and key findings from OECD analysis. They do not claim to be comprehensive assessments and are not intended solely to guide sector-specific policy making processes. The aim of the regional profiles is to present the defining features of the manufacturing sub-sectors in each region using the same methodology and data sources. They can be seen as a first step towards more detailed sector analysis.

5.1. Regional overview

Turkish regions show great variation in economic structure and manufacturing sector development as assessed by five key indicators: i) share of employment by sector, ii) share of and compound average growth rate of manufacturing employment, iii) manufacturing diversification and iv) manufacturing technological intensity.

Figure 13. **Employment by sector in Turkey's regions, 2013**

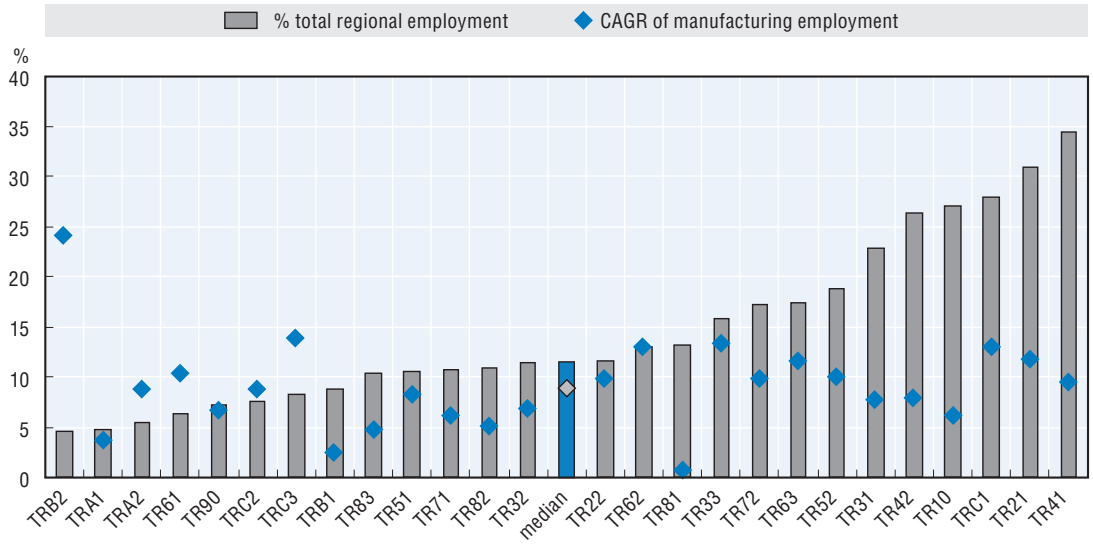


Source: Adapted from TUIK "Economic activities" (2013), TUIK (n.d), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

Turkey's regional economic structures as described by the distribution of employment across the three broad sectors of agriculture, industry and services are diverse. A few regions are dominated by services and industry, together accounting for at least 90% of employment in TR10 – Istanbul; TR31 – Izmir; TRC1 – Adıyaman, Gaziantep and Kilis; TR41 – Bilecik, Bursa and Eskişehir. On the other end of the spectrum, over half the workforce is engaged in agriculture in two regions, TR62 – Adana and Mersin and TRC2 – Diyarbakir and Şanlıurfa. The average share of employment in each sector is 29% in agriculture, 25% in industry and 46% in services. The share of employment in agriculture has the largest range from almost 1% to 60%. The share of employment in services ranges from 26-71% and in industry from 12% to 43%. Five regions have over a third of the workforce in industry: TR83 – Amasya, Çorum, Samsun and Tokat; TR81 – Bartin, Karabük and Zonguldak; TR10 – Istanbul, TR51 – Ankara; TR41 – Bilecik, Bursa and Eskişehir.

Figure 14. **Manufacturing employment by region**

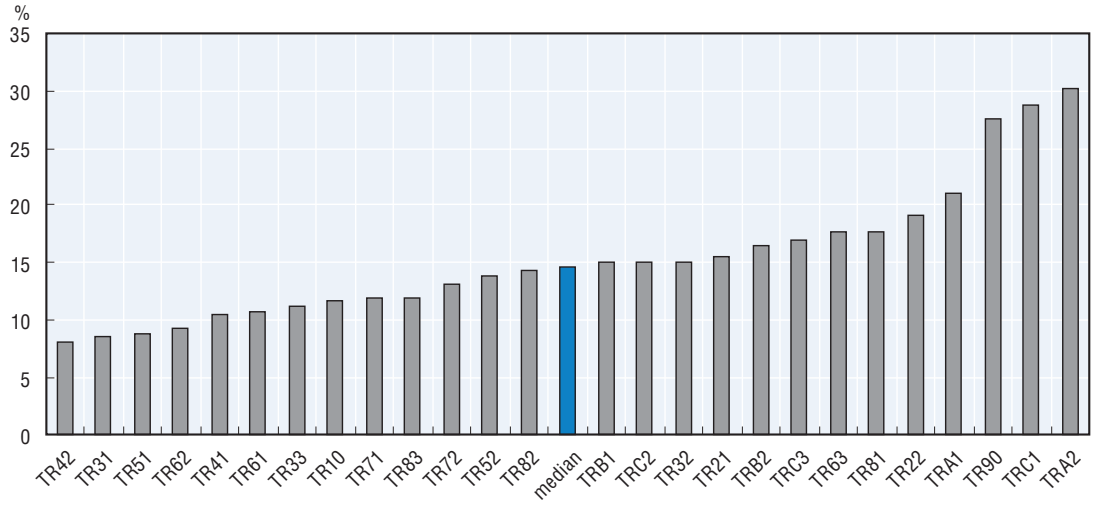
% of total employment (2012), CAGR of manufacturing employment (2009-13)



Source: Adapted from TUIK "Formal and informal employment by economic activities" (2012), TUIK (n.d), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

Within the industry sector, the manufacturing sector regional median share of total employment is just over 10% with a median manufacturing compound average growth rate (CAGR) between 2009 and 2013 of 9%. While manufacturing employs less than 5% of two regions' workforces, TRB2 – Bitlis, Hakkari, Muş and Van, TRA1 – Bayburt, Erzincan and Erzurum, it employs about a third of two regions' workforces, TR41 – Bilecik, Bursa, and Eskişehir and TR21 – Edirne, Kırklareli and Tekirdağ. Regional employment in manufacturing has grown in all regions from 2009 to 2013. The annual compound growth rate varies from four regions with less than 5% with TR81 almost approaching 1% to nine regions with rates above 10% with TR82 reaching 24%. The share of regional employment and CAGR are not correlated with regions with larger and smaller shares of manufacturing employment both experiencing a range of higher and lower CAGRs.

Figure 15. **Diversification of manufacturing sector by region, 2013**
Herfindahl-Hirschman Index

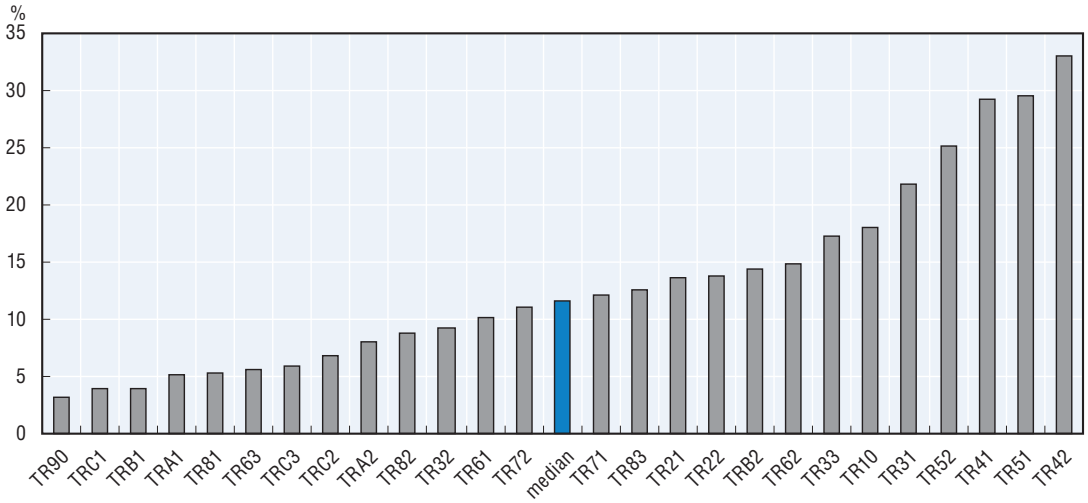


Source: Adapted from TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

The Herfindahl-Hirschman Index (HHI) shows variation across manufacturing sector diversification across Turkey's regions. Increasing manufacturing development is associated with diversification. The three regions with the least diversified manufacturing sectors have HHI values over 25 – TRA2 – Ağrı, Ardahan, Iğdır and Kars; TRC1 – Adıyaman, Gaziantep and Kilis; TR90 – Artvin, Giresun, Gümüşhane, Ordu, Rize and Trabzon. The four regions with the most diversified manufacturing sectors have HHI values under 10 – TR42 –Düzce, Bolu, Kocaeli, Sakarya and Yalova; TR31 – Izmir; TR51 – Ankara; TR62 – Adana and Mersin.

Figure 16. **Employment in high and medium-high R&D intensive manufacturing sub-sectors, 2013**

Percentage of total regional manufacturing employment



Source: Adapted from TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

Manufacturing sub-sectors with higher ratios of investment in research and development (R&D) to gross value added enables advances in economic structure towards more technology-intensive fields. Four regions employ more than 25% of their manufacturing workforce in R&D intensive sub-sectors – TR42 – Kocaeli, Sakarya, Düzce, Bolu and Yalova; TR51 – Ankara; TR41 – Bursa, Bilecik and Eskişehir; TR52 – Konya and Karaman. On the other end of the spectrum, three regions employ less than 5% of their manufacturing labour force in R&D intensive sub-sectors – TR90 – Artvin, Giresun, Gümüşhane, Ordu, Rize and Trabzon; TRC1 – Gaziantep, Adıyaman and Kilis; TRB1 – Malatya, Elazig, Bingöl and Tunceli. The share of manufacturing employment in R&D intensive sub-sectors is broadly associated with more diversified manufacturing sectors as measured by the HHI.

5.2. Region TR10 – Istanbul

TR10 is one of Turkey's most economically diverse regions. As a result, the tools used in this report might be less comprehensive to its economic structure. The profile should be read in conjunction with other more targeted analyses.

Introduction

Istanbul is Turkey's largest city and strategically connects Europe to the Middle East and Central Asia. Istanbul's economic structure is now highly diversified and includes knowledge-based clusters, research and development centres, technoparks, and high-tech industries. TR10 is also an innovative ecosystem thanks to its young, educated and entrepreneurial workforce. As large companies have chosen Istanbul as their headquarters, the economic structure of the region has shifted from being efficiency-driven to innovation-driven. In 2012, more than 60% of the working population were employed in service sectors, with logistics, real estate, tourism, finance, insurance consultancy and legal activities considered to be Istanbul's most competitive sectors (İSTKA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) promotes "freedom, innovation and culture". The Plan is structured around three key development axes i) globally decisive, high value-added, innovative and creative economy ii) fair sharing, inclusive and learning society; and iii) joyful authentic urban spaces and sustainable environment. It prioritises the services sector (financial services, media, education, health, IT consulting, senior services, real estate and construction, and logistics), tourism and culture, creative industries, industry (computer, electronic and optical products, pressing and reproduction of the recorded media, wood and wood products, manufacture of the beverages and the food, paper and paper products, basic metals, chemicals and chemical products, textiles and apparel products, rubber and plastic products, machinery and equipment manufacturing, fabricated metal products, electrical equipment manufacturing, chemicals and chemical products, other non-metallic products) (İSTKA Development Agency, n.d.b). TR10 places greater emphasis on the service sector than other regions. It is also one of the few regions where agriculture is not identified as a priority.

Regional expert feedback

On 1 April 2016, at the expert group meeting in Istanbul, regional experts identified food products (C.10), apparel (C.14), fabricated metal products (C.25), food and beverage service activities (I.56), and tourism as dominant sub-sectors in the TR10 region. During the workshop discussion and in the survey, they also identified the repair and installation of machinery and equipment (C.33), computer programming (J.62), accommodation (C.55), pharmaceutical products (C.21), and computer, electronic and optical products (C.26) as having high growth potential in the region.

Dominant sub-sectors

A defining feature of TR10's economy is its large services sector, which accounts for 68% of regional employment, followed by industry (36%) and agriculture (0.5%). The manufacturing sector plays an important role in the regional economy with 26% of total employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 11.68, more diversified than the regional median of 14.62. TR10 has two dominant sub-sectors: i) wearing apparel (C.14), accounts for over 7% of total regional employment and with an LQ of 1.8, and ii) food and beverage services (I.56), which accounts for a considerable share of regional employment (nearly 6%) with an LQ value of 1.2.

Dynamic manufacturing sub-sectors

In addition to the dominant sub-sectors described above, LQ analysis shows that the region is relatively specialised in repair and installation of machinery (C.33), pharmaceutical products (C.21), and printing and reproduction of recorded media (C.18). A number of higher value-added sub-sectors recorded an increase in their absolute and relative growth – furniture (C.31), basic metals (C.24), and computer, electronic and optical products (C.26). Despite employing a sizable proportion of the regional labour force, a relative regional specialisation decreased in furniture (C.31), textiles (C.13) and fabricated metal products (C.25).

Of Turkey's regions, TR10 has – at 25.8% – the 2nd-highest share of tertiary-educated workers in its labour force. Manufacturing sub-sectors that require a relatively well educated labour force could, therefore, offer potential for further development. However, 18% of the 292 companies that the BEEPS V survey questioned in the broader Marmara region, which includes TR10, reported struggling to find adequately educated employees. For example, more than one-quarter of the companies in chemicals and chemical products (C.20) perceived the current lack of skilled labour as an obstacle which could hamper growth.

Table 3. **Key statistics on manufacturing sub-sectors in TR10**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Marmara region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	14	Wearing apparel	1.85	-0.01	7.41	8.26	1.12	●	n/a	n/a	27
SG											
ST	33	Repair and installation of machinery and equipment	1.72	-0.31	0.75	10.11	1.51				
	15	Leather and related products	1.52	-0.17	0.76	7.67	1.19				20
	17	Paper and paper products	1.38	-0.07	0.59	7.04	0.84				
	27	Electrical equipment	1.27	-0.10	1.37	6.26	0.69	●	●	●	
	32	Other manufacturing	1.75	-0.27	0.82	3.64	1.10				
	18	Printing and reproduction of recorded media	1.59	-0.01	0.73	2.80	1.05				
	21	Basic pharmaceutical products and pharmaceutical preparations	1.92	-0.02	0.45	0.74	n/a		●	●	
	20	Chemicals and chemical products	1.13	-0.25	0.58	-0.89	0.92	●	●	●	26
EM	31	Manufacture of furniture	0.71	0.02	1.03	10.24	0.97				0
	24	Basic metals	0.54	0.02	0.51	8.19	0.44	●	●		
	26	Computer, electronic and optical products	0.98	0.03	0.22	5.88	0.62	●	●	●	
SH	23	Other manufacturing	0.46	-0.03	0.85	9.62	1.14				
	28	Machinery and equipment n.e.c.	0.92	-0.07	1.40	8.42	0.77	●		●	11
	13	Textiles	0.68	-0.10	2.14	6.39	0.70	●			28
	22	Rubber and plastic products	0.96	-0.07	1.43	5.99	1.00				17
	10	Food products	0.48	-0.04	1.68	5.70	0.86				5
	25	Fabricated metal products, except machinery and equipment	0.93	-0.17	2.29	4.79	0.89	●			5
	29	Motor vehicles, trailers and semi-trailers	0.38	-0.13	0.50	0.65	0.73	●	●	●	
	16	Wood and products of wood and cork, except furniture	0.46	-0.09	0.26	-2.55	0.73				0
	30	Other transport equipment	0.72	-0.54	0.15	-19.02	1.66	●			

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; İSTKA Development Agency, İSTKA 20142023 Regional Development Plan, TR10, www.istka.org.tr/content/pdf/2014-2023%20istanbul%20bolge%20Plani_opt.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.3. Region TR21 – Edirne, Kırklareli and Tekirdağ

Introduction

The TR21 region comprises the provinces of Edirne, Kırklareli and Tekirdağ located on the western coast of Turkey where it borders Europe. The economic structure of the Edirne and Kırklareli provinces is built principally on agriculture and agrofood industries, while Tekirdağ has developed industrial production. In addition to rich groundwater, the region has many mineral resources such as lignite and coal. However, the unrestrained industrial development of the last two decades has affected the environment. In response, the regional government introduced the Environmental Plan for Ergene Basin in 2009 to structure further industrial activity (TRAKYA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) envisions a region "based on innovation and co-operation with high added value production capacities, [which preserves] natural and cultural values, and [achieves] high living standards." The RDP has three areas of focus: i) people and the community; ii) life and the environment; and iii) production and the economy. It prioritises agriculture, food, textiles, chemicals, electric-electronic components, machinery, and automotive industry (TRAKYA Development Agency, n.d.[b]).

Regional expert feedback

At the expert group meeting in Tekirdağ on 16 February 2016, regional experts identified rubber and plastic products (C.22), food products (C.10), beverages (C.11) machinery and equipment (C.28), and textiles (C.13) as dominant sub-sectors in the TR21 region. During the discussions at the workshop and in the survey, regional experts identified basic metals (C.24), chemicals (C.20), tourism, renewable energy, and pharmaceutical products (C.21) as having high growth potential for the region.

Dominant sub-sectors

The TR21 regional economy boasts a large industry sector that accounts for 40.4% of regional employment. It is followed by services (39.9%) and agriculture (19.6%). Manufacturing plays an important role in the regional economy, with 31% of total employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 15.43, slightly more concentrated than the regional median of 14.62. From an employment perspective, five dominant sub-sectors were identified. Textiles (C.13) and wearing apparel (C.14) together account for 24% of regional employment, with strong regional specialisations reflected in their LQs of 4.8 and 2.2, respectively. The three other dominant sub-sectors are food products (C.10), other non-metallic mineral products (C.23), and rubber and plastic products (C.22), which count for nearly 11% of total regional employment.

Dynamic manufacturing sub-sectors

Manufacturing in TR21 is relatively well developed in scope and depth compared to the national average. In addition to the dominant sub-sectors highlighted above, the region is relatively specialised in pharmaceutical products (C.21) and beverages (C.11). A number of higher value-added sub-sectors recorded strong absolute and relative growth. Examples are chemicals (C.20), wood products (C.16), and machinery and equipment (C.28). Despite employing a sizable proportion of the regional labour force, a relative regional specialisation dropped in furniture sector (C.31) and motor vehicles (C.29).

At 17.8%, TR21 is the region with the 8th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well educated labour force thus have potential for development. Of the 292 companies that the BEEPS V survey questioned in the broader Marmara region, which includes TR21, 18% reported struggling to find adequately educated employees. For example, more than one-quarter of the companies in chemicals (C.20) perceived the current lack of skilled labour as an obstacle that could hamper growth.

Table 4. **Key statistics on manufacturing sub-sectors in TR21**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Marmara region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	13	Textiles	4.83	-0.25	15.32	9.56	1.98	●	n/a	n/a	28
	14	Wearing apparel	2.17	0.10	8.72	10.76	4.95	●	n/a	n/a	27
	10	Food products	1.35	0.27	4.71	15.00	1.67	●	n/a	n/a	5
	23	Other non-metallic mineral products	1.66	0.27	3.08	17.77	1.06		n/a	n/a	27
	22	Rubber and plastic products	1.54	0.23	2.30	13.17	2.53		n/a	n/a	
SG	20	Chemicals and chemical products	1.80	0.83	0.90	21.90	0.70	●	●	●	26
	16	Wood and of products of wood and cork, except furniture	1.50	0.67	0.82	18.50	n/a				0
	24	Basic metals	1.70	0.47	1.58	16.50	0.60			●	
	17	Paper and paper products	2.70	0.16	1.16	11.50	0.90				
	27	Electrical equipment	2.00	-0.03	2.21	9.50	n/a	●		●	
	11	Beverages	3.00	0.07	0.34	7.40	0.80		●	●	5
	21	Basic pharmaceutical products and pharmaceutical preparations	3.60	0.39	0.85	5.10	1.70			●	
ST	15	Leather and related products	2.00	-0.58	1.02	5.10	0.90				
EM	28	Machinery and equipment n.e.c.	0.90	0.51	1.29	35.30	0.90	●	●		11
	25	Fabricated metal products, except machinery and equipment	0.70	0.05	1.76	12.60	0.70				5
	32	Other manufacturing	0.60	0.03	0.29	10.30	n/a				
	18	Printing and reproduction of recorded media	0.50	0.03	0.23	5.40	0.97				
SH	33	Repair and installation of machinery and equipment	0.70	-0.01	0.29	14.00	0.25		●		
	29	Motor vehicles, trailers and semi-trailers	0.90	-0.05	1.16	7.30	n/a	●	●	●	
	31	Furniture	0.30	0.30	0.48	3.20	0.80				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; TRAKYA Development Agency, Trakya Region 20142023 Regional Development Plan, TR21, www.trakyaka.org.tr/uploads/docs/2014%20-%202023%20B%C3%96LGE%20PLANI%20TASLA%C4%9EI%20BASKI.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.4. Region TR22 – Balıkesir and Çanakkale

Introduction

The TR22 region comprises the Çanakkale and Balıkesir provinces located to the south of the Sea of Marmara. It has access to the Marmara region via the Dardanelles Strait. The regional economy is centred on agriculture, livestock and agricultural industry. While Balıkesir has rich natural resources such as boron, coal, iron, chromium, marble, zinc, kaolene and zeolite. Çanakkale performs well in tourism (GMKA Development Agency n.d. [a]; MoCT, 2007).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to achieve "qualified human capital, in a competitive and liveable South Marmara." The RDP has three key objectives: i) social standards with quality and developed human capital; ii) liveable spaces and environment; and iii) strong, competitive economy. The RDP prioritises agriculture, food, tourism, mining activities, metals and renewable energy (GMKA Development Agency n.d.[b]).

Regional expert feedback

On 17 February 2016 at the expert group meeting in Çanakkale, regional experts identified food products (C.10), tourism, basic metals (C.24), mining activities, other non-metallic mineral product (C.23) and renewable energy as dominant sub-sectors in the region. During discussions and in the survey, they also identified the manufacturing of beverages (C.11), furniture (C.31) and products of wood (C.16) as having high growth potential for the region. Participants also underscored the importance of environmental issues.

Dominant sub-sectors

Employment data analysis shows that regional economic activities are concentrated principally in the services sector which accounts for 47.8% of employment. It is followed by a large agriculture sector with 30.9% and industry with 21.3% of regional employment. Manufacturing plays a relatively limited role in the regional economy, with just 12% of total employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 19.21, more highly concentrated than the regional median of 14.62. Employment data analysis identified several dominant sub-sectors in the region. Food products (C.10) represents around 9% of total employment and has the greatest LQ value of 2.5, indicating strong regional specialisation in this sub-sector. Food and beverage services (I.56) and land transport and transport via pipelines (H.49) are similar when it comes to employment levels, although the former has a greater LQ (1.5 compared to 1.2). Non-metallic mineral products (C.23) has a relatively high LQ at 1.8, though its share of regional employment is lower (around 3%). Finally, accommodation (I.55) does not reach the same levels of employment or LQ as the other dominant sub-sectors.

Dynamic manufacturing sub-sectors

Manufacturing in TR22 is relatively underdeveloped in comparison to the national average. Apart from the dominant sub-sectors described above, the region is relatively specialised in beverages (C.11) and wood products (C.16). However, a number of higher value-added sub-sectors recorded strong absolute and relative growth – motor vehicles (C.29), machinery and equipment (C.28), rubber and plastic products (C.22), and chemical products (C.20). Despite employing a sizable proportion of the regional labour force, the region became relatively less specialised in the furniture sub-sector (C.31).

At 17.3%, TR22 is the region with the 9th-highest share of workers in the labour force educated to tertiary level. The manufacturing sub-sectors that require a relatively well educated labour force might thus have potential for further development. Of the 292 companies that the BEEPS V survey questioned in the broader Marmara region, which includes TR22, 18% reported struggling to find adequately educated employees. These companies were concentrated in a few sectors which require a greater share of highly educated staff. For example, more than one-quarter of the companies in chemicals (C.20) perceived the current lack of skilled labour as an obstacle, which could hamper growth.

