Industrial Ecosystems in the Annual Single Market Report (ASMR):

A REFLECTION ON ALTERNATIVE FRAMEWORKS FROM EXISTING NATIONAL PRACTICE AND A GUIDE TO ESTIMATE INDICATORS BASED ON PUBLICLY AVAILABLE DATA

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\ ABSTRACT

In total, 40 Key Performance Indicators (KPIs) have been identified to monitor the 14 industrial ecosystems that cover around 80% of the European business economy in terms of value added and employment. Calculating these indicators on the basis of Eurostat data entails methodological problems such as missing data and double-counting: ecosystems are neither mutually exclusive nor fully covered by the statistical classification of economic activities (NACE), with NACE codes assigned to ecosystems according to a fixed matrix devised by DG GROW. In the Annual Single Market Report (ASMR) 2022, the KPIs quantify eco-systems using National Accounts (NA) data as well as data from Structural Business Statistics (SBS), trade statistics and other Eurostat sources. National Accounts data cover all economic activities, but these data are only publicly available at an aggregated level, which is not always sufficient for calculating the KPIs. On the contrary, more granular data such as Structural Business Statistics (SBS) or Short-Term Business Statistics (STS) have the disadvantage that they are only available for a subset of economic activities.

The contribution of this report is twofold: first, this study gives an assessment of the feasibility of calculating the KPIs proposed in the ASMR based solely on publicly available data. For the KPIs that can be estimated in this way, it also provides methodological and practical guidance on performing the required calculations. Secondly, it offers some methodological reflection on the calculation of ecosystem statistics by presenting two examples from national practice. In this report, some of the indicators proposed in the ASMR are derived from publicly available data, including National Accounts (NA), Structural Business Statistics (SBS), Short-term Business Statistics, Community Innovation Survey (CIS), Business Demography (DB) and Research & Development (R&D) data, but only at the aggregated EU-27 level. Initially, Single Market Report results, which partially relied on confidential data, are replicated with publicly available data only. The results are identical to those of the Annual Single Market Report in the ecosystems with complete information and very similar in those ecosystems with incomplete data.

Producing indicators based solely on publicly available data requires overcoming additional methodological difficulties, such as misclassifications, different levels of aggregation and data coverage in the available databases, but also quality issues with some publicly available NACE codes, confidential values and inconsistencies in the publicly available data. To overcome these problems, this report presents methodological solutions and explains how they can be applied to derive KPI estimates based on publicly available data.

In addition, two examples from national statistics offices producing statistics on clusters or ecosystems are discussed to analyse national practices. It should be noted that Member States had to deal with similar issues as in the compilation of the KPIs, however are in a more fortunate position regarding the level of available data on national level.

***Keywords**: Industrial ecosystems, KPIs, ASMR, public data, estimation, indicators*

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The main codes and programs have also been uploaded on the dedicated space on Github: https://github.com/eurostat/Industrial_ecosystems_indicators

CONTENTS

ABBREVIATIONS

ASMR	Annual Single Market Report
BD	Business demography
BR	Business Register
CIS	Community Innovation Survey
CODED	Eurostat's Concepts and Definitions Database
DG GROW	Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
EBS	European Business Statistics
EC	European Commission
eDAMIS	electronic Dataflow Administration and Management Information System
EESC	European Economic and Social Committee
ESQR	ESS Standard for Quality Reports
ESQRS	ESS Standard for Quality Reports Structure
ESS	European Statistical System
ERT	European Round Table for Industry
EU	European Union
Eurostat	Statistical Office of the European Union
GIA	General Implementing Act
KPIs	Key Performance Indicators
LFS	Labour Force Survey
MH	Metadata handler
MS	Member States
NA	National Accounts
NSI	National Statistical Institute
QAF	Quality Assurance Framework
SBR	Statistical Business Register
SDMX	Statistical Data and Metadata eXchange
SIMS	Single Integrated Metadata Structure
SME	Small and medium-sized enterprises
STS	Short-Term Statistics
UK	The United Kingdom
US	The United States of America

TABLES

1 INTRODUCTION

To support the industrial strategy for Europe, the European Commission has identified 14 'ecosystems', which can be described as all the players in a particular value chain.[1] The eco-systems consist of a range of interrelated activities – from manufacturing to services. The 14 industrial ecosystems represent about 80% of the European business economy in terms of value added and employment.[2] These eco-systems were quantified in the Annual Single Market Report 2021 and 2022 using National Accounts (NA) and Structural Business Statistics (SBS) data as well as environmental, trade and BD statistics.[3] A total of 40 Key Performance Indicators (KPIs)[4] were identified to monitor the development of the eco-systems.

NA data are the only statistical data source covering all economic activities. However, these data are only publicly available at an aggregated level (NACE Rev. 2, 2-digit level (Divisions). In order to understand the inter-dependencies between the different activities not only for shaping enterprise policy, but also for security and energy supply policy, given recent developments such as the Russia's war of aggression against Ukraine, more detailed data are needed, but they are only available for a subset of economic activities, such as Structural Business Statistics (SBS) or Short term Business Statistics (STS). In addition, detailed information on the size class distribution of enterprises within each eco-system is needed to formulate policy targeted at small and medium-sized enterprises (SMEs). To fill the gap in coverage of economic activities and size classes, DG GROW has proposed a methodology to calculate a limited number of indicators for the eco-systems including breakdowns of the totals by size classes by combining granular SBS and NA data (for calibrating the totals).[5] The selected indicators are:

- Share of persons employed (by size class),
- Share of value added (by size class),
- Ratio of value added in production value,
- Gross operating rate

The Annual Single Market Report 2022 states that *'the granularity of the sectoral classification for the data sources available is not ideal to describe the ecosystems precisely. Hence, the indicators should be interpreted with caution.'*

This paper assesses the feasibility of the proposed calculation method for the additional KPIs proposed by DG GROW to monitor the eco-systems and explains how to carry out these calculations using only publicly available data. Chapter 2 provides a concise description of the industrial ecosystems and a brief overview of results in the annual single market report and other initiatives. Furthermore, in Chapter 3, the study examines national practices in compiling statistics on eco-systems or other types of mega-clusters of activities. The purpose of this exercise is to analyse whether these national approaches and experiences could improve the methodology proposed by DG GROW. In Chapter 4, publicly available data is used to compile a set of indicators proposed by DG GROW for the annual single market report. The data used include National Accounts (NA), Structural Business Statistics (SBS), Short-Term Business Statistics, Community Innovation Survey (CIS), Business Demographics (DB) and Research & Development (R&D), only at aggregated EU-27 level.

1 European Commission: A New Industrial Strategy for Europe ((COM2020) 102 final)
2 Business economy is defined as total economy excluding financial services and public administration, see European Commission: Annual Single Market Report 2022 (SWD(2022) 40 final).
3 European Commission:: Annual Single Market Report 2021 ((COM2021) 351 final)
4 Most indicators are calculated for the whole EU economy (or a high-level breakdown into industry/manufacturing/services) – only 11 are calculated per ecosystem
5 European Commission: Annual Single Market Report 2022 (SWD(2022) 40 final)

Finally, based on the feasibility study and the examination of national practices, the paper outlines possible recommendations for future measurement of ecosystems utilising official statistics as a source and guidelines for the calculation of indicators based on publicly available data.

2 INDUSTRIAL ECOSYSTEMS AND INDICATORS: ANNUAL SINGLE MARKET REPORT AND OTHER INITIATIVES

2.1 OVERVIEW ON INDUSTRIAL ECOSYSTEMS

In March 2020, the European Commission published its Communication 'A new Industrial Strategy'. The strategy aims to support the transition to a green and digital economy, making European industry more competitive on a global scale. It paves Europe's new industrial path[6] towards climate neutrality, further enhancement of digital technologies and a digital single market, and a more circular economy. The COVID-19 crisis that erupted shortly afterwards severely affected the European Union economy and demonstrated the importance of a globally integrated and well-functioning Single Market. The Single Market is the EU's most important asset, offering certainty, scale and a global springboard for European companies.

In May 2021, taking into account the new circumstances following the COVID-19 crisis, the European Commission published an update of the Communication. The update includes measures for SMEs, e.g., to strengthen resilience, tackle late payments, and support solvency. The aim of these new measures is to ensure that SMEs and start-ups benefit greatly, whether through a strengthened Single Market, reduced supply dependencies or the accelerated green and digital transitions. To ensure the resilience of the Single Market, one of the targets was to explore harmonisation of standards for key business services; as well as to strengthen the digitalisation of market surveillance and other targeted measures for SMEs. To address these issues, the Commission proposed industrial ecosystem approach: an annual analysis of the state of the Single Market, covering 14 industrial ecosystems. The ecosystem approach is an analytical approach that develops against the same background: an integrated Single Market, with research, engineering, production, assembly and service activities that can spread across different Member States.

Industrial ecosystems 'encompass all players operating in a value chain: from the smallest start-ups to the largest companies, from academia to research, service providers to suppliers. […]. The Commission will systematically analyse the different ecosystems and address the different risks and needs of industry […].

It will look at issues including research and innovation skills, the role of SMEs and big companies, as well as external pressures and dependencies.' The industrial strategy also relates to the Green transition and Digital transition.

Eurostat, together with DG GROW, have assessed the usage of different data sources that can be used for producing data on the Industrial Ecosystems, mainly National Accounts data and **Structural Business Statistics, but also Short-Term Statistics and statistics on R&D expenditure and business innovation.**

The focus of these annual analyses should be on the following areas of interest:

6 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020DC0102&from=EN

\ **Industrial competitiveness**: European industrial policy should create a sustainable, attractive and competitive business environment to achieve a higher level of 'European added value', resource efficiency and circularity and to unlock the high potential of spill-over effects through increased cooperation in networks of interconnected businesses across the EU;

\ **Green transition contribution**: GHG emissions

\ **Digital transition contribution**: 5G

\ **Technological resilience leadership** - based on research, knowledge transfer and innovation, smart specialisation, sustainability, protection of intellectual property rights, strengthened European value chains and security of supply of raw materials in Europe are prerequisites for a higher level of resilience of European industry and contribute to strengthening the Union's open economy, its strategic autonomy and its future competitiveness;

\ **Open Economy**: identifying and reducing strategic dependencies and increasing resilience in the most sensitive industrial ecosystems and specific sectors, such as health, defence industry, space, digital, energy and critical raw materials; this can include diversifying production and supply chains, securing strategic stockpiling, promoting and attracting investments and production in Europe, exploring alternative solutions and circular models, and promoting broad industrial cooperation across Member States.

\ **Skills**: Importance of the up- and reskilling, training and employability of workers.

\ **Supplies**: Importance of importance of strategic and diversified access to raw materials.

\ **Energy**: importance of further improving resource-efficiency, and ensuring security of supply of energy resources, high level of environmental protection, competitive transformation of EU energy-intensive industries to enable a climate neutral and circular economy by 2050.

\ **Social**: Wage levels, health and safety, employment by gender, skills, education and training, precarious employment.

There are several initiatives that comply with these areas of interest. Some of them have already been adopted, others are new. These initiatives are mostly implemented by Eurostat or in collaboration with Eurostat.

2.2 ANNUAL SINGLE MARKET REPORT 2021(2022) AND OTHER INITIATIVES

Eurostat publishes a range of different indicators. For example, the Euroindicators are disseminated on a monthly and/or quarterly basis and provide general economic information on the euro area, the European Union and individual Member States. The European statistical recovery dashboard presents a selection of COVID-related indicators or the Macroeconomic Imbalance Procedure (MIP), a surveillance mechanism that aims to identify potential macroeconomic risks at an early stage, are some examples of indicator systems for monitoring European economic policies. These include the Single Market Scoreboard, the European Innovation Scoreboard or the Eco-innovation Scoreboard and recently the Recovery Dashboard.

The Annual Single Market report 2021 was a response to the call of the Competitiveness Council on the Commission in September 2020 to evaluate and assess the resilience of the Single Market and in November 2020 to define key performance indicators for monitoring the industrial strategy and competitiveness of the Single Market, taking into account investment trends and comparing them with other world regions.

An updated version of this report was presented this year, see The Annual Single Market report 2022[7].

7 DocsRoom - European Commission (europa.eu)

Section 2 of this report assesses the impact of the crisis on the Single Market and on European companies, including industrial ecosystems and SMEs.

The composition of the ecosystems is very heterogeneous with different key actors per system. More and more reports of the Commission refer to Industrial Ecosystems, e.g. the 'Single Market Report 2021' and different internal working papers, see e.g. [8] or [9].

Together with the analysis of the main persisting barriers in the Single Market, it will be possible to draw lessons from the crisis and assess the resilience of the Single Market. This report therefore looks at these two dimensions – Single Market and industry – together. The accumulation of these restrictions caused major disruptions in many of the EU's industrial ecosystems, especially given the close links between activities within these systems. Some restrictions have been particularly harmful to the functioning of the Single Market and even counterproductive. Bans or other restrictions on intra-EU exports of products raise serious doubts about their suitability and proportionality. They also undermine the principle of European solidarity and lead to a domino effect throughout the Single Market.

Economic activity can also be analysed through the lens of industrial ecosystems. This approach aims at capturing the interlinkages and interdependencies between different economic actors. The initial analysis suggests that estimates will be required for many indicators. While National Accounts might be best suited for providing high-level aggregates, SBS and other data sources could provide information at a more detailed level.

\ **Key Performance Indicators** (KPIs) describe the ecosystems in more detail. All indicators developed for the industrial strategy are based on publicly available data. Therefore, no additional reporting obligations are needed for Member States to calculate them. The main purpose is to report also in a synthetic manner and to cover horizontal issues. Therefore, an appropriate toolbox is also needed to visualise the indicators (see annex 1 and 2 for more details).

\ **Headline indicators** that capture the size and performance of ecosystems are derived from Eurostat data such as national accounts aggregates by industry (value added)[10] and national accounts employment data by industry[11]. From this information, annual growth rates can be derived to show the evolution and dynamics in a given ecosystem. The annual Single Market Report shows that the number of enterprises in each ecosystem varies, indicating not only differences of size, but also of market structure. The indicator on Green transition is still mainly contained in the Energy-Renewables ecosystem. However, as the Green Deal is one of the pillars of the new strategy, further analysis needs to be conducted for the other industrial ecosystems. The economic sentiment indicator as well as other harmonised surveys conducted by DG ECFIN[12] for different sectors of the economies provide insight into the views in the different ecosystems.

Another aspect to be discussed is whether in approaching the task we should explore the Key Performance Indicators for EU Industrial Ecosystems listed in Annex 4 of the Annual Single Market Report 2021 or explore any other information available. For example on 5 September 2021, the European Economic and Social Committee organised a webinar on 'The EU's industrial strategy – which indicators to track its progress? which aimed to translate the objectives of the new industrial strategy into sound indicators:

- industrial competitiveness,
- industry's contribution to the green and digital transitions,
- the Union's resilience and
- strategic autonomy while preserving an open economy.

8 communication-industrial-strategy-update-2020_en.pdf (europa.eu)
9 EUR-Lex - 52020DC0102 - EN - EUR-Lex (europa.eu)
10 Eurostat - Data Explorer (europa.eu), gross value added at current prices
11 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_e&lang=en , total employment domestic concept, in 1000 persons
12 https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en

Other comments concerned the gender and skills profile of workforce in the different ecosystems and further extensions of the indicator system should reflect environmental, social and governance (ESG) criteria and include financial market indicators and the social dimension.

Another paper in response to the strategy of the Commission was presented by the European Round Table (ERT) for Industry[13]. In this paper, the ERT proposes a set of KPIs for the Commission to assess progress in implementing the priorities set out in the New Industrial Strategy until 2030. Using 28 indicators, it compares the EU's competitiveness with other competitors (the United States, Japan, China, the United Kingdom and India) and tracks the EU`s progress in moving towards climate neutrality and technological leadership. This paper looks at the EU as a single economic entity and focuses less on intra-EU differences. The paper summarises industry indicators under four headings that represent and focus attention on the key components, time scales and perspectives of an organisation's strategy: output performance, internal processes, future orientation and global relationship. The paper focuses on defining industry competitiveness. The approach assumes that international competitiveness is determined by both domestic factors and presence in global markets.

This paper also defines targets for 2030 that are in line with EU's priorities and are intended to guide the collective efforts of industry stakeholders in maintaining and increasing European industrial competitiveness. To ensure that the framework is effective and allows European decision makers to evaluate the EU's performance quickly, the number of indicators has been limited. The balanced scorecard approach focuses on outcomes and performance drivers. Outcome measures describe the results of past actions and are more prevalent in the output performance and global relationships quadrants.

The advice of the ERT to the Commission is to annually publish data based on the KPIs presented as a new 'European Competitiveness Report'. Such Reports were published by the Commission from 1997 to 2014 before they were discontinued. This report should focus on the global stage and thus measure the competitiveness of the EU as a whole compared to other geographical areas. If necessary, the KPIs could be adapted or added and the targets adjusted.

The ASM report and the ERT paper have slightly different focuses, although both reports respond to the strategy of the Commission. First, the ASM report presents results for each ecosystem, while the ERT paper focuses only on industry and is very detailed for this sector. The ASM report also presents the results for medium and small enterprises. The data sources used in these reports are also different: the results in the ERT paper are based on many different publications and data, including results from several years. In this way, alterations in the indicators can be traced. In the ASMR,

Headline indicators are calculated based also on other data sources, however, so far, calculations were made by Eurostat based on confidential data but aggregated non-confidentially. This study calculate these same indicators based on publicly available data only.

13 ERT-Publication-Putting-the-EU-Industrial-Strategy-into-action_Nov-2020.pdf

3 NATIONAL PRACTICES

This chapter presents two national examples of producing statistics on clusters or eco-systems based on official statistics in order to analyse national practices and their potential to complement the methodology proposed by DG GROW.

Similar to the goals defined in the Commission strategy on industrial ecosystems, both national initiatives aim to ensure the resilience of the Single Market, monitor SME's and strengthen the competitiveness and knowledge infrastructure of the respective country.

It should be noted that Member States most likely have access to data sources that contain more granular data and thus provide a better source for describing their national clusters without having to take into account the complexity and heterogeneity of the business structures of all Member States. The next section describes so-called mega clusters and strongholds identified in Denmark and the top-sectors in the Netherlands. The national practices presented here are synthesised and compared with the methodology used by DG GROW.

3.1 DENMARK – MEGA-CLUSTERS AND STRONGHOLDS

3.1.1 INTRODUCTION

Already in the early 1990s, the Danish business authorities defined eight (8) specific mega clusters (called 'resource areas') and a residual group of activities for which Statistics Denmark compiled statistics. The resource area is defined as covering all activities involved in the production of inter-related final products, e.g., the production of building materials and construction services. The resource area encompasses the entire value chain from the production of primary goods over manufacturing to trade of final goods, including related support services. Each resource area is divided into four sub-areas:

- Primary activities
- Manufacturing
- Support activities
- Services

The eight resource areas identified as essential to the Danish economy include[14]:

- Food
- Furniture and textiles
- Tourism
- Construction and buildings
- ICT and Communication
- Transport
- Energy and Environment
- Medical sector and health

14 Statistics Denmark: Ressourceområdestatistik 1999; Statistiske Efterretninger: Generel erhvervsstatistik (2001:14)

The eight resource areas and the residual group covering activities, which cannot be unambiguously designated to a resource area, cover the total business economy in Denmark. Each activity is solely attributed to one specific resource area in order to avoid double counting. The statistics compiled include the following variables:

- Number of enterprises
- Total turnover
- Total exports of goods
- Number of employed persons (head count)
- Number of Full Time Equivalent
- Number of employees
- Total wages and salaries

The Danish Business Promotion Board appointed by two Danish ministries, Businesses and education, and research respectively, decided in 2020 to update the mega clusters by identifying narrower clusters in the form of **ten strongholds** and **three budding areas** [15].

A **stronghold** is characterized by the fact that Danish companies and knowledge environments are among the best in their field, and that the economic activity is of national importance and has a high international competitiveness. Emerging areas are prioritised on the basis of large and scalable potentials, where the growth prospects mean wind in the sails for companies in the light of macro trends, the development of global markets and the strength of Danish knowledge, and research in the field.

Tourism has been designated as a position of strength, although the public inter-municipal destination companies and national tourism companies are taking the place of a cluster effort.

Strongholds and budding areas were decided within the political system and only in the follow-up phase was Statistics Denmark involved in the process of defining the strongholds in terms of NACE Rev. 2 classes (4-digit level) to measure the importance of each stronghold.

3.1.2 BRIEF DESCRIPTION OF THE STRONGHOLDS

As mentioned above, the strategy operates with ten strongholds and two budding areas. Below is a brief description of each stronghold:

\ **Environmental technology** covers solutions within, among others, water, air and soil treatment, water supply, wastewater, chemical substitutes, waste management, circular economy, climate adaptation, resource efficiency, process optimization of waste reduction and new and recycled plastic.

\ **Energy technology** covers technologies related to energy production and to energy-efficient solutions in a business context. The area includes industries and value chains within energy production, infrastructure, storage, transport, conversion, planning, energy efficient technologies, electrification, sector switching, design, consulting and integration of systems.

\ **Food and bio-resources** cover the supply and value chain from primary production over processing and distribution of food to value creation via biological residual and tributary streams as well as environmentally and climate-friendly alternatives in the areas of biogas, materials, chemicals and animal feed, among others.

\ **Maritime business and logistics** cover the entire value chain from production and development of equipment and technology to management, service and logistics from global shipper to recipient. It includes maritime transport, end-to-end logistics solutions on land, sea and air and related freight and passenger transport areas with related needs and potentials for development and innovation.

15 Danmarks Erhvervsfremmebestyrelse: Erhvervsfremme i Danmark 2020-2023 (2020)

\ **Life science and welfare technology** covers the entire value chain in pharmaceutical and biotechnological preparations and medico-products. Welfare technology includes technical and digital aids and solutions, for example, for the elderly, as well as social and health care.

\ **Building and construction** covers the entire value chain in the area, which includes buildings, architects, consulting companies and building materials. The construction area primarily covers transport infrastructure as well as its operation and maintenance.

\ **Design, fashion and furniture** covers design companies that work with e.g., graphic and visual design, product design and housing and clothing companies, including design and production of furniture, interiors, textiles, fashion products etc.

\ **Advanced production** covers value chains in manufacturing and automation technology. A significant sub-segment consists of companies within machine manufacturing.

\ **Digital technologies** cover IT companies that develop software and IT-related products and services, including artificial intelligence, machine learning, computer technology, digital communication, big data, block chain, data analysis and the Internet of Things.

\ **Finance and fintech** cover banking and investment business, insurance and pensions, and related financial business. Fintech includes digital financial technologies, and a number of both established companies and entrepreneurs work here at the interface between finance and IT.

\ **Tourism** covers tourism companies such as hotels, campsites, restaurants, transport companies, attractions and amusements as well as businesses that experience indirect effects, such as retail. Tourism is divided into coastal and nature tourism, metropolitan tourism and business and meeting tourism.

\ **Robotics and drone technology** covers robotics and drone technologies that aim to streamline and increase productivity in various industries. The area includes, for example, surveillance drones, collaborative robots, and semi-autonomous systems.

\ **Animation, games and films** cover the companies that work with all or part of the value chain in the production of animation, games, films, television, advertising and interactive technologies as well as distribution via licensing, publishing and streaming.

\ **Defence**, space and security are identified as another emerging area. The Centre for the Security Industry in Denmark (CenSec) aims to create a unique ecosystem within defense, space and security.

\ **Sound technology** has been designated as a further budding area. It focuses on four areas: Healthcare & welfare, environmental sound solutions, creative sound solutions and future sound-tech solutions. The primary target group is innovation-mature companies that use sound in technological products and services, or where sound constitutes a significant differentiator, e.g., sound in security systems, robotic solutions etc.

3.1.3 THE CONCERNS AND CONSIDERATIONS

The above descriptions were the starting point for defining the strongholds in terms of NACE activities in the first place and secondly measuring them statistically. The main concern was the generic and very imprecise description of the strongholds (or at least most of them). At the same time, they were very imbalanced in terms of coverage and thus expected size.

As the strongholds were not clearly defined in terms of activities, there was a concern that they could be double counted. Thus, one activity could refer to more than one stronghold. This was very concerning for the compilation of statistics, as the values would be inflated, and it would not be possible to identify the values in the official statistics. Should a given activity only refer to one stronghold or to several? On the other hand, Denmark realized that not all activities would be included in the predefined strongholds – and the question was raised if a residual group should be introduced in order to arrive at the total values of the official statistics.

These issues were discussed with the Ministry and the following decisions were made:

An activity can be attributed to more than one stronghold. In order to establish some transparency related to the double counting resulting from this approach, the 615 activities were marked as belonging either only to one stronghold, belonging to several or not belonging to any stronghold. In the end, 328 activities were assigned to only one stronghold, 202 cross-cutting activities referred to two or more strongholds and a residual of 85 activities were not assigned to any stronghold. In total, there are not 530 unique activities in the 15 strongholds, but 767 activities assigned to the strongholds indicating a substantial double counting. As the work is not yet completed and final approval from the Ministry is still pending, no further statistics are currently available. Primarily, the Structural Business Statistics will be used to report on the number of enterprises, total employment and total turnover; partly to inform on the relative importance of each stronghold, partly to analyse the development of each stronghold since the financial crisis in 2008.

Compared to the ecosystems defined by the European Commission as mentioned above, a number of differences have been observed. Firstly, Denmark has used activity classes, i.e., the most detailed activity level of the NACE Rev. 2 classification to define the strongholds and not national accounts aggregates. The advantage is the granularity and thus the precision of the definitions of the strongholds.

Secondly, the use of classes makes it possible to use business statistics to describe the volume and characteristics of each stronghold/ecosystem. All statistics covered by the new European Business Statistics Regulation are based on classes, not only Structural Business Statistics which can give information about size classes and thus the importance of SMEs for each ecosystem, but also business demography, which provides information on new enterprises or innovative enterprises from the CIS statistics or on exports from international trade statistics.

The problem with using business statistics is, of course, that not all activities are covered, especially the agricultural sector is missing. Other statistics should be used instead.

As the ecosystems consist of entire activity classes only, no modelling is involved in the Danish example. The fundament is the statistics which have an economy-wide coverage (with few class exceptions and full size class coverage as well) such as Structural Business Statistics (SBS), Business Demography (BD) and International Trade in Goods statistics (ITG). These statistics have been supplemented with R&D and CIS statistics and ICT usage by enterprises and furthermore with LFS data. Using these statistics the SBS, BD and ITG statistics as the backbone enables the production of granular data for a number of central indicators such as turnover, gross value added, employment, investment, productivity, exports, imports, births and deaths.

Thus, the advantage of the Danish example compared to the method used by DG GROW is the production of robust indicators at a granular level, but the backside is that information from some Statistical domains is limited and thus also the number of available indicators.

Therefore, in order to produce a wide range of high quality KPIs for ecosystems, it is probably best to identify ecosystems based on the most detailed classification of economic activities in the national accounts. This would allow ecosystems to be monitored in many ways, but the granularity would compromise the value of the statistics produced for business policy making.

3.2 THE NETHERLANDS – TOP SECTORS

3.2.1 INTRODUCTION

In 2011, on behalf of the Dutch government, representatives from the business community, research institutes and government institutions formulated recommendations for a new business policy in order to strengthen the competitiveness and knowledge infrastructure of the Netherlands.

An important principle was to support to Dutch companies in their business, investments, innovations and exports.

It was decided to focus this support on sectors that are important for the Dutch economy.

These sectors were called top sectors. Four factors determined the choice of the **top sectors**. The top sectors should:

1. be knowledge-intensive;
2. be export-oriented;
3. often deal with specific legislation and regulations;
4. be able to make an important contribution to solving socially relevant problems.

The focus was placed on leading sectors of the Dutch economy and their monitoring. This approach is similar to the goal of defining ecosystems by DG GROW in order to ensure the resilience of the Single Market, monitor SME's on increased resilience, tackle late payments, and support solvency.

The Ministry of Economic Affairs commissioned the Center for Policy Statistics at Statistics Netherlands to create a monitoring system of the top sectors. The goal of the monitoring was to determine the importance of the top sectors for the economy in the form of (macro)economic indicators and to follow the change of these indicators over time.

3.2.2 CHOICE AND DEMARCATION OF THE POPULATION

The expert group chose the following nine economic 'top' sectors that are crucial for the Dutch economy:

1. Agriculture;
2. Chemistry;
3. Creative industries;
4. Energy;
5. High-tech systems and materials;
6. Life sciences and health;
7. Transportation and storage;
8. Horticulture and raw materials;
9. Water.

Each top-sector is divided into two to four sub-sectors, in total 30 sub-sectors. For the majority of the businesses, the top-sector classification follows the main activity of businesses according to NACE Rev. 2 classification:

\ **Agriculture**. Agriculture revolves around the food chain. The core of the agriculture consists of the primary production of (raw materials for) foodstuffs and processing of these in the food industry. In addition, the infrastructure around these two core activities is for food logistics, trade and financial services, and research on agricultural and food industry development.

\ **Chemistry**. The Chemistry top sector is divided into three subsectors: Petroleum Processing, Chemical Industry, and Rubber and Plastic Industry. Activities that fall within the Petroleum Processing subsector also include petroleum processing and refining. The subsector Chemical industry encompasses many activities, such as the manufacture of industrial gases, chemicals, cleaning agents, man-made fibers, and dyes. The Rubber and plastic industry does not only cover the production of rubber and plastic, but also the manufacture of products such as tires, tubes, packaging materials and building materials. To avoid overlap with the top sector Life sciences and health, the pharmaceutical industry is not counted among the top sector Chemistry.

\ **Creative industry**. Creative industry has been one of the fastest growing sectors in the world and in the Dutch economy. The Creative Industry can be divided into four subsectors: Art (including performing arts and creative arts), Cultural heritage (including museums and monument conservation), Media and entertainment industry (including television and radio broadcasters, record and film companies and game developers) and Creative business services (including fashion, designers, architects, and advertising agencies).

\ **Energy**. The Energy top sector can be divided into two types of companies. The first group consists of companies of energy production and supply including: extraction, processing, production, transport and trade of in particular, fossil energy and electricity. In the Top Sectors Monitor, these companies can be found in the subsectors 'Natural gas' and the 'Related activities'. The second group of companies belongs to the subsector 'Renewable energy: non-exploitation phase'. The selected companies are active in the production chain of sustainable energy (non-exploitation phase), such as companies that make solar panels or research institutions that research new renewable energy sources.

\ **High-tech systems and materials**. The top sector High-tech systems and materials mainly comprises technological activities in the field of the metal industry and the manufacture of machines, equipment and means of transport. In addition, part of the chain around these core activities is considered part of the top sector. These consist of developing, producing and publishing of software, the inspection and control of machines and devices and research and development in the field of High-tech systems and materials. The trade in High-tech systems and materials is not included in this top sector.

\ **Life sciences and health**. The Life sciences and health top sector is an innovative and technology-intensive sector focused on human and animal health. This top sector consists of the Pharmacy sub-areas (including the manufacture of pharmaceutical products and raw materials), Medical instruments (including manufacture of medical instruments and aids, radiation equipment and of electro-medical and electrotherapeutic equipment) and Research (including medical laboratories and whether non-biotech research and development). Various technologies that form the basis of the top sector include: genomics, nanotechnology, biotechnology and bioinformatics. The top sector Life sciences and health is closely intertwined with other top sectors, especially with the Agriculture and High-tech systems and materials.

\ **Transportation and storage**. The transport and storage top sector includes all specialized logistics companies that are within the standard business division of SN. The transport and storage top sector is divided into two sub-sectors: the transport and shipment subsector focuses mainly on the transport of goods in all possible modalities and second subsector focuses on storage, services and support activities. This also includes shipbrokers, forwarders and companies that focus on ICT, advice and research in the field of logistics. Logistics activities in industry, trade, retail (e.g. distribution centers in wholesale), construction and other (top) sectors are not included in this top sector.

\ **Horticulture and raw materials**. The Horticulture and Propagating Materials top sector covers the entire horticultural chain starting from building the greenhouses, growing the seeds to auctioning vegetables, fruits and flowers. The companies from Horticulture and starting materials are divided into two subsectors. The first subsector, Primary production, consists of all companies within the primary production of horticulture and starting materials, such as the cultivation of seeds, vegetables and ornamental plants. The companies that support the primary production chain are clustered in the Other subsector. This subsector consists of suppliers of greenhouse horticulture such as greenhouse builders, horticultural service providers, seed and crop care providers after the harvest, wholesalers and auctions within the horticultural sector and finally include companies that carry out development work for horticulture.

\ **Water**. Water defines the Dutch existence in many different ways. The top sector Water covers companies from very different sub-areas. The first is the subsector Maritime manufacturing industry. This concerns shipyards for shipbuilding or ship repair. This subsector also includes suppliers of the shipbuilders and repairers. The second subsector the Water Technology covers drinking water. This subsector provides clean and sufficient drinking water for the population through the extraction, distribution and purification of water. The third subsector is the Delta Technology. Without the delta technology, the Netherlands would be much smaller today. Mainly because of the delta works, the Netherlands has a leading technology in the field of water supply. Research and expertise needed for all three sub-areas mentioned are clustered in the fourth subsector, knowledge and advice.

3.2.3 THE POPULATION

After identifying the top sectors, an important step was to determine the set of companies for each of the nine top sectors, i.e., to establish the target population for each sector. Three sources were used to create the target population. The main source is the SN business register data that includes the NACE Rev. 2 classification. This register provided almost complete coverage of the population. For the five top sectors, part of the activities could not be found through the NACE codes. For these sectors additional sources were used: membership lists supplied by the associations and trade organizations, online sources. Using the key words, the manual and automated web-scraping was carried out to find the relevant businesses.

For the five top-sectors an additional manual web-search was needed: 'Creative Industries', 'Energy', 'Transportation and storage', 'Horticulture and raw materials' 'Water'. After finding companies within the membership lists, these were linked to business register data. For example, for the top sector 'Creative industries', the association member lists were used to define the parts of this sector. These associations were the Dutch Association of Producers and Importers of image and sound carriers, the Dutch Gaming Association and Dutch Digital Agencies. This ultimately resulted in a complete tailor-made list of companies for the five top sectors.