Table 5. **Key statistics on manufacturing sub-sectors in TR22**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Marmara region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	2.54	0.21	8.83	7.83	2.32	●	n/a	n/a	5
	23	Other non-metallic mineral products	1.79	0.45	3.32	17.32	0.76	●	n/a	n/a	27
SG	11	Beverages	1.01	0.28	0.12	12.79			●	●	5
ST	16	Wood and products of wood and cork, except furniture	2.22	-0.75	1.24	-7.33	0.37		●	●	0
EM	29	Motor vehicles, trailers and semi-trailers	0.40	0.29	0.53	45.65				●	
	28	Machinery and equipment n.e.c.	0.80	0.37	1.21	25.95	1.10			●	11
	22	Rubber and plastic products	0.57	0.24	0.85	20.57					17
	25	Fabricated metal products, except machinery and equipment	0.65	0.17	1.61	15.29	0.60	●			5
	33	Repair and installation of machinery and equipment	0.58	0.05	0.26	14.83			●	●	
	15	Leather and related products	0.81	0.16	0.40	14.21					
	32	Other manufacturing	0.38	0.08	0.18	11.87				●	
	20	Chemicals and chemical products	0.98	0.29	0.50	11.37		●			26
	30	Other transport equipment	0.70	0.36	0.15	9.41			●		
	14	Wearing apparel	0.18	0.02	0.74	9.23					27
	27	Electrical equipment	0.63	0.06	0.68	8.57					
	13	Textiles	0.13	0.00	0.42	8.55					28
	18	Printing and reproduction of recorded media	0.60	0.13	0.28	7.00	0.70				
SH	31	Furniture	0.85	-0.18	1.24	2.07			●	●	

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.

Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; GMKA Development Agency, South Marmara Region 20142023 Regional Development Plan, TR22,www.gmka.org.tr/uploads/downloads/dosya/bolge_plani/TR%2022%20G%C3%BCney%20Marmara%20B%C3%B6lgesi%202014-2023%20B%C3%B6lge%20Plan%C4%B1. pdf (accessed February 2015); TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.5. Region TR31 – Izmir

TR31 is one of the most economically diverse regions of Turkey. As a result, the tools used in this report might be less comprehensive to its economic structure, and the profile should be read in conjunction with other more closely targeted analyses.

Introduction

The TR31 region is located on the Aegean coast of Turkey. The region is considered an important trade centre both in the region and in Turkey. It is also the gateway to Europe, which affords it significant logistical advantages. İzmir is currently the third largest city in Turkey and an important economic hub for the Turkish economy. Moreover, 32 of the 500 largest industrial organisations in Turkey are located in İzmir (IZKA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to make "Izmir the centre of attraction of the Mediterranean region, with information, design, and innovation." The RDP has three areas of focus: i) strong economy; ii) high standard of living and iii) strong society. Drawing on the current economic weight of the sub-sectors in the region, the RDP identifies important sub-sectors – agriculture, organic agriculture, metals, furniture, food processing, beverage, wearing apparel, leather goods, chemicals, tourism (cruise, seaside culture, faith, convention, nature, gastronomy and ecotourism), renewable energy (wind, solar and geothermal) and logistics (IZKA Development Agency, n.d.[b]).

Regional expert feedback

On 17 December 2015 at the expert group meeting in Izmir, regional experts identified coke and refined petroleum products (C.19), motor vehicles (C.29), furniture (C.31), chemicals (C.20), wearing apparel (C.14), rubber and plastic products (C.22), and machinery and equipment (C.28) as dominant sub-sectors in the region. During discussions and through the survey, regional experts also identified the manufacturing of other transport equipment (C.30), renewable energy, beverages (C.11), and computers, electronics and optical products (C.26) as sectors with high growth potential.

Dominant sub-sectors

The regional economy has a large services sector, which accounts for 57.8% of regional employment, followed by industry (31.7%) and agriculture (10.5%). The manufacturing sector in Izmir plays an important role in the regional economy with 23% of regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 8.54, more diversified than the regional median of 14.62. Employment data analysis identified five dominant sub-sectors: services to buildings and landscape activities (N.81), wearing apparel (C.14), food products (C.10), fabricated metal products (C.25), and food and beverage services (I.56). Each of them represents less than 6% of regional employment and their LQs ranging from 1 to 1.3.

Dynamic manufacturing sub-sectors

In addition to the dominant sub-sectors, TR31 is also relatively specialised in leather (C.15), machinery and equipment (C.28), and printing and reproduction of recorded media (C.18). A number of higher value-added sub-sectors recorded strong absolute and relative growth. Examples are wood products (C.16), and the repair and installation of machinery and equipment (C.33). Despite employing a sizable proportion of the regional labour force, LQs of other non-metallic mineral products (C.23) and textiles (C.13) decreased in 2009-2013.

At 22.3%, TR31 is the region with the 3rd-highest share of workers in the labour force educated to tertiary level. The manufacturing sectors that require a relatively well educated labour force might thus have potential for further development. Almost one-third of the 215 companies that the BEEPS V survey questioned in the broader Aegean region cited finding adequately educated employees as an obstacle. The companies were concentrated in a few sectors that require greater shares of highly educated staff. For example, more than half of the companies operating in chemicals (C.20) perceived the current lack of skilled labour as a possible obstacle to growth.

Table 6. **Key statistics on manufacturing sub-sectors in TR31**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Aegean region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	14	Wearing apparel	1.19	0.11	4.79	9.28	0.61	●	n/a	n/a	28
	10	Food products	1.34	0.10	4.65	8.13	1.00	●	n/a	n/a	8
	25	Fabricated metal products, except machinery and equipment	1.11	-0.02	2.75	6.88	1.81	●	n/a	n/a	8
SG	15	Leather and related products	1.79	0.50	0.90	17.82	0.53	●	●		
	28	Machinery and equipment n.e.c.	1.45	0.22	2.20	13.11	0.96	●	●	●	0
	18	Printing and reproduction of recorded media	1.05	0.38	0.48	13.05	1.83				
	11	Beverages	1.78	0.36	0.21	10.41	1.45				8
	24	Basic metals	1.22	0.20	1.16	9.98	0.47	●			
	20	Chemicals and chemical products	2.21	0.52	1.14	9.49	0.88	●	●	●	51
	22	Rubber and plastic products	1.05	0.09	1.56	8.19	0.84				
	32	Other manufacturing	1.40	0.08	0.66	7.18	0.73	●	●	●	
	29	Motor vehicles, trailers and semi-trailers	1.49	0.05	1.95	7.16	0.63	●			
	19	Coke and refined petroleum products	3.91	0.03	0.24	3.98	n/a		●	●	
	12	Tobacco products	10.36	6.34	0.37	-7.80	0.32				
ST	17	Paper and paper products	1.72	-0.61	0.73	-1.18	1.22				
	31	Furniture	1.07	-0.44	1.56	-1.27	0.81				
EM	16	Wood and products of wood and cork, except furniture	0.77	0.43	0.43	22.87	0.33				
	33	Repair and installation of machinery and equipment	0.65	0.15	0.28	20.17	n/a			●	
	27	Electrical equipment	0.70	0.05	0.76	8.38	0.70	●			
	26	Computer, electronic and optical products	0.72	0.10	0.16	7.08	0.66				
	30	Other transport equipment	0.69	0.25	0.15	2.54	n/a	●	●		
	21	Basic pharmaceutical products and pharmaceutical preparations	0.41	0.03	0.10	1.17	n/a			●	
SH	23	Other non-metallic mineral products	0.78	-0.02	1.45	8.89	0.95				44
	13	Textiles	0.25	-0.02	0.80	6.46	0.40	●			40

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; İZKA Development Agency, İSTKA 20142023 Regional Development Plan, TR31, www.istka.org.tr/content/pdf/2014-2023%20istanbul%20bolge%20Plani_opt.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.6. Region TR32 – Aydin, Denizli and Muğla

Introduction

The TR32 region comprises the provinces of Aydin, Denizli and Muğla. It has a diversified economic structure and uses relatively more renewable energy than other regions. TR32 is well known for tourism (GEKA Development Agency, 2009) with Muğla province one of the largest summer destinations in Turkey (MoCT, 2007). As for Aydin and Denizli, they perform well in agriculture and agricultural machinery (GEKA Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to "increase living standards, base production on innovation, preserve nature, and be the worldwide centre of tourism." The RDP has four areas of focus: i) highly developed human capital and strong community; ii) high value-added and innovation-focused production; iii) all-season tourism; iv) liveable places and sustainable environment. It prioritises agriculture, food, tourism, textiles, metals, electrical components, machinery equipment, as well as forward-looking sectors such as chemicals, geothermal renewable energy, motor vehicles and trailers, and other transportation vehicles (GEKA Development Agency, n.d.[b]).

Regional expert feedback

On 15 December 2015 at the expert group meeting in Denizli, regional experts identified textiles (C.13), basic metals (C.24), food products (C.10), other non-mineral metallic products (C.23), and beverages (C.11) as dominant sub-sectors in the region. However, participants also insisted on the differences between the provinces. Agricultural machinery, milk products and dry fruits are leading sub-sectors in Aydin. Textiles, electrical equipment (wire) and milk products lead in Denizli. In Mugla, water products, shipbuilding (yachts), marble and bee-keeping are key. During discussions and through the survey, regional experts identified chemicals (C.20) and motor vehicles (C.29) as sub-sectors with high growth potential.

Dominant sub-sectors

The regional economy is dominated by services that account for 46.4% of regional employment. Next come agriculture with 29.4% and industry 24.2%. The manufacturing sector, however, is relatively modest with 11% of total regional employment. The distribution of employment across manufacturing sub-sectors, where the HHI value is 15.08, is more concentrated than the regional median of 14.62. Employment data analysis identified several dominant sub-sectors in the region. Food and beverage service activities (I.56), textiles (C.13) and accommodation (I.55) have a similar share of regional employment (ranging from 6.6% to 8.4%) but relative regional specialisation in those sub-sectors differ – I.55's LQ is more than three times higher than I.56's. Other non-metallic mineral products (C.23) and food products (C.10) are the two smaller dominant sub-sectors.

Dynamic manufacturing sub-sectors

In addition to the dominant sub-sectors highlighted above, TR32 is relatively specialised in beverages (C.11) and wood products (C.16) show regional specialisations. However, a number of higher value-added sub-sectors recorded strong absolute and relative growth, e.g. furniture (C.31), electrical equipment (C.27) and other manufacturing (C.32). Despite employing a sizable proportion of the regional labour force, the region has become relatively less specialised in fabricated metal products (C.25), machinery and equipment (C.28), and rubber and plastic products (C.22).

At 13.6%, TR32 is the region with the 19th-highest share of tertiary-educated workers in the labour force. The manufacturing sub-sectors that require a relatively well educated labour force might therefore struggle to find the adequately skilled workers. Almost one-third of the 215 companies that the BEEPS V survey questioned in the broad Aegean region reported struggling to find adequately educated employees. The results of the survey indicated, for example, that half of the companies operating in chemicals (C.20) reported that finding skilled labour could be challenging. Over 40% of companies in other non-metallic mineral products (C.23), a dominant sub-sector in TR32, also reported a lack of skilled labour. Hence, it may be a possible obstacle to growth.

Table 7. **Key statistics on manufacturing sub-sectors in TR32**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Aegean region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	13	Textiles	2.44	0.05	7.76	9.84	0.61	●	n/a	n/a	40
	23	Other non-metallic mineral products	2.43	0.36	4.51	15.39	0.45		n/a	n/a	44
	10	Food products	1.10	0.18	3.82	12.02	0.72	●	n/a	n/a	8
SG											
ST	11	Beverages	1.40	-0.19	0.16	2.11	0.52			●	8
	16	Wood and products of wood and cork, except furniture	1.15	-0.67	0.65	-9.81	0.12				
EM	31	Furniture	0.57	0.37	0.83	41.46	0.57		●		
	27	Electrical equipment	0.57	0.20	0.61	19.63	1.36	●	●	●	
	32	Other manufacturing	0.23	0.06	0.11	14.74	0.31				
	18	Printing and reproduction of recorded media	0.59	0.21	0.27	13.95	1.11				
	20	Chemicals and chemical products	0.42	0.10	0.22	10.36	0.37	●		●	51
	29	Motor vehicles, trailers and semi-trailers	0.20	0.01	0.26	9.18	n/a	●	●		
	30	Other transport equipment	0.84	0.38	0.18	7.78	0.22	●			
	24	Basic metals	0.54	0.01	0.51	6.69	0.34	●	●		
SH	28	Machinery and equipment n.e.c.	0.76	-0.05	1.15	7.83	1.01	●	●		0
	17	Paper and paper products	0.65	-0.15	0.28	2.36	n/a				
	15	Leather and related products	0.27	-0.11	0.14	0.80	1.20				
	22	Rubber and plastic products	0.43	-0.23	0.64	-3.95	0.29				
	25	Fabricated metal products, except machinery and equipment	0.59	-0.48	1.45	-6.53	0.52	●	●		8

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; GEKA Development Agency, GEKA 20142023 Regional Development Plan, TR32, geka.gov.tr/Dosyalar/o_19utnqk2s1tbcm0h1g6i1973po38.pdf, TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.7. Region TR33 – Afyonkarahisar, Kütahya, Manisa and Uşak

Introduction

The TR33 region is located in the Inner Aegean region and comprises the provinces of Afyonkarahisar, Kütahya, Manisa, and Uşak. It benefits from a diversified economic structure. Kütahya province is known for its important stocks of boron and, together with Uşak, for its ceramics industry. Afyonkarahisar has a well-developed marble industry. Manisa has developed electronics and home appliance manufacturing and Uşak has developed textile sector. TR33 is rich in other natural resources such as magnetite, silver, gold, titanium and uranium. In addition to agriculture, the Gediz Basin also boasts growing biomedical and biotechnological manufacturing activities (ZAFER Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to build "a region based on a knowledge economy to produce added value, balanced growth, competitiveness, and high quality of life, with a balanced ecological structure". The RDP has four key objectives: i) create a more competitive economic structure; ii) increase the standard of living; iii) reduce the development gap between provinces; and iv) balance spatial organisation. The economic activities that the RDP prioritises are agriculture (fruit, vegetables and livestock), mining, food processing, culture, thermal tourism, textiles, metals, computers, electronic and optical components, machine equipment, non-metallic mineral products, and rubber and plastic products, as well as forward-looking sectors such as geothermal and wind energy and faith tourism (ZAFER Development Agency, n.d.[b]).

Regional expert feedback

On 16 December 2015 at the regional expert group meeting in Uşak, experts identified textiles (C.13), leather (C.15), other non-metallic mineral products (C.23) and fabricated metal products, except machinery and equipment (C.25) as dominant sub-sectors in the region. Participants also underlined the diverse structure of the region. In discussions and the survey, regional experts identified land transport and transport via pipelines (H.49), agricultural machinery (C.28), renewable energy, rubber and plastic product (C.22), and other mining and quarrying as sub-sectors with high growth potential. Experts also highlighted that the relative growth in sub-sectors such as social work activities without accommodation (Q.88), paper (C.17), and printing and reproduction of recorded media (C.18) were directly linked with state subsidies in TR33.

Dominant sub-sectors

The regional economy has a large agricultural sector that accounts for 39.2% of employment. Services represent 38.1% of regional employment, followed by industry with 22.6%. The manufacturing sector plays a relatively important role with 16% of employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 11.09, more diversified than the regional median of 14.62. Employment data identify five dominant sub-sectors in the region. Other non-metallic mineral products (C.23) and food products (C.10) account for over 11% of total regional employment. The mining of coal and lignite (B.05) accounts for over 4% of total regional employment and the region has a strong relative specialisation in this sector with LQ of 10.9. Finally, textiles (C.13) and fabricated metal products (C.25) are the two other dominant sub-sectors and their combined share of regional employment is 7%.

Dynamic manufacturing sub-sectors

As well as the dominant sub-sectors highlighted above, electrical equipment (C.27), leather (C.15) or rubber and plastic products (C.22) have an LQ value above 1. A number of higher value-added sub-sectors also show strong absolute and relative growth. Examples are repair and installation of machinery and equipment (C.33), beverages (C.11), rubber and plastic products (C.22) and motor vehicles (C.29).

At 10.6%, TR33 is the region with the 3rd-lowest share of tertiary-educated workers in the labour force. The manufacturing sub-sectors that require a relatively well educated labour force might, therefore, struggle to develop further. Almost one-third of the 215 companies from the broader Aegean region questioned in the BEEPS V survey reported struggling to find adequately educated employees. Indeed, half of the companies operating in chemicals (C.20) reported that finding skilled labour could be a challenge. Over 40% of those in other non-metallic mineral products (C.23), a dominant sub-sector in TR33, also perceived the current lack of skilled labour as an obstacle.

Table 8. **Key statistics on manufacturing sub-sectors in TR33**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Aegean region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	23	Other non-metallic mineral products	3.41	0.14	6.33	13.96	0.80	●	n/a	n/a	44
	10	Food products	1.57	-0.23	5.46	5.30	0.87	●	n/a	n/a	8
	13	Textiles	1.27	0.22	4.01	16.67	1.11	●	n/a	n/a	40
	25	Fabricated metal products, except machinery and equipment	1.25	0.44	3.09	22.89	1.96	●	n/a	n/a	8
SG	11	Beverages	1.37	0.71	0.16	28.73	1.31				8
	22	Rubber and plastic products	1.57	0.65	2.35	24.27	1.44	●	●	●	
	28	Machinery and equipment n.e.c.	1.05	0.18	1.59	17.05	0.77			●	0
	27	Electrical equipment	2.30	0.41	2.47	14.97	1.10	●	●	●	
	15	Leather and related products	1.67	0.18	0.83	14.93	0.77	●	●	●	
	18	Printing and reproduction of recorded media	1.18	0.37	0.54	14.23	0.96				
	16	Wood and products of wood and cork, except furniture	1.55	0.05	0.87	3.76	n/a			●	
ST											
EM	33	Repair and installation of machinery and equipment	0.59	0.40	0.26	52.86	n/a		●		
	29	Motor vehicles, trailers and semi-trailers	0.86	0.29	1.12	21.09	n/a				
	17	Paper and paper products	0.71	0.17	0.30	17.17	1.85				
	24	Basic metals	0.53	0.07	0.51	12.09	n/a	●		●	
	20	Chemicals and chemical products	0.74	0.07	0.38	7.83	0.49	●			51
SH	14	Wearing apparel	0.24	-0.04	0.97	5.42	0.55	●			28
	31	Furniture	0.54	-0.28	0.79	-0.40	0.46				
n/a	32	Other manufacturing	0.23		0.11				●		

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; ZAFER Development Agency, ZEKA 20142023 Regional Development Plan, TR33 www.zafer.org.tr/bolgemiz/planlama-faaliyetleri/tr33bolgesi-bolge-plani/viewdownload/3-boelge-planlar/1186-tr33-boelgesi-boelge-plan-2014-2023.html; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.8. Region TR41 – Bursa, Bilecik and Eskişehir

Introduction

The TR41 region comprises the provinces of Bursa, Bilecik and Eskişehir. It benefits from a diversified economic structure and is well known for the aviation and railway sector in Eskişehir, marble and ceramics in Bilecik and various industrial activities in Bursa. Bursa borders the Sea of Marmara and is well connected by maritime transport. Bilecik and Eskişehir have good railway and road infrastructure. TR41 is rich in natural resources, especially marble in Bilecik, meerschaum and boron in Eskisehir. The Bursa Uludağ area is also one of the most important winter tourism destinations in Turkey (BEBKA Development Agency, n.d.[a,b]; MoCT, 2015).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to achieve "a competitive region at the international level, with a sustainable production and innovative, liveable places". The RDP has three key areas of focus: i) competitiveness in international markets; ii) human and social capital development; iii) balanced territorial development and a sustainable environment. The economic activities that the RDP prioritises are agriculture, food, tourism, textiles, chemicals, furniture, mining, metals, electrical appliances, electronics, machinery automotive, white goods and ceramics (BEBKA Development Agency, n.d.[b]).

Regional expert feedback

On 29 January 2016, at the expert regional group meeting in Bursa, experts identified textile (C.13), furniture (C.31), motor vehicles (C.29), railway-related equipment, other non-metallic mineral products (C.23), basic metals (C.24), and computer, electronic and optical products (C.26) as dominant sub-sectors in the region. Some also highlighted rubber and plastic products (C.22) and chemicals (C.20) as sectors with high growth potential.

Dominant sub-sectors

Analysis shows that the overall structure of the region is balanced between the services and industry. Respectively, they account for 45.9% and 43.3% of regional employment, followed by agriculture with 10.8%. The manufacturing sector plays an important role in the regional economy with 34% of total employment. With an HHI value of 10.44, the distribution of employment across manufacturing sub-sectors is more diversified than the regional median of 14.62. Employment data analysis identified four dominant sub-sectors in the region. Motor vehicles (C.29) accounts for 7.1% of total regional employment and the region has a strong relative specialisation in this sector with LQ of 5.4. The three other dominant sub-sectors, food products (C.10), fabricated metal products (C.25) and textiles (C.13) range in their share of regional employment from 3.4 to 8.7% and in their LQs from 1.3 to 2.7.

Dynamic manufacturing sub-sectors

Manufacturing in TR41 is relatively well developed in comparison to the national average. Like the dominant sub-sectors highlighted above, the region is relatively specialised in other transport equipment (C.30), furniture (C.31), and machinery and equipment (C.28). A number of higher value-added sectors show strong absolute and relative growth. Examples are furniture (C.31), fabricated metal products (C.25), food products (C.10), and rubber and plastic products (C.22). Despite employing a sizable proportion of the regional labour force, LQs of leather (C.15), printing and reproduction of recorded media (C.18), and other manufacturing (C.32) have decreased in recent years.

At 20.3%, TR41 is the region with the 5th highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well educated labour force might, therefore, have potential for further development. Of the 292 companies that the BEEPS V survey questioned in the broader Marmara region, which includes TR41, 18% reported struggling to find adequately educated employees. Among the sectors that are particularly specialised in the region, or had strong employment growth between 2009 and 2013, only in chemicals (C.20) did a significant share of companies (over 25%) report trouble finding skilled labour. This relatively positive finding suggests that the TR41 region does not suffer from a significant education and skills shortfall.

Table 9. **Key statistics on manufacturing sub-sectors in TR41**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Marmara region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	13	Textiles	2.74	-0.24	8.70	8.79	0.99	●	n/a	n/a	28
	29	Motor vehicles, trailers and semi-trailers	5.41	0.02	7.08	9.33	1.10	●	n/a	n/a	
	10	Food products	1.32	0.16	4.58	12.46	1.16	●	n/a	n/a	5
	25	Fabricated metal products, except machinery and equipment	1.37	0.09	3.39	12.08	1.10	●	n/a	n/a	5
SG	31	Furniture	2.04	0.33	2.99	15.49	1.34	●	●	●	0
	22	Rubber and plastic products	1.75	0.18	2.62	11.87	0.78			●	17
	27	Electrical equipment	1.56	0.06	1.68	10.43	n/a				
	30	Other transport equipment	2.48	1.03	0.52	7.70	n/a		●	●	
ST	28	Machinery and equipment n.e.c.	2.20	-0.06	3.33	10.82	1.65	●	●	●	11
	23	Other non-metallic mineral products	1.57	-0.13	2.91	10.42	1.40	●	●		27
	24	Basic metals	1.29	-0.08	1.23	6.52	0.45	●	●	●	
	11	Beverages	2.06	-0.38	0.24	2.82	1.39				5
EM	17	Paper and paper products	0.82	0.12	0.35	13.90	0.88				
	26	Computer, electronic and optical products	0.66	0.14	0.15	12.69	0.31	●	●		
	20	Chemicals and chemical products	0.70	0.05	0.36	7.03	1.34	●	●	●	26
	16	Wood and products of wood and cork, except furniture	0.97	0.10	0.55	5.50	0.82				0
SH	15	Leather and related products	0.40	-0.08	0.20	6.79	1.28				
	32	Other manufacturing	0.33	-0.26	0.16	-5.97	n/a				
	18	Printing and reproduction of recorded media	0.50	-0.83	0.23	-18.54	1.44				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 1.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; BEBKA Development Agency, BEBKA 20142023 Regional Development Plan, TR41, www.bebka.org.tr/admin/datas/sayfas/files/2014-2023_BolgePlani(1).pdf (accessed February 2015); TUIK (n.d.), Labour Force Statistics (database), http://www.turkstat.gov.tr/Start.do.

5.9. Region TR42 – Bolu, Düzce, Kocaeli, Sakarya and Yalova

Introduction

The TR42 region comprises the provinces of Bolu, Düzce, Kocaeli, Sakarya and Yalova. It is one of the most industrialised areas in Turkey and is a hub that connects Turkey's three biggest urban areas – Istanbul, Ankara and Bursa. It is accessible by every means of transport and includes Turkey's largest maritime basin (MARKA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to build a *marka* ["brand" in Turkish] in sustainable development with its strategic location and business networks; diversified economic structure; a *marka* that shapes the future and makes a difference with its developed human capital, focus on knowledge and on innovation, and is competitive at the world level". The RDP has three areas of focus whose aim is to make TR42: i) a liveable region; ii) a competitive region; iii) a learning region. In terms of economic activities, the Plan adopts Smart Specialisation approach and prioritises are agriculture (livestock, seafood, fruits and vegetables), machinery, food processing, textiles, automotive, electronic components, chemicals, paper and packing, shipbuilding, optical components, products of wood, and steel and metal products (MARKA Development Agency, n.d.[b]).

Regional expert feedback

On 31 March 2016, at the regional expert group meeting in Kocaeli, regional experts identified motor vehicles (C.29), machinery and equipment (C.28), electrical components (C.26), food processing (C.10), transports and storage (H.49, 50 and 52), shipbuilding (C.30), and products of wood (C.16) as dominant sub-sectors in the region. Experts highlighted that chemicals (C.20) also had growth potential.

Dominant sub-sectors

Employment data analysis shows that services account for the largest share of employment in the regional economy with 45.3%, followed by industry (36.5%) and agriculture (18.3%). The manufacturing sector plays an important role with 26% of total employment. Statistical analysis reveals that TR42 has the most diversified manufacturing sector in Turkey, with an HHI value of 8.03, compared to the regional median of 14.62. Employment data analysis identifies five dominant sub-sectors. The manufacture of motor vehicles (C.29) has the highest LQ of 4.7, although its share of total regional employment does not exceed 6.2%. The four other dominant sub-sectors – food products (C.10), fabricated metal products (C.25), food and beverage service activities (I.56), and rubber and plastic products (C.22) – are relatively similar when it comes to their share in regional employment, from around 4% to over 5%. However, their LQs are lower, ranging from 1 to 2.3.

Dynamic manufacturing sub-sectors

As well as the dominant sub-sectors, other transport equipment (C.30), products of wood (C.16), chemicals (C.20), and repair and installation of machinery and equipment (C.33) have LQs higher than 1, indicating relative regional specialisation in those sectors. A number of higher value-added sub-sectors recorded strong absolute and relative growth. Examples are the repair and installation of machinery and equipment (C.33), paper (C.17), machinery and equipment (C.28), and motor vehicles (C.29). Despite employing a sizable proportion of the regional labour force in textiles (C.13) and other non-metallic mineral products (C.23), TR42 has become relatively less regionally specialised in those sectors.

At 21.6%, TR42 is the region with the 4th-highest share of tertiary-educated workers in the labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, have potential for further development. Of the 292 companies that the BEEPS V survey questioned in the broader Marmara region, 18% reported struggling to find adequately educated employees. Among the sectors that are particularly concentrated in TR42, or enjoyed strong employment growth between 2009 and 2013, only chemicals (C.20) had a significant share of companies (over 26%) that reported difficulties in finding skilled labour.

Table 10. **Key statistics on manufacturing sub-sectors in TR42**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Marmara region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	29	Motor vehicles, trailers and semi-trailers	4.70	0.12	6.16	8.98	1.46	●	n/a	n/a	
	25	Fabricated metal products, except machinery and equipment	2.11	0.06	5.19	10.06	1.94	●	n/a	n/a	5
	10	Food products	1.27	-0.12	4.42	5.62	1.27	●	n/a	n/a	5
	22	Rubber and plastic products	2.34	-0.35	3.50	4.21	1.20		n/a	n/a	17
SG	33	Repair and installation of machinery and equipment	2.05	0.75	0.90	28.78	0.70			●	
	17	Paper and paper products	1.55	0.68	0.66	25.37	1.04				
	28	Machinery and equipment n.e.c.	1.73	0.33	2.61	16.67	0.94	●	●	●	11
	31	Furniture	1.12	0.13	1.64	12.91	1.01				
	20	Chemicals and chemical products	3.15	0.36	1.62	7.55	1.85	●	●	●	26
	16	Wood and products of wood and cork, except furniture	2.67	0.10	1.49	2.93	2.79		●		0
	30	Other transport equipment	3.64	0.42	0.77	-3.81	1.31		●	●	
ST	11	Beverages	2.39	-0.06	0.28	5.64	0.98	●			5
	27	Electrical equipment	2.04	-0.25	2.20	5.38	1.43	●	●	●	
	24	Basic metals	2.86	-0.68	2.72	1.56	1.20	●			
	21	Basic pharmaceutical products and pharmaceutical preparations	1.49	-0.26	0.35	-2.83	n/a	●			
EM	14	Wearing apparel	0.68	0.09	2.72	12.29	0.85	●			27
	18	Printing and reproduction of recorded media	0.60	0.15	0.28	10.49	0.61				
SH	23	Other non-metallic mineral products	0.94	-0.09	1.74	9.24	1.24				27
	13	Textiles	0.40	-0.03	1.27	8.41	0.76	●			28
	15	Leather and related products	0.62	-0.17	0.31	4.32	0.67				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; MARKA Development Agency, Eastern Marmara 20142023 Regional Development Plan, TR42, www.dogumarmarabolgeplani.gov.tr/pdfs/DoguMarmaraBolgePlani.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.10. Region TR51 – Ankara

TR51 is one of the most economically diverse regions of Turkey. As a result, the tools used in this report might be less comprehensive to its economic structure. Its profile should be read, therefore, in conjunction with other more closely targeted analyses.

Introduction

The TR51 region is located in the northwest of Central Anatolia. As the capital city of Turkey, Ankara hosts a large number of universities, technology parks, industrial zones, strong sub-sector clusters, international agencies and civil society organisations. Ankara is also well known for its human and intellectual capital and a services sector that accounts for 72.5% of regional employment. Ankara also has the highest share of higher-education graduates relative to its population. It is the second largest regional economy in Turkey thanks to its geographical location, modern infrastructure, and young, growing population. Health, education, banking and finance, tourism, and government are leading sectors (ANKARAKA Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to integrate "the region in the world economy, with high balanced welfare, to make it an attraction centre". The RDP has three areas of focus: i) living standards; ii) work environment; iii) environment. The RDP prioritises agriculture, tourism (eco-tourism, faith, nature, health and thermal), defence, aircraft, machinery (high-tech), medical equipment, electronics, and electrical equipment. It also sets two other priorities for the region: i) increase Ankara's high-tech production, reduce the external deficit, and improve competitiveness; and ii) consolidate Ankara's value-added technology-based economy with entrepreneurship and innovation (ANKARAKA Development Agency, n.d.[b]).

Regional expert feedback

On 29 January 2016, at the expert group meeting in Ankara, regional experts identified the following dominant sub-sectors in the region: furniture (C.31), basic metals (C.24), fabricated metal products (C.25) computer, electronic and optical products (C.26), motor vehicles (C.29), machinery and equipment (C.28), other manufacturing (C.32), energy and computer programming, consultancy and related activities (C.62), other transport equipment (C.30) and defence industry. In discussions and the survey, regional experts also identified electrical equipment (C.27) and chemicals (C.20) as sub-sectors with high growth potential in the region.

Dominant sub-sectors

The regional economy has a large services sector that accounts for 71.3% of regional employment, followed by industry (25.7%) and agriculture (3%). The manufacturing sector plays a relatively limited role, with 11% of total employment in the region. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 8.85, more diversified than the regional median of 14.62. Employment data analysis identified two dominant sub-sectors in the region. Services to buildings and landscape activities (N.81) account for over 7% with an LQ of 1.7. Statistics for the other dominant sub-sector, fabricated metal products (C.25), are more modest: its share of regional employment is almost twice as low as N.81's at 3.7%, while its LQ does not exceed 1.3.

Dynamic manufacturing sub-sectors

As well as the dominant sub-sectors highlighted above, the region is relatively specialised in computer, electronic and optical products (C.26) and other transport equipment (C.30). A number of higher value-added sub-sectors recorded strong absolute

and relative growth – leather (C.15), motor vehicles (C.29), basic metals (C.24), and electrical equipment (C.27) are among them. Despite employing a sizable proportion of the regional labour force, region's relative specialisation in wearing apparel (C.14) and other non-metallic mineral products (C.23) has decreased in recent years.

At 33.8%, TR51 is the region with the highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well educated labour force might, therefore, have potential for further development. Of the 180 companies that the BEEPS V survey questioned in the broader Central Anatolia region, 21% reported struggling to find adequately educated employees. For example, a fifth of the companies in chemicals (C.20) perceived the current lack of skilled labour as an obstacle, which could merit further investigation.

Table 11. **Key statistics on manufacturing sub-sectors in TR51**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Central Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Fabricated metal products, except machinery and equipment	1.28	0.09	3.15	12.06	1.20	●	n/a	n/a	17
SG	26	Computer, electronic and optical products	3.33	0.32	0.76	8.53	n/a	●	●	●	
	30	Other transport equipment	2.56	1.02	0.54	6.55	n/a	●	●		
ST	31	Furniture	1.41	-0.05	2.06	9.40	0.89			●	38
	28	Machinery and equipment n.e.c.	1.36	-0.39	2.05	4.44	1.52	●	●	●	40
	18	Printing and reproduction of recorded media	1.28	-0.03	0.59	3.05	1.49			●	
EM	15	Leather and related products	0.41	0.07	0.20	16.70	n/a				
	29	Motor vehicles, trailers and semi-trailers	0.43	0.09	0.57	15.21	n/a	●	●		
	24	Basic metals	0.64	0.14	0.61	14.69	0.34				
	27	Electrical equipment	0.88	0.15	0.95	14.41	0.98	●	●	●	
	32	Other manufacturing	0.78	0.11	0.37	12.62	1.46	●	●		
	10	Food products	0.56	0.06	1.96	11.66	0.90				26
	22	Rubber and plastic products	0.47	0.03	0.70	10.26	1.06				
	16	Wood and products of wood and cork, except furniture	0.47	0.10	0.26	8.86	0.91				38
SH	33	Repair and installation of machinery and equipment	0.52	-0.14	0.23	8.92	0.53		●	●	
	23	Other non-metallic mineral products	0.58	-0.10	1.07	7.94	1.41		●		17
	20	Chemicals and chemical products	0.45	-0.11	0.23	-0.39	0.75				20
	21	Basic pharmaceutical products and pharmaceutical preparations	0.57	-0.06	0.13	-0.68	0.55		●		
	17	Paper and paper products	0.28	-0.13	0.12	-0.77	0.58				
	13	Textiles	0.08	-0.05	0.26	-1.13	0.56				9
	14	Wearing apparel	0.21	-0.12	0.86	-2.20	0.90				18

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; ANKARA Development Agency, Ankara 20142023 Regional Development Plan, TR51, www.ankaraka.org.tr/bolge-plani/ankara-bolge-plani-2014-2023.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.11. Region TR52 – Karaman and Konya

Introduction

The TR52 region is located in the southern part of Central Anatolia and comprises the provinces of Konya and Karaman. The region benefits from strong agricultural and industrial sectors. However, there are important differences between the provinces. Turkey's largest aluminium (bauxite) reserves are in the Seydişehir district and an important magnesite reserve is located in Konya (in the Meram district). TR52 is also well known for the salt lake that accounts for much of Turkey's salt supply (MEVKA Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to integrate "the region in the world economy, with high and balanced welfare, and making it an attraction centre". The RDP has seven areas of focus: i) increase competitiveness at national and global level (export/import, R&D, technology, clustering); ii) ensure a better investment environment (government spending and FDI); iii) invest in human capital (demography and social policies); iv) narrow the urban-rural gap in the region and develop rural areas (agriculture); v) achieve environmentally friendly growth (energy, quality of air and water), vi) build a multi-centre spatial structure (regional development); and vii) improve logistics and infrastructure. The economic activities that the RDP prioritises are agriculture (fruit, grain, vegetables, livestock and bee keeping), food processing, vehicle parts, machinery, rubber and plastic products, furniture, and tourism. The plan also mentions chemicals and renewable energy as forward-looking priority sub-sectors (MEVKA Development Agency, n.d.[b]).

Regional expert feedback

On 26 January 2016, at the expert group meeting in Konya, regional experts identified textiles (C.13), food processing (C.10), motor vehicles (C.29), machinery and equipment (C.28), and fabricated metal products (C.25) as dominant sub-sectors in the TR52 region. In discussions and the survey, regional experts also identified the defence industry, products of wood (C.16), and other transport equipment (C.30) as sub-sectors with high growth potential.

Dominant sub-sectors

The regional economy has a services sector that accounts for 45.3% of regional employment, followed by industry (29%) and agriculture (25.6%). The manufacturing sector plays a relatively important role in the regional economy with 19% of total employment. The distribution of employment across manufacturing sub-sector is, with an HHI value of 13.95, slightly more diversified than the regional median of 14.62. Employment data analysis identifies three dominant sub-sectors in the region: food products (C.10), which accounts for 8% of total regional employment, twice as much as the other two sectors, machinery and equipment (C.28) and fabricated metals (C.25). However, the manufacture of machinery and equipment (C.28) has the highest LQ of 2.8, followed by food products (C.10) and fabricated metals (C.25).

Dynamic manufacturing sub-sectors

Manufacturing in TR52 is relatively well developed. In addition to the dominant sub-sectors highlighted above, the region is relatively specialised in motor vehicles (C.29), leather (C.15), and basic metals (C.24). A number of higher value-added sub-sectors recorded strong absolute and relative growth. Examples are the repair and installation of machinery and equipment (C.33), electrical equipment (C.27), and printing and

reproduction of recorded media (C.18). Despite employing a sizable proportion of the regional labour force, region's relative specialisation in paper (C.17), chemicals (C.20), textiles (C.13), and wearing apparel (C.14) has decreased in recent years.

At 15.6%, TR52 is the region with the 13th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, have potential for further development. Of the 180 companies that the BEEPS V survey questioned in the broader Central Anatolia region, 21% reported struggling to find adequately educated employees. The results of the survey indicate, for example, that a relatively high share of companies operating in other non-metallic mineral products (C.23) and chemicals (C.20) perceived the current lack of skilled labour as an obstacle, which may hamper their growth.

Table 12. **Key statistics on manufacturing sub-sectors in TR52**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Central Anatolian region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	2.59	0.09	9.00	8.79	0.98	●	n/a	n/a	26
	28	Machinery and equipment n.e.c.	2.85	0.73	4.31	18.94	4.40	●	n/a	n/a	40
	25	Fabricated metal products, except machinery and equipment	1.62	0.51	3.99	20.00	5.02	●	n/a	n/a	17
SG	18	Printing and reproduction of recorded media	1.02	0.54	0.47	24.16	0.62				
	15	Leather and related products	2.00	0.57	1.00	20.33	0.41		●		
	16	Wood and products of wood and cork, except furniture	1.14	0.10	0.64	4.09	0.16		●		38
ST	24	Basic metals	1.49	-0.03	1.42	6.51	0.24	●		●	
	29	Motor vehicles, trailers and semi-trailers	2.08	-0.38	2.72	3.66	0.42	●	●	●	
	22	Rubber and plastic products	1.13	-0.38	1.69	0.22	1.31	●			
EM	33	Repair and installation of machinery and equipment	0.50	0.26	0.22	37.71	n/a			●	
	27	Electrical equipment	0.37	0.17	0.40	26.62	0.37			●	
	23	Other non-metallic mineral products	0.82	0.13	1.52	16.61	0.79				17
	32	Other manufacturing	0.71	0.13	0.34	13.06	n/a		●		
	31	Furniture	0.85	0.03	1.25	10.42	0.93	●	●		38
SH	17	Paper and paper products	0.84	-0.07	0.36	6.39	0.99				
	13	Textiles	0.11	-0.05	0.35	-0.07	n/a				9
	14	Wearing apparel	0.26	-0.12	1.06	-1.46	0.53				18
	20	Chemicals and chemical products	0.50	-0.31	0.26	-7.62	n/a	●			20

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.

Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; MEVKA Development Agency, Konya Karaman Region 20142023 Regional Development Plan, TR52,www.mevka.org.tr/Content/ViewArticle/2014-2023_konya_karaman_taslak_bolge_plani?articleID=liwMLUjD4pH0%2FZugGWFvbg%3D%3D; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.12. Region TR61 – Antalya, Burdur and Isparta

Introduction

The TR61 region is located on the Mediterranean coast of Turkey and comprises the provinces of Antalya, Burdur and Isparta. Overall, the region benefits from a strong tourism sector. However, important differences exist between provinces. While the economic structure of Isparta and Burdur is mostly built on natural stone extraction, agriculture and the food industry, Antalya is now a leading province for winter and summer tourism in Turkey (BAKA Development Agency, n.d.[a]; MoCT, 2007).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to make the region "a leader in sustainable regional development and a top region with high living standards based on competitiveness and employment". The RDP has five areas of focus: i) modernise agriculture and pursue rural development, ii) diversify tourism, iii) boost competitiveness in the industrial sector, iv) develop the region's logistics infrastructure, and v) raise the standard of living and promote a sustainable environment. The RDP prioritises agriculture (livestock, fruit and vegetables), food processing, mining, minerals, products of wood, textiles, and various types of tourism. It also identifies chemicals, electric and electronic components and renewable energy as forward-looking sectors (BAKA Development Agency, n.d.[b]).

Regional expert feedback

On 29-April 2016, at the regional expert meeting in Antalya, regional experts identified tourism as a dominant sub-sector in the TR61 region. However, they stressed that tourism is concentrated mostly in the Antalya province. Isparta and Burdur are driven chiefly by the manufacturing of non-metallic mineral products (C.23) and agriculture. In discussions and the survey, regional experts also identified furniture (C.31), textiles (C.13), food products (C.10), other transport equipment (C.30) and chemicals (C.20) as sub-sectors with high growth potential.

Dominant sub-sectors

TR61 has a large services sector that accounts for 57.7% of regional employment, followed by agriculture (27.7%) and industry (14.6%). The manufacturing sector plays a limited role with 6% of regional employment. The distribution of employment across manufacturing sub-sectors is, with a HHI value of 10.60, more diversified than the regional median of 14.62. Employment data analysis identifies several dominant sub-sectors related to tourism in the region. Accommodation (H.55) and food and beverage services (H.56) together represent more than 30% of total regional employment with LQs of 9.2 and 1.1, respectively. The manufacture of other non-metallic mineral products (C.23) is another sub-sector which accounts for 2.5% of employment in the region with LQ of 1.3.

Dynamic manufacturing sub-sectors

Manufacturing in TR61 is less developed than the national average. In addition to the dominant sub-sectors highlighted above, the region is relatively specialised in other manufacturing (C.32) and products of wood (C.16). However, a number of higher value-added sub-sectors recorded strong absolute and relative growth. Examples are other manufacturing (C.32), furniture (C.31) and the repair and installation of machinery and equipment (C.33).

At 18.5%, TR61 is the region with the 7th-highest share of tertiary-educated workers in the labour force. Manufacturing sub-sectors that require a relatively well educated labour force might, therefore, have potential for further development. Of the 152 companies that the BEEPS V survey questioned in the broader Mediterranean region, 34% report struggling to find adequately educated employees. Results from the survey suggest that manufacturing companies operating in chemicals and chemical products (C.20) find hiring skilled labour challenging. By contrast, most food products companies (C.10) do not experience the same problem. In addition to the sub-sectors that require a well-educated labour force, those that have close ties with established sectors might also have potential for further development, especially sub-sectors related to tourism and non-metallic mineral products.

Table 13. **Key statistics on manufacturing sub-sectors in TR61**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Mediterranean region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	23	Other non-metallic mineral products	1.35	-0.06	2.50	11.79	0.74	●	n/a	n/a	38
SG	32	Other manufacturing	1.51	1.22	0.71	64.87	n/a				
	16	Wood and products of wood and cork, except furniture	1.18	0.06	0.66	4.39	n/a	●			
ST											
EM	31	Furniture	0.87	0.29	1.27	22.81	0.65		●	●	
	33	Repair and installation of machinery and equipment	0.47	0.05	0.21	19.29	0.67		●	●	
	27	Electrical equipment	0.18	0.03	0.19	15.15	0.37	●			
	18	Printing and reproduction of recorded media	0.48	0.16	0.22	15.12	0.42				
	13	Textiles	0.23	0.03	0.72	14.77	0.63	●	●	●	39
	30	Other transport equipment	0.83	0.16	0.17	-0.54	n/a	●	●		
SH	10	Food products	0.54	-0.02	1.89	8.15	0.53	●	●	●	20
	14	Wearing apparel	0.13	-0.01	0.53	7.50	1.11	●			36
	25	Fabricated metal products, except machinery and equipment	0.36	-0.08	0.88	4.97	0.66				24
	22	Rubber and plastic products	0.55	-0.11	0.82	4.14	0.85				
	20	Chemicals and chemical products	0.52	-0.08	0.27	1.80	0.38	●	●	●	56
	28	Machinery and equipment n.e.c.	0.26	-0.26	0.39	-6.05	0.56	●			

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; BAKA Development Agency, BAKA 20142023 Regional Development Plan, TR61, www.baka.org.tr/uploads/1391759531TR61Duzey2Bolgesi2014-2023BolgePlani.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.13. Region TR62 – Adana and Mersin

Introduction

The TR62 region is located on the eastern Mediterranean coast and comprises the provinces of Adana and Mersin. The region benefits from a well-developed transportation network of highways, airports, railways, and seaports. TR62's economic structure is built around the manufacture, logistics, and agricultural industry sub-sectors (ÇUKUROVA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to convert "the rich resources and strategic geo-location of the region into profit in order to become the leader of the Mediterranean region". The RDP has six areas of focus: i) make the region a production centre with worldwide appeal, ii) reduce development gaps between provinces, iii) improve social cohesion, iv) develop human capital, v) develop green production, and vi) increase living standards in cities. The economic activities that the RDP prioritises include agriculture (bee-keeping, milk and milk products), food processing, metals, chemicals, furniture, machinery, automotive and tourism (seaside, cruise, culture and gastronomy, winter and eco-tourism) (ÇUKUROVA Development Agency, n.d.[b]).

Regional expert feedback

On 26 April 2016, at the expert group meeting in Adana, regional experts identified fabricated metals (C.25), textiles (C.13), food processing (C.10), chemicals (C.20), and transportation and storage (H.49, 50 and 51) as dominant sub-sectors in the region. They also highlighted differences between the provinces – Adana is driven predominantly by textiles (C.13) and Mersin by other non-metallic mineral products (C.23). In discussions and the survey, regional experts identified other machinery (C.28), pharmaceuticals (C.21), other manufacturing (C.32), and rubber and plastic products (C.22) as sub-sectors with high growth potential in the region.

Dominant sub-sectors

Data analysis shows that 55.1% of regional employment is in the service sectors, followed by industry (23.8%) and agriculture (21.1%). The manufacturing sector plays a relatively limited role, accounting for 13% of regional employment. With an HHI value of 9.36, the distribution of employment across manufacturing sub-sectors is more diversified than the regional median of 14.62. Employment data analysis identified three dominant sub-sectors in the region: i) land transport and transport via pipelines (H.49) sub-sectors, food products (C.10) and fabricated metal products (C.25). Altogether, the three sub-sectors make up less than 15% of total regional employment and LQ analysis shows a modest level of regional specialisation in those sectors

Dynamic manufacturing sub-sectors

Manufacturing in TR62 is relatively undeveloped in comparison to the national average. In addition to the dominant sub-sectors, the region is relatively specialised in rubber and plastic products (C.22), products of wood (C.16), chemicals (C.20), and beverages (C.11). A number of higher value-added sectors recorded strong absolute and relative growth. Examples are other manufacturing (C.32), wearing apparel (C.14), and basic metals (C.24). Despite employing a sizable proportion of the regional labour force, the LQs decreased in other non-metallic mineral products (C.23), furniture (C.31), and beverages (C.11).