Within a top sector there should be no double counting, which is why we prefer the NACE demarcation to the tailor-made demarcation within a top sector.

3.2.4 INDICATORS

Over **30 indicators** were defined for the **nine top sectors**. These indicators can be divided into the following themes: **macro-economy, businesses, employment, R&D, innovation, education and green growth**.

The data that are used for the performance indicators are obtained from different publications, e.g., the Structural Business Statistics (SBS), national accounts (NA), and international trade statistics. The SBS outcomes are based on a sample survey and are re-weighted to the NA-outcomes, at level of a NA-grouping of economic sectors. Outcomes on export are related to the international trade outcomes as these are considered to be more reliable. However, combined weights are set for the top five sectors where the populations are grouped based on NACE codes, industry association lists and manual web searches. Not all companies on the trade organization membership lists can be linked to the SBS survey and hence for these companies there are no estimates for performance indicators. Thus, the question remains how to obtain good estimates for the units that are on the trade organization lists.

By consistently delineating the top sectors on the basis of the main economic activity of companies, comparisons between the top sectors are possible. It is also possible to calculate results for the totality of the top sectors. This is a measure of the joint (economic) importance of the top sectors for the Netherlands.

Here is the summary of the following technical and methodological issues:

- The classification for some enterprises can only be derived partly using the NACE code. Other parts of the top sector's populations are derived from membership lists or manual web search. This is a time-consuming and labour-intensive error sensitive method.
- For the companies found from branch organisations lists or webpages, the auxiliary information can be missing. In addition, linkage problems occur for these non-standard units, especially for the part of the top sectors where its code is not directly related to the NACE code. This makes it hard to define indicators.
- The lists of units supplied by a trade organization are often of a more recent date than the publication period, where the publication period is the period for which the statistical outcomes are to be described. An implication might be that some units on the list are 'born' after the publication data, while other units may be missing.
- Note that the NACE code of an enterprise represents its main economic activity. However, a manually appointed top-sector class may concern a secondary economic activity. Here two-way miscalculations may occur: first, for the companies that have secondary activities that are not in top sectors, the share of the secondary activity will still be included in the top sector; second, the companies that have the secondary activities in the top sector, although the main activity not in top sector, will not be included. For the part of the companies that are included manually by using the list of branch organizations, these issues will be corrected, but not for others.

Similar methodological issues as for the ecosystems, as also presented in the ASMR, had to be solved. These were mainly the right coverage of the population and the treatment of missing values. These issues were solved through modelling techniques. In order to avoid double counting within a top sector, the NACE demarcation was preferred to the customized demarcation, however, this was not always possible. Most of the top sectors were also defined by using the NACE code. However, as the NACE code of

an enterprise represents its main economic activity and a manually appointed top-sector class may concern a secondary economic activity, two miscalculations may occur: first, the proportion of companies that have secondary activities that are not in the top sectors is still included in the top sector; second, companies that have secondary activities in the top sector but whose main activity is not in the top sector are not included. For the part of the companies that are included manually using list of branch organizations these issues will be corrected, but not for others.

Statistics Netherlands has already conducted the top sectors monitor six times. In 2019, the monitor of top sectors was discontinued, due to missing support at governmental level.

4 PROPOSED METHODOLOGY AND ASSESSMENT

4.1 INTRODUCTION

The methodology developed by DG GROW to derive the KPI indicators for monitoring ecosystems[16] makes use of NACE Rev. 2, 2-digit level codes, allocating these codes to a certain ecosystem and assigning certain weights (see Annex 13) to each NACE code. The main issues of this approach:

- Ecosystems overlap (the same NACE codes are present in different ecosystems) - this leads to double counting.
- Certain NACE codes are not allocated – leading to incompleteness.
- The allocation of the share of NACE's to ecosystems is determined.

Following up this proposal, Eurostat has contributed to the production of indicators about 'Industrial Ecosystems', which partially relied on confidential data in this report, the feasibility of producing the proposed indicators using only publicly available data will be examined. For those indicators, for which this calculation is possible, the indicators will be computed as EU-27 aggregates (not at a country level). The data used to compile indicators on the industrial ecosystems might be derived from official statistics, including national accounts (NA), Structural Business Statistics (SBS), Short-Term Business Statistics, Community Innovation Survey (CIS), Business Demography (DB) or R&D.

The following steps were performed:

- Familiarization with and understanding of the methodology developed by DG GROW (Annex 1);
- Overview and assessment of KPI indicators proposed by DG GROW (Annex 2);
- classification of these by feasibility of their production based on publicly available data (Annex 3).

The following subsection presents the results of this project.

4.2 INDICATORS CHARACTERISTICS AND PRINCIPLES

All the indicators are based on publicly available data, thus no additional reporting obligations to the Member States are necessary to calculate them. The indicators are characterized as follows:

- focus on the most relevant dimensions of the ecosystem;
- have high statistical quality in terms of measurement and timeliness;
- are able to highlight areas with a need to be improved;
- are defined at the EU-27 aggregate level.

Due to the methodological issue of double-counting inherent in the design of the ecosystems, shares and ratios are more appropriate than the totals.

4.3 DATA MANAGEMENT AND METHODOLOGY

Producing industrial ecosystems indicators from public Eurostat data faces multiple challenges. The lack of disaggregated data at 2-digit (NACE) level is the main problem. However, when the dataset contains 2-digit (NACE) disaggregated data, other problems emerge, such as missing sectors (e.g. SBS missing

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sectors affect five Ecosystems), missing values (e.g. for confidentiality reasons) or disaggregation of aggregated NACE codes to match ecosystem weights (e.g. C31-C32).

Difficulties:

Producing indicators using only publicly available data is associated with some challenges. Missing data is one of the main issues. There are different kinds of missing data; e.g. EU-27 totals or NACE Rev. 2 digit values are missing. Some NACE codes that are part of ecosystems are not reported in the databases. Other issues are misclassifications and different levels of aggregation of different NACE codes. NACE coverage changes from one data series to another, then specific criteria have to be built to distribute KPIs to a single NACE code, when it is presented on an aggregated level. Using of existing shares or ratios indicators could be impossible and 'ecosystem' ratio indicators might need to be calculated from 'totals'. Due to these missing data a total of five (5) ecosystems are affected. SBS data used for KPI production e.g. for 'size class: big and SME disaggregation of the data' only covers (fully) nine ecosystems (see Annex 6).

Next to the missing data, coverage and aggregation level, there are other aspects of data that affect the quality of the KPIs. These are the quality of NACE codes, the validity of the weights, confidential values and inconsistencies.

These issues are listed below in more detail:

\ Some indicators do not contain EU-27 aggregates. Only country data is available and, in many cases, not all EU-27 countries are available.

- e.g. BERD Business enterprise expenditure on R&D. Absence of EU27_2020 aggregated data. Although all EU-27 countries are reported, there is no data for all the NACE codes corresponding to the Ecosystems for several countries: Austria, Denmark, Ireland, Greece, France, Luxemburg and Sweden. (see Annex 8)
- e.g. Similar problems are found in other datasets such as R&D personnel and researchers in business enterprise sector by NACE Rev. 2 activity and sex [RD_P_BEMPOCCR2]
- e.g. CIS 2018 data. Absence of EU27_2020 aggregated data. Although all EU-27 countries are reported: there is no data for all the NACE codes in Denmark, there is no data for N74 to N82 in most of the countries and there is plenty of data missing in Estonia, Cyprus, Luxemburg, Austria, Slovenia and Finland. Therefore, it is not possible to calculate an aggregate from the available data for CIS data (information from CIS 2018, see Annex 8).

\ Some indicators for EU-27 do not have a value for certain NACE codes.

- e.g. C20, C21, C26, C28, C30,... for NA or A, N79, P,Q86,... for SBS (see Annex 6) do not have values for EU-27 for the year 2018. In many cases, they can be estimated by aggregation of the EU-27 country values. Missing KPI values that can be calculated as an aggregation of national values (e.g. For NA). See df_target table (Output number 13) in the example Eurostat-NA-Value Added-detailed.html (e.g. A 217836.1 vs. 217836.1; C10-C12 244293.5 vs. 244044.9; C13-C15 68346.8 v.s. 68347.1). Although other possible solutions for missing data could be used to estimate them (e.g. an average or linear approximation using data from the previous and following year), an overview of the data indicates that, in many cases, the same data is missing in all the years.

\ Some data have different levels of aggregation in the weights and for the KPI database

- e.g. C10, C11 and C12 is disaggregated in the weights distribution but for example in the database KPI (National Accounts [NAMA_10_A64]) [C10-C12] Manufacture of food products; beverages and tobacco products is aggregated. This particular case causes no problems as C10, C11 and C12 weights are assigned one single Ecosystem.
- e.g. C31 and C32 or N80, N81 and N82 are disaggregated in the weights distribution, but for example in the database KPI (National Accounts [NAMA_10_A64]) C31_C32 or N80-N82 are provided as an aggregate. In these cases, a criterion for the distribution of the KPI values into NACE codes is

needed to allocate the weighted values to the Ecosystems. These criteria would be an approximation, therefore, be biased by the indicator selected to distribute the values.

\ **Some NACE codes are not reported with the same NACE code label** in the weights and in the Eurostat database.

- e.g. D35 is reported as D in National Accounts KPI [NAMA_10_A64]). Some kind of homogenization will be necessary.

\ **Some NACE codes that are present in ecosystems are not reported in the** datasets and therefore, these KPIs will provide complete data only in some of the ecosystems.

- e.g. SBS data does not include data on Q86,Q87_Q88, R90-R92, R93, S94, S96, T
- e.g. SBS J62 value, J63 missing but in NA J62_63 is available.
- e.g. SBS M69 missing, M70 present but in NA M69_70 is available.

Missing NACE code	Ecosystem affected
A	Agri-food
P85	Cultural and Creative Industries
Q86	Health
Q87_Q88	Health; Proximity, Social Economy and Civil Security
R90-R92	Cultural and Creative Industries; Tourism
R93	Tourism
S94	Cultural and Creative Industries
T	Proximity, Social Economy and Civil Security

Therefore, SBS data used for KPI production like 'size class: big and SME disaggregation of the data' covers (fully) nine ecosystems (see Annex 6).

E.g. BERD NACE T is missing, U is not included (see Annex 8).

NACE_BERD	NACE Ecosystem weights	Observations
'D35_E36'	'D35' + 'E36'	
'G'	'G45' + 'G46'+ 'G47'	
'L68'	'L'	
'M'- 'M71'- 'M72'	'M69'+ 'M70'+ 'M73'+ 'M74_M75'	
'R'	'R90-R92' + 'R93'	
'S-U'	'S94' + 'S95' + 'S96' + 'U'	U not in weights
Missing	'T'	Proximity, Social Economy and Civil Security

e.g. CIS (2018) misses the following NACE codes and several Ecosystems are affected (see Annex 9).

Missing NACE code	Ecosystem affected
P	Cultural and Creative Industries
Q86	Health
Q87_Q88	Health
Q87_Q88	Proximity, Social Economy and Civil Security
R90_R92	Cultural and Creative Industries
R90_R92	Tourism
R93	Tourism
S94	Cultural and Creative Industries
S95	Cultural and Creative Industries
S95	Digital
S95	Proximity, Social Economy and Civil Security
S96	Proximity, Social Economy and Civil Security
T	Proximity, Social Economy and Civil Security

Due to these missing data, a total of five (5) ecosystems are affected: ['Cultural and Creative Industries', 'Health', 'Proximity, Social Economy and Civil Security ', 'Tourism' and 'Digital']

\ **NACE coverage changes from one database/data series to another**, then specific criteria have to be built to distribute KPIs to single NACE when it is presented as aggregated NACE.

\ **Using existing shares or ratio indicators as a source from publicly available databases could be impossible and the 'Ecosystem' ratio indicators might have to be calculated from 'totals' (see Annex 7).**

- E.g., Fatal Accidents at work by NACE Rev. 2 activity [HSW_N2_02] has two measures: number of accidents and incidence rate. Incidence rate represents the number of accidents in relation to the number of persons employed. If EU27 value for a NACE code is missing, is not possible to calculate the EU27 incidence rate directly (weighted average of the EU27 countries) and it is necessary to convert the incidence rate into a number of accidents (original 'total' from which the ratio value is calculated) for all the countries and obtain the incidence rate. Additionally, this problem emerges again when assigning the values to the ecosystems using the weights. Let 'i' be the NACE code and 'j' the ecosystem.

$$IR_i = Incidence\ Rate\ for\ NACE_i = \frac{Number\ of\ Fatal\ Accidents_i}{Number\ of\ Employees_i}$$

and w_{ij}= *weight of Nace i in ecosystem j.* Then, the Incidence Rate for the ecosystem j (IRj) is not $IR_i * w_{ij}$, but

$$IR_j = \frac{\sum_i Number\ of\ Fatal\ Accidents_i * w_{ij}}{\sum_i Number\ of\ Employees_i * w_{ij}}$$

Other important issues that affect the quality of KPIs are:

\ **The quality of the NACE codes**. For example, in many EU countries the statistical business register (SBR) is used for the population of enterprises in economic activity codes (NACE). Incorrect coding can occur during the registration of a business or due to the evolution of the company to other activities that are rarely being reported (Christensen, J., 2008; Van Delden, A., Scholtus, S., & Burger, J., 2016). As NACE codes are used to classify business statistics, errors in the enterprises allocation to NACE codes have consequences for many business statistics.

\ **The validity of the weights**. According to the Annual Single Market Report for 2021 'All weights refer to 2014, i.e. the latest year for which Input-Output tables are available' and are obtained with data on

value-added 'Shares shown in the table are computed based on value-added' although they can be produced based on the number of employees ('Shares computed based on employment data are also used for the analysis but not shown'). A static weight structure does not account for the changes in the industry structures of suppliers and clients. The value-added input-outputs for the sectors (NACEs) evolve and so will be the weights that should be assigned to each ecosystem. Failure to take this evolution into account will lead to errors in the estimation of the contribution of sectors (NACEs) to each ecosystem. Apart from the importance of updated data on value added inputs and outputs to obtain weights that reflect a closer image of the contribution of the sector to the different ecosystems, tracking the evolution of the Ecosystem structures (weight distribution) is in essence a very important KPI. Similar to the distribution of suppliers and clients of a company, it is important to know how dependent ecosystems are on each sector or how dependent sectors are on each ecosystem, so risks and opportunities can be managed properly. This is now clearly seen on the gas or oil crisis. Several Ecosystems are more exposed than others and changes in the structure can increase/decrease the exposure to these risks.

\ **Confidential values**. Confidential values complicate the task and require estimations. Estimations could be avoided for Eurostat completing publicly available data with the confidential data to improve the estimation. As KPIs should not include 'totals', this can be done in the background when totals are calculated and before producing ratios or percentage KPIs for the general public.

\ **Inconsistencies. Some inconsistencies have been detected regarding the data provided by Eurostat.** e.g. N04 -Wind based renewable natural energy inputs (2011-2013), N07 -Other renewable natural energy inputs (2013-2014) or CHG emission intensity (2014-2015). These inconsistencies are reflected in the Ecosystem KPIs as a jump in values from one year to the next. This might indicate that there has been a change in the way of measuring or in the number of countries reporting the data to Eurostat. Therefore, careful study of these particular inconsistencies should be taken into account.

4.4 PROPOSED METHODOLOGY FOR CALCULATIONS

The proposed methodology of calculation is explained for Gross Value Added (GVA) from National Accounts. Files and results for a single year (2018) and the period 2011-2018 can be followed in the scripts (Annex 10).

Additionally, Annex 3 includes files and documents for other indicators. Note: each indicator from Eurostat can have slightly different method to assign the KPI value to those NACE codes that are not disaggregated in the same way weights are.

4.4.1 DISAGGREGATION FOR BIG ENTERPRISES AND SMES.

Due to lack of disaggregation for big enterprises and SMEs in National Accounts, alternative data (e.g. SBS data) should be used to get an approximation to distribute the results between big and small enterprises.

SBS data include data on ['0-9'], ['10-19'], ['20-49'], ['50-249'], ['GE250'], ['TOTAL'] groups for certain variables of interest (e.g. Value Added at Factor Cost, Number of employees.)

However, SBS lacks information (since outside the scope of SBS) on certain NACE codes as indicated (e.g. A, P, Q86,...). Additionally, SBS data has missing data for some EU27 aggregates:

- Detailed data by size class is only available for the nine ecosystems fully covered by SBS, five out of the defined fourteen industrial ecosystems are composed by NACE codes that do not all fall within the SBS data collection ('Agri-food', 'Cultural and Creative Industries', 'Health', 'Proximity, Social Economy and Civil Security ' and 'Tourism'). Then, using incomplete data, it is assumed that the size distribution in those ecosystems is equal to the size distribution of the ecosystems without the missing NACE codes (This estimation introduces some error in the calculations).
- Using a similar procedure as before (e.g. filtering for year, if EU-27 is missing then calculate the corresponding estimate for the total value as the sum of the 27 country values), the ratio values for the variable of interest for each size group can be calculated. The results have some inconsistencies

because the EU-27 missing values have been calculated as a sum of the country values for each group. Then total values are not exactly the sum of each of the size groups, therefore the sum of the ratios is not equal to 1 (very close but not equal). Assuming this small discrepancy, [GE250] ratio can be used as a reference to calculate big company values and [1 - GE250 ratio] as the ratio for SMEs. These ratios for Big and SMEs can be used to allocate and follow the values of the variables of interest in each ecosystem for SMEs and big companies.

- These ratios can be calculated for any SBS related data (e.g., value added at factor cost, number of employees, etc.) and can be used to distribute the corresponding National Account indicators. However, the SBS lacks representative indicators to make the distribution between SMEs and Big companies to distribute the values of other non-related indicators (for example, GHG emissions in Tons). Then, SMEs and Big Companies distribution needs to be estimated (for example, using value added ratio between SMEs and Big companies based on SBS data assumes that value added is proportional to emissions), which leads to further errors in the calculation.

Considering all these limitations regarding the calculation of SMEs, Annex 6 includes the references to the script, the files (see Annex 10 table of files) and calculation examples.

4.4.2 OPERATIONAL EXECUTION OF THE TASK

Publicly available data for the study can be retrieved directly from Eurostat Data Browser (https://ec.europa.eu/eurostat/databrowser/explore/all/all_themes?lang=en). However, doing it through the data browser has some problems:

\ **It is time-consuming**. Each time the data is extracted, all possible variables must be selected manually to customize the database to the requirements. Among others:

- The selection of the specific countries is required; the EU27 and all the EU27 individual country values to complement missing EU27 values
- Select the specific NACE codes that are relevant to the Ecosystem calculations. This includes leaving specific NACEs out of the selection, determine which aggregations or disaggregations are selected in the pool of NACES that the database includes.
- Select the variable/s of interest.
- Select the proper /s to measure the variable/s to measure the variables
- Select the years to be retrieved
- After the selection, one should customize the way data is displayed and downloaded. E.g. Eliminating comment columns

\ **The output file is complicated when managing many variables at the same time**. In the simplest case, we will create an excel file with only one variable (E.g. value added), with one unit (E.g. Million Euro), for one year (E.g. 2018) and with all the NACE codes of the Ecosystem distribution as rows and with EU27 and all the EU27 countries as columns. Thus, for each year and KPI we will need at least one excel file or one file with all the years for all the 28 columns which will complicate the file management and calculations.

\ The calculations using spreadsheets will require many linkages and operations between cells increasing the time to customize the calculations in the spreadsheet for each KPI (E.g. It might include different aggregations of the NACE codes or it might need different disaggregations of NACE codes), increasing the possible errors in the formulae, increasing the time to refine the formulae and calculations and increasing the time to calculate new values to keep the KPI's updated.

\ It would be a very manual task.

In the light of these circumstances, it was clear that it would be better to programme a script that retrieves, selects, calculates, corrects errors and produces a report. We used Jupyter Lab 1.2.6 in Anaconda Navigator 1.9.12 and Python 3 to program a script for the calculations. Particularly, we use eurostat 1.0.1 (https://pypi.org/project/eurostat/), it is the package that allows to retrieve the Eurostat database. One important feature of Eurostat python package is that it retrieves all the data for the database. Thus, by downloading the database we have access to all the combinations of variables, units, years, etc. (which

is not possible with a spreadsheet). The latter in combination with the similar structure of Eurostat databases makes it very appropriate for an automatic and iterative process. Indeed, customizing the specific values of the database to be retrieved, configuring them for the calculations and doing operations can be done with scripts that can be adapted more easily to retrieve new KPIs or update existing ones. For example, in the National Account aggregates by industry (up to NACE A*64) Gross Value Added was calculated. But once the script is done, any other indicator from this database (e.g. Output, Compensation of employees, etc.) can be calculated for each Industrial Ecosystem. In these cases, the variable of interest should have available data disaggregated in the same NACE codes as in the original indicator, which it is normally possible when coming from the same database from Eurostat. However, there are cases in which data is missing for a particular indicator in the database.

The attached files include the scripts in python extension and html. Running the scripts in Jupyterlab requires all the packages and libraries that are used to be properly installed. We recommend using a package manger (e.g. pip or conda) to install the packages in the corresponding computer. Additionally, we supply in the file folders with auxiliary files that are required to be in the same folder as the python file that includes the script. Typically, these files include the excel file including the ecosystem weights and, when necessary, the files with the data to distribute the aggregated NACE codes. If a certain library or package is not available in the corresponding computer, the script will report an error code and will indicate the missing package. Searching for a package and installing it is straightforward and on the internet one can find the pip or conda to install it.

Although the script helps to retrieve, organise and calculate the KPIs, the process is not free from some manual work. First, it is important to understand well the information from the databases needed to obtain the estimations (EU-27 data and/or country data, 2-digit level NACE codes, etc.), the problems with the existing data and the ideal situation to calculate the indicators (E.g. missing data for EU-27, non-disaggregated NACE codes, different NACE codes structures, etc.). Second, looking for availability of databases that meet the minimum information for the calculations within the Eurostat data browser is better addressed using the Eurostat data browser. There we can look for the availability of NACE codes needed in a first screening of the database. For example, Business surveys - NACE Rev. 2 activity is not a viable database and to be aware of this, it is required to enter the database to find out that the data is not disaggregated at NACE rev 2. Similarly, other databases have NACE rev 2 data, but the disaggregation is not viable (1-digit NACE, missing NACE codes, incomplete NACE codes for ecosystems…) for ecosystem calculation). Once you have identified potential databases, you will need to spend a year in-depth work on the database characteristics (e.g. units, variables of interest, aggregation of NACE codes, availability of EU27 aggregates and/or country data, etc.) needed to adapt the script.

This manual work is particularly important because there are large differences in the way the 2-digit level NACE codes are reported: Although some databases have 2-digit level NACE codes, their availability and links across NACE groups differ. For example, divisions C11, 12 and 13 are reported individually, aggregated as C12-C13 or C11_C13, depending on which database is considered. Some harmonization and standardization of the data attending to 2-digit level NACE codes would be advisable to also standardize and automatize a procedure to report and update the ecosystem KPIs.

In the Readme.docx file in the Ecosystem files folder there is an example on how to update the script to retrieve additional years. In some cases, scripts have a selection screen (pop-up) that allows to select the years of the iteration, the unit, the indicator, etc. that the user wants to retrieve from the Eurostat database (see also the readme file). This can be done for all the databases, but it was decided not to use it for all the scripts because it was faster to indicate a fixed period of years (2011-2018), variables, units etc. rather that each time the script was run to select the values using Eurostat codes (not easy to identify the variable or the unit).

Annex 3 includes a table with the indicators that have been calculated, including the type of indicator, the database identification (from Eurostat), the variables and the KPI. The procedure and the detailed script for the calculation of the Gross Value Added using National Accounts for one year is included. Additionally, the script and calculation for the same indicator for a period of years (2011 till 2019), and derived indicators (percentages and ratios) are also included. The calculations for the other KPIs are provided as a script in html documents (see table of documents).

Annex 11 contains a table with Eurostat indicators that cannot be used for Ecosystems and the reason is that they are not suitable for calculation. Due to the size of Eurostat databases, some thematic areas of Eurostat are reported as a group of databases in this table.

4.4.3 SUMMARY OF RESULTS

Results on the different KPIs are reported in the corresponding html files and excel files included in Annex 10. The calculations have been made with the weight table from 2022 Annual Single Market report (which are slightly different from those that can be obtained from the Annual Single Market Report for 2021).

Initially, Single Market Report results were replicated (using NA Value Added data of Eurostat, the reported weights from the Annual Single Market Report and in those areas where there is lack of data SBS data was used as a proxy). The results on the test were the same as in the Annual Single Market Report in those ecosystems with complete information (those with complete information about Value Added and that didn't have any of the aggregated NACE codes) and very similar in those ecosystems with incomplete information.

Ecosystem KPIs can be produced with EU-27 publicly available data. The proposed methodology:

\ Could be applied to a **small amount of indicators in publicly available data** form Eurostat, mainly because there is no 2-digit code disaggregation of the data.

\ Uses the availability of country data to overcome the lack of EU27 aggregates and complementary databases (e.g. SBS) to overcome the lack of disaggregation in certain NACE aggregates (e.g. C31_32). Alternative databases can be used to overcome lack of EU27 databases in a few cases where the measures are very similar (e.g. SBS data can complement the lack of some NACE on UE27 level for National Accounts for Gross Value Added or employees, as both databases are highly correlated).

\ Should be applied to 'totals' and afterwards shares and ratios can be calculated.

\ Could produce SMEs and Big companies disaggregated values easily, but somewhat **unreliable** because of the lack of information on SBS data for certain NACE codes (affecting 5 ecosystems)

\ Will require more complete information on country level to be able to produce indicators to compare between the different EU-27 countries.

Then, the **main problems** for the calculations and search for new Ecosystem KPIs are:

\ Availability of 2-digit NACE codes in the publicly available databases. In Annex 11 there is a list of discarded databases because of this issue.

\ In the cases where 2-digit NACE codes are available, some databases do not cover all the NACE codes included in the Ecosystems (e.g. SBS data lack on information that affects 5 Ecosystems, other databases only cover for example NACE C codes-manufacturing industries)

\ **Availability of disaggregated information** requested to distribute the KPI values to ecosystems (e.g. Ecosystem weight distribution requires C31-C32 to be separate in C31 and C32 to distribute the corresponding KPI value to the Ecosystems). In this case, the methodology proposed in this report suggests the use of SBS Value Added, number of employees or number of firms for disaggregation because of the high correlation between these values in National Accounts and SBS data. Particularly, for those proposed KPIs that are not directly related to Value Added, employees or number of firms (e.g. CHG emissions), it is suggested to use Value Added as this would be the most representative of the available indicators for disaggregation. However, when developing a ratio KPI using Value Added (to avoid the use of 'totals'), this will result in obtaining the same ratio for the aggregated and disaggregated codes (e.g. KPI = ratio CHG /value added. Then, using Value added to distribute CHG values for C31-C32 into C31 and C32, will result on KPI for C31-C2 = KPI for C31 = KPI for C32).

\ **Availability of EU-27 values**. Eurostat databases suffer in many cases from non-reported data (e.g. for the year 2018 Gross Value Added for C20, C21, C26, C28, C30 and C31_C32 are missing). In Eurostat databases EU-27 country data is reported. Country data suffers from the same issues as the EU-27 aggregated value (e.g. non reported data for some NACE codes). For those NACE values with complete

information, EU-27 reported value is equal to the sum of EU27 countries individual values. The method proposed suggests the use of the sum of EU-27 countries individual values when EU-27 value is missing as an approximation. The missing values in a determined database are typically the same for EU-27 and EU-27 countries regardless of the year. Then, the method measures a quite stable set of countries which is good enough for monitoring purposes. Other methods, such as average value of the previous and following year, are not an option because there is no data in the same positions from one year to the next.

\ **Availability of EU-27 country data**. Some Eurostat databases have no EU-27 aggregate but report country values. However, the explored databases with this problem fail to be a good candidate to obtain Ecosystem KPIs, because they either do not report all EU-27 countries or they have significant amount of countries with missing data (e.g. CIS, BERD,.).

\ **Inconsistencies in the results from one year to another** (e.g. energy use databases). The results indicate that there are **inconsistencies in the values** (e.g. CHG emission intensity 2014-2015) that should be studied in more detail to determine the cause (e.g. change in the measurement method,).

\ **SMEs disaggregation of data** is complicated because of the lack of available data for certain ecosystems. Several Eurostat databases disaggregate data by the size of the company, among them, SBS is the one with higher coverage in terms of NACE codes and with a higher interest because of the variables that are covered. However, **SBS NACE codes do not cover all the ecosystems** (5 ecosystems have incomplete information while 9 ecosystems will be completely covered). Additionally, there are some problems in determining the ratios for SME's and Big companies from SBS due to the missing data in the public SBS database. The missing information results in some SME's and Big companies' ratios not summing exactly 1. However, this problem has a very small impact and can be depreciated. Overall, there are two problems with SMEs and Big companies disaggregation: Coverage (ratio values for disaggregation between SMEs and Big companies don't cover all the ecosystems and representativeness (for those KPIs that are not linked to SBS indicators (value added, employment, number of companies) the ratio SMEs/Big would be unrelated (e.g. CHG emissions would have to be assigned to SMEs an Big companies for a certain NACE code based on the value added for example, assuming that value added is CHG emissions)

5 CONCLUSIONS

'A new Industrial Strategy' of the European Commission aims to support the transition to a green and digital economy, making European industry more competitive on a global level, leading it towards further enhancement of digital single market and climate-neutral circular economy. To ensure this transition, the Commission has proposed an industrial ecosystem approach, which includes an annual analysis of the state of the Single Market across 14 industrial ecosystems, with a particular focus on actions for SMEs.

In response to this proposal, DG GROW developed the methodology to derive the KPI indicators for monitoring ecosystems[17]. KPIs describe the ecosystems in more detail and are based on publicly available data. For defining the size and performance of ecosystems, DG Grow used Eurostat data of National Accounts aggregates by industry (value added)[18] and National Accounts employment data by industry[19]. Information on the size class distribution within each eco-system for formulating policy targeting SMEs was obtained by combining granular SBS data and NA (for calibrating the totals).[20] All data use the NACE Rev. 2 classification to identify enterprises according to their main activity. NACE Rev. 2 was also used to define the 14 industrial ecosystems.

The main problems with this approach are as follows:

- The ecosystems overlap (the same NACE codes are present in different ecosystems) - this leads to double counting;
- Certain NACE codes are not allocated – leading to incompleteness;
- The allocation of the share of NACE's to ecosystems is fixed.

In this report strictly publicly available data is used to compile a set of indicators proposed by GD GROW. National Accounts data is publicly available only at an aggregated level and Structural Business Statistics (SBS) or Short term Business Statistics (STS) data is used to overcome this issue, e.g. to include the detailed information about the size class distribution on each eco-system within small and medium-sized enterprises (SMEs), SBS and STS data are needed. However, SBS and STS data are available for a subset of economic activities. Other data used include Community Innovation Survey (CIS), Business Demographics (DB) and R&D, all on EU27 aggregate level. For the calculations, the IES weights provided by Eurostat were used (which are slightly different from those that can be obtained from the Annual Single Market Report for 2021).

Initially, Single Market Report results were replicated. The results were the same as in the Annual Single Market Report in the ecosystems with complete information and very similar in the ecosystems with incomplete information.

When producing indicators using only publicly available data, some methodological difficulties have to be overcome. Missing data is one of the main issues. Also, some NACE codes that are part of ecosystems are not reported in the databases. Other issues are misclassifications, different levels of aggregation of different NACE codes and different coverages in databases. Other aspects of data that affect the quality of the KPI estimates are: quality of NACE codes, validity of the weights, confidential values and inconsistencies. The coverage and representativeness issues of SBS data lead to biased estimates. Additionally, there are issues with obtaining the ratios for SME's and Big companies from SBS due to the missing data

17 DocsRoom - European Commission (europa.eu)
18 Eurostat - Data Explorer (europa.eu), gross value added at current prices
19 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_e&lang=en , total employment domestic concept , in 1000 persons
20 European Commission: Annual Single Market Report 2022 (SWD(2022) 40 final)

in the SBS database. To overcome these problems, methodological solutions for deriving the KPI estimates have been introduced.

Examples of two national statistics offices producing statistics on clusters or ecosystems in order to analyse national practices are also presented. Keeping in mind that Member States most likely have access to data sources holding more granular data and thus a better source for describing their national clusters. In addition, they do not have to take the complexity and heterogeneity of the business structures of all member states into consideration. Still, these examples show that similar issues as KPIs have been encountered. One of the main issues is that it is very difficult to isolate strongholds/ecosystems to only include unique activities. However, it is not transparent which activities are included in the horizontal groups under different ecosystems. This makes the statistical descriptions of the ecosystems difficult to interpret, and the volume of double counting is not possible to detect.

This study can be seen as a proof of concept on the availability and feasibility of Eurostat data/indicators and statistical methodologies to produce a set of indicators for monitoring of industrial ecosystems. This report has attempted to summarize the issues that shed light on the role of official statistics in defining and producing a set of statistically sound and policy relevant indicators. These issues should be addressed with care.

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\ ANNEXES

ANNEX 1 KPI CLUSTERS

The KPIs have been clustered as follows[21]:

1. Headline indicators, providing a synthetic overview of the main trends of the EU economy and benchmarking against other countries;
2. Short-Term indicators, to describe the evolution of the COVID crisis and provide forward looking analysis;
3. Thematic indicators, which proxy the following dimensions:
   - Economic Resilience
   - Digital transition
   - Climate neutrality and circular economy
   - Single Market integration SMEs
   - International dimension
4. Indicators by ecosystem, which describe the main features of the ecosystems and their performance.