At 16.9%, TR62 is the region with the 11th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, have potential for further development. Of the 152 companies that the BEEPS V survey questioned in the broader Mediterranean region, 34% reported struggling to find adequately educated employees. Results of the survey suggest that, for companies operating in chemicals (C.20), finding skilled labour was especially challenging. On the other hand, most companies operating in manufacturing of food products (C.10) did not perceive the current availability of skilled labour as an obstacle.

Table 14. **Key statistics on manufacturing sub-sectors in TR62**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Mediterranean region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	1.02	0.02	3.40	4.70	1.85	●	n/a	n/a	20
	25	Fabricated metal products, except machinery and equipment	1.06	0.50	2.60	26.40	0.71	●	n/a	n/a	24
SG	22	Rubber and plastic products	1.21	0.39	1.80	17.15	0.65				
	16	Wood and products of wood and cork, except furniture	1.03	0.22	0.58	6.59	2.24				
ST	20	Chemicals and chemical products	1.74	-0.05	0.90	2.15	0.8	●	●	●	56
	11	Beverages	1.01	-0.41	0.11	-4.32	1.6	●		●	20
EM	32	Other manufacturing	0.67	0.54	0.32	57.34	n/a		●		
	14	Wearing apparel	0.71	0.45	2.91	37.05	0.66	●	●	●	36
	24	Basic metals	0.47	0.21	0.44	22.75	0.19	●	●		
	13	Textiles	0.78	0.23	2.48	18.39	1.55	●	●	●	39
	15	Leather and related products	0.28	0.07	0.14	16.93	n/a				
	28	Machinery and equipment n.e.c.	0.76	0.02	1.15	9.82	0.34	●	●	●	
	17	Paper and paper products	0.83	0.08	0.35	9.66	n/a				
	21	Basic pharmaceutical products and pharmaceutical preparations	0.70	0.05	0.16	1.42	n/a		●		
SH	33	Repair and installation of machinery and equipment	0.68	-0.03	0.30	11.86	0.37				
	31	Furniture	0.79	-0.02	1.15	7.40	0.53	●	●	●	
	23	Other non-metallic mineral products	0.76	-0.10	1.41	6.63	1.4				38
	29	Motor vehicles, trailers and semi-trailers	0.53	-0.06	0.70	4.15	n/a	●			
	27	Electrical equipment	0.22	-0.08	0.24	-0.69	0.35				
	18	Printing and reproduction of recorded media	0.53	-0.20	0.24	-6.12	0.43				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; ÇUKUROVA Development Agency, ÇUKUROVA Region 20142023 Regional Development Plan, TR62, www.cka.org.tr/dosyalar/cukurovabolgeplani_05092013_taslak.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.14. Region TR63 – Hatay, Kahramanmaraş and Osmaniye

Introduction

The TR63 region is located on the eastern Mediterranean coast and comprises the provinces of Hatay, Kahramanmaraş and Osmaniye. Although the region benefits from a strong agricultural sector, there are slight differences between provinces. While the economic structure of Kahramanmaraş is built chiefly around agriculture, livestock and food processing, Hatay and Osmaniye provinces strikes a balance between agriculture, textile and fabricated metal industry. After Istanbul, Hatay is the province with the second largest number of transportation fleets (DOGAKA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to increase "competitiveness and living standards with developed human capital and well established infrastructures". The RDP has four areas of focus: i) strategic development, ii) potential development, iii) urban and social development, and iv) territorial policies. The economic activities that the Plan prioritises are agriculture, food processing, textiles and related products, basic metals, other non-metallic mineral products, rubber and plastic products, machinery, furniture and chemicals. It also identifies tourism, logistic and energy (hydroelectric, wind, solar and energy logistics) as forward-looking sub-sectors (DOGAKA Development Agency, n.d.[b]).

Regional expert feedback

On 27 April 2016, at the expert group meeting in Osmaniye, regional experts identified fabricated metals (C.25), textiles (C.13), basic metals (C.24), food processing (C.10), and land transport and transport via pipelines (H49) as dominant sub-sectors in the TR63 region. In discussions and the survey, regional experts identified furniture (C.31), leather products (C.15), jewellery (under C.32), warehousing and support activities for transportation (H.52), repair and installation of machinery and equipment (C.33), and chemicals (C.20) as sub-sectors with high growth potential in the region.

Dominant sub-sectors

TR63 has a large services sector that accounts for 48.8% of total regional employment, followed by industry (29.6%) and agriculture (21.6%). The manufacturing sector plays an important role in the regional economy with 18% of total regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 17.72, more concentrated than the regional median of 14.62. Employment data analysis identified textiles (C.13) and land transport and transport via pipelines (H.49) as dominant sub-sectors in the region, as they jointly contribute around 20% of total regional employment and have LQs of 3.2 and 1.6, respectively. The two other dominant sub-sectors are basic metals (C.24) and fabricated metal products (C.25), which represent 8.5% of total regional employment, with C.24 also having a high LQ of 5.5.

Dynamic manufacturing sub-sectors

Manufacturing in TR63 is relatively well developed. However, outside the dominant sub-sectors mentioned above, none have an LQ higher than 1. Nonetheless, a number of higher value-added sectors recorded strong absolute and relative growth. Examples are other manufacturing (C.32), the repair and installation of machinery and equipment (C.33), and motor vehicles (C.29). Despite employing a sizable proportion of the regional labour force, the regions has become relatively less specialised in machinery and equipment (C.28), rubber and plastic products (C.22), and products of wood (C.16).

At 13.8%, TR63 is the region with the 17th-highest share of tertiary-educated workers in the labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, face difficulties in further developing. Of the 152 companies that the BEEPS V survey questioned in the broader Mediterranean region, 34% reported struggling to find adequately educated employees. Over one- third of the companies operating in other non-metallic mineral products (C.23) cited finding skilled labour as a challenge. A relatively high share of companies in textiles (C.13) also perceived the current lack of skilled labour as an obstacle which might hamper the growth of this dominant sub-sector in TR63.

Table 15. **Key statistics on manufacturing sub-sectors in TR63**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Mediterranean region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	13	Textiles	3.16	0.22	10.03	11.84	1.02	●	n/a	n/a	39
	24	Basic metals	5.53	0.21	5.26	7.96	3.66	●	n/a	n/a	
	25	Fabricated metal products, except machinery and equipment	1.29	0.40	3.18	19.54	0.84	●	n/a	n/a	24
SG											
ST											
EM	32	Other manufacturing	0.93	0.64	0.44	44.29	n/a		●		
	33	Repair and installation of machinery and equipment	0.53	0.27	0.23	37.24	n/a		●	●	
	29	Motor vehicles, trailers and semi-trailers	0.20	0.10	0.26	29.00	n/a				
	23	Other non-metallic mineral products	0.76	0.21	1.42	20.56	0.62	●		●	38
	31	Furniture	0.62	0.19	0.91	19.61	0.44	●	●	●	
	17	Paper and paper products	0.65	0.18	0.28	17.59	n/a				
	15	Leather and related products	0.55	0.08	0.27	15.16	n/a		●		
	10	Food products	0.83	0.16	2.89	13.49	0.48	●	●	●	20
	14	Wearing apparel	0.40	0.06	1.61	12.87	n/a	●	●	●	36
	20	Chemicals and chemical products	0.48	0.12	0.25	11.60	n/a	●	●	●	56
SH	28	Machinery and equipment n.e.c.	0.65	-0.09	0.98	6.96	0.67	●		●	
	22	Rubber and plastic products	0.36	-0.08	0.53	2.47	n/a	●			
	18	Printing and reproduction of recorded media	0.41	-0.27	0.19	-9.31	0.20				
	16	Wood and products of wood and cork, except furniture	0.82	-0.83	0.46	-14.59	0.19				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; DOĞAKA Development Agency, DOGAKA 20142023 Regional Development Plan, TR63, www.dogaka.gov.tr/Icerik/Dosya/www.dogaka.gov.tr_603_GE7J97UV_TR63-Bolge-Plani-2014-2023.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.15. Region TR71 – Aksaray, Kırıkkale, Kırşehir, Nevşehir and Niğde

Introduction

The TR71 region is located in Central Anatolia and comprises the provinces of Aksaray, Kırıkkale, Kırşehir, Nevşehir and Niğde. Overall, the economic structure of the region is built on agriculture, livestock, and agricultural industry. However, Nevşehir differs from the other provinces, as it also performs well in tourism sectors (AHILER Development Agency, n.d.[a]; MoCT, 2007).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks "sustainable development, as well as to preserve the natural and cultural heritage, and develop human capital". The RDP has four goals: i) achieve sustainable economic growth, ii) preserve the regions' natural and cultural legacy, iii) increase living standards, and iv) ensure high quality services. It prioritises agriculture (livestock, milk and milk products), food processing, furniture, metals, mining, automotive, tourism, and renewable energy (AHILER Development Agency, n.d.[b]).

Regional expert feedback

On 11 March 2016, at the expert group meeting in Nevşehir, regional experts identified non-metallic mineral products (C.23), textiles (C.13), food products (C.10), weapons and ammunitions in the fabricated metal products sub-sector (C.25) as dominant sub-sectors in the region. In discussions and the survey, regional experts identified beverages (C.11), rubber and plastic products (C.22), motor vehicles (C.29), chemicals (C.20), mining in general and renewable-energy-related components as sectors with high growth potential in the region.

Dominant sub-sectors

The regional economy has a services sector that represents 47.9% of regional employment, followed by a large agriculture sector (34.3%) and industry (17.8%). The manufacturing sector is relatively modest, accounting for 11% of regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 11.90, more diversified than the regional median of 14.62. Employment data analysis identifies land transport and transport via pipelines (H.49), food and beverage service activities (I.56), fabricated metal products (C.25), other non-metallic mineral products (C.23), food and food products (C.10), and accommodations (I.55) as dominant sub-sectors in the region. While H.49, I.56 and C.25 account for over 15% of regional employment, the level of regional specialisation in those sectors is modest with LQs ranging from just over 1 to less than 1.2. By contrast, the three other sectors represent a lower share of regional employment (around 10%), though relative regional specialisation in those sectors is slightly stronger with LQs of 1.7 for C.23 and C.10, and 1.35 for I.55.

Dynamic manufacturing sub-sectors

In addition to the dominant sub-sectors highlighted above, LQ analysis shows that the region is relatively specialised in rubber and plastic products (C.22), motor vehicles (C.29), furniture (C.31) and repair and installation of machinery and equipment (C.33). A number of higher value-added sectors recorded strong absolute and relative growth. Examples are basic metals (C.24), the repair and installation of machinery and equipment (C.33), or other manufacturing (C.32). Despite employing a sizable proportion of the regional labour force, the region has become relatively less specialised in textiles (C.13), wearing apparel (C.14), and machinery and equipment (C.28).

With 17.1%, TR71 is the region with the 10th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well educated labour force might, therefore, have potential for further development, even TR71 though hosts only a few – such as motor vehicles (C.29). Of the 180 companies that the BEEPS V survey questioned in the broader Central Anatolia region, 21% reported struggling to find adequately educated employees. For example, some companies operating in machinery and equipment (C.28) claim that finding skilled labour can be challenging, which may partly explain the relative negative growth of this sector in TR71.

Table 16. **Key statistics on manufacturing sub-sectors in TR71**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Central Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	1.67	0.09	5.79	8.62	0.5	●	n/a	n/a	21
	23	Other non-metallic mineral products	1.73	0.36	3.21	17.51	0.5		n/a	n/a	17
	25	Fabricated metal products, except machinery and equipment	1.18	-0.63	2.91	-2.62	1.0	●	n/a	n/a	17
SG	33	Repair and installation of machinery and equipment	1.05	0.09	0.46	16.36	n/a				
	31	Furniture	1.17	0.09	1.70	10.67	0.9	●	●		38
ST	22	Rubber and plastic products	1.75	-0.73	2.62	-1.94	n/a			●	
	29	Motor vehicles, trailers and semi-trailers	1.49	0.00	1.96	7.35	n/a	●	●	●	
EM	24	Basic metals	0.47	0.19	0.45	20.72	n/a	●	●	●	
	32	Other manufacturing	0.47	0.12	0.22	14.62	0.2				
	20	Chemicals and chemical products	0.41	0.13	0.21	13.73	0.4			●	20
	16	Wood and products of wood and cork, except furniture	0.79	0.24	0.44	10.81	n/a				38
SH	28	Machinery and equipment n.e.c.	0.44	-0.02	0.66	7.77	0.7		●		40
	14	Wearing apparel	0.40	-0.02	1.62	6.86	n/a			●	18
	13	Textiles	0.50	-0.06	1.60	6.28	0.8		●	●	9
	15	Leather and related products	0.38	-0.19	0.19	-1.20	n/a				
	18	Printing and reproduction of recorded media	0.55	-0.47	0.25	-12.47	n/a				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; AHILER Development Agency, AHILER 20142023 Regional Development Plan, TR71, www.ahika.gov.tr/assets/ilgilidosyalar/2014-2023-Taslak-Bolge-Plani-Versiyon-3.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.16. Region TR72 – Kayseri, Sivas and Yozgat

Introduction

The TR72 region is located in central Anatolia and comprises the provinces of Kayseri, Sivas and Yozgat. Overall, the region benefits from a strong agricultural sector. However, there are some important differences between provinces: the economic structure of Yozgat and Sivas is built principally on agriculture and food industry, while Kayseri province performs better in industrial sectors (ORAN Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to build a region that is "competitive vis-a-vis the nation and the world, with developed human capital, while also developing cities and social infrastructure". The RDP has four areas of focus: i) competitiveness, ii) social development, iii) sustainable environment and energy, and iv) rural-urban infrastructure. The RDP prioritises agriculture (livestock), basic metals, furniture, electric components, non-metallic mineral products, machinery, food processing and mining. It also identifies forward-looking sectors, such as tourism (winter, health, nature, culture and thermal), the defence industry, medical equipment, and energy related equipment (ORAN Development Agency, n.d.[b]).

Regional expert feedback

On 10 March 2016, at the expert group meeting in Kayseri, regional experts identified furniture (C.31), food products (C.10), electrical equipment (C.27), quarrying (B.08) and other non-metallic mineral products (C.23) as dominant sub-sectors in region. They also insisted on the differences that exist between provinces: Sivas is predominantly driven by quarrying, Kayseri by furniture, and Yozgat by food processing. In discussions and the survey, regional experts identified motor vehicles (C.29), computer programming, consultancy and related activities (J.62), leather (C.15), chemicals (C.20), rubber and plastic products (C.22), other manufacture (C.32), and basic metals (C.24), water products, and tourism as sectors with high growth potential in the region.

Dominant sub-sectors

Data analysis shows that 47.9% of regional employment is concentrated on service sectors, followed by agriculture (26.4%) and industry (25.7%). The manufacturing sector plays a relatively important role, accounting for 17% of regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 13.19, slightly more diversified than the regional median of 14.62. Employment data analysis identifies several dominant sub-sectors in the region. Furniture (C.31) and land transport and transport via pipelines (H.49) employ over 16% of the total regional workforce (with each accounting for around 8%). An LQ analysis shows that the regional specialisation is relatively stronger in C.31 (LQ 5.8) compared to the three other dominant sub-sectors

Dynamic manufacturing sub-sectors

In addition to the dominant sub-sectors highlighted above the region is relatively specialised in products of wood (C.16), other non-metallic mineral products (C.23) and electrical equipment (C.27).A number of higher-value added sectors recorded strong absolute and relative growth, including repair and installation of machinery and equipment (C.33), leather (C.15), or chemicals (C.20). Despite employing a sizable proportion of the regional labour force, the LQs value have decreased in wearing apparel (C.14), printing and reproduction of recorded media (C.18), and other manufacturing (C.32).

At 18.7%, TR72 is the region with the 6th-highest share of tertiary-educated workers in its labour force. The manufacturing sectors that require a relatively well-educated labour force might, therefore, have potential for further development. Of the 180 companies the BEEPS V survey questioned in the broader Central Anatolia region, 21% reported struggling to find adequately educated employees. For example, that a relatively high share of companies operating in other non-metallic mineral products (C.23), products of wood (C.16), or chemicals (C.20) perceived the current lack of skilled labour as problematic and a possible threat to the growth of the sector in TR72.

Table 17. **Key statistics on manufacturing sub-sectors in TR72**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Central Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	31	Furniture	5.79	0.31	8.50	9.70	1.60	●	n/a	n/a	38
	10	Food products	1.24	0.21	4.30	11.70	0.70	●	n/a	n/a	26
	25	Fabricated metal products, except machinery and equipment	1.47	0.06	3.60	9.00	0.90	●	n/a	n/a	17
	13	Textiles	0.94	-0.06	3.00	7.20	1.60		n/a	n/a	9
SG	16	Wood and products of wood and cork, except furniture	2.38	0.95	1.33	14.39	0.18		●		38
	23	Other non-metallic mineral products	1.02	0.13	1.90	14.01	0.69	●		●	17
	27	Electrical equipment	2.08	0.18	2.24	9.53	0.94	●	●	●	
ST											
EM	33	Repair and installation of machinery and equipment	0.51	0.45	0.22	92.32	n/a				
	15	Leather and related products	0.27	0.16	0.10	35.70	n/a		●	●	
	20	Chemicals and chemical products	0.33	0.16	0.17	21.18	n/a			●	20
	28	Machinery and equipment n.e.c.	0.57	0.12	0.86	15.63	0.52	●			40
	22	Rubber and plastic products	0.95	0.25	1.42	14.82	0.51			●	
	24	Basic metals	0.98	0.20	0.93	12.07	0.17	●	●	●	
	17	Paper and paper products	0.79	0.00	0.34	7.33	n/a				
SH	14	Wearing apparel	0.39	-0.06	1.58	3.71	1.40				18
	18	Printing and reproduction of recorded media	0.53	-0.12	0.24	-3.20	0.40				
	32	Other manufacturing	0.65	-0.78	0.30	-12.78	1.01				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; ORAN Development Agency, ORAN Region 20142023 Regional Development Plan, TR72, oran.org.tr/materyaller/Editor/document/PlanlamaBirimi/TR72_2014-2023_BolgePlani.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.17. Region TR81 – Bartin, Karabük and Zonguldak

Introduction

The TR81 region is located on the western coast of Black Sea and comprises the provinces of Bartin, Karabük and Zonguldak. The region is well known for its rich natural resources. The economic structure of TR81 was first developed through the coal, iron and steel industries before diversifying into other industrial sectors (BAKKA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to bring about an "independent economy and high living standards". The RDP has two areas of focus: i) sector diversity encouraged by innovation and entrepreneurship and ii) sustainable social development. The RDP prioritises agriculture (fruit and vegetables), furniture, shipbuilding, metals (steel-iron recycle facilities), mining (coal and carry). It also identifies forward-looking priority sectors such as tourism, agriculture (livestock and organic farming), mining (marble), automotive, machinery, and sea logistics (BAKKA Development Agency, n.d.[b]).

Regional expert feedback

On 17 November 2015, at the expert group meeting in Samsun, regional experts identified other non-metallic mineral products (C.23), fabricated metal products (C.25), products of wood (C.16), furniture (C.31) and mining of coal and lignite (B.05) as dominant sub-sectors in the TR81 region. In discussions and the survey, regional experts identified chemicals (C.20) and other transport equipment (C.30) as sectors with high growth potential.

Dominant sub-sectors

Data analysis shows that the economic structure of the region comprises a dominant agriculture sector, which accounts for 38.5% of regional employment, followed by services (37.8%) and industry (23.7%). The manufacturing sector is relatively modest with 13% of regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 17.76, more concentrated than the regional median of 14.62. Employment data analysis identifies five dominant sub-sectors in the region. Basic metals (C.24) and mining of coal (B.5) account for around 20% of total employment in the region, with LQ of 9.3 and 28 respectively, indication strong regional specialisation in those two sectors.. The three other dominant sub-sectors are more modest in size: land transport and transport via pipelines (H.49), food and beverage service activities (I.56), and wearing apparel (C.14) employ less than 20% of the total regional workforce and have lower LQ.

Dynamic manufacturing sub-sectors

Manufacturing in TR62 is undeveloped in comparison to the national average. Beyond the dominant sub-sectors highlighted above the region is relatively specialised only in leather (C.15) and other non-metallic mineral products (C.23). A number of higher value-added sectors recorded strong absolute and relative growth. Examples are machinery and equipment (C.28), electrical equipment (C.27), or fabricated metal products (C.25). Despite employing a sizable proportion of the regional labour force, relative regional specialisation decreased in repair and installation of machinery and equipment (C.33), textiles (C.13), and food products (C.10).

At 13.8%, TR81 is the region with the 16th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well educated labour force might, therefore, experience difficulties in developing. Of the 114 companies that the BEEPS V survey questioned in the broader Black Sea region, 23% reported struggling to find adequately educated employees. For example, companies operating in textiles (C.13) perceived the current lack of skilled labour as an obstacle which might hamper the growth of the sector in TR81.

Table 18. **Key statistics on manufacturing sub-sectors in TR81**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Black Sea region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	24	Basic metals	9.3	-1.5	8.9	5.1	0.57	●	n/a	n/a	
	14	Wearing apparel	1.2	-0.1	4.9	3.0	n/a		n/a	n/a	33
SG	15	Leather and related products	1.1	0.5	0.6	23.2	n/a			n/a	
	31	Furniture	0.9	0.2	1.3	13.5	n/a	●		n/a	
	22	Rubber and plastic products	0.8	0.0	1.3	5.1	0.44			n/a	
ST	23	Other non-metallic mineral products	1.1	-1.1	2.0	-8.7	n/a	●	●	n/a	32
EM	28	Machinery and equipment n.e.c.	0.5	0.4	0.8	43.9	0.51	●	●	n/a	
	27	Electrical equipment	0.3	0.2	0.3	32.4	0.32			n/a	
	25	Fabricated metal products, except machinery and equipment	0.7	0.3	1.7	24.3	0.60	●	●	n/a	12
SH	33	Repair and installation of machinery and equipment	0.9	-0.5	0.4	1.0	0.60			n/a	
	32	Other manufacturing	0.3	0.0	0.1	0.7	n/a			n/a	
	10	Food products	0.5	-0.1	1.9	-0.1	0.44			n/a	4
	13	Textiles	0.2	-0.1	0.6	-0.2	n/a			n/a	40
	18	Printing and reproduction of recorded media	0.6	0.0	0.3	-1.1	0.37			n/a	
	29	Motor vehicles, trailers and semi-trailers	0.1	0.0	0.1	-5.3	n/a	●		n/a	
	16	Wood and products of wood and cork, except furniture	1.0	-0.2	0.5	-6.4	0.37			n/a	
	30	Other transport equipment	0.6	-5.4	0.1	-49.0	n/a			n/a	

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; BAKKA Development Agency, West Black Sea 20142023 Regional Development Plan, TR81, bakka.gov.tr/assets/Planlama1/faaliyet_raporlari/MEVCUTDURUMANALiZi.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.18. Region TR82 – Çankırı, Kastamonu, and Sinop

Introduction

The TR82 region is located on the coast of Black Sea and comprises the provinces of Çankırı, Kastamonu, and Sinop. Overall, the region benefits from a balanced agricultural and industrial economic structure. However, there are differences between provinces. Sinop province's economic structure is built principally on products of wood, food processing, and metal industry. Kastamonu, for its part, is driven by wood products and agriculture, and the economy of Çankırı is built on agriculture, livestock and mining sectors (KUZKA Development Agency, n.d.[a]; MoSIT, 2016).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to build a region that is "producing constantly, with a strong community, and [can] make a difference thanks to its natural environment". The RDP has three areas of focus: i) social development, ii) green and liveable places, and iii) an economy which exploits its full potential. The economic activities that the RDP prioritises are agriculture (bee-keeping, milk and milk products, fruits and vegetables, and livestock), food processing, textiles, products of wood, mining, renewable energy, and tourism (health, winter, rural, faith) (KUZKA Development Agency, n.d.[b]; 2014).