21 For further details see also: annual-single-market-report-2021.pdf (europa.eu)

ANNEX 2 KPIS BY ECOSYSTEM

The following table summarizes a list of KPIs by ecosystem:

Table 1: List of KPIs calculated by ecosystem

THEMATIC AREA	INDICATOR	MEASURE	SOURCE
Headline indicators	gross value added	Million EUR and % change 2015-2018	Eurostat
Headline indicators	Employment	Million EUR and % change 2015-2018	Eurostat
Headline indicators	Number of firms	Number	Eurostat
Green transition	Greenhous gas intensity	level and % Change 2015-2018	Eurostat
Short-term indicators	Economic confidence indicator	Level	ECFIN
International dimension	Export intensity	Extra EU Export/VA	Eurostat
Single market integration	Intra-EU trade	% of total ecosystem trade	Eurostat
Economic Resilience	Churn rate of business	%change 2015-2018	Eurostat
Economic Resilience	Investment in tangibles	level and % change 2015-2018	Eurostat

Source: https://ec.europa.eu/info/sites/default/files/annual-single-market-report-2021.pdf

ANNEX 3 TABLE OF INDICATORS

Note that indicators in totals can be calculated as % annual increase or decrease or as a ratio with other indicators (e.g. For energy use: Terajoule/Value Added)

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Competitiveness-Value added	National Accounts aggregates by industry (up to NACE A*64)	[NAMA_10_A64]	B1G -Value added, gross	[CP_MEUR] Current prices, million euro
			Gross Value Added in % of GDP	%
			Annual % change=(year t1-year t0)/yeart0 B1G -Value added, gross	%
			Compensation of Employees [D1]	[CP_MEUR] Current prices, million euro
			Annual % change=(year t1-year t0)/yeart0 Compensation of employees	%
			Labour costs per employee= Compensation of Employees [D1] / Total employment domestic concept [EMP_DC] Thousands	Million euro/ thousand employees
Competitiveness-Labour cost Productivity			Labor cost productivity= B1G -Value added, gross / Compensation of Employees [D1]	Euros of value added/Euros of labour cost
Competitiveness-Employment	National Accounts employment data by industry (up to NACE A*64)	[NAMA_10_A64_E]	Number of employees - Total employment domestic concept [EMP_DC]	Thousands of persons
			% of total employment Total employment domestic concept [EMP_DC]	%
			Annual % change	%

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Competitiveness-Productivity		[NAMA_10_A64] [NAMA_10_A64_E]	Gross value added per employee =B1G -Value added, gross / Total employment domestic concept [EMP_DC] Can be calculated per hour worked	Million Euro/Thousands of persons
Sustainability	Air emissions accounts by NACE Rev. 2 activity	[ENV_AC_AINAH_R2]	[GHG] Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2[22]	Tons
Sustainability	Air emissions intensities by NACE Rev. 2 activity	[ENV_AC_AEINT_R2]	[GHG] Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2[23]	[KG_EUR_CP] Kilograms per euro, current prices (Value added)
Sustainability	Environmental taxes by economic activity (NACE Rev. 2)	[ENV_AC_TAXIND2]	ENV -Total environmental taxes NRG -Energy taxes POL -Pollution taxes RES -Resource taxes TRA -Transport taxes	Million Euro
Sustainability			Alternative ratio: Environmental tax pressure on emissions: Environmental taxes[ENV]/emissions [CHG]	Units= Million euros/Ton
Energy	Energy supply and use by NACE Rev. 2 activity	[ENV_AC_PEFASU]	[N00] Natural energy inputs N01 -Fossil non-renewable natural energy inputs N02 -Nuclear non-renewable natural energy inputs N03 -Hydro based renewable natural energy inputs N04 -Wind based renewable natural energy inputs N05 -Solar based renewable natural energy inputs N06 -Biomass based renewable natural energy inputs N07 -Other renewable natural energy inputs	[TJ] Terajoule

[22] 23 additional air pollutant variables are available in the same dataset. For a full list, consider the database view on the Eurostat website.
[23] 23 additional air pollutant variables are available in the same dataset. For a full list, consider the database view on the Eurostat website.

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Sustainability		[ENV_AC_PEFASU]	N03 -Hydro based renewable natural energy inputs N04 -Wind based renewable natural energy inputs N05 -Solar based renewable natural energy inputs N06 -Biomass based renewable natural energy inputs N07 -Other renewable natural energy inputs P23 -Wood, wood waste and other solid biomass, charcoal P24 -Liquid biofuels P25 -Biogas R28 -Renewable waste	[TJ] Terajoule
Sustainability		[ENV_AC_PEFASU]	Renewable energy input/Total energy input e.g. (N03+…+N7)/N00 Hydro base renewable natural energy inputs / Natural Energy inputs	% Renewable energy over total energy
Energy	Key indicators of physical energy flow accounts by NACE Rev. 2 activity	ENV_AC_PEFA04	EPRD_DOM -Domestic production of energy products EPRD_ICNS -Intermediate consumption of energy products NEI_EXT -Extraction of natural energy inputs NETDOM_EUSE -Net domestic energy use NETDOM_EUSE_EP -Net domestic energy use for energy purposes NETDOM_EUSE_NEP -Net domestic energy use for non-energy purposes NRG_INP_OUT -Energy input and output WST_USE -Use of waste for energetic purposes	[TJ] Terajoule Alternative measure: Amount of energy per value added (Terajoule/Value Added)
Headline indicators	Business demography by size class (from 2004 onwards, NACE Rev. 2) See Annex Use of demography data	[BD_9BD_SZ_CL_R2]	[V11910] Population of active enterprises in t – number. Not disaggregation of 'C17_C18', 'C20_C21', 'C24_C25', 'C26_C27', 'C29_C30', 'C31_C32', 'E', Use SBS data to disaggregate Correlation= 0.9998	Number of companies

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
		(Trivial, but not calculated in the files)	% of total companies= companies in Ecosystem/ Total number of companies	%
		(Trivial, but not calculated in the files)	Average size of the companies = Number of employees / Number of companies	Employees/company
		(Trivial, but not calculated in the files)	Annual % change=(year t1-year t0)/yeart0 number of employees	%
		(Trivial, but not calculated in the files)	Average value added of the companies = Value added / Number of companies	Million Euro/company
	Business demography by legal form (from 2004 onwards, NACE Rev. 2) See Annex Use of demography data	BD_9AC_L_FORM_R2	[V11910] Population of active enterprises in t - number	Number of companies
			[V11920] Births of enterprises in t - number	Number of companies
			Birth rate= Births of enterprises in t*100/Population of enterprises in t	%
			[V11930] Deaths of enterprises in t - number	Number of companies
			Death rate= Births of enterprises in t*100/Population of enterprises in t	%
			Business churn: birth rate + death rate - percentage	%
Quality at work	Fatal Accidents at work by NACE Rev. 2 activity	HSW_N2_02	Number of fatal accidents [NR]	Number of fatal accidents
			Incidence rate= Number of Fatal Accidents [NR]/Total employment domestic concept [EMP_DC] Thousands	Incidence rate =Number of fatal accidents / thousand employees
	Non-fatal accidents at work by NACE Rev. 2 activity and sex	HSW_N2_01	Number of nonfatal accidents	Number of nonfatal accidents
			Incidence rate= Number of non-fatal Accidents [NR]/Total employment domestic concept [EMP_DC] Thousands	Incidence rate =Number of fatal accidents / thousand employees

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Economic		ASSET_10	Assets Only for those assets that have no missing countries in the data	

ANNEX 4 PROPOSED METHODOLOGY AND CALCULATIONS – PER INDICATORS

Proposed methodology

Note: *each indicator from Eurostat can have slightly different method to assign the* KPI *value to those NACE codes that are not disaggregated in the same way weights are.*

1. Import the corresponding database [df]. E.g. If we are calculating Gross Value Added from Aational Accounts we download 'nama_10_a64'
2. Limit database to the years of interest (2011 and forward) [df]. E.g. publicly available data reported changes from database to database. From first screening, 2011 looks like a good starting point to be able to have data for several years for different KPIs. In the example, data from years previous to 2011 and from 2019 is eliminated from the database.
3. Determine variables and dimensions of the variables (e.g.. units, item,…) to be able to select the variable of interest and the units.
4. Choose the variable dimensions for the study. E.g. CP_MEUR Million Euros, B1G Gross Value added,…
5. Determine countries (not in the EU27) and NACE values to drop from the dataframe. These countries and NACE codes are of no use within the calculation. E.g. Countries not in the EU27 like UK or NACE codes like B which are not in the ecosystems or that are aggregated or disaggregated measures of NACES that are already captured in other (E.g. C10, C11 and C12 are already captures by C10-C12)
6. Filter the database with the variables (E.g. **is** in unit, **is not** in *nacedrop* list, is in *item*, is not in *countries to drop list*) [df_selection]. Based on the variable and unit and the EU27 countries and the NACE codes to distribute the KPI values to the ecosystem, the selected information is stored in a new dataframe [df_selection].
7. Set an iteration for each year values E.g. from 2011 to 2018 or for a single year.
    - 7.1. For each year. Create a new database [df_target] by filtering the year data and rearranging the filtered data in by NACE code (NACE codes in rows). Then the database has the countries and EU27 values (in columns) the variable of interest (E.g. Gross Value Added in million Euros) for the corresponding year, and the rows represent each NACE code of interest.
    - 7.2. Estimate EU27 values as the sum of all EU27 country values.
    - 7.3. Complete EU27 column missing values only if the value is missing with the estimated value and eliminate all the columns for countries (maintain only EU27 column). At this point the database has a single column of data for the variable (E.g. Gross Value Added), unit (e.g. Million Euros) and year selected (E.g. 2011) with the EU27 values for each of the NACES present in the KPI database (excluding those NACES that are not of interest)
    - 7.4. Deal with NACE aggregated data. In the example, National Accounts lack on disaggregated values on certain NACE (e.g. C10-C12,… C31_C32,…N80-N82). This is not a problem in some cases because they are assigned to the same ecosystem (e.g. C10-C12 is assigned completely to Agri-food Ecosystem), but requires criteria for distribution in other cases (e.g. for Value Added in National Accounts C31_C32 and N80-C80). Distribution can be made using SBS data, which has this disaggregation for 'Value added at factor cost', 'number of employees' or 'Number of companies', depending on the case. The approximation between SBS and NA data is for this purpose. E.g. for data in year 2018. Correlation between National

Accounts Gross Value Added and SBS Value added at factor cost is 0.923. Correlation between National Accounts number of employees and SBS employees is 0.998. Correlation between National Accounts number of companies and SBS number of companies is 0.999.

Calculate ratios from SBS data for each year. With these ratios distribute C31_C32 values into C31 and C32 or N80-N82 into N80, N81 and N82. [moddf_target]. See Eurostat-sbs-ratioc31-N80valueadded.html

7.5. Load the weights data from DGGROW (arranged by ecosystem (column) and NACE codes (rows) to index values using NACE codes.

7.6. Create a table for results [results] by multiplying each KPI value for each NACE for EU27 in [modf_target] by the corresponding weight. The resulting table [results] will have the variable value (e.g. Gross Value Added) for ecosystems (columns) and the NACE codes (rows).

7.7. Calculate the sum for each column and save the values for each ecosystem in a different table [results_compiled]

7.8. Repeat the process for each year (in the iteration).

8. The compiled results are stored in a new database.

Calculations

Detailed script. Calculation for Value Added from National Accounts for year 2008.

File: Eurostat-NA-Value Added-detailed.html

In [1]:

```
# import pandas to manage dataframes
import pandas as pd
```

In [2]:

```
#import eurostat to be able to retrieve data from the corresponding eurostat database
import eurostat
#eurostat requires the name of the database. In this case
#nama_10_a64 National accounts aggregates by industry (up to NACE A*64)
df = eurostat.get_data_df('nama_10_a64', flags=False)
df
```

Out[2]:

	UNIT	NACE_R2	NA_ITEM	GEO\TIME	2020	2019	2018	2017	2016	2015	...	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975
0	CLV05_MEUR	A	B1G	AL	NaN	1824.9	1813.6	1792.5	1777.6	1742.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1	CLV05_MEUR	A	B1G	AT	3820.3	3940.9	3945.2	3803.9	3615.5	3536.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	CLV05_MEUR	A	B1G	BE	2541.5	2727.7	2703.1	2997.0	2872.1	3092.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	CLV05_MEUR	A	B1G	BG	1498.3	1549.4	1488.4	1518.5	1400.1	1302.8	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	CLV05_MEUR	A	B1G	CH	2744.5	2804.2	3002.4	2766.7	2855.9	2829.3	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
231957	PYP_MNAC	U	P51C	RO	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
231958	PYP_MNAC	U	P51C	SE	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
231959	PYP_MNAC	U	P51C	SI	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
231960	PYP_MNAC	U	P51C	SK	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

	UNIT	NACE_R2	NA_ITEM	GEO\TIME	2020	2019	2018	2017	2016	2015	...	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975
231961	PYP_MNAC	U	P51C	UK	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

231962 rows × 50 columns

In [3]:

```
# see the columns to eliminate years that we are not interested in
df.columns
```

Out[3]:

```
Index([   'unit',  'nace_r2',  'na_item', 'geo\time',2020,      2019,
          2018,      2017,      2016,      2015,      2014,      2013,
          2012,      2011,      2010,      2009,      2008,      2007,
          2006,      2005,      2004,      2003,      2002,      2001,
          2000,      1999,      1998,      1997,      1996,      1995,
          1994,      1993,      1992,      1991,      1990,      1989,
          1988,      1987,      1986,      1985,      1984,      1983,
          1982,      1981,      1980,      1979,      1978,      1977,
          1976,      1975],
      dtype='object')
```

In [4]:

```
#eliminate columns for years previous to 2011
#years list accumulates years from 1975 to 2010
years =[]
```

```
year_start=1975
year_study=2011
for y in range(year_start,year_study):
    years.append(y)

#drop the years in the list
df=df.drop(years, axis=1)#quitamos todas las columnas de añosque no nos interesan

#rename geo time column to be easier to handle because of the name
df.rename(columns={'geo\\time': 'geo'}, inplace=True)
```

In [5]:

```
#select the unit that we want
unit=['CP_MEUR']
#select the variable of interest
naitem=['B1G']
#name the variable of interest
variable_of_interest= 'Value added, gross'
```

In [6]:

```
#we can select the nace codes that we want or the ones that we don't want.
#In this case we are selecting those that we dont want
#we can see the unique nace codes
```

```
df.nace_r2.unique()
```

Out[6]:

```
array(['A', 'A01', 'A02', 'A03', 'B', 'B-E', 'C', 'C10-C12', 'C13-C15',
       'C16', 'C16-C18', 'C17', 'C18', 'C19', 'C20', 'C21', 'C22',
       'C22_C23', 'C23', 'C24', 'C24_C25', 'C25', 'C26', 'C27', 'C28',
       'C29', 'C29_C30', 'C30', 'C31-C33', 'C31_C32', 'C33', 'D', 'E',
       'E36', 'E37-E39', 'F', 'G', 'G-I', 'G45', 'G46', 'G47', 'H', 'H49',
       'H50', 'H51', 'H52', 'H53', 'I', 'J', 'J58', 'J58-J60', 'J59_J60',
       'J61', 'J62_J63', 'K', 'K64', 'K65', 'K66', 'L', 'L68A', 'M',
       'M69-M71', 'M69_M70', 'M71', 'M72', 'M73', 'M73-M75', 'M74_M75',
       'M_N', 'N', 'N77', 'N78', 'N79', 'N80-N82', 'O', 'O-Q', 'P', 'Q',
       'Q86', 'Q87_Q88', 'R', 'R-U', 'R90-R92', 'R93', 'S', 'S94', 'S95',
       'S96', 'T', 'TOTAL', 'U'], dtype=object)
```

In [7]:

```
#we can see the countries that are unique
df.geo.unique()
```

Out[7]:

```
array(['AL', 'AT', 'BE', 'BG', 'CH', 'CY', 'CZ', 'DE', 'DK', 'EA', 'EA12',
       'EA19', 'EE', 'EL', 'ES', 'EU15', 'EU27_2020', 'EU28', 'FI', 'FR',
       'HR', 'HU', 'IE', 'IS', 'IT', 'LT', 'LU', 'LV', 'MT', 'NL', 'NO',
```

```
'PL', 'PT', 'RO', 'RS', 'SE', 'SI', 'SK', 'TR', 'UK', 'ME', 'BA',
'LI', 'MK'], dtype=object)
```

In [8]:

```
#we select the naces and countries not to be selected
nacedrop=['O','K66', 'J', 'H', 'C16-C18','A03', 'O-Q', 'E', 'C31-C33', 'M_N', 'J58-J60', 'R-U', 'G', 'K', 'TOTAL', 'L68A', 'A02', 'C22_C23', 'C29_C30',  'B-E', 'G-I', 'N', 'Q', 'R', 'C24_C25','C', 'M69-M71', 'M73-M75', 'U', 'S', 'B', 'M', 'A01', 'K65','K64']
countries_not_selected= ['UK', 'TR', 'AL','IS','LI','NO','CH','UK','ME','MK','AL','RS','TR','BA','EU28','EU15','EA','EA19','EA12']

#we select the rows that have the right unit, the right item but are not (~ symbol) in the list of nace codes and countries
df_selection=df[df.unit.isin(unit)&~df.nace_r2.isin(nacedrop)&df.na_item.isin(naitem)&~df.geo.isin(countries_not_selected)]
df_selection
```

Out[8]:

	UNIT	NACE_R2	NA_ITEM	GEO	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
81998	CP_MEUR	A	B1G	AT	4172.2	4259.7	4355.9	4471.3	3970.6	3889.5	4000.2	4064.2	4297.2	4347.7
82000	CP_MEUR	A	B1G	BE	2915.6	3183.9	2774.3	2960.0	2702.8	2860.3	2570.5	2676.2	3016.9	2436.4
82001	CP_MEUR	A	B1G	BG	2150.3	1995.3	1903.0	2122.7	1976.8	1860.3	1961.4	1899.0	1872.0	1933.5
82003	CP_MEUR	A	B1G	CY	417.4	416.2	374.7	376.2	407.6	335.2	322.5	367.4	390.2	426.0
82004	CP_MEUR	A	B1G	CZ	4123.5	4198.3	4084.9	3994.5	3703.2	3749.3	3808.9	3770.9	3660.1	3275.2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
109532	CP_MEUR	T	B1G	PT	1143.4	1230.1	1158.6	1114.0	1096.8	1085.2	1112.7	1106.0	1150.6	1200.6
109533	CP_MEUR	T	B1G	RO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
109535	CP_MEUR	T	B1G	SE	239.1	238.8	238.4	209.7	212.6	172.9	194.3	173.8	144.5	127.4
109536	CP_MEUR	T	B1G	SI	32.9	31.4	30.5	29.1	28.7	28.4	28.2	27.4	27.3	26.7
109537	CP_MEUR	T	B1G	SK	48.6	48.6	42.5	48.6	42.4	35.2	35.1	30.8	32.7	31.2

1568 rows × 14 columns

In [9]:

```
#we load the ratios to divide N80_82 and C31_32. Value Added from SBS. Calculated previously.
# Here we just read the excel file where the ratios are and name it as ratios_values
ratios_values = pd.read_excel('ratioCN-Value added at factor cost - million euro.xlsx')
ratios_values.set_index('nace_r2', inplace=True)#nace como índice
ratios_values
```

Out[9]:

	VALUE ADDED AT FACTOR COST - MILLION EURO2011	VALUE ADDED AT FACTOR COST - MILLION EURO2012	VALUE ADDED AT FACTOR COST - MILLION EURO2013	VALUE ADDED AT FACTOR COST - MILLION EURO2014	VALUE ADDED AT FACTOR COST - MILLION EURO2015	VALUE ADDED AT FACTOR COST - MILLION EURO2016	VALUE ADDED AT FACTOR COST - MILLION EURO2017	VALUE ADDED AT FACTOR COST - MILLION EURO2018	VALUE ADDED AT FACTOR COST - MILLION EURO2019
nace_r2									
C31	0.398512	0.403322	0.400551	0.398158	0.400751	0.409175	0.388565	0.382716	0.401069
C32	0.601488	0.596678	0.599449	0.601842	0.599249	0.590825	0.611435	0.617284	0.598931
N80	0.165778	0.162820	0.158483	0.152327	0.157963	0.160093	0.155610	0.145835	0.145916
N81	0.462572	0.459438	0.466741	0.463845	0.467105	0.467350	0.469511	0.477816	0.495916
N82	0.371650	0.377742	0.374777	0.383828	0.374932	0.372558	0.374879	0.376349	0.358168

In [10]:

```
# cols is a list of the EU27 countries (will be use to put the database into columns) and will be use to sum the variable values later
cols = ['AT', 'BE', 'BG', 'CY', 'CZ', 'DE', 'DK', 'EE', 'EL', 'ES', 'FI','FR', 'HR', 'HU', 'IE', 'IT', 'LT','LU', 'LV', 'MT','NL', 'PL', 'PT', 'RO', 'SE', 'SI', 'SK']
```

In [11]:

```
#in this example we are only calculating one year, 2018
year=2018
i=year
```

```
import numpy as np
# df_selection is a table with the Value added in Million euros for each countries and EU27 and for all the naces
#but we want to convert the rows where each row is a nace code and each column is a country
#to convert it we use nace as index and in columns we put the countries ('geo'). The result is df_target
#df_target has the 29 columns= 27 countries and EU27
df_target = pd.pivot_table(df_selection, values=i, index=['nace_r2'],columns=['geo'], aggfunc=np.sum, fill_value=0)#reorde
df_target
```

Out[11]:

GEO	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	...	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK
nace_r2																					
A	4355.9	2774.3	1903.0	374.7	4084.9	23205	3103.6	573.4	6527.7	33181	...	140.7	1047.7	90.7	12776	11641.7	4178.6	8858.5	6555.5	1029.9	1922.6
C10-C12	6252.5	8511.0	1236.8	362.5	3950.4	46967	4069.4	435.6	5138.6	24411	...	0.0	599.0	147.9	16221	13733.0	4262.8	9383.6	4686.8	631.3	1117.5
C13-C15	1003.1	1379.5	735.1	17.6	1043.6	7547	482.2	191.2	519.0	9054	...	233.1	148.1	14.3	1170	2585.7	4265.9	3141.1	483.2	275.9	711.1
C16	2700.7	946.9	131.6	54.9	1224.0	6924	580.2	573.3	96.0	2003	...	0.0	754.5	0.0	1094	3094.7	1048.6	1145.1	2398.4	291.4	534.9
C17	2210.3	1009.2	175.9	16.1	856.7	11777	380.2	75.7	368.3	3864	...	0.0	38.3	0.0	1957	2921.5	1117.8	321.6	4437.1	184.7	330.4
C18	809.6	897.2	137.9	27.0	591.8	6521	395.5	82.6	301.5	2248	...	0.0	84.8	71.1	1361	1554.9	434.0	587.5	740.4	155.2	198.1
C19	929.2	1299.4	113.1	2.4	40.2	4923	232.0	77.3	966.9	3215	...	0.0	0.9	0.0	1201	2587.6	554.6	2068.5	687.5	1.0	300.2
C20	2985.3	9201.8	392.1	27.2	1764.1	46389	2694.0	126.6	851.7	8979	...	103.5	96.8	11.6	12015	3654.6	824.6	1082.7	0.0	387.0	534.2
C21	2304.3	8250.2	237.0	138.0	688.0	25404	11339.6	12.0	750.8	6476	...	0.0	87.2	54.9	2615	2003.1	604.8	250.4	0.0	1053.3	69.7
C22	2534.0	2253.6	411.5	29.5	3401.7	30159	1119.0	132.3	574.5	6399	...	0.0	78.2	0.0	3048	6495.4	1291.7	1714.8	1694.1	694.9	1314.7
C23	2643.8	2636.8	438.3	123.0	2169.0	18406	1416.8	183.7	804.6	5845	...	0.0	220.8	0.0	2131	4995.4	1537.1	1402.4	1496.9	344.5	613.6
C24	4503.1	3127.1	432.4	22.8	1505.9	23019	388.6	26.2	1220.4	6626	...	0.0	15.6	0.8	2431	2368.4	498.5	1637.5	3370.3	480.4	1082.9
C25	6506.0	3902.7	830.9	108.1	5485.6	58200	2485.4	405.4	967.6	12224	...	0.0	264.7	48.9	7495	9738.1	2520.3	1808.6	5546.8	1339.0	2420.6
C26	3850.9	1425.0	215.0	34.8	3047.1	43350	2509.8	219.9	247.6	1791	...	0.0	112.1	0.0	4532	2042.2	549.5	1020.0	2380.9	295.6	555.9
C27	5780.0	1102.8	446.0	12.4	3629.8	45293	1064.8	203.0	384.1	4705	...	0.0	101.5	21.5	2933	3410.8	647.8	2104.5	2199.0	920.7	1001.9
C28	8968.5	3534.2	586.0	24.4	4113.4	106321	6425.6	157.5	351.2	7267	...	0.0	104.7	0.0	12022	4057.5	924.1	1749.0	8946.8	676.8	1484.2
C29	4536.6	2426.7	244.8	4.8	9888.2	138004	348.7	109.0	48.3	12404	...	0.0	81.2	0.0	2953	6960.0	1782.7	5165.1	10683.5	755.2	3393.2
C30	1321.1	864.4	95.9	1.6	914.5	15212	218.3	24.8	398.6	4745	...	0.0	23.4	0.0	1360	1678.5	202.7	792.1	2188.7	31.4	109.6
C31_C32	2825.3	1342.1	463.2	39.5	1720.7	25454	2557.4	242.6	319.3	4427	...	0.0	152.3	146.7	5229	4992.8	1232.4	1399.1	1763.8	384.9	532.8
C33	2196.7	1884.2	292.7	105.8	1802.6	14988	862.7	211.0	365.6	6093	...	0.0	113.8	86.5	3813	4401.5	860.6	1473.5	1305.2	408.7	625.1
D	5820.2	5167.4	1562.0	218.7	5284.8	59174	3139.6	746.2	4570.9	27161	...	408.5	406.1	0.0	8091	12088.5	4686.8	5035.1	8845.5	892.7	1753.1

GEO	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	...	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK
E36	636.4	1215.8	205.8	30.9	810.3	5814	428.1	87.2	710.8	4712	...	62.8	56.8	0.0	995	1434.7	741.6	493.0	446.6	146.1	271.4
E37-E39	2956.4	2705.4	274.5	116.8	1128.3	27252	1686.1	105.1	1246.2	7397	...	198.4	159.6	0.0	3438	0.0	943.0	1089.3	2226.8	197.5	423.3
F	22336.5	21767.4	2034.6	1090.0	10630.7	148226	14828.7	1522.9	2431.2	64467	...	2952.3	1608.6	453.5	32544	33326.8	7463.8	11271.1	27996.8	2286.9	6441.9
G45	4602.2	6918.7	673.2	186.1	2470.1	48046	3555.0	384.6	1924.2	18066	...	503.8	424.0	87.2	9005	12893.3	2502.1	2905.9	6885.8	645.0	921.2
G46	21743.3	24631.9	3808.3	898.0	10703.9	149611	22571.9	1562.5	10164.4	64656	...	0.0	1713.0	519.4	59488	29352.3	12035.1	6975.0	22433.0	2225.5	3663.6
G47	14782.7	16203.2	2780.3	1053.8	7886.3	104411	8482.3	1025.9	7050.1	57189	...	0.0	1487.8	510.9	26691	35175.9	9021.9	11252.9	14152.0	1984.0	3837.7
H49	9249.9	8563.5	1610.3	190.8	5600.9	50557	4562.2	649.5	2938.6	22867	...	1310.9	968.6	75.3	12254	18999.9	3521.7	8929.5	9828.6	1333.4	2887.8
H50	51.1	904.7	41.5	561.8	12.1	6054	3567.2	135.4	4658.1	741	...	0.0	50.4	0.0	2751	171.3	131.4	386.3	770.5	25.4	12.7
H51	900.6	512.9	84.2	-28.9	133.0	7319	673.3	21.3	646.1	3536	...	0.0	152.2	121.4	3839	0.0	1044.0	202.2	720.0	25.7	29.6
H52	7359.2	10964.4	777.5	609.9	4327.5	52032	3533.4	764.7	2589.3	19995	...	0.0	986.9	395.5	12107	9233.8	3594.7	2380.5	0.0	1001.9	1653.5
H53	1424.8	2111.1	167.8	44.9	674.0	16598	793.6	81.2	509.1	2388	...	0.0	82.8	0.0	2035	0.0	507.9	462.8	0.0	188.8	287.6
I	18063.7	7884.9	1308.8	1390.2	3906.4	48506	4365.0	445.1	10787.1	69260	...	1012.9	508.3	609.6	14729	5758.5	10812.5	4029.1	7483.8	984.7	1327.2
J58	1156.9	1146.1	92.8	288.5	1091.2	14647	2001.2	73.8	342.3	2635	...	172.6	50.0	52.8	2850	1631.8	391.9	733.2	6632.6	95.4	228.4
J59_J60	1248.9	1838.0	371.7	72.7	1065.1	16266	1695.5	98.2	401.4	5238	...	0.0	88.2	26.8	2407	1987.3	645.8	978.7	2172.3	164.7	297.3
J61	3154.1	5132.5	918.7	349.8	2485.3	26606	2489.4	331.1	2759.7	13914	...	1352.6	417.1	0.0	7495	5003.2	2349.2	2526.9	5799.4	455.6	1145.3
J62_J63	7170.1	9293.7	1919.7	521.9	6436.7	88406	5752.0	846.8	1277.3	18234	...	0.0	843.6	0.0	21817	9966.4	2861.4	6647.7	17009.1	829.2	2311.5
L	34076.0	37512.2	5144.6	1713.4	17396.0	320531	27922.8	2200.5	25665.6	126257	...	4700.8	3147.7	705.2	50726	21306.1	22209.8	15363.7	36003.3	2974.8	8256.1
M69_M70	9462.2	32833.8	706.2	1402.1	3386.6	99113	6516.8	468.5	2814.6	23306	...	3991.9	495.3	578.2	36969	12869.6	3869.8	4508.4	11801.1	1016.3	2771.8
M71	4942.6	4587.0	327.1	119.9	2786.4	43476	4720.3	232.1	1247.5	11821	...	662.2	243.7	120.8	10020	4698.3	1456.3	2146.9	0.0	692.3	1298.7
M72	1489.9	1795.3	224.1	21.8	1297.3	25171	3270.5	220.0	655.6	5311	...	0.0	137.0	6.4	2080	2352.5	607.3	1006.4	0.0	449.7	286.0
M73	1615.7	1588.8	228.2	79.1	1192.6	12504	930.2	164.7	420.3	6128	...	0.0	162.1	333.9	3730	3462.9	562.4	919.6	1836.3	177.3	685.4
M74_M75	911.2	1158.3	400.4	62.9	1498.7	15668	1501.0	99.2	162.6	5324	...	0.0	124.5	65.1	3303	2386.0	673.6	1324.8	2730.8	449.5	435.7
N77	4518.8	5567.2	214.8	127.3	1055.4	48757	1745.2	282.9	526.6	8308	...	889.6	222.7	295.9	8973	2243.3	1143.6	591.4	2937.4	104.3	412.7
N78	4365.5	7782.4	122.4	56.3	204.4	30041	2671.7	209.8	262.3	6182	...	0.0	107.1	186.6	23401	3007.2	1653.9	650.7	4861.0	714.2	298.3
N79	556.1	497.0	89.6	70.9	400.6	7737	391.0	51.9	635.8	3132	...	0.0	61.9	52.6	5868	543.7	370.6	352.3	740.7	84.1	203.7
N80-N82	5978.6	7266.5	842.6	184.3	2172.9	71089	3760.3	347.0	1205.5	26552	...	866.4	408.4	298.4	11528	5661.2	3971.1	3564.3	6946.6	402.0	1944.9
P	18375.9	28713.4	1928.2	1182.7	8460.2	138562	16060.1	1078.1	8591.2	57820	...	2283.2	1219.9	594.1	33929	19966.0	10091.4	7364.1	23600.6	2087.2	3101.7
Q86	18204.7	18791.2	1657.6	670.0	7209.0	162148	13209.8	816.5	6053.5	56668	...	1820.5	848.3	478.0	33800	16380.1	8382.3	8590.1	22443.3	1633.7	2595.6
Q87_Q88	5963.2	10277.6	272.0	76.8	1584.8	68987	13701.9	114.6	637.5	16532	...	1524.9	151.8	182.5	29182	3064.9	3170.3	320.7	22731.7	428.4	531.2
R90-R92	2710.8	1700.1	416.9	199.7	1296.6	22624	2673.9	241.9	2192.7	11389	...	201.7	415.1	834.4	4787	2068.8	753.1	3085.9	2771.4	420.1	1624.4
R93	1588.6	1223.5	176.5	105.9	604.5	18218	1147.3	154.1	400.3	12261	...	143.7	122.2	41.8	2925	1277.2	888.7	558.4	2684.9	111.4	268.7
S94	2565.9	2570.6	164.6	83.2	634.2	31376	2287.3	102.8	933.7	10025	...	203.2	85.9	26.9	3731	968.4	739.1	1045.1	3416.5	137.0	203.5
S95	180.8	245.9	64.8	9.9	348.8	1698	295.3	16.3	294.7	1237	...	11.5	24.2	11.4	555	1575.0	207.2	517.5	291.2	39.5	127.7
S96	2386.5	2282.5	276.1	200.9	977.4	34297	1201.8	82.5	965.6	9227	...	233.2	147.1	64.0	3508	3362.9	1423.6	1365.9	2719.4	244.2	518.8
T	171.7	484.1	0.0	172.3	217.1	7347	639.7	13.6	608.1	10138	...	148.2	48.5	12.6	726	586.4	1158.6	0.0	238.4	30.5	42.5

56 rows × 28 columns

In [12]:

```
#We create a sum of the 27 countries and store it in a new column called 'sum'
df_target['sum'] = df_target[cols].sum(axis=1)#sums the columns of the countries to 'sum'
df_target
```

Out[12]:

GEO	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	...	LV	MT	NL	PL	PT	RO	SE	SI	SK	SUM
nace_r2																					
A	4355.9	2774.3	1903.0	374.7	4084.9	23205	3103.6	573.4	6527.7	33181	...	1047.7	90.7	12776	11641.7	4178.6	8858.5	6555.5	1029.9	1922.6	217836.1
C10-C12	6252.5	8511.0	1236.8	362.5	3950.4	46967	4069.4	435.6	5138.6	24411	...	599.0	147.9	16221	13733.0	4262.8	9383.6	4686.8	631.3	1117.5	244044.9
C13-C15	1003.1	1379.5	735.1	17.6	1043.6	7547	482.2	191.2	519.0	9054	...	148.1	14.3	1170	2585.7	4265.9	3141.1	483.2	275.9	711.1	68347.1
C16	2700.7	946.9	131.6	54.9	1224.0	6924	580.2	573.3	96.0	2003	...	754.5	0.0	1094	3094.7	1048.6	1145.1	2398.4	291.4	534.9	36374.5
C17	2210.3	1009.2	175.9	16.1	856.7	11777	380.2	75.7	368.3	3864	...	38.3	0.0	1957	2921.5	1117.8	321.6	4437.1	184.7	330.4	47099.7
C18	809.6	897.2	137.9	27.0	591.8	6521	395.5	82.6	301.5	2248	...	84.8	71.1	1361	1554.9	434.0	587.5	740.4	155.2	198.1	26788.9
C19	929.2	1299.4	113.1	2.4	40.2	4923	232.0	77.3	966.9	3215	...	0.9	0.0	1201	2587.6	554.6	2068.5	687.5	1.0	300.2	25146.0
C20	2985.3	9201.8	392.1	27.2	1764.1	46389	2694.0	126.6	851.7	8979	...	96.8	11.6	12015	3654.6	824.6	1082.7	0.0	387.0	534.2	129056.9
C21	2304.3	8250.2	237.0	138.0	688.0	25404	11339.6	12.0	750.8	6476	...	87.2	54.9	2615	2003.1	604.8	250.4	0.0	1053.3	69.7	87655.5
C22	2534.0	2253.6	411.5	29.5	3401.7	30159	1119.0	132.3	574.5	6399	...	78.2	0.0	3048	6495.4	1291.7	1714.8	1694.1	694.9	1314.7	92486.4
C23	2643.8	2636.8	438.3	123.0	2169.0	18406	1416.8	183.7	804.6	5845	...	220.8	0.0	2131	4995.4	1537.1	1402.4	1496.9	344.5	613.6	69380.7
C24	4503.1	3127.1	432.4	22.8	1505.9	23019	388.6	26.2	1220.4	6626	...	15.6	0.8	2431	2368.4	498.5	1637.5	3370.3	480.4	1082.9	71095.6
C25	6506.0	3902.7	830.9	108.1	5485.6	58200	2485.4	405.4	967.6	12224	...	264.7	48.9	7495	9738.1	2520.3	1808.6	5546.8	1339.0	2420.6	183086.5
C26	3850.9	1425.0	215.0	34.8	3047.1	43350	2509.8	219.9	247.6	1791	...	112.1	0.0	4532	2042.2	549.5	1020.0	2380.9	295.6	555.9	94820.5
C27	5780.0	1102.8	446.0	12.4	3629.8	45293	1064.8	203.0	384.1	4705	...	101.5	21.5	2933	3410.8	647.8	2104.5	2199.0	920.7	1001.9	98176.8
C28	8968.5	3534.2	586.0	24.4	4113.4	106321	6425.6	157.5	351.2	7267	...	104.7	0.0	12022	4057.5	924.1	1749.0	8946.8	676.8	1484.2	226048.4
C29	4536.6	2426.7	244.8	4.8	9888.2	138004	348.7	109.0	48.3	12404	...	81.2	0.0	2953	6960.0	1782.7	5165.1	10683.5	755.2	3393.2	234498.3
C30	1321.1	864.4	95.9	1.6	914.5	15212	218.3	24.8	398.6	4745	...	23.4	0.0	1360	1678.5	202.7	792.1	2188.7	31.4	109.6	58401.0
C31_C32	2825.3	1342.1	463.2	39.5	1720.7	25454	2557.4	242.6	319.3	4427	...	152.3	146.7	5229	4992.8	1232.4	1399.1	1763.8	384.9	532.8	79481.7
C33	2196.7	1884.2	292.7	105.8	1802.6	14988	862.7	211.0	365.6	6093	...	113.8	86.5	3813	4401.5	860.6	1473.5	1305.2	408.7	625.1	76925.1
D	5820.2	5167.4	1562.0	218.7	5284.8	59174	3139.6	746.2	4570.9	27161	...	406.1	0.0	8091	12088.5	4686.8	5035.1	8845.5	892.7	1753.1	227743.3
E36	636.4	1215.8	205.8	30.9	810.3	5814	428.1	87.2	710.8	4712	...	56.8	0.0	995	1434.7	741.6	493.0	446.6	146.1	271.4	29989.2
E37-E39	2956.4	2705.4	274.5	116.8	1128.3	27252	1686.1	105.1	1246.2	7397	...	159.6	0.0	3438	0.0	943.0	1089.3	2226.8	197.5	423.3	79850.1
F	22336.5	21767.4	2034.6	1090.0	10630.7	148226	14828.7	1522.9	2431.2	64467	...	1608.6	453.5	32544	33326.8	7463.8	11271.1	27996.8	2286.9	6441.9	633924.4

GEO	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	...	LV	MT	NL	PL	PT	RO	SE	SI	SK	SUM
G45	4602.2	6918.7	673.2	186.1	2470.1	48046	3555.0	384.6	1924.2	18066	...	424.0	87.2	9005	12893.3	2502.1	2905.9	6885.8	645.0	921.2	180606.4
G46	21743.3	24631.9	3808.3	898.0	10703.9	149611	22571.9	1562.5	10164.4	64656	...	1713.0	519.4	59488	29352.3	12035.1	6975.0	22433.0	2225.5	3663.6	668685.2
G47	14782.7	16203.2	2780.3	1053.8	7886.3	104411	8482.3	1025.9	7050.1	57189	...	1487.8	510.9	26691	35175.9	9021.9	11252.9	14152.0	1984.0	3837.7	520034.5
H49	9249.9	8563.5	1610.3	190.8	5600.9	50557	4562.2	649.5	2938.6	22867	...	968.6	75.3	12254	18999.9	3521.7	8929.5	9828.6	1333.4	2887.8	270998.3
H50	51.1	904.7	41.5	561.8	12.1	6054	3567.2	135.4	4658.1	741	...	50.4	0.0	2751	171.3	131.4	386.3	770.5	25.4	12.7	26938.1
H51	900.6	512.9	84.2	-28.9	133.0	7319	673.3	21.3	646.1	3536	...	152.2	121.4	3839	0.0	1044.0	202.2	720.0	25.7	29.6	30888.8
H52	7359.2	10964.4	777.5	609.9	4327.5	52032	3533.4	764.7	2589.3	19995	...	986.9	395.5	12107	9233.8	3594.7	2380.5	0.0	1001.9	1653.5	207550.6
H53	1424.8	2111.1	167.8	44.9	674.0	16598	793.6	81.2	509.1	2388	...	82.8	0.0	2035	0.0	507.9	462.8	0.0	188.8	287.6	41493.0
I	18063.7	7884.9	1308.8	1390.2	3906.4	48506	4365.0	445.1	10787.1	69260	...	508.3	609.6	14729	5758.5	10812.5	4029.1	7483.8	984.7	1327.2	349495.4
J58	1156.9	1146.1	92.8	288.5	1091.2	14647	2001.2	73.8	342.3	2635	...	50.0	52.8	2850	1631.8	391.9	733.2	6632.6	95.4	228.4	57011.4
J59_J60	1248.9	1838.0	371.7	72.7	1065.1	16266	1695.5	98.2	401.4	5238	...	88.2	26.8	2407	1987.3	645.8	978.7	2172.3	164.7	297.3	57110.4
J61	3154.1	5132.5	918.7	349.8	2485.3	26606	2489.4	331.1	2759.7	13914	...	417.1	0.0	7495	5003.2	2349.2	2526.9	5799.4	455.6	1145.3	135627.8
J62_J63	7170.1	9293.7	1919.7	521.9	6436.7	88406	5752.0	846.8	1277.3	18234	...	843.6	0.0	21817	9966.4	2861.4	6647.7	17009.1	829.2	2311.5	324527.1
L	34076.0	37512.2	5144.6	1713.4	17396.0	320531	27922.8	2200.5	25665.6	126257	...	3147.7	705.2	50726	21306.1	22209.8	15363.7	36003.3	2974.8	8256.1	1308068.7
M69_M70	9462.2	32833.8	706.2	1402.1	3386.6	99113	6516.8	468.5	2814.6	23306	...	495.3	578.2	36969	12869.6	3869.8	4508.4	11801.1	1016.3	2771.8	411237.9
M71	4942.6	4587.0	327.1	119.9	2786.4	43476	4720.3	232.1	1247.5	11821	...	243.7	120.8	10020	4698.3	1456.3	2146.9	0.0	692.3	1298.7	155206.2
M72	1489.9	1795.3	224.1	21.8	1297.3	25171	3270.5	220.0	655.6	5311	...	137.0	6.4	2080	2352.5	607.3	1006.4	0.0	449.7	286.0	103437.9
M73	1615.7	1588.8	228.2	79.1	1192.6	12504	930.2	164.7	420.3	6128	...	162.1	333.9	3730	3462.9	562.4	919.6	1836.3	177.3	685.4	53109.5
M74_M75	911.2	1158.3	400.4	62.9	1498.7	15668	1501.0	99.2	162.6	5324	...	124.5	65.1	3303	2386.0	673.6	1324.8	2730.8	449.5	435.7	62447.9
N77	4518.8	5567.2	214.8	127.3	1055.4	48757	1745.2	282.9	526.6	8308	...	222.7	295.9	8973	2243.3	1143.6	591.4	2937.4	104.3	412.7	151014.2
N78	4365.5	7782.4	122.4	56.3	204.4	30041	2671.7	209.8	262.3	6182	...	107.1	186.6	23401	3007.2	1653.9	650.7	4861.0	714.2	298.3	142703.6
N79	556.1	497.0	89.6	70.9	400.6	7737	391.0	51.9	635.8	3132	...	61.9	52.6	5868	543.7	370.6	352.3	740.7	84.1	203.7	27574.7
N80-N82	5978.6	7266.5	842.6	184.3	2172.9	71089	3760.3	347.0	1205.5	26552	...	408.4	298.4	11528	5661.2	3971.1	3564.3	6946.6	402.0	1944.9	244498.8
P	18375.9	28713.4	1928.2	1182.7	8460.2	138562	16060.1	1078.1	8591.2	57820	...	1219.9	594.1	33929	19966.0	10091.4	7364.1	23600.6	2087.2	3101.7	592398.0
Q86	18204.7	18791.2	1657.6	670.0	7209.0	162148	13209.8	816.5	6053.5	56668	...	848.3	478.0	33800	16380.1	8382.3	8590.1	22443.3	1633.7	2595.6	610988.2
Q87_Q88	5963.2	10277.6	272.0	76.8	1584.8	68987	13701.9	114.6	637.5	16532	...	151.8	182.5	29182	3064.9	3170.3	320.7	22731.7	428.4	531.2	278116.8
R90-R92	2710.8	1700.1	416.9	199.7	1296.6	22624	2673.9	241.9	2192.7	11389	...	415.1	834.4	4787	2068.8	753.1	3085.9	2771.4	420.1	1624.4	93811.5
R93	1588.6	1223.5	176.5	105.9	604.5	18218	1147.3	154.1	400.3	12261	...	122.2	41.8	2925	1277.2	888.7	558.4	2684.9	111.4	268.7	70280.4
S94	2565.9	2570.6	164.6	83.2	634.2	31376	2287.3	102.8	933.7	10025	...	85.9	26.9	3731	968.4	739.1	1045.1	3416.5	137.0	203.5	80204.8
S95	180.8	245.9	64.8	9.9	348.8	1698	295.3	16.3	294.7	1237	...	24.2	11.4	555	1575.0	207.2	517.5	291.2	39.5	127.7	15253.2
S96	2386.5	2282.5	276.1	200.9	977.4	34297	1201.8	82.5	965.6	9227	...	147.1	64.0	3508	3362.9	1423.6	1365.9	2719.4	244.2	518.8	102433.1
T	171.7	484.1	0.0	172.3	217.1	7347	639.7	13.6	608.1	10138	...	48.5	12.6	726	586.4	1158.6	0.0	238.4	30.5	42.5	42988.6

56 rows × 29 columns

In [13]:

```
#once we have added the sum column we are not interested anymore in the individual values of each countries. So we drop these columns

#we have then just 2 columns the EU27 value from the database and the sum value from the sum of the 27 countries individual values

df_target=df_target.drop(cols, axis=1)

df_target
```

Out[13]:

GEO	EU27_2020	SUM
nace_r2		
A	217836.1	217836.1
C10-C12	244293.5	244044.9
C13-C15	68346.8	68347.1
C16	36387.6	36374.5
C17	47095.3	47099.7
C18	26786.9	26788.9
C19	25503.9	25146.0
C20	0.0	129056.9
C21	0.0	87655.5
C22	92658.0	92486.4
C23	69501.6	69380.7
C24	71136.9	71095.6
C25	183256.9	183086.5
C26	0.0	94820.5
C27	98287.3	98176.8
C28	0.0	226048.4
C29	234694.7	234498.3
C30	0.0	58401.0
C31_C32	0.0	79481.7
C33	81350.4	76925.1
D	227833.6	227743.3
E36	30035.5	29989.2
E37-E39	84221.9	79850.1
F	633924.4	633924.4
G45	180621.8	180606.4
G46	671214.9	668685.2
G47	521975.0	520034.5
H49	270955.7	270998.3
H50	27081.4	26938.1
H51	34077.0	30888.8
H52	217903.6	207550.6
H53	44761.4	41493.0
I	349495.3	349495.4
J58	74773.3	57011.4
J59_J60	57884.5	57110.4
J61	135757.0	135627.8
J62_J63	326714.4	324527.1
L	1308068.5	1308068.7
M69_M70	414373.2	411237.9
M71	163067.0	155206.2
M72	109154.2	103437.9
M73	53566.6	53109.5

GEO	EU27_2020	SUM
M74_M75	63045.3	62447.9
N77	150929.2	151014.2
N78	143224.1	142703.6
N79	27673.0	27574.7
N80-N82	244416.1	244498.8
P	592397.9	592398.0
Q86	610988.9	610988.2
Q87_Q88	278117.1	278116.8
R90-R92	93811.4	93811.5
R93	70280.4	70280.4
S94	80204.7	80204.8
S95	15253.0	15253.2
S96	102432.8	102433.1
T	42988.8	42988.6

In [14]:

```
#We use the sum value to cover for the missing data in the EU27_2020 column.

#Then we look for values of 0 in the EU27_2020 column and make the substitution

df_target.loc[df_target['EU27_2020']==0,'EU27_2020'] = df_target['sum']#now we can locate columns with 0 and make the substitution with the column 'sum'

df_target
```

Out[14]:

GEO	EU27_2020	SUM
nace_r2		
A	217836.1	217836.1
C10-C12	244293.5	244044.9
C13-C15	68346.8	68347.1
C16	36387.6	36374.5
C17	47095.3	47099.7
C18	26786.9	26788.9
C19	25503.9	25146.0
C20	129056.9	129056.9
C21	87655.5	87655.5
C22	92658.0	92486.4
C23	69501.6	69380.7
C24	71136.9	71095.6
C25	183256.9	183086.5
C26	94820.5	94820.5
C27	98287.3	98176.8
C28	226048.4	226048.4
C29	234694.7	234498.3
C30	58401.0	58401.0
C31_C32	79481.7	79481.7
C33	81350.4	76925.1
D	227833.6	227743.3
E36	30035.5	29989.2
E37-E39	84221.9	79850.1
F	633924.4	633924.4
G45	180621.8	180606.4
G46	671214.9	668685.2
G47	521975.0	520034.5

GEO	EU27_2020	SUM
H49	270955.7	270998.3
H50	27081.4	26938.1
H51	34077.0	30888.8
H52	217903.6	207550.6
H53	44761.4	41493.0
I	349495.3	349495.4
J58	74773.3	57011.4
J59_J60	57884.5	57110.4
J61	135757.0	135627.8
J62_J63	326714.4	324527.1
L	1308068.5	1308068.7
M69_M70	414373.2	411237.9
M71	163067.0	155206.2
M72	109154.2	103437.9
M73	53566.6	53109.5
M74_M75	63045.3	62447.9
N77	150929.2	151014.2
N78	143224.1	142703.6
N79	27673.0	27574.7
N80-N82	244416.1	244498.8
P	592397.9	592398.0
Q86	610988.9	610988.2
Q87_Q88	278117.1	278116.8
R90-R92	93811.4	93811.5
R93	70280.4	70280.4
S94	80204.7	80204.8
S95	15253.0	15253.2
S96	102432.8	102433.1
T	42988.8	42988.6

In [15]:

```
#we are not interested any more in the sum column then we drop it and call the table moddf_target
moddf_target=df_target.drop('sum', axis=1)#we create a new table
moddf_target
```

Out[15]:

GEO	EU27_2020
nace_r2	
A	217836.1
C10-C12	244293.5
C13-C15	68346.8
C16	36387.6
C17	47095.3
C18	26786.9
C19	25503.9
C20	129056.9
C21	87655.5
C22	92658.0
C23	69501.6
C24	71136.9
C25	183256.9
C26	94820.5

GEO	EU27_2020
C27	98287.3
C28	226048.4
C29	234694.7
C30	58401.0
C31_C32	79481.7
C33	81350.4
D	227833.6
E36	30035.5
E37-E39	84221.9
F	633924.4
G45	180621.8
G46	671214.9
G47	521975.0
H49	270955.7
H50	27081.4
H51	34077.0
H52	217903.6
H53	44761.4
I	349495.3
J58	74773.3
J59_J60	57884.5
J61	135757.0
J62_J63	326714.4
L	1308068.5
M69_M70	414373.2
M71	163067.0
M72	109154.2
M73	53566.6
M74_M75	63045.3
N77	150929.2
N78	143224.1
N79	27673.0
N80-N82	244416.1
P	592397.9
Q86	610988.9
Q87_Q88	278117.1
R90-R92	93811.4
R93	70280.4
S94	80204.7
S95	15253.0
S96	102432.8
T	42988.8

In [16]:

```
#Now we need to desaggregate C31_C2 and N80-N82

# then, we add rows C31,... and assign value with the ratio multiplying by the value of position C31_32

#we take the ratio year form the corresponding column in ratio_Values, in this case column number 2018-2011= 7 which corresponds with the

#the eighth column as the starting column is 0

year_ratio=i-2011

moddf_target.loc['C31'] = ratios_values.iloc[0][year_ratio]*moddf_target.loc['C31_C32','EU27_2020']
```

```
moddf_target.loc['C32'] = ratios_values.iloc[1][year_ratio]*moddf_target.loc['C31_C32','EU27_2020']
moddf_target.loc['N80'] = ratios_values.iloc[2][year_ratio]*moddf_target.loc['N80-N82','EU27_2020']
moddf_target.loc['N81'] = ratios_values.iloc[3][year_ratio]*moddf_target.loc['N80-N82','EU27_2020']
moddf_target.loc['N82'] = ratios_values.iloc[4][year_ratio]*moddf_target.loc['N80-N82','EU27_2020']
moddf_target
```

Out[16]:

GEO	EU27_2020
nace_r2	
A	217836.100000
C10-C12	244293.500000
C13-C15	68346.800000
C16	36387.600000
C17	47095.300000
...	...
C31	30418.922222
C32	49062.777778
N80	35644.455348
N81	116785.953431
N82	91985.691221

61 rows × 1 columns

In [17]:

```
#now we can eliminate rows C31_C32
moddf_target = moddf_target.drop(['C31_C32', 'N80-N82'])
moddf_target
```

Out[17]:

GEO	EU27_2020
nace_r2	
A	2.178361e+05
C10-C12	2.442935e+05
C13-C15	6.834680e+04
C16	3.638760e+04
C17	4.709530e+04
C18	2.678690e+04
C19	2.550390e+04
C20	1.290569e+05
C21	8.765550e+04
C22	9.265800e+04
C23	6.950160e+04
C24	7.113690e+04
C25	1.832569e+05
C26	9.482050e+04
C27	9.828730e+04
C28	2.260484e+05
C29	2.346947e+05
C30	5.840100e+04
C33	8.135040e+04

GEO	EU27_2020
D	2.278336e+05
E36	3.003550e+04
E37-E39	8.422190e+04
F	6.339244e+05
G45	1.806218e+05
G46	6.712149e+05
G47	5.219750e+05
H49	2.709557e+05
H50	2.708140e+04
H51	3.407700e+04
H52	2.179036e+05
H53	4.476140e+04
I	3.494953e+05
J58	7.477330e+04
J59_J60	5.788450e+04
J61	1.357570e+05
J62_J63	3.267144e+05
L	1.308068e+06
M69_M70	4.143732e+05
M71	1.630670e+05
M72	1.091542e+05
M73	5.356660e+04
M74_M75	6.304530e+04
N77	1.509292e+05
N78	1.432241e+05
N79	2.767300e+04
P	5.923979e+05
Q86	6.109889e+05
Q87_Q88	2.781171e+05
R90-R92	9.381140e+04
R93	7.028040e+04
S94	8.020470e+04
S95	1.525300e+04
S96	1.024328e+05
T	4.298880e+04
C31	3.041892e+04
C32	4.906278e+04
N80	3.564446e+04
N81	1.167860e+05
N82	9.198569e+04

In [18]:

```
#this is to set the data to for decimal values
pd.set_option('display.float_format', lambda x: '%.4f' % x)
```

In [19]:

```
#we load the weights provided by Eurostat (still need to modify with the last update from March)
# Here we just read the excel file and store it as weights_target
weights_target = pd.read_excel('ecosystemweights.xlsx')
```

```
#we set the index the column NACE_R2 to use it later as reference to match nace codes
weights_target.set_index('NACE_R2', inplace=True)#nace como índice
weights_target
```

Out[19]:

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM
NACE_R2														
A	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C10-C12	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C13-C15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000
C16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C18	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C25	0.0974	0.0662	0.3052	0.0090	0.0209	0.0196	0.0156	0.0363	0.0516	0.2355	0.0235	0.0442	0.0085	0.0368
C26	0.4400	0.0000	0.0000	0.0000	0.2225	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C27	0.2300	0.0000	0.0000	0.0000	0.0000	0.0000	0.3781	0.0000	0.0000	0.0251	0.0000	0.0000	0.0000	0.0000
C28	0.0679	0.0782	0.1984	0.0126	0.0305	0.1226	0.0160	0.0401	0.0562	0.2776	0.0300	0.0573	0.0100	0.0501
C29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
C30	0.6810	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3190	0.0000	0.0000	0.0000	0.0000
C31	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C32	0.0000	0.0000	0.0000	0.0790	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C33	0.1665	0.1185	0.1554	0.0132	0.0329	0.0153	0.0164	0.0474	0.0686	0.1653	0.0357	0.0647	0.0097	0.0717
D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
E36	0.0174	0.1218	0.1025	0.0247	0.0222	0.0069	0.0113	0.0401	0.1110	0.0582	0.0765	0.0741	0.0129	0.1046
E37-E39	0.0274	0.0948	0.1367	0.0189	0.0278	0.0102	0.0143	0.0862	0.0853	0.0982	0.0537	0.0776	0.0144	0.0712
F	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
G45	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
G46	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
G47	0.0000	0.0000	0.0000	0.0120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1550	1.0000	0.0000	0.0000
H49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5177	0.0000	0.0000	0.0000	0.4452

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM
H50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7772	0.0000	0.0000	0.0000	0.2222
H51	0.0929	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9071
H52	0.1780	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3936	0.0000	0.0000	0.0000	0.0000
H53	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
I	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1400	0.0000	0.0000	1.0000
J58	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
J59_J60	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
J61	0.0690	0.0000	0.0000	0.0000	0.9727	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
J62_J63	0.0000	0.0000	0.0000	0.0040	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0836	0.0000	0.0000	0.0000
M69_M70	0.0250	0.0772	0.1151	0.0277	0.0513	0.0117	0.0097	0.0491	0.0876	0.0862	0.0572	0.1345	0.0115	0.0676
M71	0.0337	0.0602	1.2568	0.1730	0.0442	0.0146	0.0117	0.0368	0.0761	0.0929	0.0442	0.0800	0.0112	0.0549
M72	0.0565	0.0721	0.1041	0.0272	0.0690	0.0507	0.0083	0.0306	0.1422	0.1300	0.0465	0.0814	0.0115	0.0485
M73	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
M74_M75	0.0000	0.0000	0.0000	0.6400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N77	0.0271	0.0821	0.1292	0.0291	0.0517	0.0130	0.0085	0.0313	0.1000	0.0855	0.0612	0.1269	0.0099	0.0828
N78	0.0271	0.0821	0.1292	0.0285	0.0517	0.0130	0.0085	0.0313	0.1000	0.0855	0.0612	0.1269	0.0099	0.0828
N79	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000
N80	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N81	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2800	0.0000	0.0000	0.0000
N82	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1100	0.0000	0.0000	1.0000
P	0.0000	0.0000	0.0000	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Q86	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Q87_Q88	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000
R90-R92	0.0000	0.0000	0.0000	0.8000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6600
R93	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000
S94	0.0000	0.0000	0.0000	0.0200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
S95	0.0000	0.0000	0.0000	0.2600	0.4800	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
S96	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
T	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000

In [20]:

```
#we select the name we are going to give to the columns. In this case only one year
column_name=str(variable_of_interest)+str(year)
column_name
```

Out[20]:

'Value added, gross2018'

In [21]:

```
#we create a copy of the weights table for the calculation
results=weights_target.copy()
#we create a new column in the weights_target table that looks value added of the corresponding nace value in moddf_target
results[variable_of_interest]=results.index.map(moddf_target['EU27_2020'])
results
```

Out[21]:

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
NACE_R2															
A	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	217836.1000
C10-C12	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	244293.5000
C13-C15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	68346.8000
C16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	36387.6000
C17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	47095.3000
C18	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	26786.9000
C19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	25503.9000
C20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	129056.9000

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
C21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	87655.5000
C22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	92658.0000
C23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	69501.6000
C24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	71136.9000
C25	0.0974	0.0662	0.3052	0.0090	0.0209	0.0196	0.0156	0.0363	0.0516	0.2355	0.0235	0.0442	0.0085	0.0368	183256.9000
C26	0.4400	0.0000	0.0000	0.0000	0.2225	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	94820.5000
C27	0.2300	0.0000	0.0000	0.0000	0.0000	0.0000	0.3781	0.0000	0.0000	0.0251	0.0000	0.0000	0.0000	0.0000	98287.3000
C28	0.0679	0.0782	0.1984	0.0126	0.0305	0.1226	0.0160	0.0401	0.0562	0.2776	0.0300	0.0573	0.0100	0.0501	226048.4000
C29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	234694.7000
C30	0.6810	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3190	0.0000	0.0000	0.0000	0.0000	58401.0000
C31	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	30418.9222
C32	0.0000	0.0000	0.0000	0.0790	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	49062.7778
C33	0.1665	0.1185	0.1554	0.0132	0.0329	0.0153	0.0164	0.0474	0.0686	0.1653	0.0357	0.0647	0.0097	0.0717	81350.4000
D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	227833.6000
E36	0.0174	0.1218	0.1025	0.0247	0.0222	0.0069	0.0113	0.0401	0.1110	0.0582	0.0765	0.0741	0.0129	0.1046	30035.5000
E37-E39	0.0274	0.0948	0.1367	0.0189	0.0278	0.0102	0.0143	0.0862	0.0853	0.0982	0.0537	0.0776	0.0144	0.0712	84221.9000
F	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	633924.4000
G45	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	180621.8000
G46	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	671214.9000
G47	0.0000	0.0000	0.0000	0.0120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1550	1.0000	0.0000	0.0000	521975.0000
H49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5177	0.0000	0.0000	0.0000	0.4452	270955.7000
H50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7772	0.0000	0.0000	0.0000	0.2222	27081.4000
H51	0.0929	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9071	34077.0000
H52	0.1780	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3936	0.0000	0.0000	0.0000	0.0000	217903.6000
H53	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	44761.4000
I	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1400	0.0000	0.0000	1.0000	349495.3000
J58	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	74773.3000
J59_J60	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	57884.5000
J61	0.0690	0.0000	0.0000	0.0000	0.9727	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	135757.0000
J62_J63	0.0000	0.0000	0.0000	0.0040	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	326714.4000
L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0836	0.0000	0.0000	0.0000	1308068.5000
M69_M70	0.0250	0.0772	0.1151	0.0277	0.0513	0.0117	0.0097	0.0491	0.0876	0.0862	0.0572	0.1345	0.0115	0.0676	414373.2000
M71	0.0337	0.0602	1.2568	0.1730	0.0442	0.0146	0.0117	0.0368	0.0761	0.0929	0.0442	0.0800	0.0112	0.0549	163067.0000
M72	0.0565	0.0721	0.1041	0.0272	0.0690	0.0507	0.0083	0.0306	0.1422	0.1300	0.0465	0.0814	0.0115	0.0485	109154.2000
M73	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	53566.6000
M74_M75	0.0000	0.0000	0.0000	0.6400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	63045.3000
N77	0.0271	0.0821	0.1292	0.0291	0.0517	0.0130	0.0085	0.0313	0.1000	0.0855	0.0612	0.1269	0.0099	0.0828	150929.2000

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
N78	0.0271	0.0821	0.1292	0.0285	0.0517	0.0130	0.0085	0.0313	0.1000	0.0855	0.0612	0.1269	0.0099	0.0828	143224.1000
N79	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	27673.0000
N80	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	35644.4553
N81	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2800	0.0000	0.0000	0.0000	116785.9534
N82	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1100	0.0000	0.0000	1.0000	91985.6912
P	0.0000	0.0000	0.0000	0.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	592397.9000
Q86	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	610988.9000
Q87_Q88	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	278117.1000
R90-R92	0.0000	0.0000	0.0000	0.8000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6600	93811.4000
R93	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	70280.4000
S94	0.0000	0.0000	0.0000	0.0200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	80204.7000
S95	0.0000	0.0000	0.0000	0.2600	0.4800	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	15253.0000
S96	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	102432.8000
T	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	42988.8000

In [22]:

```
#for the 14 ecosystems we are going to multiply the weights by the variable of interest to get the weighted value
for i in range(0,14):
    #we multiply the total value added by the weight for each nace
    results.iloc[:, i]=weights_target.iloc[:, i]*results[variable_of_interest]
results
```

Out[22]:

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
NACE_R2															
A	0.0000	217836.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	217836.1000
C10-C12	0.0000	244293.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	244293.5000
C13-C15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	68346.8000	0.0000	68346.8000
C16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	36387.6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	36387.6000
C17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	47095.3000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	47095.3000
C18	0.0000	0.0000	0.0000	26786.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	26786.9000
C19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	25503.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	25503.9000
C20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	129056.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	129056.9000
C21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	87655.5000	0.0000	0.0000	0.0000	0.0000	0.0000	87655.5000
C22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	92658.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	92658.0000
C23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	69501.6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	69501.6000
C24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	71136.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	71136.9000
C25	17842.2044	12125.7066	55927.9122	1645.9973	3830.2374	3591.8904	2850.2429	6656.6522	9463.1919	43157.2144	4300.2874	8100.0013	1564.1286	6752.0666	183256.9000
C26	41721.0200	0.0000	0.0000	0.0000	21099.1670	94820.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	94820.5000
C27	22606.0790	0.0000	0.0000	0.0000	0.0000	0.0000	37163.7712	0.0000	0.0000	2465.8956	0.0000	0.0000	0.0000	0.0000	98287.3000
C28	15347.4049	17686.8774	44846.3280	2852.1675	6900.0336	27703.9856	3613.2123	9054.5194	12709.4632	62760.4539	6770.9995	12962.9096	2257.3388	11317.4739	226048.4000
C29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	234694.7000	0.0000	0.0000	0.0000	0.0000	234694.7000
C30	39773.6377	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	18627.4625	0.0000	0.0000	0.0000	0.0000	58401.0000
C31	0.0000	0.0000	30418.9222	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	30418.9222
C32	0.0000	0.0000	0.0000	3875.9594	0.0000	0.0000	0.0000	0.0000	49062.7778	0.0000	0.0000	0.0000	0.0000	0.0000	49062.7778
C33	13541.3023	9639.7797	12640.2784	1074.1925	2674.7273	1245.0354	1334.5429	3853.7788	5583.3551	13444.2197	2900.9003	5261.5294	786.6773	5829.5370	81350.4000
D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	66071.7440	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	227833.6000
E36	523.9420	3658.5940	3078.1220	740.9813	665.9389	206.8664	338.8085	1203.1397	3333.1113	1748.0664	2298.6049	2226.8522	386.1504	3141.3210	30035.5000
E37-E39	2311.2376	7984.3125	11511.5498	1595.2292	2341.7547	857.9776	1205.4763	7262.7884	7182.7499	8266.9337	4522.9104	6532.2538	1210.2345	5995.7639	84221.9000
F	0.0000	0.0000	633924.4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	633924.4000
G45	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	180621.8000	0.0000	0.0000	0.0000	0.0000	180621.8000
G46	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	671214.9000	0.0000	0.0000	671214.9000

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
G47	0.0000	0.0000	0.0000	6263.7000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	80906.1250	521975.0000	0.0000	0.0000	521975.0000
H49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	140285.2804	0.0000	0.0000	0.0000	120635.0637	270955.7000
H50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21048.7412	0.0000	0.0000	0.0000	6018.1678	27081.4000
H51	3164.5916	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	30912.4084	34077.0000
H52	38786.8408	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	85769.4125	0.0000	0.0000	0.0000	0.0000	217903.6000
H53	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	44761.4000	0.0000	0.0000	44761.4000
I	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	48929.3420	0.0000	0.0000	349495.3000	349495.3000
J58	0.0000	0.0000	0.0000	74773.3000	74773.3000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	74773.3000
J59_J60	0.0000	0.0000	0.0000	57884.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	57884.5000
J61	9367.2330	0.0000	0.0000	0.0000	132053.7464	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	135757.0000
J62_J63	0.0000	0.0000	0.0000	1306.8576	326714.4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	326714.4000
L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	109354.5266	0.0000	0.0000	0.0000	1308068.5000
M69_M70	10352.7730	31993.9371	47705.4564	11492.4393	21271.9042	4834.5895	3998.8046	20326.5063	36308.4766	35715.3760	23715.7799	55741.8823	4774.9127	28018.0354	414373.2000
M71	5493.4913	9810.5275	204943.4940	28218.3112	7212.4156	2374.3765	1911.9800	6002.7844	12416.0295	15148.7188	7199.6867	13051.6112	1819.1580	8949.7223	163067.0000
M72	6169.0324	7867.9495	11359.4909	2968.8126	7535.1604	5535.8563	904.4048	3344.7365	15517.9580	14186.9044	5079.6236	8886.0636	1255.8259	5288.8550	109154.2000
M73	0.0000	0.0000	0.0000	53566.6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	53566.6000
M74_M75	0.0000	0.0000	0.0000	40348.9920	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	63045.3000
N77	4097.4858	12390.2957	19498.7483	4384.6465	7798.4354	1968.9182	1278.2512	4722.3471	15086.9652	12904.8523	9241.0191	19156.5576	1493.2410	12491.6023	150929.2000
N78	3888.3047	11757.7576	18503.3160	4074.8710	7400.3168	1868.4028	1212.9951	4481.2661	14316.7592	12246.0455	8769.2550	18178.5944	1417.0094	11853.8924	143224.1000
N79	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	27673.0000	27673.0000
N80	35644.4553	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	35644.4553
N81	0.0000	0.0000	116785.9534	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	32700.0670	0.0000	0.0000	0.0000	116785.9534
N82	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	10118.4260	0.0000	0.0000	91985.6912	91985.6912
P	0.0000	0.0000	0.0000	59239.7900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	592397.9000
Q86	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	610988.9000	0.0000	0.0000	0.0000	0.0000	0.0000	610988.9000
Q87_Q88	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	278117.1000	0.0000	278117.1000	0.0000	0.0000	0.0000	278117.1000
R90-R92	0.0000	0.0000	0.0000	75049.1200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	61915.5240	93811.4000
R93	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	70280.4000	70280.4000

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
S94	0.0000	0.0000	0.0000	1604.0940	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	80204.7000
S95	0.0000	0.0000	0.0000	3965.7800	7321.4400	0.0000	0.0000	0.0000	0.0000	0.0000	15253.0000	0.0000	0.0000	0.0000	15253.0000
S96	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	102432.8000	0.0000	0.0000	0.0000	102432.8000
T	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	42988.8000	0.0000	0.0000	0.0000	42988.8000

In [23]:

```
#we calculate the total (adding all the values for the naces in the same ecosystem)
#we create row call total for this calculation (will appear as the last row)
results.loc['total'] = results.select_dtypes(pd.np.number).sum()
results
```

Out[23]:

NACE_R2	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
A	0.0000	217836.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	217836.1000
C10-C12	0.0000	244293.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	244293.5000
C13-C15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	68346.8000	0.0000	68346.8000
C16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	36387.6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	36387.6000
C17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	47095.3000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	47095.3000
C18	0.0000	0.0000	0.0000	26786.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	26786.9000
C19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	25503.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	25503.9000
C20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	129056.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	129056.9000
C21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	87655.5000	0.0000	0.0000	0.0000	0.0000	0.0000	87655.5000
C22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	92658.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	92658.0000
C23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	69501.6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	69501.6000
C24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	71136.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	71136.9000
C25	17842.2044	12125.7066	55927.9122	1645.9973	3830.2374	3591.8904	2850.2429	6656.6522	9463.1919	43157.2144	4300.2874	8100.0013	1564.1286	6752.0666	183256.9000

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
C26	41721.0200	0.0000	0.0000	0.0000	21099.1670	94820.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	94820.5000
C27	22606.0790	0.0000	0.0000	0.0000	0.0000	0.0000	37163.7712	0.0000	0.0000	2465.8956	0.0000	0.0000	0.0000	0.0000	98287.3000
C28	15347.4049	17686.8774	44846.3280	2852.1675	6900.0336	27703.9856	3613.2123	9054.5194	12709.4632	62760.4539	6770.9995	12962.9096	2257.3388	11317.4739	226048.4000
C29	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	234694.7000	0.0000	0.0000	0.0000	0.0000	234694.7000
C30	39773.6377	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	18627.4625	0.0000	0.0000	0.0000	0.0000	58401.0000
C31	0.0000	0.0000	30418.9222	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	30418.9222
C32	0.0000	0.0000	0.0000	3875.9594	0.0000	0.0000	0.0000	0.0000	49062.7778	0.0000	0.0000	0.0000	0.0000	0.0000	49062.7778
C33	13541.3023	9639.7797	12640.2784	1074.1925	2674.7273	1245.0354	1334.5429	3853.7788	5583.3551	13444.2197	2900.9003	5261.5294	786.6773	5829.5370	81350.4000
D	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	66071.7440	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	227833.6000
E36	523.9420	3658.5940	3078.1220	740.9813	665.9389	206.8664	338.8085	1203.1397	3333.1113	1748.0664	2298.6049	2226.8522	386.1504	3141.3210	30035.5000
E37-E39	2311.2376	7984.3125	11511.5498	1595.2292	2341.7547	857.9776	1205.4763	7262.7884	7182.7499	8266.9337	4522.9104	6532.2538	1210.2345	5995.7639	84221.9000
F	0.0000	0.0000	633924.4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	633924.4000
G45	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	180621.8000	0.0000	0.0000	0.0000	0.0000	180621.8000
G46	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	671214.9000	0.0000	0.0000	671214.9000
G47	0.0000	0.0000	0.0000	6263.7000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	80906.1250	521975.0000	0.0000	0.0000	521975.0000
H49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	140285.2804	0.0000	0.0000	0.0000	120635.0637	270955.7000
H50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21048.7412	0.0000	0.0000	0.0000	6018.1678	27081.4000
H51	3164.5916	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	30912.4084	34077.0000
H52	38786.8408	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	85769.4125	0.0000	0.0000	0.0000	0.0000	217903.6000
H53	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	44761.4000	0.0000	0.0000	44761.4000
I	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	48929.3420	0.0000	0.0000	349495.3000	349495.3000
J58	0.0000	0.0000	0.0000	74773.3000	74773.3000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	74773.3000
J59_J60	0.0000	0.0000	0.0000	57884.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	57884.5000
J61	9367.2330	0.0000	0.0000	0.0000	132053.7464	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	135757.0000
J62_J63	0.0000	0.0000	0.0000	1306.8576	326714.4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	326714.4000
L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	109354.5266	0.0000	0.0000	0.0000	1308068.5000
M69_M70	10352.7730	31993.9371	47705.4564	11492.4393	21271.9042	4834.5895	3998.8046	20326.5063	36308.4766	35715.3760	23715.7799	55741.8823	4774.9127	28018.0354	414373.2000
M71	5493.4913	9810.5275	204943.4940	28218.3112	7212.4156	2374.3765	1911.9800	6002.7844	12416.0295	15148.7188	7199.6867	13051.6112	1819.1580	8949.7223	163067.0000
M72	6169.0324	7867.9495	11359.4909	2968.8126	7535.1604	5535.8563	904.4048	3344.7365	15517.9580	14186.9044	5079.6236	8886.0636	1255.8259	5288.8550	109154.2000
M73	0.0000	0.0000	0.0000	53566.6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	53566.6000
M74_M75	0.0000	0.0000	0.0000	40348.9920	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	63045.3000
N77	4097.4858	12390.2957	19498.7483	4384.6465	7798.4354	1968.9182	1278.2512	4722.3471	15086.9652	12904.8523	9241.0191	19156.5576	1493.2410	12491.6023	150929.2000
N78	3888.3047	11757.7576	18503.3160	4074.8710	7400.3168	1868.4028	1212.9951	4481.2661	14316.7592	12246.0455	8769.2550	18178.5944	1417.0094	11853.8924	143224.1000
N79	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	27673.0000	27673.0000
N80	35644.4553	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	35644.4553

	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM	VALUE ADDED, GROSS
N81	0.0000	0.0000	116785.9534	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	32700.0670	0.0000	0.0000	0.0000	116785.9534
N82	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	10118.4260	0.0000	0.0000	91985.6912	91985.6912
P	0.0000	0.0000	0.0000	59239.7900	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	592397.9000
Q86	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	610988.9000	0.0000	0.0000	0.0000	0.0000	0.0000	610988.9000
Q87_Q88	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	278117.1000	0.0000	278117.1000	0.0000	0.0000	0.0000	278117.1000
R90-R92	0.0000	0.0000	0.0000	75049.1200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	61915.5240	93811.4000
R93	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	70280.4000	70280.4000
S94	0.0000	0.0000	0.0000	1604.0940	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	80204.7000
S95	0.0000	0.0000	0.0000	3965.7800	7321.4400	0.0000	0.0000	0.0000	0.0000	0.0000	15253.0000	0.0000	0.0000	0.0000	15253.0000
S96	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	102432.8000	0.0000	0.0000	0.0000	102432.8000
T	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	42988.8000	0.0000	0.0000	0.0000	42988.8000
total	270631.0360	587045.3377	1211143.9716	463713.2415	629592.9777	145008.3986	121884.2339	538248.7189	1157742.3378	903092.0774	795599.2534	1388049.5556	85311.4767	858553.8247	10625822.8000

In [24]:

```
#create a dataframe to accummulate the totals
results_compiled = pd.DataFrame()
#We copy the total row from the table 'results' to the table 'results compiled' as a new column
results_compiled[column_name]=results.loc['total']
results_compiled = results_compiled.drop(variable_of_interest)
results_compiled
```

Out[24]:

	VALUE ADDED, GROSS2018
Aerospace & Defence	270631.0360
Agri-food	587045.3377
Construction	1211143.9716
Cultural and Creative Industries	463713.2415
Digital	629592.9777
Electronics	145008.3986
Energy - Renewables	121884.2339
Energy Intensive Industries	538248.7189
Health	1157742.3378
Mobility - Transport - Automotive	903092.0774
Proximity, Social Economy and Civil Security	795599.2534
Retail	1388049.5556
Textile	85311.4767
Tourism	858553.8247

This procedure can be done for each year.

Example calculation Gross Value Added from National Accounts for year 2011-2018:

Eurostat-NA-Value Added.html

In [1]:

```
# pandas
import pandas as pd
```

In [2]:

```
import PySimpleGUI as sg
def selection(option):
    #sg.theme('DarkAmber')   # Add a touch of color
    #select the variable we want to calculate
    options = option
```

```
    # All the stuff inside your window.
    layout = [
          [sg.Text('Select one->'), sg.Listbox(options,select_mode=sg.LISTBOX_SELECT_MODE_SINGLE,size=(20,len(options)))],
          [sg.Button('Ok'), sg.Button('Cancel')]
        ]

    # Create the Window
    window = sg.Window('Make your choice', layout)

    # Event Loop to process 'events' and get the 'values' of the input
    while True:
        event, values = window.read()
        print( f'event={event}' )
        if event is None or event == 'Ok' or event == 'Cancel': # if user closes window or clicks cancel
            break

    # close  the window
    window.close()

    if event == 'Cancel':
        print( 'You cancelled' )
    else:
        print('You entered ', values[0])
        sg.popup( f'You selected {values[0]}' )
    return values
```

In [3]:

```
#list of databases NA
datanames = pd.read_excel('datanames.xlsx')
datanames
```

Out[3]:

	DESCRIPTION	DATANAMES
0	National accounts aggregates by industry (up t...	nama_10_a64
1	Gross capital formation by industry (up to NAC...	nama_10_a64_P5
2	National accounts employment data by industry ...	nama_10_a64_e

In [4]:

```
#Put the number of the database
database_selection=0
#change the number to select another database
database_sel= datanames.iloc[database_selection]['datanames']
database_sel
Out[4]:
'nama_10_a64'
```

In [5]:

```
#nama_10_a64 National accounts aggregates by industry (up to NACE A*64)
#NAMA_10_A64_P5 Gross capital formation by industry (up to NACE A*64)
#National accounts employment data by industry (up to NACE A*64)
import eurostat
df = eurostat.get_data_df(database_sel, flags=False)
df
```

Out[5]:

	UNIT	NACE_R2	NA_ITEM	GEO\TIME	2020	2019	2018	2017	2016	2015	...	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975
0	CLV05_MEUR	A	B1G	AL	NaN	1824.9	1813.6	1792.5	1777.6	1742.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
1	CLV05_MEUR	A	B1G	AT	3820.3	3940.9	3945.2	3803.9	3615.5	3536.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	CLV05_MEUR	A	B1G	BE	2541.5	2727.7	2703.1	2997.0	2872.1	3092.1	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	CLV05_MEUR	A	B1G	BG	1498.3	1549.4	1488.4	1518.5	1400.1	1302.8	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	CLV05_MEUR	A	B1G	CH	2744.5	2804.2	3002.4	2766.7	2855.9	2829.3	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
231957	PYP_MNAC	U	P51C	RO	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
231958	PYP_MNAC	U	P51C	SE	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
231959	PYP_MNAC	U	P51C	SI	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
231960	PYP_MNAC	U	P51C	SK	0.0	0.0	0.0	0.0	0.0	0.0	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
231961	PYP_MNAC	U	P51C	UK	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

231962 rows × 50 columns

In [6]:

```
df.columns
```

Out[6]:

```
Index([    'unit',  'nace_r2',  'na_item', 'geo\time',       2020,       2019,
             2018,       2017,       2016,       2015,       2014,       2013,
             2012,       2011,       2010,       2009,       2008,       2007,
             2006,       2005,       2004,       2003,       2002,       2001,
             2000,       1999,       1998,       1997,       1996,       1995,
             1994,       1993,       1992,       1991,       1990,       1989,
             1988,       1987,       1986,       1985,       1984,       1983,
             1982,       1981,       1980,       1979,       1978,       1977,
             1976,       1975],
      dtype='object')
```

In [7]:

```
#eliminate columns for years previous to 2011
years =[]
year_start=1975
year_study=2011
for y in range(year_start,year_study):
    years.append(y)
df=df.drop(years, axis=1)#quitamos todas las columnas de añosque no nos interesan
#rename geo time column to be easier to handle because of the name
df.rename(columns={'geo\\time': 'geo'}, inplace=True)
#We can get the unique values of the different variables
```

In [8]:

```
#list of selected variables variabales


dic_unit = eurostat.get_dic('unit') #dictionary for all the unit in eurostat
#print the units in the database
for u in df.unit.unique():
    if u in dic_unit:
```

```
        print (u + ' -'+dic_unit[u])
#select the unit that we want
unit=selection(df.unit.unique())[0]


print(' ')


dic_item = eurostat.get_dic('na_item') #dictionary for all the unit in eurostat
for item in df.na_item.unique():
    if item in dic_item:
        print (item + ' -'+dic_item[item])
naitem=selection(df.na_item.unique())[0]


print(' ')


#determine the variable of interest based on the selection
for item in naitem:
    if item in dic_item:
        variable_of_interest=dic_item[item]
variable_of_interest
CLV05_MEUR -Chain linked volumes (2005), million euro
CLV05_MNAC -Chain linked volumes (2005), million units of national currency
CLV10_MEUR -Chain linked volumes (2010), million euro
CLV10_MNAC -Chain linked volumes (2010), million units of national currency
CLV15_MEUR -Chain linked volumes (2015), million euro
CLV15_MNAC -Chain linked volumes (2015), million units of national currency
CLV_I10 -Chain linked volumes, index 2010=100
CLV_I15 -Chain linked volumes, index 2015=100
CLV_PCH_PRE -Chain linked volumes, percentage change on previous period
CP_MEUR -Current prices, million euro
CP_MNAC -Current prices, million units of national currency
PC_TOT -Percentage of total
PD10_EUR -Price index (implicit deflator), 2010=100, euro
PD10_NAC -Price index (implicit deflator), 2010=100, national currency
PD15_NAC -Price index (implicit deflator), 2015=100, national currency
PD_PCH_PRE_EUR -Price index (implicit deflator), percentage change on previous period, euro
PD_PCH_PRE_NAC -Price index (implicit deflator), percentage change on previous period, national
currency
```

```
PYP_MEUR -Previous year prices, million euro
PYP_MNAC -Previous year prices, million units of national currency
event=Ok
You entered  ['CP_MEUR']


B1G -Value added, gross
B2A3N -Operating surplus and mixed income, net
D1 -Compensation of employees
D11 -Wages and salaries
D29X39 -Other taxes less other subsidies on production
P1 -Output
P2 -Intermediate consumption
P51C -Consumption of fixed capital
event=Ok
You entered  ['B1G']
```

Out[8]:

```
'Value added, gross'
```

In [9]:

```
nacedrop=['O','K66', 'J', 'H', 'C16-C18','A03', 'O-Q', 'E', 'C31-C33', 'M_N', 'J58-J60', 'R-U', 'G', 'K', 'TOTAL', 'L68A', 'A02', 'C22_C23', 'C29_C30',  'B-E', 'G-I', 'N', 'Q', 'R', 'C24_C25','C', 'M69-M71', 'M73-M75', 'U', 'S', 'B', 'M', 'A01', 'K65','K64']
countries_not_selected= ['UK', 'TR', 'AL','IS','LI','NO','CH','UK','ME','MK','AL','RS','TR','BA','EU28','EU15','EA','EA19','EA12']


#we select the rows that have the right unit, nace codes, items and countries
df_selec-
tion=df[df.unit.isin(unit)&~df.nace_r2.isin(nacedrop)&df.na_item.isin(naitem)&~df.geo.isin(countries_not_selected)]
```

In [10]:

```
#ratios to divide N80_82 and 31_32. Value Added from SBS
ratios_values = pd.read_excel('ratioCN-Value added at factor cost - million euro.xlsx')
ratios_values.set_index('nace_r2', inplace=True)#nace como índice
```

ratios_values

Out[10]:

	VALUE ADDED AT FACTOR COST - MILLION EURO2011	VALUE ADDED AT FACTOR COST - MILLION EURO2012	VALUE ADDED AT FACTOR COST - MILLION EURO2013	VALUE ADDED AT FACTOR COST - MILLION EURO2014	VALUE ADDED AT FACTOR COST - MILLION EURO2015	VALUE ADDED AT FACTOR COST - MILLION EURO2016	VALUE ADDED AT FACTOR COST - MILLION EURO2017	VALUE ADDED AT FACTOR COST - MILLION EURO2018	VALUE ADDED AT FACTOR COST - MILLION EURO2019
nace_r2									
C31	0.398512	0.403322	0.400551	0.398158	0.400751	0.409175	0.388565	0.382716	0.401069
C32	0.601488	0.596678	0.599449	0.601842	0.599249	0.590825	0.611435	0.617284	0.598931
N80	0.165778	0.162820	0.158483	0.152327	0.157963	0.160093	0.155610	0.145835	0.145916
N81	0.462572	0.459438	0.466741	0.463845	0.467105	0.467350	0.469511	0.477816	0.495916
N82	0.371650	0.377742	0.374777	0.383828	0.374932	0.372558	0.374879	0.376349	0.358168

In [11]:

```
weights_target = pd.read_excel('ecosystemweights.xlsx')
weights_target
```

Out[11]:

	NACE_R2	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM
0	A	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
1	C10-C12	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	C13-C15	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000
3	C16	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4	C17	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
5	C18	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
6	C19	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
7	C20	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
8	C21	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000
9	C22	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

	NACE_R2	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM
10	C23	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
11	C24	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
12	C25	0.097362	0.066168	0.305189	0.008982	0.020901	0.019600	0.015553	0.036324	0.051639	0.235501	0.023466	0.044200	0.008535	0.036845
13	C26	0.440000	0.000000	0.000000	0.000000	0.222517	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
14	C27	0.230000	0.000000	0.000000	0.000000	0.000000	0.000000	0.378114	0.000000	0.000000	0.025089	0.000000	0.000000	0.000000	0.000000
15	C28	0.067894	0.078244	0.198393	0.012618	0.030525	0.122558	0.015984	0.040056	0.056225	0.277642	0.029954	0.057346	0.009986	0.050067
16	C29	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000
17	C30	0.681044	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.318958	0.000000	0.000000	0.000000	0.000000
18	C31	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
19	C32	0.000000	0.000000	0.000000	0.079000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000
20	C33	0.166456	0.118497	0.155381	0.013205	0.032879	0.015305	0.016405	0.047373	0.068633	0.165263	0.035659	0.064677	0.009670	0.071660
21	D	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.290000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
22	E36	0.017444	0.121809	0.102483	0.024670	0.022172	0.006887	0.011280	0.040057	0.110972	0.058200	0.076530	0.074141	0.012856	0.104587
23	E37-E39	0.027442	0.094801	0.136681	0.018941	0.027805	0.010187	0.014313	0.086234	0.085284	0.098157	0.053702	0.077560	0.014370	0.071190
24	F	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
25	G45	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000
26	G46	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000
27	G47	0.000000	0.000000	0.000000	0.012000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.155000	1.000000	0.000000	0.000000
28	H49	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.517742	0.000000	0.000000	0.000000	0.445221
29	H50	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.777240	0.000000	0.000000	0.000000	0.222225
30	H51	0.092866	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.907134
31	H52	0.178000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.393612	0.000000	0.000000	0.000000	0.000000
32	H53	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000
33	I	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.140000	0.000000	0.000000	1.000000
34	J58	0.000000	0.000000	0.000000	1.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
35	J59_J60	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
36	J61	0.069000	0.000000	0.000000	0.000000	0.972721	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
37	J62_J63	0.000000	0.000000	0.000000	0.004000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
38	L	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.083600	0.000000	0.000000	0.000000
39	M69_M70	0.024984	0.077210	0.115127	0.027735	0.051335	0.011667	0.009650	0.049054	0.087623	0.086191	0.057233	0.134521	0.011523	0.067615
40	M71	0.033689	0.060163	1.256805	0.173047	0.044230	0.014561	0.011725	0.036812	0.076141	0.092899	0.044152	0.080038	0.011156	0.054884
41	M72	0.056517	0.072081	0.104068	0.027198	0.069032	0.050716	0.008286	0.030642	0.142165	0.129971	0.046536	0.081408	0.011505	0.048453
42	M73	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
43	M74_M75	0.000000	0.000000	0.000000	0.640000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
44	N77	0.027148	0.082093	0.129191	0.029051	0.051669	0.013045	0.008469	0.031288	0.099961	0.085503	0.061228	0.126924	0.009894	0.082765
45	N78	0.027148	0.082093	0.129191	0.028451	0.051669	0.013045	0.008469	0.031288	0.099961	0.085503	0.061228	0.126924	0.009894	0.082765
46	N79	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000

	NACE_R2	AEROSPACE & DEFENCE	AGRI-FOOD	CONSTRUCTION	CULTURAL AND CREATIVE INDUSTRIES	DIGITAL	ELECTRONICS	ENERGY - RENEWABLES	ENERGY INTENSIVE INDUSTRIES	HEALTH	MOBILITY - TRANSPORT - AUTOMOTIVE	PROXIMITY, SOCIAL ECONOMY AND CIVIL SECURITY	RETAIL	TEXTILE	TOURISM
47	N80	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
48	N81	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.280000	0.000000	0.000000	0.000000
49	N82	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.110000	0.000000	0.000000	1.000000
50	P	0.000000	0.000000	0.000000	0.100000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
51	Q86	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000
52	Q87_Q88	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	1.000000	0.000000	0.000000	0.000000
53	R90-R92	0.000000	0.000000	0.000000	0.800000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.660000
54	R93	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000
55	S94	0.000000	0.000000	0.000000	0.020000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
56	S95	0.000000	0.000000	0.000000	0.260000	0.480000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000
57	S96	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000
58	T	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000

In [12]:

```
weights_target.NACE_R2.unique()
```

Out[12]:

```
array(['A', 'C10-C12', 'C13-C15', 'C16', 'C17', 'C18', 'C19', 'C20',
       'C21', 'C22', 'C23', 'C24', 'C25', 'C26', 'C27', 'C28', 'C29',
       'C30', 'C31', 'C32', 'C33', 'D', 'E36', 'E37-E39', 'F', 'G45',
       'G46', 'G47', 'H49', 'H50', 'H51', 'H52', 'H53', 'I', 'J58',
       'J59_J60', 'J61', 'J62_J63', 'L', 'M69_M70', 'M71', 'M72', 'M73',
       'M74_M75', 'N77', 'N78', 'N79', 'N80', 'N81', 'N82', 'P', 'Q86',
       'Q87_Q88', 'R90-R92', 'R93', 'S94', 'S95', 'S96', 'T'],
      dtype=object)
```

In [13]:

```
# columns of countries to be eliminated
cols = ['AT', 'BE', 'BG', 'CY', 'CZ', 'DE', 'DK', 'EE', 'EL', 'ES', 'FI','FR', 'HR', 'HU', 'IE', 'IT', 'LT','LU', 'LV', 'MT','NL', 'PL', 'PT', 'RO', 'SE', 'SI', 'SK']
#create a dataframe for the results
results_compiled = pd.DataFrame()
import numpy as np
#loop to calculate values for years
for j in range (2011,2019):
    year=j
    #we transpose the values for the year selected
    for i in range (year,year+1):
        df_target = pd.pivot_table(df_selection, values=i, index=['nace_r2'],columns=['geo'], aggfunc=np.sum, fill_value=0)#reorde
    df_target['sum'] = df_target[cols].sum(axis=1)#sums the columns of the countries to 'sum'
    df_target=df_target.drop(cols, axis=1)#eliminamos las columnas sumadas de países
    df_target.loc[df_target['EU27_2020']==0,'EU27_2020'] = df_target['sum']#now we can locate columns with 0 and make the substitution with the column 'sum'
    moddf_target=df_target.drop('sum', axis=1)#we create a new table
    #add rows C31,... and assign value with the ratio multiplying by the value of position C31_32
    year_ratio=j-2011
    moddf_target.loc['C31'] = ratios_values.iloc[0][year_ratio]*moddf_target.loc['C31_C32','EU27_2020']
```

```
    moddf_target.loc['C32'] = ratios_values.iloc[1][year_ratio]*moddf_target.loc['C31_C32','EU27_2020']
    moddf_target.loc['N80'] = ratios_values.iloc[2][year_ratio]*moddf_target.loc['N80-N82','EU27_2020']
    moddf_target.loc['N81'] = ratios_values.iloc[3][year_ratio]*moddf_target.loc['N80-N82','EU27_2020']
    moddf_target.loc['N82'] = ratios_values.iloc[4][year_ratio]*moddf_target.loc['N80-N82','EU27_2020']
    #we eliminate rows C31_C32
    moddf_target = moddf_target.drop(['C31_C32', 'N80-N82'])
    pd.set_option('display.float_format', lambda x: '%.4f' % x)
    #cargamos los pesos en el dataframe weight
    weights_target = pd.read_excel('ecosystemweights.xlsx')
    weights_target.set_index('NACE_R2', inplace=True)#nace como índice
    column_name=str(variable_of_interest)+str(year)
    weights_target[variable_of_interest]=weights_target.index.map(moddf_target['EU27_2020'])#busca en df_target el nace y copia el valor de EU27_2020 en la fila del nace the weights_target
    #creamos la matriz de resultados
    results=weights_target
    for i in range(0,14):
        results.iloc[:, i]=weights_target.iloc[:, i]*weights_target[variable_of_interest]#we multiply the total value added by the weight for each nace
    results.loc['total'] = results.select_dtypes(pd.np.number).sum() #we add the values of each colum in a row call total
    results_compiled[column_name]=results.loc['total']
results_compiled = results_compiled.drop(variable_of_interest)
#sum of the totals
results_SMEs = results_compiled.copy()
results_big = results_compiled.copy()
#results_compiled.loc['total'] = results_compiled.select_dtypes(pd.np.number).sum()
results_compiled
```

Out[13]:

	VALUE ADDED, GROSS2011	VALUE ADDED, GROSS2012	VALUE ADDED, GROSS2013	VALUE ADDED, GROSS2014	VALUE ADDED, GROSS2015	VALUE ADDED, GROSS2016	VALUE ADDED, GROSS2017	VALUE ADDED, GROSS2018
Aerospace & Defence	224201.7479	225525.3915	227900.9581	234686.3411	243696.7358	251804.0862	262890.5220	270631.0360
Agri-food	499274.0455	503006.7378	516200.7255	525467.3745	537273.8716	548103.7215	580962.1696	587045.3377
Construction	1028298.8497	1014641.6594	1013675.5151	1031724.9013	1064448.1234	1094390.6866	1152485.3804	1211143.9716
Cultural and Creative Industries	399421.8890	397954.8597	400932.7811	406768.6326	421347.8262	431487.3054	448122.3226	463713.2415
Digital	491854.8398	495053.2520	502334.9854	514759.3317	536662.6557	555952.8256	590881.6920	629592.9777
Electronics	126110.6073	121983.0503	124189.4471	127697.1492	130249.8248	134319.5190	139397.6343	145008.3986
Energy - Renewables	108401.1735	111632.1476	111171.4423	110538.9959	111977.7852	114644.1854	118261.3951	121884.2339
Energy Intensive Industries	463112.1629	454233.6550	452163.6153	466220.0677	495052.4571	510503.6212	530084.8445	538248.7189
Health	966372.4054	984829.6950	1006741.0695	1038478.5140	1042976.3132	1079245.0858	1119344.7779	1157742.3378
Mobility - Transport - Automotive	731428.0239	725414.8335	734157.2101	772188.1728	807492.6232	845391.2120	884438.2321	903092.0774
Proximity, Social Economy and Civil Security	658059.6700	670629.9715	684872.3683	701474.5017	721961.2766	742466.8215	772729.6025	795599.2534
Retail	1145656.2452	1157365.9057	1169164.9001	1197573.6298	1247871.9723	1281874.6415	1344277.6471	1388049.5556
Textile	78641.3433	75084.6334	75925.5350	77821.1032	79427.0812	81126.5422	83785.9198	85311.4767
Tourism	675324.8561	684025.1532	693054.5638	716102.3140	750896.0918	779138.4250	823569.4352	858553.8247

In [14]:

```
#save to file
filename = '%s.xlsx' % variable_of_interest
results_compiled.to_excel(filename)
```

In [15]:

```
#KPI IN PERCENTAGES
#gross value added as % of the gdp
df_gdp = eurostat.get_data_df('nama_10_gdp', flags=False)
df_gdp.columns

#eliminate columns for years previous to 2011
years =[]
year_start=1975
year_study=2011
for y in range(year_start,year_study):
    years.append(y)
years.append(2020)
years.append(2021)
df_gdp=df_gdp.drop(years, axis=1)

df_gdp.rename(columns={'geo\\time': 'geo'}, inplace=True)
geo_gdp=['EU27_2020']
unit_gdp=['CP_MEUR']
item_gdp= ['B1GQ']
year_gdp=[]
for y in range(2011,2019):
    year_gdp.append(y)
df_gdp_selec-
tion=df_gdp[df_gdp.unit.isin(unit_gdp)&df_gdp.na_item.isin(item_gdp)&df_gdp.geo.isin(geo_gdp)]

#drop columns of no interest
df_gdp_selection=df_gdp_selection.drop(['unit','na_item'], axis=1)

#set index in geo
df_gdp_selection.set_index('geo', inplace=True)
```

```
#we need to reorder the columns in ascending order to match the other database
columns_gdp_selection = df_gdp_selection.columns
columns_gdp_selection= columns_gdp_selection.sort_values(ascending=True)
df_gdp_selection = df_gdp_selection.reindex(columns=columns_gdp_selection)
df_gdp_selection
```

Out[15]:

	2011	2012	2013	2014	2015	2016	2017	2018	2019
geo									
EU27_2020	11323915.7000	11391843.7000	11520159.1000	11783874.3000	12214623.9000	12552460.2000	13076041.8000	13531487.7000	14015405.8000

In [16]:

```
#we create a table to store the new values Gross Added Value as % of gdp
value_gdp=results_compiled.copy()

num_col_result=len(results_compiled.columns)

#iteration to calculate the values
for i in range(0,num_col_result):
    value_gdp.iloc[:,i]= results_compiled.iloc[:, i]*100/df_gdp_selection.iloc[0, i]
value_gdp=value_gdp.add_suffix('-percentage gdp')
value_gdp
```

Out[16]:

	VALUE ADDED, GROSS2011-PERCENTAGE GDP	VALUE ADDED, GROSS2012-PERCENTAGE GDP	VALUE ADDED, GROSS2013-PERCENTAGE GDP	VALUE ADDED, GROSS2014-PERCENTAGE GDP	VALUE ADDED, GROSS2015-PERCENTAGE GDP	VALUE ADDED, GROSS2016-PERCENTAGE GDP	VALUE ADDED, GROSS2017-PERCENTAGE GDP	VALUE ADDED, GROSS2018-PERCENTAGE GDP
Aerospace & Defence	1.9799	1.9797	1.9783	1.9916	1.9951	2.0060	2.0105	2.0000
Agri-food	4.4090	4.4155	4.4808	4.4592	4.3986	4.3665	4.4430	4.3384
Construction	9.0808	8.9067	8.7991	8.7554	8.7145	8.7185	8.8137	8.9506

	VALUE ADDED, GROSS2011-PERCENTAGE GDP	VALUE ADDED, GROSS2012-PERCENTAGE GDP	VALUE ADDED, GROSS2013-PERCENTAGE GDP	VALUE ADDED, GROSS2014-PERCENTAGE GDP	VALUE ADDED, GROSS2015-PERCENTAGE GDP	VALUE ADDED, GROSS2016-PERCENTAGE GDP	VALUE ADDED, GROSS2017-PERCENTAGE GDP	VALUE ADDED, GROSS2018-PERCENTAGE GDP
Cultural and Creative Industries	3.5272	3.4933	3.4803	3.4519	3.4495	3.4375	3.4270	3.4269
Digital	4.3435	4.3457	4.3605	4.3683	4.3936	4.4290	4.5188	4.6528
Electronics	1.1137	1.0708	1.0780	1.0837	1.0663	1.0701	1.0661	1.0716
Energy - Renewables	0.9573	0.9799	0.9650	0.9381	0.9168	0.9133	0.9044	0.9007
Energy Intensive Industries	4.0897	3.9874	3.9250	3.9564	4.0529	4.0670	4.0539	3.9777
Health	8.5339	8.6450	8.7390	8.8127	8.5388	8.5979	8.5603	8.5559
Mobility - Transport - Automotive	6.4591	6.3678	6.3728	6.5529	6.6109	6.7349	6.7638	6.6740
Proximity, Social Economy and Civil Security	5.8112	5.8869	5.9450	5.9528	5.9106	5.9149	5.9095	5.8796
Retail	10.1171	10.1596	10.1489	10.1628	10.2162	10.2121	10.2805	10.2579
Textile	0.6945	0.6591	0.6591	0.6604	0.6503	0.6463	0.6408	0.6305
Tourism	5.9637	6.0045	6.0160	6.0770	6.1475	6.2071	6.2983	6.3449