Regional expert feedback

On 17 November 2015, at the expert group meeting in Samsun, regional experts identified products of wood (C.16) other non-metallic mineral products (C.23), and food products (C.10) as dominant sub-sectors in the TR82 region. In discussions and the survey, they also identified furniture (C.31) and other manufacturing (C.32) as potential high-growth sub-sectors in the region.

Dominant sub-sectors

The regional economy has a large agriculture sector that accounts for 46.6% of regional employment, followed by services (37.6%) and industry (15.7%). The manufacturing sector is relatively modest, with 10.8% of regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 14.24, very close to the regional median (14.62). Employment data analysis identifies other non-metallic mineral products (C.23) food products (C.10), textiles (C.13), and wood products (C.16) as dominant sub-sectors in the region. C.23, C.10 and C.13 account for over 16% of total regional employment, with LQs that range from 1.6 to 1.9. Even though the manufacture of products of wood (C.16) accounts for a lower share in total regional employment (around 4%), it has a relatively high LQ value of 6.8.

Dynamic manufacturing sub-sectors

Manufacturing in TR82 is underdeveloped in comparison to the national average. Beyond the dominant sub-sectors highlighted above the region is relatively specialised in furniture (C.31) and electrical equipment (C.27). However, a number of higher-value added sectors recorded strong absolute and relative growth. Examples are basic metals (C.24), furniture (C.31), or fabricated metals (C.25). Despite employing a sizable proportion of the regional labour force, rubber and plastic products (C.22), textiles (C.13), and machinery and equipment (C.28) have become relatively less concentrated in recent years.

At 13.2%, TR82 is the region with the 20th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, experience difficulties in developing further. Of the 114 companies that the BEEPS V survey questioned in the broader Black Sea region, 23% reported struggling to find adequately educated employees. For example, companies operating in textiles (C.13) perceived the current lack of skilled labour as an obstacle that might explain the stagnant growth of the sub-sector in TR82.

Table 19. **Key statistics on manufacturing sub-sectors in TR82**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Black Sea region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	1.91	0.74	6.63	18.43	n/a	●	n/a	n/a	4
	14	Wearing apparel	1.59	0.34	6.40	11.64	0.74	●	n/a	n/a	33
	16	Wood and products of wood and cork, except furniture	6.83	2.77	2.90	12.53	n/a	●	n/a	n/a	
	23	Other non-metallic mineral products	1.63	0.37	2.08	15.51	n/a		n/a	n/a	32
SG	31	Furniture	1.51	0.78	2.21	27.53	n/a		●	●	
	27	Electrical equipment	1.87	0.66	2.02	17.13	n/a				
ST											
EM	24	Basic metals	0.34	0.28	0.33	59.08	n/a				
	32	Other manufacturing	0.70	0.36	0.33	24.72	n/a		●	●	
	25	Fabricated metal products, except machinery and equipment	0.62	0.22	1.53	17.90	n/a				12
	18	Printing and reproduction of recorded media	0.51	0.03	0.23	1.47	0.17				
SH	28	Machinery and equipment n.e.c.	0.20	0.12	0.31	33.75	n/a				
	13	Textiles	0.38	-0.06	1.20	3.04	n/a	●			40
	22	Rubber and plastic products	0.67	-0.22	1.01	-2.61	n/a		●		
n/a	20	Chemicals and chemical products	0.37	n/a	0.19	n/a	n/a				50

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.

Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; KUZKA Development Agency, KUZKA 20142023 Regional Development Plan, TR82, www.kuzka.org.tr/Icerik/Dosya/www.kuzka.gov.tr_8_HO1N88OG_2014-2023-bolge-plani.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.19. Region TR83 – Amasya, Çorum, Samsun and Tokat

Introduction

The TR83 region is located on the coast of the Black Sea and comprises the provinces of Amasya, Çorum, Samsun and Tokat. As a whole, the region benefits from strong agricultural and logistics activity. However, there are differences between the provinces. Amasya, Tokat and Çorum perform well in agriculture and food processing, while Samsun's economy is based on agriculture, industry and logistics (OKA Development Agency, n.d.; MoSIT, 2016).

Regional policy objectives

The 2006-2023 Development Plan aims for "sustainable development and a notable reputation at the national and international levels". The RDP has five goals: i) ensuring an effective spatial organisation, ii) developing human capital and improve social structure, iii) opening firms to world markets and increasing competitiveness, iv) improving environmental conditions and maintaining ecological balance, and v) reinforcing institutional structures. The economic activities that the development plan prioritises are agriculture (livestock, fishing, milk and milk products, fruits and vegetables), mining (raw materials and marble), tourism (culture, thermal, nature and seaside), machinery, medical equipment, electric and electronic components, food processing, furniture, and non-metallic mineral products. As a forward-looking sub-sector, it also considers renewable energy a priority (OKA, 2006).

Regional expert feedback

On 17 November 2015, at the expert group meeting in Samsun, regional experts identified fabricated metals (C.25), non-metallic minerals (C.23), products of wood (C.16), food processing (C.10), machinery and equipment (C.28) and transportation and storage (H.49. 50) as dominant sub-sectors in the TR83 region. In discussions and the survey, regional experts identified other machinery (C.28), pharmaceuticals (C.21), other manufacturing (C.32) and rubber and plastic (C.22) as sectors with high growth potential in the region.

Dominant sub-sectors

The regional economy has a strong agricultural sector that accounts for 40.1% of regional employment, followed by the services (39.3%) and industry (20.6%). The manufacturing sector is relatively small – 10% of total employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 11.94, more widely diversified than the regional median of 14.62. Employment data analysis identifies other non-metallic mineral products (C.23), food and beverage services (I.56), and food products (C.10) as dominant sub-sectors in the region. C.23 has the highest LQ value, indicating strong regional specialisation in this sector. Yet, it is also the dominant sub-sector with the lowest share of the total regional employment. I.56 and C.10 have LQ values slightly above 1 and account for over 11% of total employment in the region.

Dynamic manufacturing sub-sectors

In addition to the dominant sub-sectors highlighted above, the region is relatively specialised in pharmaceutical products (C.21), products of wood (C.16), and furniture (C.31) A number of higher-value added sectors recorded strong absolute and relative growth. Examples are motor vehicles (C.29), paper (C.17), and machinery and equipment (C.28). Despite employing a sizable proportion of the regional labour force, relative regional specialisation has decreased in basic metals (C.24), other manufacturing (C.32), or electrical equipment (C.27).

At 12.7%, TR83 is the region with the 22nd-highest share of tertiary-educated workers in its labour force. The manufacturing sectors that require a relatively well-educated labour force – such as pharmaceutical products (C.21) – might, therefore, experience difficulties in further developing. Of the 114 companies that the BEEPS V survey questioned in the broader Black Sea region, 23% reported finding adequately educated employees was difficult. For example, companies operating in textiles (C.13) perceived the current lack of skilled labour as an obstacle which might explain the relative negative growth of the sub-sector in TR83.

Table 20. **Key statistics on manufacturing sub-sectors in TR83**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Black Sea region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	1.39	-0.13	4.84	2.11	0.59	●	n/a	n/a	4
	23	Other non-metallic mineral products	2.07	0.08	3.84	9.22	0.36		n/a	n/a	32
SG	21	Basic pharmaceutical products and pharmaceutical preparations	1.29	0.48	0.30	9.75	n/a		●	●	
	16	Wood and products of wood and cork, except furniture	1.90	0.04	1.06	-0.81	1.92		●	●	
ST	31	Furniture	1.02	-0.56	1.49	-4.88	0.44	●		●	
EM	29	Motor vehicles, trailers and semi-trailers	0.49	0.22	0.64	21.84	n/a	●			
	17	Paper and paper products	0.88	0.39	0.37	21.20	n/a				
	28	Machinery and equipment n.e.c.	0.72	0.19	1.09	15.44	0.61	●	●		
	14	Wearing apparel	0.81	0.18	3.25	11.82	0.71				33
	25	Fabricated metal products, except machinery and equipment	0.57	0.03	1.39	7.18	0.38	●			12
	22	Rubber and plastic products	0.51	0.03	0.77	6.10	0.45				
SH	24	Basic metals	0.88	0.00	0.83	3.68	0.49	●	●	●	
	32	Other manufacturing	0.92	-0.08	0.43	2.00	1.06	●			
	15	Leather and related products	0.67	-0.18	0.34	0.93	n/a				
	13	Textiles	0.08	-0.03	0.26	-0.45	0.29			●	40
	27	Electrical equipment	0.60	-0.26	0.64	-4.15	0.49	●			
	18	Printing and reproduction of recorded media	0.53	-0.13	0.24	-5.61	0.30				
	33	Repair and installation of machinery and equipment	0.29	-0.51	0.13	-13.80	n/a				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; OKA Development Agency, Middle Black Sea 2013-2023 Regional Innovation Strategy, TR83, www.oka.org.tr/Documents/OKABIS_INGILIZCE.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.20. Region TR90 – Artvin, Giresun, Gümüşhane, Ordu, Rize and Trabzon

Introduction

The TR90 region is located on the east coast of the Black Sea. It has a border with Georgia and comprises the provinces of Artvin, Giresun, Gümüşhane, Ordu, Rize, and Trabzon. As a whole, the region benefits from a strong agricultural sector and food industry. It is also well known for its fisheries, tea, and hazelnut production (DOKA Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims for "an innovative and competitive economy, with qualified human capital, social welfare and a high quality of life, balanced wealth between urban and rural places, liveable spaces, and sustainable environment". The RDP has two areas of focus: i) understanding the region and ii) strategies for development. It prioritises agriculture (bee-keeping, tea, nuts, greenhouse production, fishing, seafood, tobacco, livestock, organic livestock, organic vegetables), wood, and cork products, mining (coal), tourism (nature and eco-tourism), food processing, beverages, textiles, other non-metallic mineral products, rubber and plastic products, metal industry, furniture, motor vehicles and trailers, and fossil energy. As a forward-looking sub-sector, it also considers renewables a priority (DOKA Development Agency, n.d.[b]).

Regional expert feedback

On 19 November 2015, at the expert group meeting in Trabzon, regional experts identified food products (C.10), the mining of coal and lignite (B.05), and logistics (H.49) as dominant sub-sectors in the TR90 region. In discussion and the survey, regional experts also identified machinery and equipment (C.28), pharmaceuticals (C.21), other manufacturing (C.32) and rubber and plastic products (C.22) as sectors with high growth potential.

Dominant sub-sectors

The regional economy has a large agricultural sector that accounts for 44.7% of regional employment, followed by services (37.8%) and industry (17.5%). The manufacturing sector is relatively small representing 7.2% of employment in TR90. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 27.51, more concentrated than the regional median of 14.62. Employment data analysis identified land transport and transport via pipelines (H.49), food products (C.10), and food and beverage service activities (I.56) as dominant sub-sectors in the region. H.49 and C.10 account for some 20% of total employment, with LQs of 1.6 and 2.6, respectively

Dynamic manufacturing sub-sectors

Manufacturing in TR90 is underdeveloped in comparison to the national average. In addition to the dominant sub-sectors highlighted above, the region is specialised only in the manufacture of products of wood (C.16) A small number of higher value-added sectors recorded strong absolute and relative growth. Examples are wearing apparel (C.14), fabricated metal products (C.25), and beverages (C.11). Despite employing a sizable proportion of the regional labour force, the region became relatively less specialised in other non-metallic mineral products (C.23), other manufacturing (C.32), and machinery and equipment (C.28).

At 14%, TR90 is the region with the 15th-highest share of tertiary-educated workers in its labour force. The manufacturing sectors that require a relatively well-educated labour force – such as beverages (C.11) – might, therefore, struggle to develop further. Of the 114 companies that the BEEPS V survey questioned in the broader Black Sea region, 23% reported that finding adequately educated employees was difficult. For example, a high share of companies operating in textiles (C.13) and in other non-metallic mineral products (C.23), perceived the current lack of skilled labour as an obstacle that might explain the sectors' negative growth in TR90.

Table 21. **Key statistics on manufacturing sub-sectors in TR90**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Black Sea region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	2.64	0.20	9.19	8.20	0.44	●	n/a	n/a	4
SG											
ST	16	Wood and products of wood and cork, except furniture	1.60	-0.56	0.90	-6.97	n/a	●		●	
	14	Wearing apparel	0.54	0.15	2.15	15.74	0.46	●	●		33
	25	Fabricated metal products, except machinery and equipment	0.45	0.09	1.10	13.61	0.26	●	●		12
EM	11	Beverages	0.84	0.21	0.10	12.43	0.62	●			4
	22	Rubber and plastic products	0.72	0.08	1.08	9.07	0.16	●			
	31	Furniture	0.78	0.01	1.15	8.18	0.46	●	●	●	
	15	Leather and related products	0.24	-0.03	0.12	5.33	n/a				
	23	Other non-metallic mineral products	0.70	-0.15	1.30	4.53	1.86	●			32
	27	Electrical equipment	0.16	-0.02	0.17	3.02	n/a				
SH	32	Other manufacturing	0.68	-0.17	0.32	-0.07	n/a				
	33	Repair and installation of machinery and equipment	0.26	-0.23	0.11	-3.42	0.34		●	●	
	18	Printing and reproduction of recorded media	0.32	-0.09	0.15	-4.59	n/a				
	28	Machinery and equipment n.e.c.	0.14	-0.16	0.22	-10.17	0.82	●	●		
	13	Textiles	0.05	-0.10	0.14	-18.64	n/a	●	●	●	40

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; DOKA Development Agency, East Black Sea 20142023 Regional Development Plan, TR90, www.doka.org.tr/pdf/#dosyalar/publication/page_8/1443452887-Bolge_Plani_2014-2023.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.21. Region TRA1 – Bayburt, Erzincan and Erzurum

Introduction

The TRA1 region is located in north-west Anatolia and comprises the provinces of Bayburt, Erzincan and Erzurum. As a whole, the region benefits from a large agricultural and livestock base and is rich in industrial raw materials, water resources, and thermal resources. The Erzurum Palandöken district is also one of the biggest winter tourism destinations in Turkey (KUDAKA Development Agency, n.d.; MoCT, 2015).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims for "by 2023, to transform into a region which will; have increased the amount of its agricultural products with distinctive properties sourcing from its high altitude and untouched nature; be marketing increased amount of value-added products by processing all types of raw materials it shelters; be an attraction centre for its close inner and outer geography with quality and diverse service delivery and have a high level of liveability. In order to achieve such a vision, four development axes have been defined to be "to increase the amount and quality of agricultural products especially distinctive ones". The RDP has three areas: i) to produce value added products by processing all kinds of raw materials in the region"; ii) to become a service delivering pole for its close and far geography with its quality and diverse service type; and iii) to increase the liveability level of the region. It prioritises agriculture (organic farming, forage crops, medicinal aromatic plants, beekeeping, grain, livestock), tourism (conventions, history and culture, winter and sports, nature, health and thermal), service sectors (call centres). The Plan also states in broad terms that the region should explore the potential in mining and related industries (KUDAKA Development Agency n.d).

Regional expert feedback

On 30 June 2016, at the expert group meeting in Ankara, regional experts identified food products (C.10), land transport (H.49), construction of buildings (F.41), food and beverage service activities (I.56), and office support activities (N.82) as dominant sub-sectors in the TRA1 region. In discussions and the survey, regional experts also identified fabricated metal products (C.25), wearing apparel (C.14), other manufacturing (C.32), furniture (C.31), other non-metallic mineral products (C.23), leather products (C.15), beverage (C.11), repair and installation of machinery and equipment (C.33), chemicals (C.20), wood products (C.16) and tourism as sub-sectors with high growth potential.

Dominant sub-sectors

The regional economy has a large agricultural sector that accounts for 50.8% of regional employment, followed by services (37.1%) and industry (11.2%). The manufacturing sector is relatively limited, with 5% of total regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 20.96, more concentrated than the regional median of 14.62. Employment data analysis identifies land transport and transport via pipelines (H.49), food products (C.10), and food and beverage service activities (I.56) as dominant sub-sectors in the region. C.10 and I.56 jointly account for 10% of total employment in the region and have relatively low LQs of1.1 and 1.3, respectively. Land transport and transport via pipelines (H.49) claims a higher share of employment (over 8%) and LQ of 1.3.

Dynamic manufacturing sub-sectors

Manufacturing in TRA1 is relatively underdeveloped in comparison to the national average. In addition to the dominant sub-sectors highlighted above, only the manufacture of other non-metallic mineral products (C.23) shows an LQ value higher

than 1. Analyses of recent regional trends also reveal a declining manufacturing base in the region, except for fabricated metal products (C.25), electrical equipment (C.27), and other non-metallic mineral products (C.23), which recorded relative and absolute growth. Despite employing a sizable proportion of the regional labour force, relative regional specialisation decreased in rubber and plastic products (C.22), products of wood (C.16), and furniture (C.31).

At 16.7%, TRA1 is the region with the 12th-highest share of tertiary-educated workers in its labour force. The manufacturing sectors, like beverages (C.11), which require a relatively well educated labour force might, therefore, have potential for further development. Of the 111 companies that the BEEPS V survey questioned in east and south-east Anatolia, 33% reported that finding adequately educated employees could be difficult. For example, a high share of companies operating in fabricated metal products (C.25) and in other non-metallic mineral products (C.23), perceived the current lack of skilled labour as an obstacle which might hamper the growth of the sub-sector in TRA1.

Table 22. **Key statistics on manufacturing sub-sectors in TRA1**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Eastern and Southeastern Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	1.32	-0.17	4.59	3.79	0.36		n/a	n/a	35
SG	23	Other non-metallic mineral products	1.19	0.41	2.21	22.75	n/a		●	●	22
ST											
EM	25	Fabricated metal products, except machinery and equipment	0.42	0.13	1.02	18.92	n/a		●		56
	27	Electrical equipment	0.32	0.07	0.35	13.65	0.34				
SH	14	Wearing apparel	0.08	-0.01	0.32	4.85	n/a		●	●	33
	22	Rubber and plastic products	0.45	-0.10	0.67	1.55	0.21				
	32	Other manufacturing	0.53	-0.15	0.25	0.31	n/a		●		
	18	Printing and reproduction of recorded media	0.62	-0.06	0.28	-0.27	0.51				
	31	Furniture	0.57	-1.01	0.84	-15.83	0.33		●	●	
	16	Wood and products of wood and cork, except furniture	0.85	-1.13	0.47	-18.33	n/a		●		
n/a	11	Beverages	1.50	1.50	0.17	n/a	n/a			●	35
	33	Repair and installation of machinery and equipment	0.34	0.34	0.15	n/a	n/a			●	

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), http://www.enterprisesurveys.org; KUDAKA Development Agency, Northeast Anatolia 20142023 Regional Development Plan, TRA1, kudaka.org.tr/apb/KUDAKA_Bolge_Plani_2014_2023.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.22. Region TRA2 – Ağrı, Ardahan, Iğdır and Kars

Introduction

The TRA2 region is located in North-Eastern Anatolia and has borders with Georgia, Armenia, Azerbaijan and Iran. The region comprises the provinces of Ağrı, Ardahan, Iğdır and Kars. Its economy of the region revolves around the livestock industry. It has severe weather conditions and neither contains nor lies near any larger cities, which constitutes a barrier to its economic development. (SERKA Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to make the region "the trade and logistics centre of the Caucasus and Middle Asia, thanks to its rich natural and cultural legacy, tourism, and well-known competitive agricultural products". The RDP has four areas of focus: i) social development, ii) sustainable environment, iii) accessibility, and iv) competitiveness. It prioritises agriculture (bee-keeping, milk and milk products, forage crops, livestock), wood products, tourism (winter and sports, conventions, history and culture, nature and health), and the service sector (call centres) (SERKA Development Agency, n.d.[b]).

Regional expert feedback

On 29 March 2016, at the expert group meeting in Kars, regional experts identified food products (C.10), land transport (H.49), and beverages (milk and milk products) (C.11) as dominant sub-sectors in the region. In discussions and the survey, regional experts also identified leather (C.15), furniture (C.31), basic pharmaceuticals (C.21), biogas and machinery related to beekeeping and milk products as sub-sectors with high growth potential in the region.

Dominant sub-sectors

Agriculture accounts for the highest share of employment with 59.6%, followed by the services (26.4%) and industry (14%). The manufacturing sector in TRA2 is relatively limited, with 6% of total regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 30.14, more concentrated than the regional median of 14.62. Employment data analysis identifies only two dominant sub-sectors in the region. One is land transport and transport via pipelines (H.49), which accounts for a relatively high share of total employment in the region (17%) and, with an LQ of 2.7.The other dominant sub-sector, food products (C.10), accounts for less than 6% of total employment in the region, with an LQ of 1.5.

Dynamic manufacturing sub-sectors

Manufacturing in TRA2 is underdeveloped in comparison to the national average. In addition to the dominant sub-sectors highlighted above, the region is relatively specialised only in repair and installation of machinery and equipment (C.33). A number of higher-value added sectors however recorded strong absolute and relative growth. Examples are repair and installation of machinery and equipment (C.33), rubber and plastic products (C.22), wearing apparel (C.14), textiles (C.13), electrical equipment (C.27), fabricated metal products (C.25) and other non-metallic mineral products (C.23). By contrast, and despite employing a sizable proportion of the regional labour force, a relative regional specialisation decreased in leather (C.15), products of wood (C.16), and furniture (C.31).

At 8.7%, TRA2 is the region with the lowest share of tertiary-educated workers in its labour force. The manufacturing sectors that require a well-educated labour force might, therefore, struggle hard to develop further. Of the 111 companies in the broad eastern and Southeastern Anatolia region, 33% reported that finding an adequately educated labour force could be difficult. For example, the companies operating in fabricated metal products (C.25) and other non-metallic mineral products (C.23), perceived the current lack of skilled labour as an obstacle that could hamper the growth of the sub-sectors in TRA2.

Table 23. **Key statistics on manufacturing sub-sectors in TRA2**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Eastern and Southeastern Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	1.54	0.08	5.36	7.24	n/a		n/a	n/a	35
SG	33	Repair and installation of machinery and equipment	1.09	0.83	0.48	62.37	n/a		●	●	
ST											
EM	22	Rubber and plastic products	0.35	0.22	0.53	34.19	n/a				
	14	Wearing apparel	0.15	0.08	0.62	26.45	n/a		●	●	33
	13	Textiles	0.04	0.02	0.12	22.47	n/a			●	30
	27	Electrical equipment	0.13	0.04	0.14	16.89	n/a				
	23	Non-metallic mineral products	0.72	0.11	1.33	14.04	n/a				22
	25	Fabricated metal products, except machinery and equipment	0.22	0.01	0.55	8.71	n/a	●			56
	18	Printing and reproduction of recorded media	0.74	0.07	0.34	3.39	n/a				
SH	15	Leather and related products	0.16	-0.06	0.08	0.53	n/a		●	●	
	31	Furniture	0.19	-0.10	0.27	-3.17	n/a	●	●	●	
	16	Wood and products of wood and cork, except furniture	0.60	-0.81	0.34	-19.28	n/a		●	●	
n/a	28	Machinery and equipment n.e.c.	0.07	0.07	0.11	n/a	n/a	●			

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.

Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; SERKA Development Agency, SERKA Region 20142023 Regional Development Plan, TRA2, www.serka.gov.tr/store/file/common/d195519db5158e516ec2d2874c6adaf3.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.23. Region TRB1 – Bingöl, Elazig, Malatya and Tunceli

Introduction

The TRB1 region is located in Eastern Anatolia and is distant from most large cities and port areas in Turkey. The region comprises the provinces of Bingöl, Elazig, Malatya and Tunceli. Its economy is generally built on agriculture. Across Turkey, it is also well known for its dried fruit industry (FIRAT Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims for "a well-educated, entrepreneurial human capital to reach high living standards". The RDP has two areas of focus: i) standard of living and ii) a sustainable economy. It prioritises agriculture (bee-keeping, livestock, fruits and vegetables), food processing, textiles, tourism (faith and nature), mining and energy (FIRAT Development Agency, n.d.[b]).