In [17]:

```
#save to file
filename = '%s.xlsx' % (variable_of_interest+str('-percentage over GDP'))
value_gdp.to_excel(filename)
```

In [18]:

```
#KPI IN PERCENTAGES

#create the new table and drop the first column
percent_change=results_compiled.copy()
percent_change=percent_change.drop(results_compiled.columns[0], axis=1)

#calculate the new number of columns
num_col_percent=len(percent_change.columns)

#iteration to calculate the values
for i in range(0,num_col_percent):
    percent_change.iloc[:,i]= (results_compiled.iloc[:, i+1]-results_compiled.iloc[:, i])*100/results_compiled.iloc[:, i]
percent_change=percent_change.add_suffix('-percentage change')
percent_change
```

Out[18]:

	VALUE ADDED, GROSS2012-PERCENTAGE CHANGE	VALUE ADDED, GROSS2013-PERCENTAGE CHANGE	VALUE ADDED, GROSS2014-PERCENTAGE CHANGE	VALUE ADDED, GROSS2015-PERCENTAGE CHANGE	VALUE ADDED, GROSS2016-PERCENTAGE CHANGE	VALUE ADDED, GROSS2017-PERCENTAGE CHANGE	VALUE ADDED, GROSS2018-PERCENTAGE CHANGE
Aerospace & Defence	0.5904	1.0533	2.9773	3.8393	3.3268	4.4028	2.9444
Agri-food	0.7476	2.6230	1.7952	2.2469	2.0157	5.9949	1.0471
Construction	-1.3281	-0.0952	1.7806	3.1717	2.8130	5.3084	5.0897
Cultural and Creative Industries	-0.3673	0.7483	1.4556	3.5841	2.4064	3.8553	3.4792

	VALUE ADDED, GROSS2012-PERCENTAGE CHANGE	VALUE ADDED, GROSS2013-PERCENTAGE CHANGE	VALUE ADDED, GROSS2014-PERCENTAGE CHANGE	VALUE ADDED, GROSS2015-PERCENTAGE CHANGE	VALUE ADDED, GROSS2016-PERCENTAGE CHANGE	VALUE ADDED, GROSS2017-PERCENTAGE CHANGE	VALUE ADDED, GROSS2018-PERCENTAGE CHANGE
Digital	0.6503	1.4709	2.4733	4.2551	3.5945	6.2827	6.5514
Electronics	-3.2730	1.8088	2.8245	1.9990	3.1245	3.7806	4.0250
Energy - Renew-ables	2.9806	-0.4127	-0.5689	1.3016	2.3812	3.1552	3.0634
Energy Intensive Industries	-1.9171	-0.4557	3.1087	6.1843	3.1211	3.8357	1.5401
Health	1.9100	2.2249	3.1525	0.4331	3.4774	3.7155	3.4304
Mobility - Transport - Au-tomotive	-0.8221	1.2052	5.1802	4.5720	4.6934	4.6188	2.1091
Proximity, Social Economy and Civil Security	1.9102	2.1237	2.4241	2.9205	2.8403	4.0760	2.9596
Retail	1.0221	1.0195	2.4298	4.2000	2.7249	4.8681	3.2562
Textile	-4.5227	1.1199	2.4966	2.0637	2.1396	3.2781	1.8208
Tourism	1.2883	1.3200	3.3255	4.8588	3.7612	5.7026	4.2479

In [19]:

```
#save to file
filename = '%s.xlsx' % (variable_of_interest+str('-percentage change'))
percent_change.to_excel(filename)
```

In [26]:

```
#          KPI PRODUCTIVITY
#retrieve the data for ecosystems employment
```

```
employment = pd.read_excel('Total employment domestic concept.xlsx', index_col=0)
employment
```

Out[26]:

	TOTAL EMPLOYMENT DOMESTIC CONCEPT2011	TOTAL EMPLOYMENT DOMESTIC CONCEPT2012	TOTAL EMPLOYMENT DOMESTIC CONCEPT2013	TOTAL EMPLOYMENT DOMESTIC CONCEPT2014	TOTAL EMPLOYMENT DOMESTIC CONCEPT2015	TOTAL EMPLOYMENT DOMESTIC CONCEPT2016	TOTAL EMPLOYMENT DOMESTIC CONCEPT2017	TOTAL EMPLOYMENT DOMESTIC CONCEPT2018
Aerospace & Defence	4081.6456	4099.4458	4078.3502	4088.4369	4118.7552	4232.3492	4282.0791	4355.0176
Agri-food	17314.3133	17203.4609	16917.2597	16874.0319	16636.5509	16335.1493	16440.2099	16320.1869
Construction	24628.0901	24186.3431	23809.3940	23935.0905	24094.0251	24470.2145	24937.6483	25616.2907
Cultural and Creative Industries	7857.4820	7823.2776	7801.0090	7875.9829	7880.3530	7987.5126	8060.1148	8156.2969
Digital	5722.7534	5813.4841	5871.8215	5978.6454	6124.1659	6285.3453	6503.7804	6757.1268
Electronics	1682.3470	1694.2104	1676.8236	1679.2396	1677.6495	1705.1736	1739.6239	1782.3590
Energy - Renewables	1132.7165	1129.3833	1124.3260	1137.4412	1132.6540	1151.0824	1154.0645	1175.1838
Energy Intensive Industries	7600.0628	7489.4107	7367.8741	7358.6286	7375.1454	7475.8787	7630.4530	7760.8481
Health	22262.5570	22455.8293	22728.4628	23113.9563	23514.3935	24030.3220	24490.4620	24917.2995
Mobility - Transport - Automotive	12883.2705	12895.9675	12882.0762	13062.4338	13282.2094	13610.3702	13967.1234	14314.4188
Proximity, Social Economy and Civil Security	21108.3233	21273.6378	21410.8421	21705.6344	22061.2457	22465.8981	22822.8987	23184.0119
Retail	28901.6131	28830.5638	28515.3873	28698.2054	28978.6544	29235.0180	29553.4616	29755.0784
Textile	2578.8488	2526.7869	2445.1367	2443.4498	2403.2601	2389.8322	2405.5338	2387.5233
Tourism	17568.5536	17680.8925	17804.7057	18285.1914	18758.5229	19358.1607	19972.6488	20470.0511

In [27]:

```
#we create a table to store the new values Gross Added Value as % of gdp
productivity=results_compiled.copy()
num_col_result=len(results_compiled.columns)
#iteration to calculate the values
for i in range(0,num_col_result):
    productivity.iloc[:,i]= results_compiled.iloc[:, i]/employment.iloc[:, i]
productivity=productivity.add_suffix('-productivity')
productivity
```

Out[27]:

	VALUE ADDED, GROSS2011-PRODUCTIVITY	VALUE ADDED, GROSS2012-PRODUCTIVITY	VALUE ADDED, GROSS2013-PRODUCTIVITY	VALUE ADDED, GROSS2014-PRODUCTIVITY	VALUE ADDED, GROSS2015-PRODUCTIVITY	VALUE ADDED, GROSS2016-PRODUCTIVITY	VALUE ADDED, GROSS2017-PRODUCTIVITY	VALUE ADDED, GROSS2018-PRODUCTIVITY
Aerospace & Defence	54.9293	55.0136	55.8807	57.4025	59.1676	59.4951	61.3932	62.1424
Agri-food	28.8359	29.2387	30.5133	31.1406	32.2948	33.5536	35.3379	35.9705
Construction	41.7531	41.9510	42.5746	43.1051	44.1789	44.7234	46.2147	47.2802
Cultural and Creative Industries	50.8333	50.8680	51.3950	51.6467	53.4681	54.0202	55.5975	56.8534
Digital	85.9472	85.1560	85.5501	86.0997	87.6303	88.4522	90.8520	93.1747
Electronics	74.9611	71.9999	74.0623	76.0446	77.6383	78.7718	80.1309	81.3576
Energy - Renewables	95.7002	98.8435	98.8783	97.1822	98.8632	99.5969	102.4738	103.7150
Energy Intensive Industries	60.9353	60.6501	61.3696	63.3569	67.1244	68.2868	69.4696	69.3544
Health	43.4080	43.8563	44.2943	44.9286	44.3548	44.9118	45.7053	46.4634

	VALUE ADDED, GROSS2011-PRODUCTIVITY	VALUE ADDED, GROSS2012-PRODUCTIVITY	VALUE ADDED, GROSS2013-PRODUCTIVITY	VALUE ADDED, GROSS2014-PRODUCTIVITY	VALUE ADDED, GROSS2015-PRODUCTIVITY	VALUE ADDED, GROSS2016-PRODUCTIVITY	VALUE ADDED, GROSS2017-PRODUCTIVITY	VALUE ADDED, GROSS2018-PRODUCTIVITY
Mobility - Transport - Automotive	56.7735	56.2513	56.9906	59.1152	60.7951	62.1138	63.3229	63.0897
Proximity, Social Economy and Civil Security	31.1754	31.5240	31.9872	32.3176	32.7253	33.0486	33.8576	34.3167
Retail	39.6399	40.1437	41.0012	41.7299	43.0618	43.8472	45.4863	46.6492
Textile	30.4947	29.7155	31.0517	31.8489	33.0497	33.9465	34.8305	35.7322
Tourism	38.4394	38.6873	38.9254	39.1630	40.0296	40.2486	41.2349	41.9419

In [23]:

```
#save to file
filename = '%s.xlsx' % (variable_of_interest+str('-productivity'))
productivity.to_excel(filename)
```

ANNEX 5 CALCULATION OF ALTERNATIVE MEASURES

Example: Gross Value Added / GDP

1. Load GDP information from Eurostat database ([nama_10_gdp])
2. Select years of interest (e.g. 2011-2019)
3. Select the variable, unit and geopolitical entity from the database
   e.g. geo_gdp=['EU27_2020'], unit_gdp=['CP_MEUR'], item_gdp= ['B1GQ']
4. Filter the database to the variable, unit and geopolitical entity
5. Get GDP absolute values for each year
6. Load this values
7. Divide each Value Added Value for a certain Ecosystem by the total GDP to obtain the Value Added as a percentage of the GDP

	VALUE ADDED, GROSS2011- PERCENTAGE GDP	VALUE ADDED, GROSS2012- PERCENTAGE GDP	VALUE ADDED, GROSS2013- PERCENTAGE GDP	VALUE ADDED, GROSS2014- PERCENTAGE GDP	VALUE ADDED, GROSS2015- PERCENTAGE GDP	VALUE ADDED, GROSS2016- PERCENTAGE GDP	VALUE ADDED, GROSS2017- PERCENTAGE GDP	VALUE ADDED, GROSS2018- PERCENTAGE GDP
Aerospace & Defence	1.9799	1.9797	1.9783	1.9916	1.9951	2.0060	2.0105	2.0000
Agri-food	4.4090	4.4155	4.4808	4.4592	4.3986	4.3665	4.4430	4.3384
Construction	9.0808	8.9067	8.7991	8.7554	8.7145	8.7185	8.8137	8.9506
Cultural and Creative Industries	3.5272	3.4933	3.4803	3.4519	3.4495	3.4375	3.4270	3.4269
Digital	4.3435	4.3457	4.3605	4.3683	4.3936	4.4290	4.5188	4.6528
Electronics	1.1137	1.0708	1.0780	1.0837	1.0663	1.0701	1.0661	1.0716
Energy - Renewables	0.9573	0.9799	0.9650	0.9381	0.9168	0.9133	0.9044	0.9007
Energy Intensive Industries	4.0897	3.9874	3.9250	3.9564	4.0529	4.0670	4.0539	3.9777
Health	8.5339	8.6450	8.7390	8.8127	8.5388	8.5979	8.5603	8.5559
Mobility - Transport - Automotive	6.4591	6.3678	6.3728	6.5529	6.6109	6.7349	6.7638	6.6740
Proximity, Social Economy and Civil Security	5.8112	5.8869	5.9450	5.9528	5.9106	5.9149	5.9095	5.8796
Retail	10.1171	10.1596	10.1489	10.1628	10.2162	10.2121	10.2805	10.2579
Textile	0.6945	0.6591	0.6591	0.6604	0.6503	0.6463	0.6408	0.6305
Tourism	5.9637	6.0045	6.0160	6.0770	6.1475	6.2071	6.2983	

Example: Gross Value Added percentage change

1.- % change Gross Value Added t1= (Gross Value Added t1- Gross Value Added t0)*100/Gross Value Added t0

	VALUE ADDED, GROSS2012-PERCENTAGE CHANGE	VALUE ADDED, GROSS2013-PERCENTAGE CHANGE	VALUE ADDED, GROSS2014-PERCENTAGE CHANGE	VALUE ADDED, GROSS2015-PERCENTAGE CHANGE	VALUE ADDED, GROSS2016-PERCENTAGE CHANGE	VALUE ADDED, GROSS2017-PERCENTAGE CHANGE	VALUE ADDED, GROSS2018-PERCENTAGE CHANGE
Aero-space & Defence	0.5904	1.0533	2.9773	3.8393	3.3268	4.4028	2.9444
Agri-food	0.7476	2.6230	1.7952	2.2469	2.0157	5.9949	1.0471
Con-struction	-1.3281	-0.0952	1.7806	3.1717	2.8130	5.3084	5.0897
Cultural and Cre-ative Indus-tries	-0.3673	0.7483	1.4556	3.5841	2.4064	3.8553	3.4792
Digital	0.6503	1.4709	2.4733	4.2551	3.5945	6.2827	6.5514
Electron-ics	-3.2730	1.8088	2.8245	1.9990	3.1245	3.7806	4.0250
Energy - Renewa-bles	2.9806	-0.4127	-0.5689	1.3016	2.3812	3.1552	3.0634
Energy Intensive Indus-tries	-1.9171	-0.4557	3.1087	6.1843	3.1211	3.8357	1.5401
Health	1.9100	2.2249	3.1525	0.4331	3.4774	3.7155	3.4304
Mobility - Transport - Auto-motive	-0.8221	1.2052	5.1802	4.5720	4.6934	4.6188	2.1091
Proxim-ity, Social Economy and Civil Security	1.9102	2.1237	2.4241	2.9205	2.8403	4.0760	2.9596
Retail	1.0221	1.0195	2.4298	4.2000	2.7249	4.8681	3.2562
Textile	-4.5227	1.1199	2.4966	2.0637	2.1396	3.2781	1.8208
Tourism	1.2883	1.3200	3.3255	4.8588	3.7612	5.7026	4.2479

Example: Productivity measured as Gross Value Added (National Accounts)/Total employment domestic concept

1.- Extract Total employment domestic concept (from National Accounts with same procedure as done to get Gross Value Added per ecosystem

See: Eurostat-NA-employment.html

	TOTAL EMPLOYMENT DOMESTIC CONCEPT2011	TOTAL EMPLOYMENT DOMESTIC CONCEPT2012	TOTAL EMPLOYMENT DOMESTIC CONCEPT2013	TOTAL EMPLOYMENT DOMESTIC CONCEPT2014	TOTAL EMPLOYMENT DOMESTIC CONCEPT2015	TOTAL EMPLOYMENT DOMESTIC CONCEPT2016	TOTAL EMPLOYMENT DOMESTIC CONCEPT2017	TOTAL EMPLOYMENT DOMESTIC CONCEPT2018
Aero-space & Defence	4081.6456	4099.4458	4078.3502	4088.4369	4118.7552	4232.3492	4282.0791	4355.0176
Agri-food	17314.3133	17203.4609	16917.2597	16874.0319	16636.5509	16335.1493	16440.2099	16320.1869
Con-struction	24628.0901	24186.3431	23809.3940	23935.0905	24094.0251	24470.2145	24937.6483	25616.2907
Cultural and Cre-ative Indus-tries	7857.4820	7823.2776	7801.0090	7875.9829	7880.3530	7987.5126	8060.1148	8156.2969
Digital	5722.7534	5813.4841	5871.8215	5978.6454	6124.1659	6285.3453	6503.7804	6757.1268
Electron-ics	1682.3470	1694.2104	1676.8236	1679.2396	1677.6495	1705.1736	1739.6239	1782.3590
Energy - Renewa-bles	1132.7165	1129.3833	1124.3260	1137.4412	1132.6540	1151.0824	1154.0645	1175.1838
Energy Intensive Indus-tries	7600.0628	7489.4107	7367.8741	7358.6286	7375.1454	7475.8787	7630.4530	7760.8481
Health	22262.5570	22455.8293	22728.4628	23113.9563	23514.3935	24030.3220	24490.4620	24917.2995
Mobility - Transport - Auto-motive	12883.2705	12895.9675	12882.0762	13062.4338	13282.2094	13610.3702	13967.1234	14314.4188
Proxim-ity, Social Economy and Civil Security	21108.3233	21273.6378	21410.8421	21705.6344	22061.2457	22465.8981	22822.8987	23184.0119
Retail	28901.6131	28830.5638	28515.3873	28698.2054	28978.6544	29235.0180	29553.4616	29755.0784
Textile	2578.8488	2526.7869	2445.1367	2443.4498	2403.2601	2389.8322	2405.5338	2387.5233
Tourism	17568.5536	17680.8925	17804.7057	18285.1914	18758.5229	19358.1607	19972.6488	20470.0511

2.- Productivity ti= Gross Value Added ti/ Total employment ti

	VALUE ADDED, GROSS2011-PRODUCTIVITY	VALUE ADDED, GROSS2012-PRODUCTIVITY	VALUE ADDED, GROSS2013-PRODUCTIVITY	VALUE ADDED, GROSS2014-PRODUCTIVITY	VALUE ADDED, GROSS2015-PRODUCTIVITY	VALUE ADDED, GROSS2016-PRODUCTIVITY	VALUE ADDED, GROSS2017-PRODUCTIVITY	VALUE ADDED, GROSS2018-PRODUCTIVITY
Aero-space & Defence	54.9293	55.0136	55.8807	57.4025	59.1676	59.4951	61.3932	62.1424
Agri-food	28.8359	29.2387	30.5133	31.1406	32.2948	33.5536	35.3379	35.9705
Con-struction	41.7531	41.9510	42.5746	43.1051	44.1789	44.7234	46.2147	47.2802
Cultural and Cre-ative Indus-tries	50.8333	50.8680	51.3950	51.6467	53.4681	54.0202	55.5975	56.8534
Digital	85.9472	85.1560	85.5501	86.0997	87.6303	88.4522	90.8520	93.1747
Electron-ics	74.9611	71.9999	74.0623	76.0446	77.6383	78.7718	80.1309	81.3576
Energy - Renewa-bles	95.7002	98.8435	98.8783	97.1822	98.8632	99.5969	102.4738	103.7150
Energy Intensive Indus-tries	60.9353	60.6501	61.3696	63.3569	67.1244	68.2868	69.4696	69.3544
Health	43.4080	43.8563	44.2943	44.9286	44.3548	44.9118	45.7053	46.4634
Mobility - Transport - Auto-motive	56.7735	56.2513	56.9906	59.1152	60.7951	62.1138	63.3229	63.0897
Proxim-ity, Social Economy and Civil Security	31.1754	31.5240	31.9872	32.3176	32.7253	33.0486	33.8576	34.3167
Retail	39.6399	40.1437	41.0012	41.7299	43.0618	43.8472	45.4863	46.6492
Textile	30.4947	29.7155	31.0517	31.8489	33.0497	33.9465	34.8305	35.7322
Tourism	38.4394	38.6873	38.9254	39.1630	40.0296	40.2486	41.2349	41.9419

ANNEX 6 USE OF SBS DATA

Missing NACE code	Ecosystem affected
A	Agri-food
P85	Cultural and Creative Industries
Q86	Health
Q87_Q88	Health; Proximity, Social Economy and Civil Security
R90-R92	Cultural and Creative Industries; Tourism
R93	Tourism
S94	Cultural and Creative Industries
T	Proximity, Social Economy and Civil Security

The following Ecosystems have NACE codes that do not fall within the SBS data collection: 'Agri-food', 'Cultural and Creative Industries', 'Health', 'Proximity, Social Economy and Civil Security ', 'Tourism'

Therefore, SBS data use for kpi production like 'size class: big and SME disaggregation of the data' will only cover (fully) nine ecosystems.

Disaggregation for Big and SMEs.

National Accounts lack of disaggregation for Big and SMEs. This requires to go to alternative data (e.g. SBS data) to get an approximation to distribute the results between big and small enterprises.

SBS data includes data on ['0-9'], ['10-19'], ['20-49'], ['50-249'], ['GE250'], ['TOTAL'] groups for certain variables of interest (e.g. Value Added at Factor Cost, Number of employees,....)

However SBS lacks on information for certain NACE codes as indicated (e.g. A, P,Q86,...). Additionally, SBS data has missing data for some EU27 aggregates:

- Detailed data by size class is only available for the nine ecosystems fully covered by SBS, five out of the defined fourteen industrial ecosystems are composed by NACE codes that do not all fall within the SBS data collection ('Agri-food', 'Cultural and Creative Industries', 'Health', 'Proximity, Social Economy and Civil Security ' and 'Tourism'). Then, using incomplete data it is assumed that the size distribution in those ecosystems is equal to the size distribution of the ecosystems without the missing NACE codes (This estimation introduces some error in the calculations).
- Using similar procedure as before (e.g. filtering for year, when Eu27 is missing then calculate the corresponding estimate for the total value as the sum of the 27 country values) the ratio values for the variable of interest for each size group can be calculated. The results have some inconsistencies because the EU27 missing values have been calculated as a sum of the country values for each group. Then total values are not exactly the sum of each of the size groups, therefore the sum of the ratios is not equal to 1 (very close but not equal). Assuming this small discrepancy [GE250] ratio can be used as a reference to calculate big companies values and [1 - GE250 ratio] as the ratio for SMEs. These ratios for Big and SMEs can be used to allocate and follow the values of the variables of interest in each ecosystem for SMEs and big companies.

These ratios can be calculated for any SBS related data (e.g. value added at factor cost, number of employees, etc) and can be used to distribute the corresponding National Accounts indicators. However, to distribute the values of other non-related indicators (for example, GHG emissions in Tons) into SMEs and Big companies, SBS lack of representative indicators to make the distribution between SMEs and Big companies. Then, SMEs and Big Companies distribution needs to be estimated (for example, using

value added ratio between SMEs and Big companies based on SBS data assumes value added is proportional to emissions), introducing more error in the calculation.

Example of the calculation of ratios for value added and employees

Ratios for Value Added

File: Eurostat-sbs-sizegroups.html

Result: ratioSMEs- Value added at factor cost - million euro.xlsx

Ratios for Employment

File: Eurostat-sbs-sizegroups-employment.html

Result: ratioSME-Persons employed - number.xlsx

Note that it is assumed that SMEs and Big Companies ratio is based on the available NACE codes data from SBS for the five Ecosystems that are incomplete in SBS database.

It is also assumed a small error in the calculation of EU_27 missing data and therefore in the ratio of SMEs and Big Companies.

The values for kpi value added for SME y Big companies can be calculated. And similarly, the corresponding for employment and the KPIs derived from that information (%value added/gdp, %change of value added, productivity,...)

Example calculation: Eurostat-NA-sizegroups.html

General table

	VALUE ADDED, GROSS2011	VALUE ADDED, GROSS2012	VALUE ADDED, GROSS2013	VALUE ADDED, GROSS2014	VALUE ADDED, GROSS2015	VALUE ADDED, GROSS2016	VALUE ADDED, GROSS2017	VALUE ADDED, GROSS2018
Aerospace & Defence	2.242017e+05	2.255254e+05	2.279010e+05	2.346863e+05	2.436967e+05	2.518041e+05	2.628905e+05	2.706310e+05
Agri-food	4.992740e+05	5.030067e+05	5.162007e+05	5.254674e+05	5.372739e+05	5.481037e+05	5.809622e+05	5.870453e+05
Construction	1.028299e+06	1.014642e+06	1.013676e+06	1.031725e+06	1.064448e+06	1.094391e+06	1.152485e+06	1.211144e+06
Cultural and Creative Industries	3.994219e+05	3.979549e+05	4.009328e+05	4.067686e+05	4.213478e+05	4.314873e+05	4.481223e+05	4.637132e+05
Digital	4.918548e+05	4.950533e+05	5.023350e+05	5.147593e+05	5.366627e+05	5.559528e+05	5.908817e+05	6.295930e+05
Electronics	1.261106e+05	1.219831e+05	1.241894e+05	1.276971e+05	1.302498e+05	1.343195e+05	1.393976e+05	1.450084e+05
Energy - Renewables	1.084012e+05	1.116321e+05	1.111714e+05	1.105390e+05	1.119778e+05	1.146442e+05	1.182614e+05	1.218842e+05
Energy Intensive Industries	4.631122e+05	4.542337e+05	4.521636e+05	4.662201e+05	4.950525e+05	5.105036e+05	5.300848e+05	5.382487e+05
Health	9.663724e+05	9.848297e+05	1.006741e+06	1.038479e+06	1.042976e+06	1.079245e+06	1.119345e+06	1.157742e+06
Mobility - Transport - Automotive	7.314280e+05	7.254148e+05	7.341572e+05	7.721882e+05	8.074926e+05	8.453912e+05	8.844382e+05	9.030921e+05
Proximity, Social Economy and Civil Security	6.580597e+05	6.706300e+05	6.848724e+05	7.014745e+05	7.219613e+05	7.424668e+05	7.727296e+05	7.955993e+05
Retail	1.145656e+06	1.157366e+06	1.169165e+06	1.197574e+06	1.247872e+06	1.281875e+06	1.344278e+06	1.388050e+06
Textile	7.864134e+04	7.508463e+04	7.592553e+04	7.782110e+04	7.942708e+04	8.112654e+04	8.378592e+04	8.531148e+04
Tourism	6.753249e+05	6.840252e+05	6.930546e+05	7.161023e+05	7.508961e+05	7.791384e+05	8.235694e+05	8.585538e+05

Ratio Big firms

	VALUE ADDED AT FACTOR COST - MILLION EURO2011['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2012['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2013['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2014['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2015['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2016['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2017['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2018['GE250']
Aerospace & Defence	0.573292	0.570459	0.577044	0.576128	0.592383	0.590665	0.617681	0.641334
Agri-food	0.432036	0.452404	0.434883	0.433054	0.442406	0.441731	0.498136	0.539639
Construction	0.236245	0.238281	0.245409	0.250179	0.245498	0.243359	0.260914	0.289554
Cultural and Creative Industries	0.294690	0.274248	0.276650	0.296384	0.291954	0.286996	0.318343	0.371197
Digital	0.567227	0.559086	0.541822	0.533313	0.531299	0.537451	0.553832	0.569029
Electronics	0.566634	0.543397	0.538358	0.543997	0.577570	0.579917	0.597851	0.638971
Energy - Renewables	0.661356	0.657046	0.648549	0.651543	0.640632	0.635665	0.655747	0.673922
Energy Intensive Industries	0.542655	0.548419	0.545870	0.538597	0.563388	0.564209	0.599463	0.649871
Health	0.496736	0.545823	0.522006	0.543602	0.565009	0.576632	0.605517	0.657831
Mobility - Transport - Automotive	0.478045	0.485051	0.474877	0.507020	0.512493	0.512389	0.543007	0.572089
Proximity, Social Economy	0.303324	0.307423	0.317756	0.321517	0.323422	0.324897	0.351730	0.377530

	VALUE ADDED AT FACTOR COST - MILLION EURO2011['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2012['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2013['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2014['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2015['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2016['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2017['GE250']	VALUE ADDED AT FACTOR COST - MILLION EURO2018['GE250']
and Civil Security								
Retail	0.330400	0.343989	0.347467	0.350932	0.349553	0.347359	0.363696	0.400915
Textile	0.282911	0.297295	0.295966	0.298762	0.309444	0.306449	0.335494	0.356830
Tourism	0.292114	0.282450	0.278785	0.301536	0.305746	0.305480	0.326889	0.345109

Value added BIG firms

	VALUE ADDED, GROSS2011_BIG	VALUE ADDED, GROSS2012_BIG	VALUE ADDED, GROSS2013_BIG	VALUE ADDED, GROSS2014_BIG	VALUE ADDED, GROSS2015_BIG	VALUE ADDED, GROSS2016_BIG	VALUE ADDED, GROSS2017_BIG	VALUE ADDED, GROSS2018_BIG
Aerospace & Defence	128533.139571	128652.992726	131508.856441	135209.302925	144361.897120	148731.976067	162382.582700	173564.859124
Agri-food	215704.554120	227562.406744	224486.690173	227555.656565	237693.254425	242114.386869	289398.199024	316792.415738
Construction	242930.683168	241769.603029	248765.381458	258115.544575	261319.962614	266329.964653	300700.132245	350692.019364
Cultural and Creative Industries	117705.711541	109138.253444	110917.987713	120559.780053	123014.255219	123835.041053	142656.794765	172129.050515
Digital	278993.481101	276777.329685	272176.359807	274528.002396	285128.245118	298797.209911	327249.251418	358256.809574
Electronics	71458.566490	66285.188873	66858.378473	69466.901461	75228.326843	77894.215358	83338.973706	92656.124408
Energy - Renewables	71691.731602	73347.482259	72100.097687	72020.948531	71736.571201	72875.275022	77549.523565	82140.440725
Energy Intensive Industries	251310.267554	249110.248712	246822.775341	251104.526677	278906.632138	288030.791511	317765.999148	349792.427364
Health	480032.337337	537542.852434	525525.346598	564518.504442	589290.915579	622327.079227	677782.444877	761598.866982
Mobility - Transport - Automotive	349655.680505	351862.836287	348634.216452	391514.641535	413834.339650	433169.071121	480256.217118	516649.131832

	VALUE ADDED, GROSS2011_BIG	VALUE ADDED, GROSS2012_BIG	VALUE ADDED, GROSS2013_BIG	VALUE ADDED, GROSS2014_BIG	VALUE ADDED, GROSS2015_BIG	VALUE ADDED, GROSS2016_BIG	VALUE ADDED, GROSS2017_BIG	VALUE ADDED, GROSS2018_BIG
Proximity, Social Economy and Civil Security	199605.237482	206167.343582	217622.480100	225535.811252	233497.936573	241225.359457	271792.296231	300362.409001
Retail	378524.800197	398120.828726	406245.836737	420266.328058	436197.470792	445270.931099	488908.421199	556489.440657
Textile	22248.498428	22322.313055	22471.339791	23250.000797	24578.247076	24861.164212	28109.675443	30441.723149
Tourism	197271.889139	193202.822032	193212.882068	215930.821375	229583.342116	238011.494403	269215.606674	296294.859409

For SMEs:

	VALUE ADDED, GROSS2011_SME	VALUE ADDED, GROSS2012_SME	VALUE ADDED, GROSS2013_SME	VALUE ADDED, GROSS2014_SME	VALUE ADDED, GROSS2015_SME	VALUE ADDED, GROSS2016_SME	VALUE ADDED, GROSS2017_SME	VALUE ADDED, GROSS2018_SME
Aerospace & Defence	95668.608354	96872.398764	96392.101636	99477.038136	99334.838658	103072.110110	100507.939328	97066.176839
Agri-food	283569.491425	275444.331076	291714.035340	297911.717950	299580.617221	305989.334614	291563.970565	270252.921953
Construction	785368.166548	772872.056390	764910.133596	773609.356706	803128.160771	828060.721993	851785.248202	860451.952190
Cultural and Creative Industries	281716.177456	288816.606224	290014.793413	286208.852596	298333.570932	307652.264394	305465.527830	291584.190973
Digital	212861.358746	218275.922357	230158.625633	240231.329285	251534.410623	257155.615725	263632.440545	271336.168139
Electronics	54652.040767	55697.861454	57331.068614	58230.247761	55021.497956	56425.303692	56058.660606	52352.274238
Energy - Renewables	36709.441874	38284.665352	39071.344598	38518.047418	40241.213964	41768.910379	40711.871485	39743.793171
Energy Intensive Industries	211801.895355	205123.406290	205340.839945	215115.540995	216145.825010	222472.829677	212318.845383	188456.291555
Health	486340.068032	447286.842585	481215.722932	473960.009582	453685.397653	456918.006566	441562.333065	396143.470836
Mobility - Transport - Automotive	381772.343418	373551.997187	385522.993640	380673.531303	393658.283532	412222.140830	404182.014962	386442.945578

	VALUE ADDED, GROSS2011_SME	VALUE ADDED, GROSS2012_SME	VALUE ADDED, GROSS2013_SME	VALUE ADDED, GROSS2014_SME	VALUE ADDED, GROSS2015_SME	VALUE ADDED, GROSS2016_SME	VALUE ADDED, GROSS2017_SME	VALUE ADDED, GROSS2018_SME
Proximity, Social Economy and Civil Security	458454.432497	464462.627953	467249.888223	475938.690442	488463.339986	501241.462020	500937.306299	495236.844432
Retail	767131.444960	759245.077001	762919.063352	777307.301768	811674.501519	836603.710415	855369.225931	831560.114912
Textile	56392.844896	52762.320318	53454.195183	54571.102391	54848.834167	56265.377993	55676.244351	54869.753524
Tourism	478052.966920	490822.331166	499841.681721	500171.492659	521312.749699	541126.930579	554353.828508	562258.965254

ANNEX 7 USE OF RATIO INDICATORS FROM DATABASES

There are several problems related to the use of ratios as a source indicator.

The issues can be seen with an example (i.e. Fatal Accidents at work by NACE Rev. 2 activity [HSW_N2_02]).

This Fatal Accidents data has two measures: number of accidents and incidence rate.

Incidence rate represents the number of accidents in relation to the number of persons employed.

Problems found using original ratio values:

- When a EU27_2020 value is missing in the proposed method, the EU27_2020 estimation is calculated as the sum of the EU27 country individual values. Instead, using ratio indicators the weighted average of the countries would need to be calculated. In other words, the incidence rate would need to be converted into the number of accidents (which is a 'totals' kpi) to be able to calculate the new incidence rate for the EU27. In addition, missing data for NACEs at a country level will unable the calculation of the weighted average. In this particular case, all the information for all NACES at EU_27 level is available, so this is not an issue in this particular kpi calculation.
- Later on in the proposed process, to assign rates the Incidence Rate is multiplied by the weight of the NACE code in the ecosystem. The value obtained (incidence ratei * weightij) cannot be summed or averaged to obtain the ecosystem value of the indicator because the incidence rate for ecosystem j (IRj) is not the sum of the products Incidence Rate for nace code i times the weight of nace i on ecosystem j (Sum (IRi*wij)). IRj is calculated as Sum(Number or Fatal accidentsi* wij)/sum(Number of employeesi*wij).