Regional expert feedback

On 8 March 2016, at the expert group meeting in Malatya, regional experts identified textiles (C.13), food products (C.10), and other non-metallic mineral products (C.23) as dominant sub-sectors in the region. In discussions and the survey, they also identified furniture (C.31), tourism, and basic metals (C.24) as sub-sectors with growth potential in the region.

Dominant sub-sectors

Regional economy in TRB1 is characterised by a large services sector that accounts for 50.4% of the total regional employment, followed by agriculture (31.5%) and industry sector (18.1%). The manufacturing sector is relatively modest, representing 9% of total regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 15.00, in line with the regional median of 14.62. Employment data analysis identifies three dominant sub-sectors in the region. Land transport and transport via pipelines (H.49) represent around 8% of total employment in the region and has an LQ of 1.3. The two other dominant sub-sectors are food products (C.10) and textiles (C.13). They account for less than 10% of total employment in the region and have also modest LQ value.

Dynamic manufacturing sub-sectors

Manufacturing in TRB1 is relatively underdeveloped in comparison to the national average. In addition to the dominant sub-sectors highlighted above, LQ analysis shows that the region is relatively specialised only in other non-metallic mineral products (C.23).Only a small number of higher value-added sub-sectors recorded strong absolute and relative growth – such as wearing apparel (C.14), chemicals (C.20), or basic metals (C.24). Despite employing a sizable proportion of the regional labour force, relative regional specialisation decreased in fabricated metal products (C.25), machinery and equipment (C.28) and rubber and plastic products (C.22).

At 13%, TRB1 is the region with the 21st-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, struggle to develop further. Of the 111 companies in the broad Eastern and Southeastern Anatolia region, 33% reported that finding adequately educated employees could be difficult. Indeed, a relatively high proportion of companies operating in fabricated metal products (C.25) perceived the current lack of skilled labour as problematic. Around 22% of companies in other non-metallic mineral products (C.23) and 30% in textiles (C.13) also reported that finding skilled labour could be difficult, which could be a challenge for sustaining the growth of the sub-sectors in TRB1.

Table 24. **Key statistics on manufacturing sub-sectors in TRB1**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Eastern and Southeastern Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	10	Food products	1.47	-0.52	5.12	-2.64	0.39	●	n/a	n/a	35
	13	Textiles	1.27	-0.18	4.04	3.56	2.27	●	n/a	n/a	30
SG	23	Other non-metallic mineral products	1.17	0.28	2.17	16.15	0.67		●		22
ST											
EM	14	Wearing apparel	0.77	0.26	3.09	16.94	0.45	●	●	●	33
	20	Chemicals and chemical products	0.28	0.12	0.14	16.03	n/a				22
	24	Basic metals	0.34	0.11	0.32	14.68	n/a		●		
	31	Furniture	0.59	0.06	0.87	9.28	0.97		●	●	
	32	Other manufacturing	0.59	0.06	0.28	7.48	0.17				
	16	Wood and products of wood and cork, except furniture	0.77	0.03	0.43	0.22	n/a				
SH	25	Fabricated metal products, except machinery and equipment	0.53	-0.04	1.30	4.57	n/a				56
	33	Repair and installation of machinery and equipment	0.27	-0.11	0.12	2.37	n/a				
	18	Printing and reproduction of recorded media	0.61	-0.05	0.28	-1.90	0.19				
	22	Rubber and plastic products	0.59	-0.25	0.88	-3.99	n/a				
	17	Paper and paper products	0.37	-0.51	0.16	-15.10	n/a				
	15	Leather and related products	0.22	-0.42	0.11	-17.57	n/a				
	27	Electrical equipment	0.27	-0.48	0.29	-18.53	n/a	●			
	28	Machinery and equipment n.e.c.	0.21	-0.52	0.31	-21.54	0.57				
n/a	11	Beverages	1.44	n/a	0.17	n/a	n/a		●	●	35

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; FIRAT Development Agency, FIRAT 20142023 Regional Development Plan, TRB1, www.fka.org.tr/ContentDownload/TRB1%20B%C3%96LGE%20PLANI%20; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.24. Region TRB2 – Bitlis, Hakkari, Muş and Van

Introduction

The TRB2 region is located in Southeastern Anatolia and comprises the provinces of Bitlis, Hakkari, Muş and Van. It has borders with Iran and Iraq. It benefits from a strong agricultural and livestock sector and is relatively rich in marble resources (DAKA Development Plan, n.d.).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims for a region with "strong economic development, where people can live with high social standards". The RDP has three areas of focus: i) economic transformation and growth, ii) liveability and iii) strong community. The RDP prioritises agriculture (fruit and vegetables, crops and livestock), mining and tourism (winter, nature, culture and history, and water activities) and such forward-looking sub-sectors as machinery, wood and cork products, rubber and plastic products, fabricated metals, and renewable energy (DAKA Development Plan, n.d.).

Regional expert feedback

On 30 June 2016, at the expert group meeting in Ankara, regional experts identified food products (C.10), construction of buildings (F.41), food and beverage service activities (I.56), services to buildings and landscape activities (N.81) and other non-metallic mineral products (C.23) as dominant sub-sectors in the TRB2 region. In discussions and the survey, regional experts also identified the following high-potential sub-sectors: textiles (C.13), wearing apparel (C.14), furniture (C.31), chemicals (C.20), rubber and plastic products (C.22), leather products (C.15), beverage (C.11), repair and installation of machinery and equipment (C.33), wood products (C.16) and tourism.

Dominant sub-sectors

Agriculture accounts for the largest share of regional employment with 46.9%, followed by services (34%) and industry (19.2%). Manufacturing is relatively modest with 11% of regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 16.58, more concentrated than the regional median of 14.62. Employment data analysis identifies land transport and transport via pipelines (H.49) and other non-metallic mineral products (C.23) as dominant sub-sectors in the region. With 15%, H.49 claims a much higher share of total employment in the region than C.23's 2%.

Dynamic manufacturing sub-sectors

Manufacturing in TRB2 is underdeveloped in comparison to the national average. In addition to the dominant sub-sectors highlighted above, LQ analysis suggests that the region is relatively specialised only in products of wood (C.16). Only a small number of higher-value added sectors recorded strong absolute and relative growth – wearing apparel (C.14), fabricated metal products (C.25), and textiles (C.13) which boasted an increase of 120 percentage points.

At 9.5%, TRB2 is the region with the 2nd-lowest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, have struggle hard to develop further. Of the 111 companies in the broad Eastern and Southeastern Anatolia region, 33% reported that finding adequately educated employees could be difficult. For example, companies operating in textiles (C.13), fabricated metal products (C.25), and non-metallic mineral products (C.23) stated that hiring skilled could be a challenge that might hamper the growth of the sub-sectors in TRB2.

Table 25. **Key statistics on manufacturing sub-sectors in TRB2**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Eastern and Southeastern Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	23	Other non-metallic mineral products	1.28	0.59	2.38	35.19	1.02	●	n/a	n/a	
SG	16	Wood and products of wood and cork, except furniture	1.28	0.26	0.72	12.09	n/a	●	●		
ST											
EM	10	Food products	0.87	0.14	3.03	16.92	0.29		●	●	
	14	Wearing apparel	0.35	0.25	1.42	53.64	n/a		●	●	
	25	Fabricated metal products, except machinery and equipment	0.53	0.22	1.31	29.58	n/a	●			
	22	Rubber and plastic products	0.31	0.09	0.46	21.65	0.11	●		●	
	18	Printing and reproduction of recorded media	0.79	0.24	0.36	17.23	0.35				
	13	Textiles	0.08	0.04	0.25	40.14	n/a	●	●	●	
	32	Other manufacturing	0.50	0.47	0.24	120.76	n/a				
	28	Machinery and equipment n.e.c.	0.07	0.01	0.10	18.68	n/a	●			
SH	31	Furniture	0.21	-0.15	0.31	-0.66	n/a		●	●	

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; DAKA Development Agency, DAKA 20142023 Regional Development Plan, TRB2, www.daka.org.tr/panel/files/files/belgeler/TRB2_Bolge_Plani_Taslak.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.25. Region TRC1 – Adıyaman, Gaziantep, and Kilis

Introduction

The TRC1 region is located in Southastern Anatolia. It has a border with Syria and comprises the provinces of Adıyaman, Gaziantep, and Kilis. The region's economic structure is mainly built on industry however, it has also an important agriculture and food processing sector and it is well known in Turkey for its nuts industry (IKA Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) seeks to make the region "competitive and innovative, with high living standards and developed human capital, as well as to become the centre of attraction of the Middle East". The RDP has four areas of focus aimed at: i) raising living standards, ii) developing human capital, iii) developing sustainable rural development, and iv) increasing competitive and innovative capacities. The RDP prioritises agriculture (bee-keeping, livestock, Antep pistachios, and organic agriculture), food products, textiles, plastic products, furniture, wearing apparels, tourism (culture, faith, health, gastronomy, ecotourism, nature, water sports, and conventions), and a forward-looking sub-sector, renewable energy (IKA Development Agency, n.d.[b]).

Regional expert feedback

On 28 June 2016 at the expert group meeting in Ankara, regional experts identified food products (C.10), textile (C.13), rubber and plastic products (C.22), leather (C.15), and land transport and transport via pipelines (H.49) as dominant sub-sectors in the TRC1 region. In discussions and the survey, regional experts also identified repair and installation of machinery and equipment (C.33), chemicals (C.20), machinery (C.28), wearing apparel (C.14), motor vehicles (C.29), fabricated metal (C.25), furniture (C.31) and tourism as sectors with high growth potential.

Dominant sub-sectors

The regional economy in TRC1 has a large services sector that accounts for 47.9% of employment, followed by industry (33.4%) and agriculture (18.7%). Manufacturing is an important sector, with 28% of total regional employment. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 28.68, is more concentrated than the regional median of 14.62. Employment data analysis identified textile (C.13), food products (C.10), rubber and plastic products (C.22), and transport and transport via pipelines (H.49) as dominant sub-sectors in the region. C.13 claims by far the largest share of total regional employment (over 18%) and the highest level of regional specialisation, with an LQ of 5.9. The other three dominant sub-sectors account for less than 15% of the total regional employment and have lower LQ values.

Dynamic manufacturing sub-sectors

Manufacturing in TRC1 is well developed in comparison to the national average. In addition to the dominant sub-sectors highlighted above LQ analysis shows that the region is relatively specialised in paper (C.17) and leather (C.15). A number of higher-value added sectors recorded strong absolute and relative growth. Examples are repair and installation of machinery and equipment (C.33), basic metals (C.24), other manufacturing (C.32), and chemicals (C.20). Despite employing a sizable proportion of the regional labour force, relative regional specialisation decreased in machinery and equipment (C.28),

other non-metallic mineral products (C.23) or printing and reproduction of recorded media (C.18).

At 15.5%, TRC1 is the region with the 14th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, struggle to develop further. Of the 111 companies in the broad Eastern and Southeastern Anatolia region, 33% reported that finding adequately educated employees could be difficult. For example, companies operating in textiles (C.13), chemicals (C.20) and fabricated metal products (C.25) stated that the lack of skilled labour was an obstacle that might hamper the growth of those sub-sectors in TRC1.

Table 26. **Key statistics on manufacturing sub-sectors in TRC1**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Eastern and Southeastern Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	13	Textiles	5.85	1.20	18.57	18.22	1.52	●	n/a	n/a	30
	10	Food products	1.46	-0.55	5.08	0.99	0.98	●	n/a	n/a	35
	22	Rubber and plastic products	1.58	0.18	2.36	12.66	2.13	●	n/a	n/a	
SG	17	Paper and paper products	2.33	0.98	0.99	26.24	1.13				
	15	Leather and related products	2.72	1.01	1.36	25.94	0.62		●	●	
ST	16	Wood and products of wood and cork, except furniture	1.00	-0.01	0.56	3.07	n/a				
EM	33	Repair and installation of machinery and equipment	0.31	0.24	0.13	72.01	n/a		●		
	24	Basic metals	0.22	0.13	0.21	35.29	0.08				
	32	Other manufacturing	0.27	0.14	0.13	31.85	n/a				
	20	Chemicals and chemical products	0.79	0.43	0.41	29.06	0.22	●	●	●	22
	29	Motor vehicles, trailers and semi-trailers	0.26	0.07	0.34	18.47	0.19		●	●	
	31	Furniture	0.49	0.08	0.71	16.40	1.19	●	●	●	
	25	Fabricated metal products, except machinery and equipment	0.66	0.03	1.64	12.18	0.39			●	56
	14	Wearing apparel	0.67	0.01	2.69	10.37	0.76	●		●	33
SH	28	Machinery and equipment n.e.c.	0.32	-0.14	0.49	2.67	n/a		●	●	
	23	Other non-metallic mineral products	0.39	-0.22	0.72	1.26	1.10				
	18	Printing and reproduction of recorded media	0.63	-0.17	0.29	-1.72	0.18				
	27	Electrical equipment	0.11	-0.09	0.11	-5.64	n/a				

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; İKA Development Agency, İKA 20142023 Regional Development Plan, TRB3 www.ika.org.tr/upload/yazilar/TRC1-Bolge-Plani-2014-2023-730709.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.26. Region TRC2 – Diyarbakır and Şanlıurfa

Introduction

The TRC2 region is located in the Southeastern Anatolia. The region, which has a border with Syria, comprises the provinces of Diyarbakır and Şanlıurfa. Its economic structure is built on agriculture and livestock farming (KARACADAG Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to make the region "the new centre of attraction of the Middle East thanks to a growing economy and rising living standards". The RDP has four areas of focus aimed at: i) developing urban economies and accelerating development, ii) strengthening human and social capital and reducing poverty, iii) improving living standards and managing spatial planning, and iv) achieving sustainable, green development. It prioritises agriculture, livestock, mining, textiles, machinery, non-metallic mineral products, products of wood, food processing, electrical equipment manufacturing, basic metal industry, rubber and plastic-products, furniture, wearing apparels, and tourism. As a forward-looking sector, it also makes renewable energy a priority (KARACADAG Development Agency, n.d.[b]).

Regional expert feedback

On 29 June 2016, at the expert group meeting in Ankara, regional experts identified other non-metallic mineral products (C.23), wearing apparel (C.14), land transport (H.49), food and beverage service activities (I.56), construction of buildings (F.41), services to buildings (N.81) as dominant sub-sectors in the TRC2 region. In discussions and the survey, the experts also identified food processing (C.10), textile (C.13), rubber and plastic products (C.22), fabricated metal products (C.25), furniture (C.31), motor vehicles (C.29), repair and installation of machinery and equipment (C.27), beverages (C.11), electrical equipment (C.27) and tourism as sectors with high growth potential.

Dominant sub-sectors

The regional economy has a strong agricultural sector, which accounts for 41.1% of regional employment, followed by the services (39%) and industry (19.9%). Manufacturing is relatively modest, employing 8% of the regional workforce. The distribution of employment across manufacturing sub-sectors is, with HHI value of 15.01, slightly more concentrated than the regional median of 14.62. Employment data analysis identifies only land transport and transport via pipelines (H.49) and other non-mineral metallic products (C.23) as dominant sub-sectors in the region. H.49 accounts for 11% of total regional employment, three times more than C.23. However, in terms of relative regional specialisation they are similar, with LQs of 1.7 and 1.3.

Dynamic manufacturing sub-sectors

Manufacturing in TRC2 is underdeveloped in comparison to the national average. Apart from the dominant sub-sectors highlighted above, no sub-sectors have an LQ value higher than 1. However, a small number of higher value-added sectors recorded strong absolute and relative growth. Examples are wearing apparel (C.14), pharmaceutical products (C.21), food products (C.10), or machinery and equipment (C.28).

At 10.7%, TRC2 has the 23rd-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well educated labour force might, therefore, have considerable difficulty in developing further. Of the 111 companies in the broad eastern and south-eastern Anatolia region, 33% reported that finding adequately educated employees could be difficult. For example, a high share of the companies operating in textiles (C.13) and fabricated metal products (C.25) struggle to recruit skilled labour, which might hamper the growth of the sub-sectors in TRC2.

Table 27. **Key statistics on manufacturing sub-sectors in TRC2**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Eastern and Southeastern Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	23	Oher non-metallic mineral products	1.47	-0.12	2.74	12.60	1.23	●	n/a	n/a	22
SG											
ST											
EM	14	Wearing apparel	0.20	0.04	0.82	17.32	n/a	●	●	●	33
	21	Basic pharmaceutical products and pharmaceutical preparations	0.73	0.26	0.17	16.18	n/a		●		
	10	Food products	0.64	0.08	2.22	14.87	0.40	●	●	●	35
	28	Machinery and equipment n.e.c.	0.10	0.00	0.15	14.14	n/a	●		●	
	16	Wood and products of wood and cork, except furniture	0.61	0.09	0.34	9.12	n/a	●			
	18	Printing and reproduction of recorded media	0.41	0.01	0.19	6.35	n/a		●		
SH	13	Textiles	0.52	-0.17	1.64	5.56	0.69	●		●	30
	27	Electrical equipment	0.24	-0.06	0.26	5.42	n/a	●	●	●	
	33	Repair and installation of machinery and equipment	0.69	-0.54	0.30	2.28	n/a		●	●	
	22	Rubber and plastic products	0.32	-0.16	0.47	0.00	n/a				
	31	Furniture	0.20	-0.19	0.29	-4.31	n/a	●		●	
	25	Fabricated metal products, except machinery and equipment	0.19	-0.29	0.47	-10.97	n/a		●		56
n/a.	24	Basic metals	0.25	n/a	0.24	n/a	n/a	●			

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.
Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; KARACADAĞ Development Agency, KARACADAĞ 20142023 Regional Development Plan, TRC2, 2023.karacadag.org.tr/Download/TRC2_Bolgesi_2014_2023_Bolge_Plani.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

5.27. Region TRC3 – Batman, Mardin, Siirt and Şırnak

Introduction

The TRC3 region is located in Southeastern Anatolia. It has borders with Iraq and Syria and is considered Turkey's gateway to the Middle East and North Africa. TRC3 comprises the provinces of Batman, Mardin, Siirt and Şırnak. The region's economic structure is built on agriculture and livestock farming (DIKA Development Agency, n.d.[a]).

Regional policy objectives

The 2014-2023 Regional Development Plan (RDP) aims to "catch-up with national income thanks to the regional natural resources, developed human capital, and spatial potential". The RDP has three areas of focus: i) the development of social capital, ii) social integration and high added-value production, and iii) services, sustainable environment and spatial organisation. It prioritises agriculture (livestock, fruit and vegetables), food processing, textiles, and renewable energy. As a forward looking sector, the plan also prioritises mining and tourism (culture, faith and agro-tourism) (DIKA Development Agency, n.d.[b]).

Regional expert feedback

On 29 June 2016, at the expert group meeting in Ankara, regional experts identified other non-metallic mineral products (C.23), food processing (C.10), land transport (H.49) and services to buildings (N.81) as dominant sub-sectors in the TRC3 region. In discussions and the survey, regional experts also identified food processing (C.10), textile (C.13), chemicals (C.20), repair and installation of machinery and equipment (C.33), wearing apparel (C.14), furniture (C.19), coke and refined petroleum products (C.19), and tourism as sectors with high growth potential.

Dominant sub-sectors

The regional economy has a large services sector which accounts for 55.4% of regional employment, followed by agriculture (24.4%) and industry (20.2%). Manufacturing sector is relatively small, employing 8% of the regional workforce. The distribution of employment across manufacturing sub-sectors is, with an HHI value of 16.97, more concentrated than the regional median of 14.62. Employment data analysis identifies only land transport and transport via pipelines (H.49) and other non-mineral metallic products (C.23) as dominant sub-sectors in the region. H.49 accounts for around 19% of total regional employment, eight times higher than C.23. With an LQ of 3, the region is relatively specialised in H.49

Dynamic manufacturing sub-sectors

Manufacturing in TRC3 is underdeveloped in comparison to the national average. In addition to the dominant sub-sectors highlighted above, TRC3 is relatively specialised in the repair and installation of machinery and equipment (C.33) and printing and reproduction of recorded media (C.18) Apart from C.33 and C.18, only a small number of higher value-added sectors recorded strong absolute and relative growth. Examples are wearing apparel (C.14), electrical equipment (C.27), or chemicals (C.20). Despite employing a sizable proportion of the regional labour force, the relative regional specialisation decreased in rubber and plastic products (C.22), furniture (C.31), and fabricated metal products (C.25).

At 13.7%, TRC3 is the region with the 18th-highest share of tertiary-educated workers in its labour force. The manufacturing sub-sectors that require a relatively well-educated labour force might, therefore, have difficulty developing further. Of the 111 companies in the broad Eastern and Southeastern Anatolia region, 33% reported that finding adequately educated employees could be problematic. For example, companies operating in fabricated metal products (C.25) could struggle to find skilled labour, which might hamper the growth of the sector in TRC3.

Table 28. **Key statistics on manufacturing sub-sectors in TRC3**

Group	NACE	Sub-sector	LQ 2013	Δ LQ (2009 to 2013)	Share of total employment (%)	CAGR employment (2009 to 2013) (%)	Investment rate	RDP priority	Discussion promising sub-sector	Survey promising sub-sector	Share of Eastern and Southeastern Anatolia region companies citing availability of an adequately educated workforce as an obstacle (%)
DO	23	Other non-metallic mineral products	1.24	-0.34	2.30	8.08	n/a		n/a	n/a	22
SG	33	Repair and installation of machinery and equipment	1.01	0.66	0.44	53.31	n/a		●	●	
	18	Printing and reproduction of recorded media	1.29	0.66	0.59	26.54	n/a				
ST											
EM	14	Wearing apparel	0.52	0.38	2.09	0.56	n/a	●		●	33
	27	Electrical equipment	0.22	0.14	0.24	0.45	n/a				
	20	Chemicals and chemical products	0.65	0.25	0.33	0.22	n/a		●	●	22
	13	Textiles	0.04	0.00	0.13	0.14	n/a	●	●	●	30
	10	Food products	0.85	0.06	2.95	0.13	n/a	●	●	●	35
SH	22	Rubber and plastic products	0.42	-0.06	0.63	7.49	n/a				
	16	Wood and products of wood and cork, except furniture	0.20	-0.09	0.11	-4.29	n/a				
	25	Fabricated metal products, except machinery and equipment	0.23	-0.24	0.58	-5.59	n/a				56
	31	Furniture	0.15	-0.37	0.23	-17.11	n/a			●	

Note: The initials denote the following groups of sub-sectors: DO = dominant, SG = still growing, ST = stagnating, EM = emerging, and SH = shrinking. See Figure 2.

Source: Adapted from EBRD/World Bank (2014), Business Environment and Enterprise Performance Survey (BEEPS) (database), www.enterprisesurveys.org/; DİKA Development Agency, DİKA 20142023 Regional Development Plan, TRC3, www.dika.org.tr/photos/files/TRC3_2014-2023_B%C3%B6lgesel_Geli%C5%9Fme_Plan%C4%B1.pdf; TUIK (n.d.), Labour Force Statistics (database), www.turkstat.gov.tr/Start.do.

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Annex A.
Structural analysis: methodological note

This annex comprises two tables – the OECD Structural Analysis (STAN) database indicators and a proposed R&D classification by economic activity.

Table A.1. **OECD STAN structural analysis indicators by area**

Area	Indicator
Production	Production (gross output), current prices
	Production (gross output), volumes
	Production (gross output), deflators
Intermediate inputs	Intermediate inputs, current prices
	Intermediate inputs, volumes
	Intermediate inputs, deflators
Value added	Value added, current prices
	Value added, volumes
	Value Added, deflators
	Value added at factor costs, current prices
Labour	Labour costs (compensation of employees)
	Wages and salaries
	Number of persons engaged (total employment)
	Number of employees
	Self-employed
	Full-time equivalents - total engaged
	Full-time equivalents - employees
	Hours worked - total engaged
	Hours worked - employees
Capital	Gross fixed capital formation, current prices
	Gross fixed capital formation, volumes
	Gross fixed capital formation, deflators
	Gross capital stock, volumes
	Net capital stock, volumes
	Consumption of fixed capital
Trade	Exports of goods at current prices
	Imports of goods at current prices
Government effects	Other taxes less subsidies on production
Income	Gross operating surplus and mixed income
	Net operating surplus and mixed income

Source: OECD (n.d.[c]), "Variables in STAN", www.oecd.org/sti/ind/STAN_var_list_EN.pdf.