Let 'i' be the nace code and 'j' the ecosystem

IRi = Number or Fatal accidentsi /Number of employeesi

wij= weight of Nace i in ecosystem j

IRj = Sum(Number or Fatal accidentsi* wij)/sum(Number of employeesi*wij)

IRj < > Sum (IRi*wij)

Using directly ratio kpis is very complicated and to obtain the correct value for the ecosystem it is required to come back to 'totals' from which the ratio kpis are calculated. **Thus, 'ratios' and 'percentage' values requested by Eurostat because problems of overlap and coverage should be calculated after 'totals' at an Ecosystem level.**

ANNEX 8 USE OF BERD BUSINESS ENTERPRISE EXPENDITURE ON R&D

We focus on BERD Business enterprise expenditure on R&D

NACE_BERD	NACE weights	Observations
'D35_E36'	'D35' + 'E36'	
'G'	'G45' + 'G46'+ 'G47'	
'L68'	'L'	
'M'- 'M71'- 'M72'	'M69'+ 'M70'+ 'M73'+ 'M74_M75'	
'R'	'R90-R92' + 'R93'	
'S-U'	'S94' + 'S95' + 'S96' + 'U'	U not in weights
Missing	'T'	Proximity, Social Economy and Civil Security

More problematic is the **absence of EU27_2020 aggregated data**. There are no values of EU27 reported and although all EU27 countries are reported there is NO data for all the NACE codes in several countries: **Austria, Denmark, Ireland, Greece, France, Luxemburg and Sweden**.

Result: **it is not possible to calculate an aggregate from the available data** for BERD data.

R&D personnel and researchers in business enterprise sector by NACE Rev. 2 activity and sex [RD_P_BEMPOCCR2]

Absence of EU27_2020 aggregated data. There are no values of EU27 reported and although all EU27 countries are reported there is NO data for all the NACE codes in several countries: **Austria, Denmark, Ireland, Greece, France, Luxemburg and Sweden.**

Result: **it is not possible to calculate an aggregate from the available data for RD** personnel data.

ANNEX 9 USE OF CIS DATA (YEAR 2018)

CIS data misses the following NACE codes, affecting several Ecosystems:

Missing NACE code	Ecosystem affected
P	Cultural and Creative Industries
Q86	Health
Q87_Q88	Health
Q87_Q88	Proximity, Social Economy and Civil Security
R90_R92	Cultural and Creative Industries
R90_R92	Tourism
R93	Tourism
S94	Cultural and Creative Industries
S95	Cultural and Creative Industries
S95	Digital
S95	Proximity, Social Economy and Civil Security
S96	Proximity, Social Economy and Civil Security
T	Proximity, Social Economy and Civil Security

5 Ecosystems affected: ['Cultural and Creative Industries', 'Health', 'Proximity, Social Economy and Civil Security ', 'Tourism', 'Digital']

Related to country indicators:

- EU27_2020 is present but with no information
- All the 27 countries within EU27 are present, however some do not report information

Absence of EU27_2020 aggregated data. There are no values of EU27 reported although all EU_27 countries are reported:

- There **is NO data** for all the NACE codes in: **Denmark**
- There is **NO data** for N74 to N82 in most of the countries
- There is a lot of data missing in: Estonia, Cyprus, Luxemburg, Austria, Slovenia and Finland

Result: **it is not possible to calculate an aggregate from the available data** for CIS data (information from CIS 2018).

ANNEX 10 RESULTS FOR INDICATORS

Indicators results are included in a folder structure. Each folder includes 4 subfolders:

\ Scripts: Including Python Scripts as Jupyter notebook. Can be executed in Jupyter labs. Make sure that the Auxiliary files are in the same folder as the script.

\ Html: Including Python Scripts with the cell output to be open with the web browser.

\ Output: Output tables with the calculation results as an excel file. Is we rerun the script the output will be overwritten.

\ Auxiliary: excel files that are requested by the script to load data that is needed for the calculation of the kpi. Should be in the same folder as the script.

- In some cases there are no auxiliary files and all the data is retrieved from Eurostat directly.
- In other cases, you will have a excosystemweights file (regular or extended) which it is fixed for all the calculations.
- In some cases there are auxiliary files that are an output of another indicator. As long as we are calculating the same period 2011-2018 these auxiliary files are valid. If we want a different period (ej. 2011-2020) and the auxiliary file is from an output, we should recalculate first the output for the period we are interested in (e.g. 2011-2020) and then copy the output (used as an auxiliary) in the same folder as the script we want to recalculate (otherwise an error might emerge).

Table lists the files containing the calculation files and results for the indicators per ecosystem:

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
0	README.docx	
1	Non Fatal Accidents/Output/NonFatal Accidents-Number-Incidence Rate.xlsx	Calculation for Non Fatal accidents results Countries: EU27, countries NACES: No missing, No disaggregation Quality: Very good
2	Non Fatal Accidents/Output/NonFatal Accidents-Number.xlsx	
3	Non Fatal Accidents/Html/Eurostat-nonFatal accidents number.html	
4	Non Fatal Accidents/Scripts/Eurostat-nonFatal accidents number.ipynb	
5	Non Fatal Accidents/Auxiliary/Total employment domestic concept.xlsx	
6	Non Fatal Accidents/Auxiliary/ecosystemweightsextended.xlsx	
7	Energy flow/Output/NRG_INP_OUT.xlsx	Energy flow results Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Good
8	Energy flow/Output/NETDOM_EUSE_NEP.xlsx	
9	Energy flow/Output/EPRD_DOM.xlsx	
10	Energy flow/Output/NETDOM_EUSE.xlsx	
11	Energy flow/Output/WST_USE.xlsx	
12	Energy flow/Output/EPRD_ICNS.xlsx	
13	Energy flow/Output/EPRD_HHCNS.xlsx	
14	Energy flow/Output/NETDOM_EUSE_EP.xlsx	
15	Energy flow/Output/NEI_EXT.xlsx	
16	Energy flow/Html/Eurostat-energy flow.html	
17	Energy flow/Scripts/Eurostat-energy flow.ipynb	
18	Energy flow/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
19	Energy flow/Auxiliary/ecosystemweights.xlsx	
20	Ratio SME persons employed/Output/ratioSME-Persons employed - number.xlsx	Ratios SME-BIG persons employed See SME and BIG annex.
21	Ratio SME persons employed/Html/Eurostat-sbs-sizegroups-employment.html	
22	Ratio SME persons employed/Scripts/Eurostat-sbs-sizegroups-employment.ipynb	

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
23	Ratio SME persons employed/Auxiliary/ecosystemweightsextended.xlsx	
24	ghg/Output/Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2 equivalent, PFC in CO2 equivalent, SF6 in CO2 equivalent, NF3 in CO2 equivalent).xlsx	Results on GHG Energy flow results Countries: EU27 (complete), countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Very Good
25	ghg/Html/Eurostat-ghg.html	
26	ghg/Scripts/Eurostat-ghg.ipynb	
27	ghg/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
28	ghg/Auxiliary/ecosystemweights.xlsx	
29	SBS Ratio number companies/Output/ratio-Enterprises - number.xlsx	Ratios number of companies to disaggregate NACE codes. Ratios for several naces using 'number of companies' data from SBS
30	SBS Ratio number companies/Html/Eurostat-sbs-ratio number of companies.html	
31	SBS Ratio number companies/Scripts/Eurostat-sbs-ratio number of companies.ipynb	
32	SBS Ratio value added/Output/ratioCN-Value added at factor cost - million euro.xlsx	Ratios value added to disaggregate NACE codes. Ratios for C31, C32, N80-N82 using 'Value Added at Factor Cost' data from SBS
33	SBS Ratio value added/Html/Eurostat-sbs-ratioc31-N80valueadded.html	
34	SBS Ratio value added/Scripts/Eurostat-sbs-ratioc31-N80valueadded.ipynb	
35	NA-SBS Comparison employees/Output/comparison_employment.xlsx	Comparison of employees between NA and SBS data
36	NA-SBS Comparison employees/Html/Eurostat-NA-SBS-ratios relation_employees.html	
37	NA-SBS Comparison employees/Scripts/Eurostat-NA-SBS-ratios relation_employees.ipynb	
38	NA Size groups/Output/Value_added-SME companies.xlsx	Calculation of Value Added for SMEs and BIG companies per Ecosys-tem See SME and BIG annex.
39	NA Size groups/Output/Value_added-BIG companies.xlsx	
40	NA Size groups/Html/Eurostat-NA-sizegroups.html	
41	NA Size groups/Scripts/Eurostat-NA-sizegroups.ipynb	
42	NA Size groups/Auxiliary/ratioSMEs- Value added at factor cost - million euro.xlsx	
43	NA Size groups/Auxiliary/Value added, gross.xlsx	
44	Energy/Output/Natural energy inputs.xlsx	Energy results Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Good
45	Energy/Html/Eurostat-energy.html	
46	Energy/Scripts/Eurostat-energy.ipynb	
47	Energy/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
48	Energy/Auxiliary/ecosystemweights.xlsx	
49	NA Value Added/Output/Value added, gross-productivity.xlsx	Calculation of Value Added per Ecosystem and derivated measures Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Good
50	NA Value Added/Output/Value added, gross-percentage over GDP.xlsx	
51	NA Value Added/Output/Value added, gross-percentage change.xlsx	
52	NA Value Added/Output/Value added, gross.xlsx	
53	NA Value Added/Html/Eurostat-NA-Value Added.html	
54	NA Value Added/Scripts/Eurostat-NA-Value Added.ipynb	
55	NA Value Added/Auxiliary/Total employment domestic concept.xlsx	
56	NA Value Added/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
57	NA Value Added/Auxiliary/ecosystemweights.xlsx	
58	TRADE/Trade explanations.docx	Calculation of Trade per Ecosystem (exports intra-EU total values) See Annex with the limitations of Trade calculations
59	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2016.xlsx	
60	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2020.xlsx	
61	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2017detailed.xlsx	
62	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2020detailed.xlsx	
63	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2016detailed.xlsx	
64	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2017.xlsx	
65	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2018detailed.xlsx	
66	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2012.xlsx	
67	TRADE/Output/ratiosTrade['EXP']['INT_EU']['TOTAL'].xlsx	
68	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2013.xlsx	
69	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2019detailed.xlsx	
70	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2014.xlsx	
71	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2014detailed.xlsx	
72	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2013detailed.xlsx	

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
73	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2018.xlsx	
74	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2019.xlsx	
75	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2015.xlsx	
76	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2012detailed.xlsx	
77	TRADE/Output/Trade['EXP']['INT_EU']['TOTAL']-year-2015detailed.xlsx	
78	TRADE/Html/Eurostat-Trade-exports-intra-EU.html	
79	TRADE/Scripts/Eurostat-Trade-exports-intra-EU.ipynb	
80	TRADE/Auxiliary/ecosystemweightsextended.xlsx	
81	Environmental taxes/Output/env taxes.xlsx	Calculation of Environmental taxes per ecosystem Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Good
82	Environmental taxes/Html/Eurostat-environmental_taxes.html	
83	Environmental taxes/Scripts/Eurostat-environmental_taxes.ipynb	
84	Environmental taxes/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
85	Environmental taxes/Auxiliary/ecosystemweights.xlsx	
86	Weights/WEIGHTS.docx	Creation of weights matrix from Eurostat files
87	Weights/Output/weights_table.xlsx	
88	Weights/Html/Weights_distribution.html	
89	Weights/Scripts/Weights_distribution.ipynb	
90	Weights/Auxiliary/IES_Weights.xlsx	
91	Energy renewable/Output/N04.xlsx	Calculation of renewable energies values Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Good
92	Energy renewable/Output/N05.xlsx	
93	Energy renewable/Output/N03.xlsx	
94	Energy renewable/Output/N06.xlsx	
95	Energy renewable/Output/N07.xlsx	
96	Energy renewable/Html/Eurostat-energy-renewable.html	
97	Energy renewable/Scripts/Eurostat-energy-renewable.ipynb	

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
98	Energy renewable/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
99	Energy renewable/Auxiliary/ecosystemweights.xlsx	
100	SBS Ratio employment/Output/ratioCN-Persons employed - number.xlsx	Ratios number of employees to disaggregate NACE codes Ratios for C31, C32, N80-N82 using 'Persons employed' data from SBS
101	SBS Ratio employment/Html/Eurostat-sbs-ratioc31-N80employment.html	
102	SBS Ratio employment/Scripts/Eurostat-sbs-ratioc31-N80employment.ipynb	
103	NA Value Added detailed/Output/Value added, gross2018.xlsx	Detailed calculation of Value Added from National Accounts for 2018
104	NA Value Added detailed/Html/Eurostat-NA-Value Added-detailed.html	
105	NA Value Added detailed/Scripts/Eurostat-NA-Value Added-detailed.ipynb	
106	NA Value Added detailed/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
107	NA Value Added detailed/Auxiliary/ecosystemweights.xlsx	
108	NA Value Added extended period 2011-2020/Output/Value added, gross2011-2020-percentage over GDP.xlsx	Updated calculation of the Value Added files from 2011 to 2020
109	NA Value Added extended period 2011-2020/Output/Value added, gross2011-2020.xlsx	
110	NA Value Added extended period 2011-2020/Output/Value added, gross2011-2020-percentage change.xlsx	
111	NA Value Added extended period 2011-2020/Html/Eurostat-NA-Value Added-Change period.html	
112	NA Value Added extended period 2011-2020/Scripts/Eurostat-NA-Value Added-Change period.ipynb	
113	NA Value Added extended period 2011-2020/Auxiliary/ratioCN-Value added at factor cost - million euro2011-2020.xlsx	
114	NA Value Added extended period 2011-2020/Auxiliary/Eurostat-sbs-ratioc31-N80valueadded-2020.html	
115	NA Value Added extended period 2011-2020/Auxiliary/Eurostat-sbs-ratioc31-N80valueadded-2020.ipynb	
116	NA Value Added extended period 2011-2020/Auxiliary/ecosystemweights.xlsx	
117	Demography/ORDER DEMOGRAPHY FILES.docx	Calculation of demography files (total number of companies, births, deaths and churn) Countries: EU27, countries NACES: Missing 'A' and 'T' (see related annex). 2 Ecosystems affected Disaggregation: se several codes based on number of companies but the correlation is very high Quality: Good
118	Demography/Output/Enterprises population.xlsx	
119	Demography/Output/births_rate.xlsx	
120	Demography/Output/deaths_rate.xlsx	
121	Demography/Output/Deaths of enterprises in t - number.xlsx	
122	Demography/Output/Births of enterprises in t - number.xlsx	

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
123	Demography/html/Eurostat-SBS-Demography-births.html	
124	Demography/html/Eurostat-SBS-Demography-enterprisespopulation.html	
125	Demography/html/Eurostat-SBS-Demography-deaths.html	
126	Demography/html/Eurostat-SBS-Demography-Churn.html	
127	Demography/html/.ipynb_checkpoints/Eurostat-SBS-Demography-births-checkpoint.html	
128	Demography/Scripts/Eurostat-SBS-Demography-deaths.ipynb	
129	Demography/Scripts/Eurostat-SBS-Demography-births.ipynb	
130	Demography/Scripts/Eurostat-SBS-Demography-Churn.ipynb	
131	Demography/Scripts/Eurostat-SBS-Demography-enterprisespopulation.ipynb	
132	Demography/Auxiliary/ratio-Enterprises - number.xlsx	
133	Demography/Auxiliary/ecosystemweights.xlsx	
134	NA-SBS Comparison Value Added/Output/comparison_valueadded.xlsx	Comparison between National Accounts and SBS data for Value Added and Number of companies
135	NA-SBS Comparison Value Added/Html/Eurostat-NA-SBS relation_valueadded.html	
136	NA-SBS Comparison Value Added/Scripts/Eurostat-NA-SBS relation_valueadded.ipynb	
137	NA-SBS Comparison Number of companies/Output/comparison_number_companies.xlsx	
138	NA-SBS Comparison Number of companies/Html/Eurostat-NA-SBS-relation_demography.html	
139	NA-SBS Comparison Number of companies/Scripts/Eurostat-NA-SBS-relation_demography.ipynb	
140	NACE comparison/NACE COMPARISON.docx	Comparison between NACES for ecosystem allocation and NACES available in different databases (CIS, Demography, BERD, SBS). Extracting the Ecosystems that are affected by the missing NACES
141	NACE comparison/Html/NACEcomparisonEcosystem-CIS.html	
142	NACE comparison/Html/NACEcomparisonEcosystem-Demography.html	
143	NACE comparison/Html/NACEcomparisonEcosystem-BERD.html	
144	NACE comparison/Html/NACEcomparisonEcosystem-SBS.html	
145	NACE comparison/Scripts/NACEcomparisonEcosystem-Demography.ipynb	
146	NACE comparison/Scripts/NACEcomparisonEcosystem-SBS.ipynb	
147	NACE comparison/Scripts/NACEcomparisonEcosystem-CIS.ipynb	

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
148	NACE comparison/Scripts/NACEcomparisonEcosystem-BERD.ipynb	
149	Investments positions/Output/N112N.xlsx	Calculation of Investment positions Countries: No EU27-values, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Intermediate
150	Investments positions/Output/N1131N.xlsx	
151	Investments positions/Output/N11MN.xlsx	
152	Investments positions/Output/N111N.xlsx	
153	Investments positions/Output/N115N.xlsx	
154	Investments positions/Output/N1131G.xlsx	
155	Investments positions/Html/Eurostat-investment positions.html	
156	Investments positions/Scripts/Eurostat-investment positions.ipynb	
157	Investments positions/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
158	Investments positions/Auxiliary/ecosystemweights.xlsx	
159	ghg intensity/Output/Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2 equivalent, PFC in CO2 equivalent, SF6 in CO2 equivalent, NF3 in CO2 equivalent)-intensity.xlsx	Calculation of ghg intensity Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Good
160	ghg intensity/Html/Eurostat-ghg-intensity.html	
161	ghg intensity/Scripts/Eurostat-ghg-intensity.ipynb	
162	ghg intensity/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
163	ghg intensity/Auxiliary/ecosystemweights.xlsx	
164	Ratio SME value added/Output/ratioSMEs- Value added at factor cost - million euro.xlsx	Calculation of ratio SME-BIG attending to Value Added using SBS See SME and BIG annex.
165	Ratio SME value added/Html/Eurostat-sbs-sizegroups.html	
166	Ratio SME value added/Scripts/Eurostat-sbs-sizegroups.ipynb	
167	Ratio SME value added/Auxiliary/variabledescription.xlsx	
168	Ratio SME value added/Auxiliary/ecosystemweightsextended.xlsx	
169	Fatal accidents/Output/Fatal Accidents-Number.xlsx	Calculation of Fatal accidents and incidence rate per ecosystem Countries: EU27, countries NACES: No missing, No disaggregation Quality: Very good
170	Fatal accidents/Output/Fatal Accidents-Number-Incidence Rate.xlsx	
171	Fatal accidents/Html/Eurostat-Fatal accidents number.html	
172	Fatal accidents/Scripts/Eurostat-Fatal accidents number.ipynb	

FILE	DIRECTORIES	DESCRIPTION AND QUALITY OF THE DATA
173	Fatal accidents/Auxiliary/Total employment domestic concept.xlsx	
174	Fatal accidents/Auxiliary/ecosystemweightsextended.xlsx	
175	NA compensations of employees/Output/Compensation of employees-labour cost.xlsx	Calculation of Compensation of employees and derivative measures per ecosystem form National Accounts Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on Value added at factor cost Quality: Good
176	NA compensations of employees/Output/Compensation of employees.xlsx	
177	NA compensations of employees/Output/Compensation of employees-labour cost productivity.xlsx	
178	NA compensations of employees/Output/Compensation of employees-percentage change.xlsx	
179	NA compensations of employees/Html/Eurostat-NA-compensations of employees.html	
180	NA compensations of employees/Scripts/Eurostat-NA-compensations of employees.ipynb	
181	NA compensations of employees/Auxiliary/Total employment domestic concept.xlsx	
182	NA compensations of employees/Auxiliary/ratioCN-Value added at factor cost - million euro.xlsx	
183	NA compensations of employees/Auxiliary/Value added, gross.xlsx	
184	NA compensations of employees/Auxiliary/ecosystemweights.xlsx	
185	NA Employment/Output/Total employment domestic conceptpercentage total employment.xlsx	Calculation of number of employees and derivative measures per eco-system form National Accounts Countries: EU27, countries NACES: No missing, Disaggregation 'C31_C32','N80-N82' based on persons employed Quality: Good
186	NA Employment/Output/Total employment domestic concept.xlsx	
187	NA Employment/Output/Total employment domestic conceptpercentage change.xlsx	
188	NA Employment/Html/Eurostat-NA-employment.html	
189	NA Employment/Scripts/Eurostat-NA-employment.ipynb	
190	NA Employment/Auxiliary/ratioCN-Persons employed - number.xlsx	
191	NA Employment/Auxiliary/ecosystemweights.xlsx	

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNIT
Headline indicators	National Accounts aggregates by industry (up to NACE A*64)	[NAMA_10_A64]	B1G -Value added, gross	[CP_MEUR] Current prices, million euro
			Gross Value Added in % of GDP	%
			Annual % change=(year t1-year t0)/yeart0 B1G -Value added, gross	%

HTLM Files:

Eurostat-NA-Value Added-detailed.html (detailed calculation for year 2018 Gross Value Added)

Eurostat-sbs-ratioc31-N80valueadded.html (Distribution C31-C32, N80-N82 using 'Value Added at Factor Cost' data from SBS9

Results:

	VALUE ADDED, GROSS2018
Aerospace & Defence	270631.0360
Agri-food	587045.3377
Construction	1211143.9716
Cultural and Creative Industries	463713.2415
Digital	629592.9777
Electronics	145008.3986
Energy - Renewables	121884.2339
Energy Intensive Industries	538248.7189
Health	1157742.3378
Mobility - Transport - Automotive	903092.0774
Proximity, Social Economy and Civil Security	795599.2534
Retail	1388049.5556
Textile	85311.4767
Tourism	858553.8247

HTLM Files:

Eurostat-NA-Value Added.html (calculation for 2011-2018)

Eurostat-sbs-ratioc31-N80valueadded.html (Distribution C31-C32, N80-N82 using 'Value Added at Factor Cost' data from SBS)

Excel files:

Value added, gross.xlsx

Value added, gross-productivity.xlsx (see further down, after employment)

Value added, gross-percentage change.xlsx

Value added, gross-percentage over GDP.xlsx

Gross Value Added

	VALUE ADDED, GROSS2011	VALUE ADDED, GROSS2012	VALUE ADDED, GROSS2013	VALUE ADDED, GROSS2014	VALUE ADDED, GROSS2015	VALUE ADDED, GROSS2016	VALUE ADDED, GROSS2017	VALUE ADDED, GROSS2018
Aerospace & Defence	224201.7479	225525.3915	227900.9581	234686.3411	243696.7358	251804.0862	262890.5220	270631.0360
Agri-food	499274.0455	503006.7378	516200.7255	525467.3745	537273.8716	548103.7215	580962.1696	587045.3377
Construction	1028298.8497	1014641.6594	1013675.5151	1031724.9013	1064448.1234	1094390.6866	1152485.3804	1211143.9716
Cultural and Creative Industries	399421.8890	397954.8597	400932.7811	406768.6326	421347.8262	431487.3054	448122.3226	463713.2415
Digital	491854.8398	495053.2520	502334.9854	514759.3317	536662.6557	555952.8256	590881.6920	629592.9777
Electronics	126110.6073	121983.0503	124189.4471	127697.1492	130249.8248	134319.5190	139397.6343	145008.3986
Energy - Renewables	108401.1735	111632.1476	111171.4423	110538.9959	111977.7852	114644.1854	118261.3951	121884.2339
Energy Intensive Industries	463112.1629	454233.6550	452163.6153	466220.0677	495052.4571	510503.6212	530084.8445	538248.7189
Health	966372.4054	984829.6950	1006741.0695	1038478.5140	1042976.3132	1079245.0858	1119344.7779	1157742.3378
Mobility-Transport - Automotive	731428.0239	725414.8335	734157.2101	772188.1728	807492.6232	845391.2120	884438.2321	903092.0774
Proximity, Social Economy and Civil Security	658059.6700	670629.9715	684872.3683	701474.5017	721961.2766	742466.8215	772729.6025	795599.2534
Retail	1145656.2452	1157365.9057	1169164.9001	1197573.6298	1247871.9723	1281874.6415	1344277.6471	1388049.5556
Textile	78641.3433	75084.6334	75925.5350	77821.1032	79427.0812	81126.5422	83785.9198	85311.4767
Tourism	675324.8561	684025.1532	693054.5638	716102.3140	750896.0918	779138.4250	823569.4352	

Gross Value Added as percentage of GDP

	VALUE ADDED, GROSS2011-PERCENTAGE GDP	VALUE ADDED, GROSS2012-PERCENTAGE GDP	VALUE ADDED, GROSS2013-PERCENTAGE GDP	VALUE ADDED, GROSS2014-PERCENTAGE GDP	VALUE ADDED, GROSS2015-PERCENTAGE GDP	VALUE ADDED, GROSS2016-PERCENTAGE GDP	VALUE ADDED, GROSS2017-PERCENTAGE GDP	VALUE ADDED, GROSS2018-PERCENTAGE GDP
Aerospace & Defence	1.9799	1.9797	1.9783	1.9916	1.9951	2.0060	2.0105	2.0000
Agri-food	4.4090	4.4155	4.4808	4.4592	4.3986	4.3665	4.4430	4.3384
Construction	9.0808	8.9067	8.7991	8.7554	8.7145	8.7185	8.8137	8.9506
Cultural and Creative Industries	3.5272	3.4933	3.4803	3.4519	3.4495	3.4375	3.4270	3.4269
Digital	4.3435	4.3457	4.3605	4.3683	4.3936	4.4290	4.5188	4.6528
Electronics	1.1137	1.0708	1.0780	1.0837	1.0663	1.0701	1.0661	1.0716
Energy - Renewables	0.9573	0.9799	0.9650	0.9381	0.9168	0.9133	0.9044	0.9007
Energy Intensive Industries	4.0897	3.9874	3.9250	3.9564	4.0529	4.0670	4.0539	3.9777
Health	8.5339	8.6450	8.7390	8.8127	8.5388	8.5979	8.5603	8.5559
Mobility - Transport - Automotive	6.4591	6.3678	6.3728	6.5529	6.6109	6.7349	6.7638	6.6740
Proximity, Social Economy and Civil Security	5.8112	5.8869	5.9450	5.9528	5.9106	5.9149	5.9095	5.8796
Retail	10.1171	10.1596	10.1489	10.1628	10.2162	10.2121	10.2805	10.2579
Textile	0.6945	0.6591	0.6591	0.6604	0.6503	0.6463	0.6408	0.6305
Tourism	5.9637	6.0045	6.0160	6.0770	6.1475	6.2071	6.2983	

Gross Value Added percentage change

	VALUE ADDED, GROSS2012-PERCENTAGE CHANGE	VALUE ADDED, GROSS2013-PERCENTAGE CHANGE	VALUE ADDED, GROSS2014-PERCENTAGE CHANGE	VALUE ADDED, GROSS2015-PERCENTAGE CHANGE	VALUE ADDED, GROSS2016-PERCENTAGE CHANGE	VALUE ADDED, GROSS2017-PERCENTAGE CHANGE	VALUE ADDED, GROSS2018-PERCENTAGE CHANGE
Aerospace & Defence	0.5904	1.0533	2.9773	3.8393	3.3268	4.4028	2.9444
Agri-food	0.7476	2.6230	1.7952	2.2469	2.0157	5.9949	1.0471
Construction	-1.3281	-0.0952	1.7806	3.1717	2.8130	5.3084	5.0897
Cultural and Creative Industries	-0.3673	0.7483	1.4556	3.5841	2.4064	3.8553	3.4792
Digital	0.6503	1.4709	2.4733	4.2551	3.5945	6.2827	6.5514
Electronics	-3.2730	1.8088	2.8245	1.9990	3.1245	3.7806	4.0250
Energy - Renewables	2.9806	-0.4127	-0.5689	1.3016	2.3812	3.1552	3.0634
Energy Intensive Industries	-1.9171	-0.4557	3.1087	6.1843	3.1211	3.8357	1.5401
Health	1.9100	2.2249	3.1525	0.4331	3.4774	3.7155	3.4304
Mobility - Transport - Automotive	-0.8221	1.2052	5.1802	4.5720	4.6934	4.6188	2.1091
Proximity, Social Economy and Civil Security	1.9102	2.1237	2.4241	2.9205	2.8403	4.0760	2.9596
Retail	1.0221	1.0195	2.4298	4.2000	2.7249	4.8681	3.2562
Textile	-4.5227	1.1199	2.4966	2.0637	2.1396	3.2781	1.8208
Tourism	1.2883	1.3200	3.3255	4.8588	3.7612	5.7026	4.2479

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Headline indicators	National Accounts employment data by industry (up to NACE A*64)	[NAMA_10_A64_E]	Number of employees - Total employment domestic concept [EMP_DC]	Thousands of persons
			% of total employment Total employment domestic concept [EMP_DC]	%
			Annual % change	%

HTLM File:

Eurostat-NA-employment.html (calculation for 2011-2018)

Eurostat-sbs-ratioc31-N80employment.html (Distribution C31-C32, N80-N82 using 'Persons employed' data from SBS)

Excel files:

Total employment domestic concept.xlsx

Total employment domestic conceptpercentage total employment.xlsx

Total employment domestic concept (same procedure to Gross Value Added calculated from National Accounts)

Total employment

	TOTAL EMPLOYMENT DOMESTIC CONCEPT2011	TOTAL EMPLOYMENT DOMESTIC CONCEPT2012	TOTAL EMPLOYMENT DOMESTIC CONCEPT2013	TOTAL EMPLOYMENT DOMESTIC CONCEPT2014	TOTAL EMPLOYMENT DOMESTIC CONCEPT2015	TOTAL EMPLOYMENT DOMESTIC CONCEPT2016	TOTAL EMPLOYMENT DOMESTIC CONCEPT2017	TOTAL EMPLOYMENT DOMESTIC CONCEPT2018
Aerospace & Defence	4081.6456	4099.4458	4078.3502	4088.4369	4118.7552	4232.3492	4282.0791	4355.0176
Agri-food	17314.3133	17203.4609	16917.2597	16874.0319	16636.5509	16335.1493	16440.2099	16320.1869
Construction	24628.0901	24186.3431	23809.3940	23935.0905	24094.0251	24470.2145	24937.6483	25616.2907

	TOTAL EMPLOYMENT DOMESTIC CONCEPT2011	TOTAL EMPLOYMENT DOMESTIC CONCEPT2012	TOTAL EMPLOYMENT DOMESTIC CONCEPT2013	TOTAL EMPLOYMENT DOMESTIC CONCEPT2014	TOTAL EMPLOYMENT DOMESTIC CONCEPT2015	TOTAL EMPLOYMENT DOMESTIC CONCEPT2016	TOTAL EMPLOYMENT DOMESTIC CONCEPT2017	TOTAL EMPLOYMENT DOMESTIC CONCEPT2018
Cultural and Creative Industries	7857.4820	7823.2776	7801.0090	7875.9829	7880.3530	7987.5126	8060.1148	8156.2969
Digital	5722.7534	5813.4841	5871.8215	5978.6454	6124.1659	6285.3453	6503.7804	6757.1268
Electronics	1682.3470	1694.2104	1676.8236	1679.2396	1677.6495	1705.1736	1739.6239	1782.3590
Energy - Renewables	1132.7165	1129.3833	1124.3260	1137.4412	1132.6540	1151.0824	1154.0645	1175.1838
Energy Intensive Industries	7600.0628	7489.4107	7367.8741	7358.6286	7375.1454	7475.8787	7630.4530	7760.8481
Health	22262.5570	22455.8293	22728.4628	23113.9563	23514.3935	24030.3220	24490.4620	24917.2995
Mobility - Transport - Automotive	12883.2705	12895.9675	12882.0762	13062.4338	13282.2094	13610.3702	13967.1234	14314.4188
Proximity, Social Economy and Civil Security	21108.3233	21273.6378	21410.8421	21705.6344	22061.2457	22465.8981	22822.8987	23184.0119
Retail	28901.6131	28830.5638	28515.3873	28698.2054	28978.6544	29235.0180	29553.4616	29755.0784
Textile	2578.8488	2526.7869	2445.1367	2443.4498	2403.2601	2389.8322	2405.5338	2387.5233
Tourism	17568.5536	17680.8925	17804.7057	18285.1914	18758.5229	19358.1607	19972.6488	20470.0511

Percentage of total employment (calculated from the same database geo_employment=['EU27_2020'], unit_employment= ['THS_PER'], item_employment= ['EMP_DC'], nace_employment=['TOTAL']) summarizing the data for each year.