Table A.2. **Taxonomy of economic activities by intensity of R&D**

R&D Classification	Manufacturing	Non-manufacturing
High R&D intensive industries	3031: Air and spacecraft and related machinery	72: Scientific research and development
	21: Pharmaceuticals	5821: Software publishing
	26: Computer, electronic and optical products	
Medium-high R&D intensive industries	252: Weapons and ammunition	62-63: IT and other information services
	29: Motor vehicles, trailers and semi-trailers	
	325: Medical and dental instruments	
	28: Machinery and equipment n.e.c.	
	20: Chemicals and chemical products	
	27: Electrical equipment	
	30X: Railroad, military vehicles and transport n.e.c. (ISIC 302, 304 and 309)	
Medium R&D intensive industries	22: Rubber and plastic products	
	301: Building of ships and boats	
	32X: Other manufacturing except medical and dental instruments (ISIC 32 less 325)	
	23: Other non-metallic mineral products	
	24: Basic metals	
	33: Repair and instillation of machinery and equipment	
Medium-low R&D intensive industries	13: Textiles	69-75X: Professional, scientific and technical activities except scientific R&D (ISIC 69 to 75 less 72)
	15: Leather and related products	61: Telecommunications
	17: Paper and paper products	05-09: Mining and quarrying
	10-12: Food products, beverages and tobacco	581: Publishing of books and periodicals
	14: Wearing apparel	
	25X: Fabricated metal products except weapons and ammunition (ISIC 25 less 252)	
	19: Coke and refined petroleum products	
	31: Furniture	
	16: Wood and products of wood and cork	
	18: Printing and reproduction of recorded media	
Low R&D intensive industries		64-66: Financial and insurance activities
		35-39: Electricity, gas and water supply, waste management and remediation
		59-60: Audiovisual and broadcasting activities
		45-47: Wholesale and retail trade
		01-03: Agriculture, forestry and fishing
		41-43: Construction
		77-82: Administrative and support service activities
		90-99: Arts, entertainment, repair of household goods and other services
		49-53: Transportation and storage
		55-56: Accommodation and food service activities
		68: Real estate activities

Source: Galindo-Rueda, F. and F. Verger (2016), "OECD Taxonomy of Economic Activities Based on R&D Intensity", OECD Science, Technology and Industry Working Papers, No. 2016/04, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/5jlv73sqqp8r-en.

Annex B.
Structural analysis indicator formulas

The **share of employment by sector** measures the contribution of sector (agriculture, industry and services sector) to total regional employment in a given year.

$$SE_s = \frac{employment_s}{total\ employment}$$

The **share of employment by sub-sector** measures how many employed people were engaged in a given economic sub-sector among all the people employed in a given region and year

$$SE_i = \frac{employment_i}{total\ employment}$$

The **Herfindahl-Hirschman Index** (HHI) measures the level of diversification in a manufacturing sector in a given region and year. HHI is the sum of squared employment shares of all sub-sectors in the manufacturing sector resulting in . denotes the number of manufacturing sub-sectors

$$HHI = \sum_{i=1}^{N} SE_{i,m}^2$$

The **Location Quotient** (LQ) indicator compares the economic structure of region with the national economic structure . An LQ is computed as the share of regional employment in sub-sector , denoted divided by the sub-sector's share of the national employment .

$$LQ = \frac{SE_i^r}{SE_i^n}$$

The **compound annual growth rate** (CAGR) of employment, looks at the average annual growth of employment in a sub-sector over the time period .

$$CAGR\ (t_0,t_n) = \left(\frac{E_{t_n}}{E_{t_0}}\right)^{\frac{1}{t_n - t_0}} - 1$$

The **investment rate** considers the cumulative fixed capital formation per employee over the period in a given sub-sector and region compared to the national level

$$IR_i = \frac{\frac{\sum_{t_0}^{t_n} I_i^r}{E_{i(t_n)}^r}}{\frac{\sum_{t_0}^{t_n} I_i^n}{E_{i(t_n)}^n}}$$

The **income elasticity of domestic demand** for production of the sub-sector , considers how domestic consumption – domestic production (DP) minus exports (EX) plus imports (IM) – changed in relation to the change in GDP over the time period .

$$IE_d(t_0,t_n) = \frac{\left(\frac{(DP - EX + IM)_{t_n}}{(DP - EX + IM)_{t_0}}\right)^{\frac{1}{t_n - t_0}} - 1}{\left(\frac{GDP_{t_n}}{GDP_{t_0}}\right)^{\frac{1}{t_n - t_0}} - 1}$$

Annex C.
Expert group meeting questionnaire on manufacturing sub-sectors

Organisation:_____

Code of the NUTS-II Region: _TR_____

STEP 1

Please rate each manufacturing sector on its growth potential in your region on a scale of 1 (low) to 4 (high):

Rate 1-4	NACE code	Sub-sector
	C.10	Manufacture of food products
	C.11	Manufacture of beverages
	C.12	Manufacture of tobacco products
	C.13	Manufacture of textiles
	C.14	Manufacture of wearing apparel
	C.15	Manufacture of leather and related products
	C.16	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
	C.17	Manufacture of paper and paper products
	C.18	Printing and reproduction of recorded media
	C.19	Manufacture of coke and refined petroleum products
	C.20	Manufacture of chemicals and chemical products
	C.21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
	C.22	Manufacture of rubber and plastic products
	C.23	Manufacture of other non-metallic mineral products
	C.24	Manufacture of basic metals
	C.25	Manufacture of fabricated metal products, except machinery and equipment
	C.26	Manufacture of computer, electronic and optical products
	C.27	Manufacture of electrical equipment
	C.28	Manufacture of machinery and equipment n.e.c.
	C.29	Manufacture of motor vehicles, trailers and semi-trailers
	C.30	Manufacture of other transport equipment
	C.31	Manufacture of furniture
	C.32	Other manufacturing
	C.33	Repair and installation of machinery and equipment

STEP 2

(Only sectors rated "4" in the previous question)

Please rate the questions related to the selected sub-sector on the scale from 1-4	
Please indicate the NACE code of the sector with high growth potential:	
	How do you assess the availability of skilled labour force related to the selected sub -sector in the region? (Not available – 1. High quality labour force is available – 4)
	Is there a cluster related to the selected sub-sector in the region or in the neighbouring regions? (Cluster does not exist – 1. Cluster exists and fully operates – 4)
	How do you assess the regional network of suppliers related to the selected sub-sector (There are no suppliers in the region – 1. Network of suppliers is well developed – 4)
	How do you assess scientific and technological infrastructure related to the selected sub-sector in the region. (Scientific and technological infrastructure does not exist – 1. Scientific and technological infrastructure is well developed – 4)
	How do you assess availability of natural resources relevant for the selected sub-sector in the region or in the neighbouring regions (if applicable) (Natural resources are not available – 1. High quality natural resources are available – 4)
	How do you assess the local demand for products produced by the selected sub-sector? (Low local demand – 1. High local demand – 4)
	How do you assess the national demand on products produced by the selected sub-sector? (Low national demand – 1. High national demand – 4)

Annex D.
Input-output analysis methodological note

The fundamental purpose of the input-output framework is to analyse the interdependencies of industries in an economy. Input-output analysis is based on final-demand-driven models designed to examine the interrelations between the productive sectors of the economy. It was pioneered by Wassily Leontief in the late 1930s who, in recognition of his contribution, received the Nobel Prize in Economic Science in 1973. The input-output technique uses an input-output table that shows the flow of goods and services between industries. It describes the complex process of production, the use of goods and services, and the way in which income and value added are generated within various sectors of an economy. The input-output system can be viewed as a simplified representation of the production side of the economy, where producers of similar goods and services form a homogeneous industry. It is a useful technique for tracing resources and products in the economy.

The basic Leontief Input-Output Model (henceforth referred to as the "Leontief model" or simply "input-output model") is constructed from economic data for a specific geographic area (nation, state, region, etc.). Because of the detailed structure of the data and the demanding construction procedure, they are usually prepared by national statistical offices for national economies only. Accordingly, Part 1.2. proposes a simple method of regionalising national input-output tables in which the analysis of regional inter-linkages takes into account to what extent different sectors contribute to the regional economy.

Input-output model for national economy

The main purpose of production-related activities is to satisfy final demand. In order to satisfy it, many intermediate goods and services have to be produced at different stages of the production process. Their links to the end product and to other production sectors are depicted in input-output tables. Tables can be viewed as detailed descriptions of flows of goods and services between industries, final demand sales and non-industrial inputs to production. Input-output tables are the main data source for input-output analysis.

Table D.1. **Symmetric input-output table**

	Industries	Final use		Total
Industries	Intermediate consumption	Domestic final use	Export	Total production
	Import			
	Value added			
	Total production			

The flow of intermediate goods and services between industries is captured in the first block. The elements in the block show, in the dedicated column, the intermediate consumption of goods and services and, in the industry row, the industry which produces them. Goods and services that are not used as input to production are delivered to final demand. They are either used domestically through household consumption, government consumption and investment or exported abroad. The column in the intermediate consumption table shows the input structure of each industry. Besides the consumption of domestic intermediate deliveries it shows which ones are imported. The use of primary inputs to production and corresponding incomes are in the third block. A detailed structure of value added shows the income from labour (employee compensation) and the income from capital (gross operating surplus).

The flows of goods and services in input-output tables can be written as a system of linear equations for each industry. The production of a particular industry is either used by other industries as an input to production (intermediate deliveries) or delivered to final demand. Complete flows of goods and services are captured in the linear system of equations in (1).

$$\begin{aligned} x_1 &= z_{11} + z_{12} + z_{13} + \ldots + z_{1n} + y_1 \\ &\vdots \\ &\vdots \\ x_n &= z_{n1} + z_{n2} + z_{n3} + \ldots + z_{nn} + y_n \end{aligned} \qquad (1)$$

In the first row, the production of industry 1 x_1 is used as an input to production in the same industry z_{11} and as an input to production in industries 2 to *n* while the rest is delivered to final consumption purposes y_1. Similarly, the production of *n-th* industry is used in other industries or by final demand. The system of linear equations (1) can be written in a matrix form, where $\mathbf{x}$ is a vector of total production by industries, $\mathbf{Z}$ a matrix of intermediate consumption, $\mathbf{y}$ a final demand vector and $\mathbf{i}$ a summation vector. For *n* industries $\mathbf{Z}$ is a *n by n* matrix. In its typical element z_{ij} is the magnitude of production from industry *i* used as an input to production in industry *j* – e.g. the amount of steel used in the production of cars.

$$\boldsymbol{x = Zi + y} \quad (2)$$

The input-output model is based on the assumption of the so-called "Leontief technology". It is a production function with fixed proportions of inputs to production. A matrix of input coefficients can thus be calculated for later use in the derivation of the model. The matrix of input coefficients $\mathbf{A}$ is calculated in (3).

$$\boldsymbol{A = Z\hat{x}}^{\,1} \quad (3)$$

The elements in $\mathbf{A} = \{a_{ij}\}$ indicate the amount of input from industry *i* per unit of production in industry *j*. It shows the direct input requirements per unit of production in industry *j*. Based on the assumption of fixed-proportion production function, equation (2) can be rewritten using (3) in the following way:

$$\boldsymbol{x = Ax + y} \quad (4)$$

Here again, total production of particular industries is either used as an input to production in other industries or delivered to final demand. Assuming the fixed industrial input structure, we can compute the total production that is necessary to satisfy exogenously given final demand. Formally, equation (4) has be written for where the vector of total production $\mathbf{x}$ depends on the final demand vector $\mathbf{y}$. The basic equation of the model then looks like this:

$$\boldsymbol{X=(I\ A)1\ y} \quad (5)$$

Matrix $(\mathrm{I}\ \mathrm{A})^1$ captures all complex linkages between industries and reflects the interrelations between final demand and the corresponding total production that is required. It is called the "Leontief inverse matrix". Accordingly, it is labelled $\mathrm{L}=(\mathrm{I}\ \mathrm{A})^1$. Equation (5) can be then written as follows:

$$\boldsymbol{x = Ly} \quad (6)$$

The elements in Leontief inverse matrix l_{ij} represent the output of industry *i* that is necessary to satisfy one unit of final demand for the commodities of industry *j*. A detailed description of the properties and assumptions behind the derivation of the input-output model can be found in Miller and Blair (2009).

The effects of final use consumption on total production in the economy can be analysed through **output multipliers**. The output multipliers for particular industries can be calculated as the sum of elements in each column. Formally:

$$m(o)_j = \sum_{i=1}^{n} l_{ij} \quad (7)$$

$$m(o)=iL$$

The output multiplier for industry *j* is defined as the total value of production in all industries of the economy that is necessary to satisfy a USD's worth of final demand for industry *j*'s output. For example, output multiplier 2.3 for the car industry indicates that a USD´s worth of final demand for cars generates USD 2.3's worth of production in the national economy. They show where the spending would have the greatest impact regarding the total USD value of output generated throughout the economy. Output multipliers show the linkages between final use and total production. Sometimes it is more convenient to understand the linkages between the production of one industry and its effects on other industries. To calculate such interaction, each column in the Leontief inverse matrix has to be divided by the corresponding element on the main diagonal.

$$L=L(\hat{L})^{1} \quad (8)$$

From (8) it is possible to calculate the so-called "output-to-output multipliers" that are defined as the total value of production in all industries of the economy that is necessary to satisfy a USD´s worth of industry *j*'s production. They are calculated as the sum of the elements in each column in the matrix $\mathbf{L}$.

$$m(oo)=iL \quad (9)$$

If fixed proportions between labour requirements and total production by industries are assumed and expressed as follows,

$$(e_c)_j = \frac{e_j}{x_j}, \quad j = 1 \ldots n \quad (10)$$

then the model can be augmented for the effects of final demand on total employment in the economy. The elements of vector $e_c=\{(e_c)_j\}$ are direct labour coefficients computed as the ratio of total employment in industry *j* to total production of industry *j*. The inverse value of direct labour coefficients is labour productivity. Augmented input-output model then takes this form

$$E=e_c Ly \quad (11)$$

where E is total employment generated by exogenously given final demand vector $\mathbf{y}$. If $\mathbf{y}$ is a total final use vector in the economy, then E corresponds to total employment from source data. If $\mathbf{y}$ is a final demand vector of particular final use category then E corresponds to total employment generated by that particular category – e.g. the formula (11) can be used to calculate total employment generated by export or household consumption.

The effects of one unit of final demand for particular industries on total employment in the economy can be analysed through **employment multipliers**.

$$m(e)=ecL \quad (12)$$

Employment multipliers can be calculated by replacing the summation vector in (7) by a row vector of direct labour coefficients (labour input per one unit of production). They are defined as the total employment in the economy generated by one unit of final demand for industry *j*'s production.

In a similar way, the effects of final demand on value added generated in the economy can be analysed by augmenting the model for the value added coefficients that are defined as total value added of industry *j* per one unit of production of industry *j*. If $(va)_j$ is a particular value added and x_j the corresponding production then value added input coefficients are calculated as follows:

$$v_j = \frac{(va)_j}{x_j}, \quad j = 1 \ldots n \quad (13)$$

By replacing the employment input coefficients in (11) by the value-added input coefficient vector $\mathbf{v}$ the total value added generated in the economy by the final demand vector $\mathbf{y}$ can be calculated.

$$V = vLy \quad (14)$$

Again, the direct and indirect linkages between one unit of final demand and value added can be calculated through **value-added multipliers**.

$$m(v) = vL \quad (15)$$

Equation (15) shows the calculation of value-added multipliers where a row vector of direct value-added coefficients is multiplied by the Leontief inverse matrix $\mathbf{L}$. The value-added multiplier for industry *j* is defined as the total value added in the economy generated by one unit of final demand for industry *j*'s production.

Regionalising data and model

If e_i^r and e^r denote total employment in industry *i* in region *r* and total employment in all industries in region *r*, respectively, and if e_i^n and e^n denote these totals at the national level, then the simple LQ for industry *i* in region *r* is defined as

$$LQ_i^r = \frac{e_i^r / e^r}{e_i^n / e^n} \quad (16)$$

Based on equation (16) the LQ for each industry in each region of the national economy can be calculated. The numerator in (16) indicates the proportion of region *r*'s total employment contributed by industry *i*. The denominator represents the proportion of total national employment that is contributed by sector *i* nationally. Whenever the LQ is higher than 1, industry *i* is localised (concentrated or developed) in the region rather than nationwide. Conversely, if the LQ is less than 1, industry *i* is less localized, or less concentrated, in region *r* than in nationwide and can be considered as an underdeveloped sector in that particular region. To obtain a formula for a different interpretation of LQ, the numerator and denominator in (16) can be rearranged as follows:

$$LQ_i^r = \frac{e_i^r / e_i^n}{e^r / e^n} \quad (17)$$

The numerator now measures the proportion of total national employment in industry *i* that is employed in region *r*. The denominator is the proportion of total national employment in all industries in region *r*. The interpretation of the LQ is much the same. $LQ_i^r > 1$ indicates an industry where employment is relatively localised and developed in region *r*, while $LQ_i^r < 1$ indicates an underdeveloped, or less localised, industry in region *r*.

The simple LQ can be viewed as a measure of the ability of regional industry *i* to meet the demand from other industries and final demand in that region. Thus, if industry *i* is less concentrated in the region than in the nation, it is seen as less capable of satisfying regional demand for its output, and its regional direct input coefficients are created by reducing the national coefficients. However, if industry *i* is more highly localised in the region than in the nation, then it is assumed that the national input coefficients from industry *i* apply to the region. The regional surplus produced by *i* will be exported to the rest of the nation. Thus, the regional input coefficient matrix can be calculated as follows:

$$\mathbf{A}^r = a_{ij}^r = \begin{cases} (LQ_i^r)a_{ij}^n & if\ LQ_i^r < 1) \\ a_{ij}^n & if\ LQ_i^r \quad 1 \end{cases} \quad (18a)$$

Regionalisation is shown in (18b) using simplified national input coefficient matrix for three industries. In this example, industry 1 is highly concentrated in region *r*, industry 2 is present at the national average level and industry 3 is underdeveloped in that region because its LQ equals 0.5. After regionalization of the national input coefficient matrix – $\mathbf{A}^n$ into $\mathbf{A}^r$ – the first two lines remain the same while the last row in matrix $\mathbf{A}^r$ is just one-half of original national matrix $\mathbf{A}^n$.

A^n			LQ^r	A^r		
0,31	0,14	0,1	1,5	0,31	0,14	0,1
0,12	0,35	0,22	1	0,12	0,35	0,22
0,24	0,42	0,36	0,5	0,12	0,21	0,18

(18b)

Based on the regionalized input coefficient matrix, a regional Leontief inverse matrix can be calculated:

$$L^r=(I\ A^r)^1 \quad (19)$$

In (19), the Leontief inverse matrix captures the linkages between industries in a given region *r*. The elements in the regionalized Leontief inverse matrix show the total production generated within the region in industry *i* by USD 1's worth of final demand for commodities from industry *j*. These elements are smaller than in the national Leontief inverse matrix because part of the indirect production generated by final demand is induced in other regions. Underdeveloped sectors in the local economy are not able to satisfy the production required to meet final demand. The shortfall is met through imports from other regions.

The sum of elements in the columns of the regionalized Leontief inverse matrix yield the **regional output multipliers**. They show the impact of final use of production from industry *j* on the total regional production of all industries:

$$m^r(o)=iL^r \quad (20)$$

In a similar way it is possible to calculate the regional output-to-output multipliers. With equation (8) the regionalized output-to-output coefficients matrix can be calculated which, when the sum of the elements in the columns are factored in, yields the **regional output-to-output multipliers**:

$$m^r(oo)=iL^r \quad (21)$$

Regional output-to-output multipliers are defined as the total regional production generated by USD 1's worth of output from industry *j*. The effects of final use on total (direct and indirect) regional employment are computed in equation (22). **Regional employment multipliers** show the number of jobs generated in the regional economy by one unit of final use of commodity *j*.

$$m^r(e)=e_c L^r \quad (22)$$

Total value added generated in the region by the final use of output from industry *j* can be calculated in the following way:

$$m^r(v)=vL^r \quad (23)$$

The regional multipliers calculated in equations (20) to (23) can be used to evaluate the importance of USD 1's worth of final use (or production) from particular industries in production, employment and value added. The importance of the industries is evaluated not only by their direct effects on production, employment and value added, but by the complex linkages and indirect effects on other industries within the region.

Data

The last officially released symmetric input-output tables for the Turkish economy were published by the Turkish Statistical Institute (TSI) for the year 2002. More recent data are included in the World Input-Output Database (WIOD, at www.wiod.org/new_site/home.htm). The database covers 27 European Union Member States and 13 other major countries (including Turkey) for the period 1995 to 2011. The WIOD tables are constructed for 35 industries in USD using the NACE Rev.1 classification. More information on the construction of the World Input-Output Tables can be found in Dietzenbacher, Los et al. (2013)Los et al. (2013.

The most recent data on regional employment come from the Turkish Statistics Institute. They are available for Turkey's 26 NUTS II regions. The most recent employment data relate to the year 2013 in the NACE Rev.2 classification. The data on regional employment were used to identify underdeveloped sectors in particular regions and to regionalise national input-output tables. Because national input-output tables taken from WIOD are available only in NACE Rev.1, and because regional employment is based thereon, regional data had to be converted to 35 NACE Rev.1 industries. Conversion used correspondence tables between NACE Rev.1 and NACE Rev.2 released by EUROSTAT, at ec.europa.eu/eurostat/web/nace-rev2/correspondence_tables).

Data on employment at the regional level were missing for financial intermediation and public administration. Similarly, data on employment in agriculture were incomplete. As a result, it was not possible to calculate regional LQs for those industries. LQs equal to 1 were therefore assumed. Accordingly, direct employment coefficients for financial intermediation, public administration and agriculture were based on data from WIOD.

Table D.2. **Regional production multipliers by manufacturing sub-sector**

Region	Food, Beverages and Tobacco	Textiles and Textile Products	Leather, Leather and Footwear	Wood and Products of Wood and Cork	Pulp, Paper, Paper, Printing and Publishing	Coke, Refined Petroleum and Nuclear Fuel	Chemicals and Chemical Products	Rubber and Plastics	Other Non-Metallic Mineral	Basic Metals and Fabricated Metal	Machinery, n.e.c.	Electrical and Optical Equipment	Transport Equipment	Manufacturing, n.e.c.; Recycling
TR10	1.37	1.94	1.94	1.65	1.88	1.59	1.78	1.88	1.52	1.61	1.59	1.81	1.49	1.72
TR21	1.40	1.88	1.94	1.67	1.75	1.65	1.73	1.78	1.64	1.58	1.53	1.73	1.46	1.69
TR22	1.83	1.27	1.75	1.75	1.51	1.61	1.63	1.60	1.58	1.42	1.40	1.49	1.32	1.43
TR31	1.96	1.79	2.11	1.93	1.95	1.78	1.89	1.95	1.66	1.70	1.65	1.79	1.56	1.77
TR32	1.41	1.85	1.53	1.61	1.61	1.77	1.59	1.58	1.66	1.54	1.48	1.57	1.40	1.62
TR33	1.42	1.61	1.91	1.66	1.76	1.79	1.65	1.70	1.70	1.66	1.58	1.76	1.49	1.66
TR41	1.41	1.86	1.60	1.65	1.65	1.73	1.65	1.70	1.67	1.64	1.57	1.77	1.49	1.72
TR42	1.70	1.55	1.76	1.84	1.85	1.70	1.78	1.86	1.64	1.66	1.60	1.78	1.50	1.68
TR51	1.32	1.26	1.47	1.51	1.67	1.70	1.60	1.60	1.59	1.61	1.55	1.69	1.42	1.51
TR52	1.93	1.33	1.96	1.85	1.80		1.68	1.70	1.66	1.67	1.58	1.60	1.49	1.62
TR61	1.75	1.27	1.39	1.74	1.50	1.64	1.57	1.55	1.57	1.42	1.38	1.43	1.33	1.43
TR62	1.97	1.74	1.67	1.99	1.82	1.90	1.90	1.94	1.71	1.69	1.60	1.64	1.52	1.74
TR63	1.68	1.88	1.67	1.70	1.61	1.71	1.58	1.60	1.57	1.64	1.51	1.51	1.43	1.67
TR71	1.87	1.43	1.57	1.71	1.52		1.58	1.59	1.63	1.61	1.49	1.49	1.45	1.58
TR72	1.41	1.53	1.50	1.61	1.64	1.76	1.58	1.61	1.67	1.65	1.55	1.74	1.46	1.64
TR81	1.74	1.64	1.81	1.72	1.51		1.50	1.52	1.62	1.62	1.48	1.51	1.42	1.62
TR82	1.35	1.78		1.51	1.41		1.48	1.48	1.55	1.44	1.39	1.61	1.34	1.55
TR83	1.90	1.49	1.75	1.84	1.70		1.67	1.66	1.69	1.58	1.51	1.59	1.41	1.57
TR90	1.36	1.30	1.42	1.51	1.42		1.47	1.47	1.53	1.43	1.36	1.41	1.32	1.43
TRA1	1.58	1.20		1.59	1.51		1.52	1.50	1.62	1.46	1.38	1.44	1.32	1.39
TRA2	1.35	1.19	1.36	1.39	1.41		1.37	1.38	1.37	1.33	1.32	1.38		1.33
TRB1	1.87	1.86	1.54	1.71	1.60		1.59	1.55	1.64	1.51	1.43	1.49	1.38	1.58
TRB2	1.35	1.27		1.54	1.52		1.47	1.47	1.56	1.47	1.39	1.40	1.32	1.42
TRC1	1.42	1.88	1.96	1.64	1.76	1.65	1.65	1.70	1.48	1.48	1.45	1.52	1.41	1.65
TRC2	1.30	1.32	1.31	1.46	1.45	1.66	1.51	1.49	1.59	1.43	1.36	1.41	1.30	1.37
TRC3	1.33	1.30	1.33	1.36	1.52		1.47	1.49	1.43	1.34	1.33	1.40		1.35

Source: Adapted from Timmer, M. P. et al. (2015), "An Illustrated User Guide to the World Input-Output Database: the Case of Global Automotive Production", Review of International Economics, Vol. 23, pp. 575605, dx.doi.org/10.1111/roie.12178

Table D.3. **Regional employment multipliers by manufacturing sub-sectors**

Region	Food, Beverages and Tobacco	Textiles and Textile Products	Leather, Leather and Footwear	Wood and Products of Wood and Cork	Pulp, Paper, Paper, Printing and Publishing	Coke, Refined Petroleum and Nuclear Fuel	Chemicals and Chemical Products	Rubber and Plastics	Other Non-Metallic Mineral	Basic Metals and Fabricated Metal	Machinery, n.e.c.	Electrical and Optical Equipment	Transport Equipment	Manufacturing, n.e.c.; Recycling
TR10	9.80	17.18	19.86	21.77	17.00	9.02	12.80	21.32	17.47	17.48	16.36	17.97	14.83	29.13
TR21	9.42	16.10	18.89	21.66	14.62	8.90	11.07	19.49	18.16	16.83	15.02	16.44	13.98	28.22
TR22	12.42	11.28	17.79	22.89	13.69	9.54	11.47	18.98	18.48	16.05	14.70	15.08	13.34	26.67
TR31	13.63	15.76	21.04	24.13	17.58	10.65	13.74	22.00	18.88	18.53	17.03	17.81	15.58	29.80
TR32	9.78	16.20	15.34	21.84	13.99	10.35	10.68	18.49	18.72	16.68	14.92	15.37	13.62	27.94
TR33	9.79	13.92	18.92	21.84	14.96	10.15	10.88	19.22	18.75	17.61	15.67	16.96	14.41	28.22
TR41	9.54	16.00	15.64	21.53	13.76	9.42	10.58	18.94	18.36	17.30	15.36	16.70	14.25	28.56
TR42	11.12	13.17	16.83	22.64	15.22	8.68	11.31	19.89	17.88	17.22	15.46	16.68	14.22	28.06
TR51	9.23	11.09	15.11	20.47	14.95	9.94	11.28	18.77	18.06	17.47	15.82	16.69	14.07	27.19
TR52	12.97	11.57	19.32	23.17	15.42		11.38	19.44	18.54	17.85	15.84	15.62	14.65	28.00
TR61	11.84	11.24	14.27	22.76	13.55	9.63	11.06	18.59	18.33	15.81	14.34	14.36	13.26	26.55
TR62	13.47	15.13	16.42	24.43	15.76	11.48	13.21	21.44	18.96	18.15	16.16	16.03	14.98	29.26
TR63	11.00	16.04	16.17	21.38	13.13	9.08	9.88	17.95	17.26	17.18	14.74	14.25	13.55	27.88
TR71	12.56	12.51	15.68	22.07	13.31		10.77	18.89	18.57	17.56	15.22	14.80	14.41	27.86
TR72	9.88	13.41	15.06	21.68	14.19	10.31	10.78	18.84	18.71	17.74	15.61	17.06	14.36	28.39
TR81	11.56	14.34	18.22	22.18	12.83		9.80	18.05	18.29	17.44	14.95	14.75	13.90	28.03
TR82	9.10	15.44		20.65	11.96		9.39	17.43	17.57	15.62	13.78	15.48	12.92	27.12
TR83	12.95	13.08	17.54	23.43	14.84		11.51	19.27	19.13	17.26	15.39	15.78	13.96	27.75
TR90	9.57	11.57	14.54	21.22	12.63		10.04	17.90	17.64	15.80	14.03	14.09	13.14	26.49
TRA1	10.97	10.60		21.55	13.69		10.84	18.22	18.71	16.06	14.35	14.49	13.23	26.18
TRA2	9.57	10.56	14.12	19.80	12.83		9.50	17.26	16.41	15.01	13.75	13.92		25.43
TRB1	12.62	16.23	15.39	22.00	14.15		11.06	18.49	18.67	16.40	14.59	14.73	13.61	27.64
TRB2	9.53	11.20		21.34	13.63		10.29	17.82	18.08	16.08	14.29	13.98	13.16	26.33
TRC1	9.98	16.45	19.53	21.95	15.31	9.41	11.18	19.46	16.86	16.14	14.59	14.81	13.86	28.22
TRC2	9.03	11.57	13.39	19.94	12.71	9.49	10.32	17.71	18.13	15.44	13.78	13.85	12.78	25.54
TRC3	9.36	11.46	13.66	18.95	13.69		10.14	17.89	16.96	14.99	13.74	13.90		25.40

Source: Adapted from Timmer, M. P. et al. (2015), "An Illustrated User Guide to the World Input-Output Database: the Case of Global Automotive Production", Review of International Economics, Vol. 23, pp. 575605, dx.doi.org/10.1111/roie.12178

Table D.4. **Production multipliers in Turkey by sub-sector**

NACE rev 2 codes (2 digit)	1+2+3	5+6+7 +8+9	10+11 +12	13+14	15	16	17+18	19	20+21	22	23	24+25	28	26+27	29+30	31+32 +33	35+36 +37+38 +39	41+42 +43	45	46	47	55+56	49	50	51	52	53+59 +61
1+2+3	1.1467	0.0107	0.4109	0.0358	0.0635	0.1657	0.0374	0.0099	0.0411	0.0209	0.0077	0.0056	0.0069	0.0087	0.0052	0.0152	0.0036	0.0067	0.0059	0.0060	0.0037	0.1408	0.0037	0.0090	0.0113	0.0099	0.0041
5+6+7+8+9	0.0064	1.0305	0.0094	0.0085	0.0103	0.0197	0.0184	0.2011	0.0661	0.0218	0.1196	0.0277	0.0109	0.0115	0.0090	0.0097	0.0956	0.0309	0.0106	0.0094	0.0077	0.0098	0.0065	0.0046	0.0084	0.0037	0.0053
10+11+12	0.0328	0.0070	1.1401	0.0091	0.1312	0.0119	0.0118	0.0065	0.0192	0.0106	0.0059	0.0046	0.0071	0.0084	0.0045	0.0059	0.0036	0.0040	0.0050	0.0058	0.0026	0.1385	0.0033	0.0100	0.0109	0.0095	0.0040
13+14	0.0125	0.0297	0.0258	1.5771	0.0992	0.0500	0.0608	0.0338	0.0516	0.0602	0.0288	0.0353	0.0334	0.0575	0.0406	0.1553	0.0182	0.0231	0.0175	0.0144	0.0101	0.0245	0.0151	0.0102	0.0600	0.0125	0.0161
15	0.0004	0.0009	0.0009	0.0156	1.3498	0.0027	0.0040	0.0012	0.0016	0.0019	0.0010	0.0011	0.0012	0.0039	0.0012	0.0042	0.0006	0.0008	0.0006	0.0005	0.0005	0.0007	0.0004	0.0003	0.0011	0.0005	0.0006
16	0.0010	0.0014	0.0013	0.0009	0.0013	1.1425	0.0077	0.0013	0.0018	0.0024	0.0025	0.0060	0.0030	0.0043	0.0025	0.0497	0.0010	0.0181	0.0008	0.0012	0.0006	0.0011	0.0024	0.0004	0.0005	0.0007	0.0009
17+18	0.0042	0.0087	0.0218	0.0118	0.0213	0.0300	1.2350	0.0111	0.0312	0.0262	0.0291	0.0121	0.0204	0.0197	0.0105	0.0203	0.0064	0.0116	0.0241	0.0228	0.0104	0.0147	0.0084	0.0037	0.0089	0.0131	0.0288
19	0.0139	0.0204	0.0112	0.0095	0.0146	0.0128	0.0117	1.0731	0.0169	0.0149	0.0186	0.0106	0.0082	0.0095	0.0071	0.0084	0.0095	0.0150	0.0103	0.0080	0.0046	0.0079	0.0267	0.0193	0.0331	0.0093	0.0042
20+21	0.0268	0.0199	0.0269	0.0525	0.0601	0.1005	0.0650	0.0268	1.1794	0.2050	0.0360	0.0209	0.0269	0.0416	0.0246	0.0374	0.0096	0.0190	0.0101	0.0084	0.0042	0.0175	0.0055	0.0046	0.0075	0.0076	0.0098
22	0.0054	0.0065	0.0162	0.0098	0.0207	0.0184	0.0252	0.0070	0.0245	1.0684	0.0068	0.0073	0.0155	0.0356	0.0402	0.0363	0.0042	0.0135	0.0059	0.0036	0.0026	0.0055	0.0066	0.0022	0.0033	0.0097	0.0035
23	0.0029	0.0076	0.0093	0.0057	0.0045	0.0101	0.0074	0.0107	0.0141	0.0168	1.1291	0.0305	0.0198	0.0166	0.0181	0.0109	0.0033	0.0981	0.0067	0.0039	0.0035	0.0075	0.0021	0.0014	0.0026	0.0023	0.0039
24+25	0.0029	0.0142	0.0073	0.0050	0.0083	0.0147	0.0090	0.0096	0.0158	0.0223	0.0121	1.1531	0.0923	0.0591	0.0763	0.1097	0.0118	0.0643	0.0055	0.0040	0.0035	0.0052	0.0043	0.0024	0.0033	0.0038	0.0049
28	0.0032	0.0083	0.0031	0.0023	0.0030	0.0050	0.0061	0.0051	0.0046	0.0050	0.0072	0.0067	1.0330	0.0072	0.0057	0.0042	0.0060	0.0078	0.0019	0.0013	0.0012	0.0017	0.0008	0.0032	0.0009	0.0008	0.0014
26+27	0.0013	0.0075	0.0021	0.0017	0.0023	0.0054	0.0038	0.0041	0.0039	0.0040	0.0038	0.0035	0.0211	1.1612	0.0061	0.0037	0.0153	0.0108	0.0030	0.0029	0.0030	0.0021	0.0035	0.0025	0.0037	0.0025	0.0335
29+30	0.0009	0.0023	0.0014	0.0011	0.0014	0.0017	0.0017	0.0022	0.0025	0.0027	0.0019	0.0018	0.0030	0.0035	1.0188	0.0019	0.0014	0.0019	0.0036	0.0015	0.0008	0.0009	0.0029	0.0048	0.0081	0.0013	0.0009
31+32+33	0.0009	0.0014	0.0016	0.0031	0.0018	0.0045	0.0032	0.0016	0.0020	0.0018	0.0013	0.0042	0.0018	0.0031	0.0017	1.0141	0.0008	0.0022	0.0012	0.0012	0.0016	0.0046	0.0029	0.0005	0.0009	0.0014	0.0010
35+36+37+38+39	0.0195	0.0705	0.0269	0.0314	0.0321	0.0649	0.0897	0.0481	0.0376	0.0714	0.0775	0.0926	0.0496	0.0384	0.0301	0.0304	1.7323	0.0419	0.0503	0.0271	0.0197	0.0613	0.0096	0.0060	0.0150	0.0146	0.0339
41+42+43	0.0026	0.0027	0.0018	0.0011	0.0014	0.0021	0.0020	0.0023	0.0018	0.0018	0.0016	0.0016	0.0016	0.0018	0.0011	0.0015	0.0057	1.0129	0.0038	0.0035	0.0030	0.0028	0.0014	0.0006	0.0012	0.0010	0.0048
45	0.0158	0.0228	0.0264	0.0193	0.0278	0.0313	0.0290	0.0559	0.0321	0.0359	0.0275	0.0290	0.0277	0.0343	0.0255	0.0278	0.0170	0.0267	1.0346	0.0218	0.0093	0.0168	0.0359	0.0123	0.0211	0.0126	0.0114
46	0.0337	0.0459	0.0654	0.0525	0.0736	0.0852	0.0848	0.1113	0.0854	0.0866	0.0674	0.0741	0.0763	0.0928	0.0603	0.0764	0.0415	0.0545	0.0313	1.0377	0.0155	0.0415	0.0225	0.0202	0.0305	0.0159	0.0294
47	0.0276	0.0289	0.0559	0.0408	0.0580	0.0635	0.0612	0.0949	0.0665	0.0722	0.0496	0.0631	0.0591	0.0765	0.0537	0.0611	0.0339	0.0465	0.0178	0.0139	1.0086	0.0356	0.0208	0.0167	0.0261	0.0135	0.0187
55+56	0.0020	0.0124	0.0038	0.0036	0.0053	0.0065	0.0063	0.0079	0.0082	0.0068	0.0062	0.0051	0.0055	0.0058	0.0041	0.0048	0.0047	0.0050	0.0093	0.0152	0.0057	1.0046	0.0122	0.0087	0.0542	0.0546	0.0055
49	0.0394	0.0573	0.0799	0.0616	0.0842	0.0962	0.0914	0.1548	0.1053	0.1091	0.0816	0.0964	0.0867	0.1142	0.0808	0.0945	0.0522	0.0675	0.0481	0.0492	0.0348	0.0627	1.1305	0.0759	0.0784	0.1727	0.0362
50	0.0044	0.0050	0.0090	0.0067	0.0094	0.0106	0.0102	0.0154	0.0113	0.0120	0.0084	0.0104	0.0098	0.0125	0.0090	0.0100	0.0055	0.0078	0.0167	0.0202	0.0266	0.0064	0.0080	1.0785	0.0053	0.0049	0.0038
51	0.0009	0.0021	0.0018	0.0019	0.0030	0.0040	0.0035	0.0031	0.0033	0.0034	0.0025	0.0025	0.0031	0.0035	0.0027	0.0030	0.0012	0.0023	0.0029	0.0074	0.0019	0.0018	0.0069	0.0068	1.0323	0.0085	0.0096
52	0.0064	0.0200	0.0139	0.0157	0.0187	0.0267	0.0259	0.0282	0.0257	0.0239	0.0213	0.0202	0.0175	0.0178	0.0128	0.0170	0.0096	0.0142	0.0222	0.0236	0.0129	0.0229	0.0857	0.1025	0.1298	1.2277	0.0218
53+59+61	0.0037	0.0093	0.0080	0.0084	0.0115	0.0153	0.0164	0.0121	0.0134	0.0155	0.0110	0.0102	0.0120	0.0131	0.0085	0.0118	0.0068	0.0091	0.0306	0.0361	0.0239	0.0124	0.0119	0.0058	0.0177	0.0193	1.0621

Source: Adapted from Timmer, M. P., et al. (2015), "An Illustrated User Guide to the World Input-Output Database: the Case of Global Automotive Production", Review of International Economics, Vol. 23, Issue 3, pp. 575605, dx.doi.org/10.1111/roie.12178

Annex E.
Regional profile sub-sector key statistics

Step by step approach to creating a table of regional key statistics of manufacturing sub-sectors

Step 1: define the sample of sub-sectors

Exclude agriculture, trade-related sub-sectors such as retail and wholesale, transport, and sub-sectors dominated by public investment and construction. Include only sub-sectors with a regional employment above 0.1%.

Step 2: compute sub-sector key statistics

For each sub-sector and NUTS II region, compute values for the LQ, change in LQ, share of regional employment, compound annual growth rate (CAGR) of employment, and the investment rate. Reference Part 2 and Annex B for indicator descriptions and formulas.

For each sub-sector and NUTS I region, compute the share of companies reporting a lack of adequately educated workforce as an obstacle in the Business Environment and Enterprise Performance Survey (BEEPS).

Step 3: classify sub-sectors

Based on the indicator values, classify each sub-sector into five categories:

- "Dominant" (DO). Denotes sub-sectors with a large share of regional employment (among top 10 sub-sectors in share of employment) and an LQ over 1. Include services and manufacturing sub-sectors.
- "Still growing" (SG). Denotes sub-sectors with a rising LQ that was greater than 1 in 2013. Only include manufacturing sub-sectors (NACE code C.10-C.33).
- "Stagnating" (ST). Denotes sub-sectors with a declining LQ that was greater than 1 in 2013. Only include manufacturing sub-sectors (NACE code C.10-C.33).
- "Emerging" (EM). Denotes sub-sectors with a rising LQ that was lower than 1 in 2013. Only include manufacturing sub-sectors (NACE code C.10-C.33).
- "Shrinking" (SH) Denotes sub-sectors with a declining LQ that was lower than 1 in 2013. Only include manufacturing sub-sectors (NACE code C.10-C.33).

Step 4: record priority sub-sectors

Record sub-sectors identified as priority by the Regional Development Plan (RDP), and those identified by regional stakeholders and experts as "dynamic".

Table E.1. Regional sub-sector classification overview

Dominant (DO) Still Growing (SG) Still Growing (ST) Emerging (EM) Shrinking (SH)

	C 10	C 11	C 12	C 13	C 14	C 15	C 16	C 17	C 18	C 19	C20	C 21	C 22	C 23	C 24	C 25	C 26	C 27	C 28	C 29	C 30	C 31	C 32	C 33	DO	SG	ST	EM	SH
TR 10	SH			SH	DO	ST	SH	ST	ST		ST	ST	SH	SH	EM	SH	EM	ST	SH	SH	SH	EM	ST	ST	1	0	8	3	9
TR 21	DO	SG		DO	DO	ST	SG	SG	EM		SG	SG	DO	DO	SG	EM		SG	EM	SH		SH	EM	SH	5	7	1	4	3
TR 22	DO	SG		EM	EM	EM	ST		EM		EM		EM	DO		EM		EM	EM	EM	EM	SH	EM	EM	2	1	1	13	1
TR 31	DO	SG	SG	SH	DO	SG	EM	ST	SG	SG	SG	EM	SG	SH	SG	DO	EM	EM	SG	SG	EM	ST	SG	EM	3	11	2	6	2
TR 32	DO	ST		DO		SH	ST	SH	EM		EM		SH	DO	EM	SH		EM	SH	EM	EM	EM	EM		3	0	2	8	5
TR 33	DO	SG		DO	SH	SG	SG	EM	SG		EM		SG	DO	EM	DO		SG	SG	EM		SH		EM	4	7	0	5	2
TR 41	DO	ST		DO		SH	EM	EM	SH		EM		SG	ST	ST	DO	EM	SG	ST	DO	SG	SG	SH		4	4	4	4	3
TR 42	DO	ST		SH	EM	SH	SG	SG	EM		SG	ST	DO	SH	ST	DO		ST	SG	DO	SG	SG		SG	4	7	4	2	3
TR 51	EM			SH	SH	EM	EM	SH	ST		SH	SH	EM	SH	EM	DO	SG	EM	ST	EM	SG	ST	EM	SH	1	2	3	8	7
TR 52	DO			SH	SH	SG	SG	SH	SG		SH		ST	EM	ST	DO		EM	DO	ST		EM	EM	EM	3	3	3	5	4
TR 61	SH			EM	SH		SG		EM		SH		SH	DO		SH		EM	SH		EM	EM	SG	EM	1	2	0	6	6
TR 62	DO	ST		EM	EM	EM	SG	EM	SH		ST	EM	SG	SH	EM	DO		SH	EM	SH		SH	EM		2	2	2	8	5
TR 63	EM			DO	EM	EM	SH	EM	SH		EM		SH	EM	DO	DO			SH	EM		EM	EM	EM	3	0	0	10	4
TR 71	DO			SH	SH	SH	EM		SH		EM		ST	DO	EM	DO			SH	ST		SG	EM	SG	3	2	2	4	5
TR 72	DO			DO	SH	EM	SG	EM	SH		EM		EM	SG		DO		SG	EM			DO	SH	EM	4	3	0	7	3
TR 81	SH			SH	DO	SG	SH		SH				SG	ST	DO	EM		EM	EM	SH	SH	SG	SH	SH	2	3	1	3	8
TR 82	DO			SH	DO		DO		EM				SH	DO	EM	EM		SG	SH			SG	EM		4	2	0	4	3
TR 83	DO			SH	EM	SH	SG	EM	SH			SG	EM	DO	SH	EM		SH	EM	EM		ST	SH	SH	2	2	1	6	7
TR 90	DO	EM		SH	EM	SH	ST		SH				EM	SH		EM		SH	SH			EM	SH	SH	1	0	1	5	8
TR A1	DO				SH		SH		SH				SH	SG		EM		EM				SH	SH		1	1	0	2	6
TR A2	DO			EM	EM	SH	SH		EM				EM	EM		EM		EM				SH		SG	1	1	0	7	3
TR B1	DO			DO	EM	SH	EM	SH	SH		EM		SH	SG	EM	SH		SH	SH			EM	EM	SH	2	1	0	6	8
TR B2	EM			EM	EM		SG		EM				EM	DO		EM			EM			SH	EM		1	1	0	8	1
TR C1	DO			DO	EM	SG	ST	SG	SH		EM		DO	SH	EM	EM		SH	SH	EM		EM	EM	EM	3	2	1	8	4
TR C2	EM			SH	EM		EM		EM			EM	SH	DO		SH		SH	EM			SH		SH	1	0	0	6	6
TR C3	EM			EM	EM		SH		SG		EM		SH	DO		SH		EM				SH		SG	1	2	0	5	4
DO	18	0	0	8	5	0	1	0	0	0	0	0	3	11	2	10	0	0	1	2	0	1	0	0					
SG	0	4	1	0	0	5	9	3	4	1	3	2	5	3	2	0	1	5	3	1	3	5	2	4					
ST	0	4	0	0	0	2	4	2	2	0	2	2	2	2	3	0	0	2	2	2	0	3	1	1					
EM	5	1	0	6	12	5	6	6	9	0	10	3	7	3	10	10	3	10	8	7	4	8	12	8					
SH	3	0	0	11	7	8	6	4	11	0	3	1	9	7	1	6	0	6	9	4	2	9	6	7					

AN INTRODUCTION TO THE ECONOMIC STRUCTURE OF TURKEY'S REGIONS

Regions play an increasingly important role in OECD economies. They are responsible for delivering policies that directly affect citizens' lives and the business environment. With wide disparities in the economic development of its regions Turkey is among the OECD countries now taking an active interest in regional development policies and regional competitiveness.

The OECD conducted its project, Boosting Regional Competitiveness in Turkey, to help improve regional and sectoral competitiveness policies in Turkey and to make co-ordination between newly created development agencies, the Ministry of Development and other relevant Turkish institutions more effective. The 22-month project was implemented by the OECD in close collaboration with the Ministry of Development of Turkey and co-financed by the European Union and Turkey.

Project findings are examined in four thematic reports. This report proposes a selection of approaches to sectoral and structural analysis that can be applied at the regional level. It also includes findings from initial analyses of Turkey's 26 regions.

This project is co-financed by the
European Union and the Republic of Turkey