	2011	2012	2013	2014	2015	2016	2017	2018	2019
geo									
EU27_2020	195954.9000	195477.2200	194720.5800	196499.5700	198331.6900	200903.5600	204157.2300	207145.5700	209395.2300

Employment as a percentage of total employment

	TOTAL EMPLOYMENT DOMESTIC CONCEPT2011-PERCENTAGE TOTAL EMPLOYMENT	TOTAL EMPLOYMENT DOMESTIC CONCEPT2012-PERCENTAGE TOTAL EMPLOYMENT	TOTAL EMPLOYMENT DOMESTIC CONCEPT2013-PERCENTAGE TOTAL EMPLOYMENT	TOTAL EMPLOYMENT DOMESTIC CONCEPT2014-PERCENTAGE TOTAL EMPLOYMENT	TOTAL EMPLOYMENT DOMESTIC CONCEPT2015-PERCENTAGE TOTAL EMPLOYMENT	TOTAL EMPLOYMENT DOMESTIC CONCEPT2016-PERCENTAGE TOTAL EMPLOYMENT	TOTAL EMPLOYMENT DOMESTIC CONCEPT2017-PERCENTAGE TOTAL EMPLOYMENT	TOTAL EMPLOYMENT DOMESTIC CONCEPT2018-PERCENTAGE TOTAL EMPLOYMENT
Aerospace & Defence	2.0830	2.0971	2.0945	2.0806	2.0767	2.1067	2.0974	2.1024
Agri-food	8.8359	8.8007	8.6880	8.5873	8.3882	8.1308	8.0527	7.8786
Construction	12.5682	12.3730	12.2275	12.1807	12.1483	12.1801	12.2149	12.3663
Cultural and Creative Industries	4.0098	4.0021	4.0063	4.0081	3.9733	3.9758	3.9480	3.9375
Digital	2.9204	2.9740	3.0155	3.0426	3.0878	3.1285	3.1857	3.2620
Electronics	0.8585	0.8667	0.8611	0.8546	0.8459	0.8488	0.8521	0.8604
Energy - Renewables	0.5780	0.5778	0.5774	0.5789	0.5711	0.5730	0.5653	0.5673
Energy Intensive Industries	3.8785	3.8313	3.7838	3.7449	3.7186	3.7211	3.7375	3.7466
Health	11.3611	11.4877	11.6723	11.7629	11.8561	11.9611	11.9959	12.0289
Mobility - Transport - Automotive	6.5746	6.5972	6.6157	6.6476	6.6970	6.7746	6.8414	6.9103
Proximity, Social Economy and Civil Security	10.7720	10.8829	10.9957	11.0461	11.1234	11.1824	11.1791	11.1921
Retail	14.7491	14.7488	14.6443	14.6047	14.6112	14.5518	14.4758	14.3643
Textile	1.3160	1.2926	1.2557	1.2435	1.2117	1.1895	1.1783	1.1526
Tourism	8.9656	9.0450	9.1437	9.3055	9.4582	9.6355	9.7830	9.8820

Annual Percentage change in employment

	VALUE ADDED, GROSS2012- PERCENTAGE CHANGE	VALUE ADDED, GROSS2013- PERCENTAGE CHANGE	VALUE ADDED, GROSS2014- PERCENTAGE CHANGE	VALUE ADDED, GROSS2015- PERCENTAGE CHANGE	VALUE ADDED, GROSS2016- PERCENTAGE CHANGE	VALUE ADDED, GROSS2017- PERCENTAGE CHANGE	VALUE ADDED, GROSS2018- PERCENTAGE CHANGE
Aerospace & Defence	0.5904	1.0533	2.9773	3.8393	3.3268	4.4028	2.9444
Agri-food	0.7476	2.6230	1.7952	2.2469	2.0157	5.9949	1.0471
Construction	-1.3281	-0.0952	1.7806	3.1717	2.8130	5.3084	5.0897
Cultural and Creative Industries	-0.3673	0.7483	1.4556	3.5841	2.4064	3.8553	3.4792
Digital	0.6503	1.4709	2.4733	4.2551	3.5945	6.2827	6.5514
Electronics	-3.2730	1.8088	2.8245	1.9990	3.1245	3.7806	4.0250
Energy - Renewables	2.9806	-0.4127	-0.5689	1.3016	2.3812	3.1552	3.0634
Energy Intensive Industries	-1.9171	-0.4557	3.1087	6.1843	3.1211	3.8357	1.5401
Health	1.9100	2.2249	3.1525	0.4331	3.4774	3.7155	3.4304
Mobility- Transport - Automotive	-0.8221	1.2052	5.1802	4.5720	4.6934	4.6188	2.1091
Proximity, Social Economy and Civil Security	1.9102	2.1237	2.4241	2.9205	2.8403	4.0760	2.9596
Retail	1.0221	1.0195	2.4298	4.2000	2.7249	4.8681	3.2562
Textile	-4.5227	1.1199	2.4966	2.0637	2.1396	3.2781	1.8208
Tourism	1.2883	1.3200	3.3255	4.8588	3.7612	5.7026	

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Productivity		[NAMA_10_A64] [NAMA_10_A64_E] [EMP_DC]	Gross value added per employee =B1G -Value added, gross/ Total employment domestic concept [EMP_DC] Can be calculated per hour worked	Million Euro/Thousands of persons

HTLM File:

Eurostat-NA-Value Added.html (calculation for 2011-2018) (Productivity = Gross Value Added/ Total employment)

Excel File (to get employment breakdown):

Total employment domestic concept.xlsx

Excel File:

Value added, gross-productivity.xlsx

	VALUE ADDED, GROSS2011-PRODUCTIVITY	VALUE ADDED, GROSS2012-PRODUCTIVITY	VALUE ADDED, GROSS2013-PRODUCTIVITY	VALUE ADDED, GROSS2014-PRODUCTIVITY	VALUE ADDED, GROSS2015-PRODUCTIVITY	VALUE ADDED, GROSS2016-PRODUCTIVITY	VALUE ADDED, GROSS2017-PRODUCTIVITY	VALUE ADDED, GROSS2018-PRODUCTIVITY
Aerospace & Defence	54.9293	55.0136	55.8807	57.4025	59.1676	59.4951	61.3932	62.1424
Agri-food	28.8359	29.2387	30.5133	31.1406	32.2948	33.5536	35.3379	35.9705
Construction	41.7531	41.9510	42.5746	43.1051	44.1789	44.7234	46.2147	47.2802
Cultural and Creative Industries	50.8333	50.8680	51.3950	51.6467	53.4681	54.0202	55.5975	56.8534
Digital	85.9472	85.1560	85.5501	86.0997	87.6303	88.4522	90.8520	93.1747
Electronics	74.9611	71.9999	74.0623	76.0446	77.6383	78.7718	80.1309	81.3576
Energy - Renewables	95.7002	98.8435	98.8783	97.1822	98.8632	99.5969	102.4738	103.7150
Energy Intensive Industries	60.9353	60.6501	61.3696	63.3569	67.1244	68.2868	69.4696	69.3544
Health	43.4080	43.8563	44.2943	44.9286	44.3548	44.9118	45.7053	46.4634
Mobility - Transport - Automotive	56.7735	56.2513	56.9906	59.1152	60.7951	62.1138	63.3229	63.0897

	VALUE ADDED, GROSS2011-PRODUCTIVITY	VALUE ADDED, GROSS2012-PRODUCTIVITY	VALUE ADDED, GROSS2013-PRODUCTIVITY	VALUE ADDED, GROSS2014-PRODUCTIVITY	VALUE ADDED, GROSS2015-PRODUCTIVITY	VALUE ADDED, GROSS2016-PRODUCTIVITY	VALUE ADDED, GROSS2017-PRODUCTIVITY	VALUE ADDED, GROSS2018-PRODUCTIVITY
Proximity, Social Economy and Civil Security	31.1754	31.5240	31.9872	32.3176	32.7253	33.0486	33.8576	34.3167
Retail	39.6399	40.1437	41.0012	41.7299	43.0618	43.8472	45.4863	46.6492
Textile	30.4947	29.7155	31.0517	31.8489	33.0497	33.9465	34.8305	35.7322
Tourism	38.4394	38.6873	38.9254	39.1630	40.0296	40.2486	41.2349	41.9419

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Headline indicators	National Accounts aggregates by industry (up to NACE A*64)	[NAMA_10_A64]	Gross Value Added in % of GDP	%
		[EMP_DC]	Labour costs per employee= Compensation of Employees [D1] / Total employment domestic concept [EMP_DC] Thousands	Million euro/ thousand employees
		[D1]	Labor cost productivity= B1G -Value added, gross / Compensation of Employees [D1]	Euros of value added/Euros of labour cost

HTLM file:

Eurostat-NA-compensations of employees.html

Eurostat-sbs-ratioc31-N80valueadded.html (Distribution C31-C32, N80-N82 using 'Value Added at factor cost' data from SBS)

Excel files:

Compensation of employees-labour cost.xlsx

Compensation of employees-percentage change.xlsx

Compensation of employees.xlsx

Compensations of employees

	COMPENSATION OF EMPLOYEES2011	COMPENSATION OF EMPLOYEES2012	COMPENSATION OF EMPLOYEES2013	COMPENSATION OF EMPLOYEES2014	COMPENSATION OF EMPLOYEES2015	COMPENSATION OF EMPLOYEES2016	COMPENSATION OF EMPLOYEES2017	COMPENSATION OF EMPLOYEES2018
Aerospace & Defence	129330.8174	132024.3251	133930.8504	136593.4024	141693.0414	147409.5969	153001.9390	158523.1887
Agri-food	214543.2103	218081.3818	222049.2667	228252.4212	235107.0191	242617.4801	253214.0436	262575.4876
Construction	596717.8633	596774.3366	595097.9220	603700.5859	621532.6468	642811.4242	675347.4858	713248.1270
Cultural and Creative Industries	221936.3262	223551.8496	223900.7950	227140.7499	232400.3442	237597.6347	247222.7302	257851.5457
Digital	244955.3553	252855.0478	258157.6064	265852.8317	278703.3672	291542.5948	310460.3187	331291.8989
Electronics	67838.7936	68738.5942	70303.9994	71884.2857	73676.7882	76589.0399	79451.2844	82912.1228
Energy - Renewables	44909.4620	46026.8351	46695.7215	47594.3867	48413.3587	49405.5741	51107.5580	53122.9672
Energy Intensive Industries	259725.5794	261235.7309	261454.8129	264912.2964	270095.1193	276134.3353	287010.1970	297514.5518
Health	652755.0801	666486.9835	684565.5147	704013.5355	727395.5323	756196.8974	788533.7113	820053.9671
Mobility - Transport - Automotive	393975.1781	401835.7440	408142.4508	420850.4793	436501.6545	452399.8610	475122.3612	497431.4108
Proximity, Social Economy and Civil Security	399144.6893	408936.8224	418196.9203	429110.2186	442717.2055	459340.3718	478440.9628	497175.3699
Retail	659184.7931	670246.5127	674430.7365	687516.8083	706080.1243	729863.5782	759754.5879	791315.6757
Textile	44002.5622	43408.9692	43047.2765	43729.2997	44720.0301	45626.8195	47532.4052	49200.5598
Tourism	380707.1953	387452.7205	391246.7975	402686.9437	418570.0395	437462.7333	463127.4872	489457.4517

Percentage change Compensation of Employees

	COMPENSATION OF EMPLOYEES2012-PERCENTAGE CHANGE	COMPENSATION OF EMPLOYEES2013-PERCENTAGE CHANGE	COMPENSATION OF EMPLOYEES2014-PERCENTAGE CHANGE	COMPENSATION OF EMPLOYEES2015-PERCENTAGE CHANGE	COMPENSATION OF EMPLOYEES2016-PERCENTAGE CHANGE	COMPENSATION OF EMPLOYEES2017-PERCENTAGE CHANGE	COMPENSATION OF EMPLOYEES2018-PERCENTAGE CHANGE
Aerospace & Defence	2.0826	1.4441	1.9880	3.7334	4.0345	3.7937	3.6086
Agri-food	1.6492	1.8195	2.7936	3.0031	3.1945	4.3676	3.6970
Construction	0.0095	-0.2809	1.4456	2.9538	3.4236	5.0615	5.6120
Cultural and Creative Industries	0.7279	0.1561	1.4470	2.3156	2.2364	4.0510	4.2993
Digital	3.2250	2.0971	2.9808	4.8337	4.6068	6.4888	6.7099
Electronics	1.3264	2.2773	2.2478	2.4936	3.9527	3.7371	4.3559
Energy - Renewables	2.4881	1.4533	1.9245	1.7207	2.0495	3.4449	3.9435
Energy Intensive Industries	0.5814	0.0839	1.3224	1.9564	2.2360	3.9386	3.6599
Health	2.1037	2.7125	2.8409	3.3212	3.9595	4.2762	3.9973
Mobility - Transport - Automotive	1.9952	1.5695	3.1136	3.7189	3.6422	5.0227	4.6954
Proximity, Social Economy and Civil Security	2.4533	2.2644	2.6096	3.1710	3.7548	4.1583	3.9157
Retail	1.6781	0.6243	1.9403	2.7001	3.3684	4.0954	4.1541
Textile	-1.3490	-0.8332	1.5844	2.2656	2.0277	4.1765	3.5095
Tourism	1.7718	0.9792	2.9240	3.9443	4.5136	5.8667	5.6853

Labour cost= Compensation of Employees (National Accounts)/ Employment domestic concept (National Accounts)

	COMPENSATION OF EMPLOYEES2011-LABOUR COST	COMPENSATION OF EMPLOYEES2012-LABOUR COST	COMPENSATION OF EMPLOYEES2013-LABOUR COST	COMPENSATION OF EMPLOYEES2014-LABOUR COST	COMPENSATION OF EMPLOYEES2015-LABOUR COST	COMPENSATION OF EMPLOYEES2016-LABOUR COST	COMPENSATION OF EMPLOYEES2017-LABOUR COST	COMPENSATION OF EMPLOYEES2018-LABOUR COST
Aerospace & Defence	31.6859	32.2054	32.8395	33.4097	34.4019	34.8293	35.7308	36.4001
Agri-food	12.3911	12.6766	13.1256	13.5268	14.1320	14.8525	15.4021	16.0890
Construction	24.2292	24.6740	24.9942	25.2224	25.7961	26.2691	27.0814	27.8435
Cultural and Creative Industries	28.2452	28.5752	28.7015	28.8397	29.4911	29.7461	30.6724	31.6138
Digital	42.8038	43.4946	43.9655	44.4671	45.5088	46.3845	47.7354	49.0285
Electronics	40.3239	40.5726	41.9269	42.8076	43.9167	44.9157	45.6715	46.5182
Energy - Renewables	39.6476	40.7540	41.5322	41.8434	42.7433	42.9210	44.2848	45.2040
Energy Intensive Industries	34.1741	34.8807	35.4858	36.0002	36.6223	36.9367	37.6138	38.3353
Health	29.3208	29.6799	30.1193	30.4584	30.9341	31.4684	32.1976	32.9110
Mobility - Transport - Automotive	30.5804	31.1598	31.6830	32.2184	32.8636	33.2394	34.0172	34.7504
Proximity, Social Economy and Civil Security	18.9094	19.2227	19.5320	19.7695	20.0676	20.4461	20.9632	21.4448
Retail	22.8079	23.2478	23.6515	23.9568	24.3655	24.9654	25.7078	26.5943
Textile	17.0629	17.1795	17.6053	17.8965	18.6081	19.0921	19.7596	20.6074
Tourism	21.6698	21.9136	21.9743	22.0226	22.3136	22.5984	23.1881	23.9109

Labour cost productivity= Value Added (National Accounts)/ Labour cost (calculated before with NA data)

	COMPENSATION OF EMPLOYEES2011-LABOUR COST PRODUCTIVITY	COMPENSATION OF EMPLOYEES2012-LABOUR COST PRODUCTIVITY	COMPENSATION OF EMPLOYEES2013-LABOUR COST PRODUCTIVITY	COMPENSATION OF EMPLOYEES2014-LABOUR COST PRODUCTIVITY	COMPENSATION OF EMPLOYEES2015-LABOUR COST PRODUCTIVITY	COMPENSATION OF EMPLOYEES2016-LABOUR COST PRODUCTIVITY	COMPENSATION OF EMPLOYEES2017-LABOUR COST PRODUCTIVITY	COMPENSATION OF EMPLOYEES2018-LABOUR COST PRODUCTIVITY
Aerospace & Defence	1.7336	1.7082	1.7016	1.7181	1.7199	1.7082	1.7182	1.7072
Agri-food	2.3271	2.3065	2.3247	2.3021	2.2852	2.2591	2.2944	2.2357
Construction	1.7233	1.7002	1.7034	1.7090	1.7126	1.7025	1.7065	1.6981
Cultural and Creative Industries	1.7997	1.7801	1.7907	1.7908	1.8130	1.8160	1.8126	1.7984
Digital	2.0079	1.9579	1.9458	1.9363	1.9256	1.9069	1.9032	1.9004
Electronics	1.8590	1.7746	1.7665	1.7764	1.7679	1.7538	1.7545	1.7489
Energy - Renewables	2.4138	2.4254	2.3808	2.3225	2.3130	2.3205	2.3140	2.2944
Energy Intensive Industries	1.7831	1.7388	1.7294	1.7599	1.8329	1.8488	1.8469	1.8092
Health	1.4805	1.4776	1.4706	1.4751	1.4339	1.4272	1.4195	1.4118
Mobility - Transport - Automotive	1.8565	1.8053	1.7988	1.8348	1.8499	1.8687	1.8615	1.8155
Proximity, Social Economy and Civil Security	1.6487	1.6399	1.6377	1.6347	1.6308	1.6164	1.6151	1.6002
Retail	1.7380	1.7268	1.7336	1.7419	1.7673	1.7563	1.7694	1.7541
Textile	1.7872	1.7297	1.7638	1.7796	1.7761	1.7780	1.7627	1.7340
Tourism	1.7739	1.7654	1.7714	1.7783	1.7940	1.7810	1.7783	1.7541

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Sustainability	Air emissions accounts by NACE Rev. 2 activity	[ENV_AC_AINAH_R2]	[GHG] Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2	Tons
Sustainability	Air emissions intensities by NACE Rev. 2 activity	[ENV_AC_AEINT_R2]	[GHG] Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2	[KG_EUR_CP] Kilograms per euro, current prices (Value added)
Sustainability	Environmental taxes	[ENV_AC_TAXIND2]	ENV -Total environmental taxes NRG -Energy taxes POL -Pollution taxes RES -Resource taxes TRA -Transport taxes	Million Euro
Energy	Energy supply and use by NACE Rev. 2 activity	[ENV_AC_PEFASU]	[N00] Natural energy inputs N01 -Fossil non-renewable natural energy inputs N02 -Nuclear non-renewable natural energy inputs N03 -Hydro based renewable natural energy inputs N04 -Wind based renewable natural energy inputs N05 -Solar based renewable natural energy inputs N06 -Biomass based renewable natural energy inputs N07 -Other renewable natural energy inputs	[TJ] Terajoule
Sustainability		[ENV_AC_PEFASU]	N03 -Hydro based renewable natural energy inputs N04 -Wind based renewable natural energy inputs N05 -Solar based renewable natural energy inputs N06 -Biomass based renewable natural energy inputs N07 -Other renewable natural energy inputs P23 -Wood, wood waste and other solid biomass, charcoal P24 -Liquid biofuels P25 -Biogas R28 -Renewable waste	[TJ] Terajoule

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
Sustainability		[ENV_AC_PEFASU]	Renewable energy input/Total energy input e.g. (N03+…+N7)/N00 Hydro base renewable natural energy inputs / Natural Energy inputs	% Renewable energy over total energy

HTML file:

Eurostat-ghg.html

Eurostat-ghg-intensity

Eurostat-sbs-ratioc31-N80valueadded.html (Distribution C31-C32, N80-N82 using 'Value Added at factor cost' data from SBS)

Excel file:

Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2 equivalent, PFC in CO2 equivalent, SF6 in CO2 equivalent, NF3 in CO2 equivalent).xlsx

Greenhouse gases (CO2, N2O in CO2 equivalent, CH4 in CO2 equivalent, HFC in CO2 equivalent, PFC in CO2 equivalent, SF6 in CO2 equivalent, NF3 in CO2 equivalent)-intensity.xlsx

Greenhouse gases

	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2011	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2012	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2013	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2014	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2015	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2016	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2017	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2018
Aerospace & Defence	28226242.4920	29148389.2802	29110583.9126	26739829.6638	27417395.0372	28111763.4713	28329026.5193	28779086.1456
Agri-food	559106926.0932	556322477.1691	558702435.4492	562248964.3920	564000878.6113	568733715.0289	575327870.9117	571829812.8813
Construction	100741915.5988	97347085.5214	95736568.9119	90869813.7920	92192736.4806	92303338.0234	94137918.1692	95633922.6390

	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2011	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2012	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2013	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2014	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2015	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2016	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2017	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2 EQUIVALENT)2018
Cultural and Creative Industries	21028030.2188	20202140.7483	20038766.2265	17118411.7756	17423710.2441	17904483.9581	18573368.6157	18158463.1032
Digital	15981501.1206	15846030.1463	15724270.3927	13281243.7829	13884222.2431	13811344.7797	14188372.7233	13991851.2178
Electronics	7596660.8037	7386508.4110	7282247.0559	6626404.7511	6932237.4601	7073034.4436	7193258.3337	7158309.9613
Energy - Renewables	334627384.5144	330846128.6029	314289517.5682	297333934.6359	299862884.9905	294231421.4133	293461185.1754	276667002.3725
Energy Intensive Industries	754685606.6705	721318479.8665	695343041.5133	688451889.0530	688701328.6771	687224613.9179	700799353.3388	696653741.0467
Health	50587431.1205	50592740.0784	53497220.2636	50311961.2730	51013215.9560	52015843.0575	51846883.8704	52311014.4227
Mobility - Transport - Automotive	235266412.5728	231871985.9659	223128034.4370	211590873.7861	229078404.5058	229363706.1908	244598043.0254	249571972.1110
Proximity, Social Economy and Civil Security	37005541.3592	36152582.3041	37553204.3047	37240844.0950	38190976.1830	38643499.4554	38635887.0775	37789913.3650
Retail	108337032.0309	107223619.6781	107524764.1856	102913469.7130	102896049.4645	101832507.5105	102817782.8550	99651581.6814
Textile	10399423.3478	9876745.3535	10286646.1898	9501873.7921	10026119.4451	10006945.7764	10414561.5392	10373994.9158
Tourism	253913829.0532	247921566.6550	244444697.6013	240465011.3678	252152221.9138	259825750.4443	268595613.5377	274574192.0535

Greenhouse gas-intensity

WARNING: Seems to be a change in the data from 2014 to 2015

	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2	GREENHOUSE GASES (CO2, N2O IN CO2 EQUIVALENT, CH4 IN CO2 EQUIVALENT, HFC IN CO2 EQUIVALENT, PFC IN CO2 EQUIVALENT, SF6 IN CO2 EQUIVALENT, NF3 IN CO2
Aerospace & Defence	0.6393	0.6401	0.6146	0.6141	2.2268	2.1646	2.2007	2.2272
Agri-food	3.0389	3.0304	2.9426	2.9338	3.1227	3.1166	2.9033	2.8948
Construction	0.5977	0.5879	0.5745	0.5251	1.6431	1.5639	1.5294	1.4744
Cultural and Creative Industries	0.3768	0.3663	0.3617	0.3133	0.4165	0.4094	0.4190	0.4070
Digital	0.1996	0.1960	0.1917	0.1685	0.5501	0.5074	0.5079	0.4606
Electronics	0.0833	0.0834	0.0805	0.0721	1.7614	1.5759	1.5946	1.4357
Energy - Renewables	1.6627	1.5570	1.4839	1.4446	1.4899	1.4320	1.3942	1.2796
Energy Intensive Industries	14.8383	14.6031	14.8318	15.4681	55.1168	53.3897	54.1164	55.2463
Health	0.4342	0.4291	0.4321	0.3915	5.1240	4.3789	4.4995	5.3960
Mobility - Transport - Automotive	4.3767	4.3081	3.7631	3.4485	5.0288	5.6259	5.4403	5.6751
Proximity, Social Economy and Civil Security	0.3879	0.3746	0.3712	0.3676	0.4344	0.4302	0.4193	0.3907
Retail	0.5225	0.5117	0.5062	0.4782	0.6110	0.5931	0.5896	0.5585
Textile	0.1550	0.1533	0.1585	0.1430	0.1719	0.1669	0.1691	0.1646
Tourism	6.2214	6.1540	5.7659	5.9015	5.3047	5.4473	5.2209	5.5109

HTML file:

Eurostat-energy.html

Eurostat-sbs-ratioc31-N80valueadded.html (Distribution C31-C32, N80-N82 using 'Value Added at factor cost' data from SBS)

Excel file:

Natural energy inputs.xlsx

Natural energy inputs

	NATURAL ENERGY INPUTS2011	NATURAL ENERGY INPUTS2012	NATURAL ENERGY INPUTS2013	NATURAL ENERGY INPUTS2014	NATURAL ENERGY INPUTS2015	NATURAL ENERGY INPUTS2016	NATURAL ENERGY INPUTS2017	NATURAL ENERGY INPUTS2018
Aerospace & Defence	1398.2713	1179.8612	1406.6751	1646.6515	1833.7117	1866.2864	4669.0141	4747.3449
Agri-food	1257921.8478	1309218.6305	1535980.7943	2736944.7120	2876321.8000	2912397.7392	2951993.9190	2883999.6203
Construction	5797.1589	5505.3319	5825.3737	8809.0449	9024.5497	9852.9645	24707.3361	25051.3906
Cultural and Creative Industries	2355.5384	1924.5551	2296.2441	2662.8332	2741.5183	2813.4606	8243.2330	8398.8648
Digital	1666.4706	1567.4250	1855.0710	2019.3285	2116.1229	2154.2035	6766.4284	6784.3725
Electronics	581.5099	554.8039	629.4461	678.5497	874.8459	926.8837	1901.5610	2037.0678
Energy - Renewables	467693.3437	492206.6253	568938.1564	983362.4740	1015122.5795	1045874.1920	1066924.0676	1135444.0484
Energy Intensive Industries	486962.9106	443891.9771	510579.1325	874319.5092	886253.7283	910783.7239	972770.6011	1011095.1231
Health	5458.1754	4739.5030	4808.4207	8744.8376	9330.4882	9126.2101	15225.3704	15656.6333
Mobility - Transport - Automotive	4876.0974	4552.8992	5174.2484	6569.8411	7361.6493	7279.0739	14716.2563	14918.8442
Proximity, Social Economy and Civil Security	3133.1042	3180.4019	4165.0486	6383.8084	6836.0866	6877.1282	22902.8676	22897.2887
Retail	3523.6955	3896.9902	6226.4861	7253.5535	9629.3588	12786.0572	31597.1359	33590.0588
Textile	986.6445	942.5267	2275.1018	10120.8377	4898.9249	5620.0587	7904.2276	8409.6378
Tourism	5134.3764	7241.1209	7352.6461	25954.8908	26021.9658	26370.3638	40945.6310	42079.1011

N03 - Hydro based renewable natural energy inputs

	N03-2011	N03-2012	N03-2013	N03-2014	N03-2015	N03-2016	N03-2017	N03-2018
Aerospace & Defence	78.3807	37.2346	41.9821	26.3958	33.7625	34.7386	39.2102	52.5692
Agri-food	51.2882	27.2160	43.0681	61.9518	67.1402	65.7885	66.8248	83.8799
Construction	175.8238	99.3316	119.3554	82.6858	101.0623	99.0378	109.4933	137.4567
Cultural and Creative Industries	15.6455	9.9178	14.0597	18.9636	13.7148	16.0934	12.7828	17.6012
Digital	5.9279	1.8761	3.5483	6.7764	7.9069	7.8376	7.9239	10.0428
Electronics	3.2059	1.3056	1.8533	3.1613	4.2666	4.4191	4.5650	5.6623
Energy - Renewables	167439.2215	179997.3425	222232.9918	385501.8609	349974.5819	360068.1838	306341.5611	358374.1005
Energy Intensive Industries	2144.8789	2092.8186	2080.6937	2048.2611	1946.7342	2134.6495	2196.3513	2096.8711
Health	14.3583	5.8764	13.7738	28.3651	30.3779	28.6322	27.8074	33.3453
Mobility - Transport - Automotive	57.8400	30.5853	35.3547	49.2776	57.1895	57.4425	61.6061	75.8338
Proximity, Social Economy and Civil Security	60.8669	35.7993	45.3332	33.7141	35.5019	32.8380	35.4668	45.3675
Retail	12.5868	4.6077	9.9748	20.0268	22.0767	21.1831	20.8782	25.5710
Textile	239.4740	198.4745	242.9014	268.9334	267.1680	249.0973	251.9264	280.9691
Tourism	150.5412	94.4188	109.2999	79.4690	81.6121	75.7346	84.3543	105.9397

N04 -Wind based renewable natural energy inputs (Warning: data 2011-2013)

	N04-2011	N04-2012	N04-2013	N04-2014	N04-2015	N04-2016	N04-2017	N04-2018
Aerospace & Defence	0.0000	0.0000	0.0000	94.6319	96.5511	93.8175	61.6041	62.2033
Agri-food	0.2000	0.2000	0.2000	1727.8372	1824.5461	1426.6671	1527.6076	1528.3342
Construction	0.1000	0.1000	0.1000	124.1481	131.1742	131.7754	132.1008	131.3601
Cultural and Creative Industries	0.0000	0.0000	0.0000	3.6347	3.6229	3.5928	3.5847	3.6322
Digital	0.0000	0.0000	0.0000	8.4641	8.3588	8.3604	8.3416	8.4599
Electronics	0.0000	0.0000	0.0000	7.8923	7.8332	7.8401	7.8225	7.8776
Energy - Renewables	88786.9510	97215.2790	109841.5600	227882.1390	269634.8735	275096.1857	321679.7897	329942.7898
Energy Intensive Industries	0.0000	0.0000	0.0000	14.6816	14.5189	14.5297	14.4970	14.6675
Health	0.0000	0.0000	0.0000	20.8753	20.6450	20.6556	20.6091	20.8562
Mobility - Transport - Automotive	0.0000	0.0000	0.0000	112.4132	112.6720	111.6366	96.4698	97.0647
Proximity, Social Economy and Civil Security	0.0000	0.0000	0.0000	9.4992	9.3835	9.3864	9.3652	9.4936
Retail	0.0000	0.0000	0.0000	17.8853	17.6740	17.6801	17.6403	17.8732
Textile	0.0000	0.0000	0.0000	3.4455	3.4120	3.4141	3.4064	3.4412
Tourism	0.0000	0.0000	0.0000	14.9605	14.7305	14.7379	14.7048	14.9627

N05 - Solar based renewable natural energy inputs

	N05-2011	N05-2012	N05-2013	N05-2014	N05-2015	N05-2016	N05-2017	N05-2018
Aerospace & Defence	516.7061	285.9583	357.4215	385.1299	504.5321	538.9286	590.0752	773.4153
Agri-food	10519.9506	13287.4002	13607.7001	13511.0695	13580.3983	13590.0776	16988.8983	17660.1792
Construction	2216.0878	1823.5801	1750.6965	1458.2137	2222.1828	2299.3475	2448.6722	2687.1164
Cultural and Creative Industries	1886.5775	1453.5545	1574.4816	1352.1996	1356.7312	1359.5703	1426.0655	1646.6844
Digital	965.0754	861.2441	926.7972	869.8874	904.1456	912.7856	947.4777	985.4162
Electronics	285.6672	260.3766	253.8915	309.2726	469.6210	502.0017	527.4083	634.9122
Energy - Renewables	37927.7026	58642.0705	70794.9438	142736.3670	152473.9888	154379.0967	161260.0077	167653.4344
Energy Intensive Industries	12953.9621	13440.4082	12573.3011	12949.1939	11641.1938	13002.3325	13097.3456	13191.2013
Health	3392.9907	2631.8156	2414.7428	1920.9265	1894.9865	1895.2637	2015.4710	2356.1278
Mobility - Transport - Automotive	2453.1464	2077.7802	2165.3146	2304.8232	2617.6753	2687.4830	2858.4378	3186.6106
Proximity, Social Economy and Civil Security	1800.1137	1805.9212	2280.9581	1707.0679	1977.6026	1938.7762	2157.8010	2582.6517
Retail	944.2127	891.4430	1455.8538	2258.3029	2780.7096	2753.5754	3083.2786	3400.9918
Textile	427.7822	412.6747	483.3055	531.2303	589.2797	543.6605	573.8910	720.4912
Tourism	2905.1431	2269.6183	2454.6812	2629.8884	2709.4909	2724.2045	2887.7001	3228.1560

N06 - Biomass based renewable natural energy inputs

	N06-2011	N06-2012	N06-2013	N06-2014	N06-2015	N06-2016	N06-2017	N06-2018
Aerospace & Defence	652.5725	704.2372	711.5812	663.2137	641.9648	651.2622	716.2000	646.5133
Agri-food	1245348.3611	1294213.4014	1520477.8799	2719395.3644	2858306.2316	2894474.2220	2927169.2606	2858862.2293
Construction	3157.5133	3360.1935	3495.7833	6296.7608	5433.9432	6401.4721	6592.2531	6824.2722
Cultural and Creative Industries	441.3629	448.9957	496.4471	693.1843	698.0230	669.6368	701.0763	777.2248
Digital	665.7097	674.1963	733.4517	671.6586	650.6208	667.8546	664.5484	663.9436
Electronics	278.7747	279.1077	298.1189	246.4017	245.0185	255.0787	255.4378	249.1864
Energy - Renewables	100754.0600	83984.2602	93932.6906	118098.9504	124644.5334	130383.0611	134880.9820	129600.7627
Energy Intensive Industries	458053.0941	415489.6701	477591.1170	842591.7546	857972.0914	889795.7868	928693.5874	965370.0176
Health	1988.7033	2039.0213	2234.7287	5016.8305	5235.8156	4813.1328	5229.2427	6199.5464
Mobility - Transport - Automotive	2215.3815	2293.1093	2490.3299	2370.1258	2511.1116	2335.2552	2487.2895	2431.7951
Proximity, Social Economy and Civil Security	1191.4888	1257.0829	1341.0131	1305.5674	1265.9462	1260.2270	1665.2048	1449.4432
Retail	2133.7562	2562.5123	3725.5038	2486.1101	4037.9540	7130.4634	6845.0294	8931.7210
Textile	310.7354	322.5223	1533.1316	9272.9164	3961.5961	4776.4025	4553.1963	4929.7464
Tourism	1668.3874	1767.6616	1818.6785	1719.3222	1876.5197	1682.2129	1688.3997	1711.3575

N07 - Other renewable natural energy inputs (Warning: jump 2016-2017)

	N07-2011	N07-2012	N07-2013	N07-2014	N07-2015	N07-2016	N07-2017	N07-2018
Aerospace & Defence	150.6098	152.4575	295.7095	477.2735	497.7858	547.5125	3261.9603	3212.6420
Agri-food	2002.2161	1690.5314	1852.0351	2248.4818	2339.3128	2840.9617	6241.2288	5865.0873
Construction	247.5884	222.3131	459.2977	820.6261	841.9041	921.4563	15424.9050	15271.3271
Cultural and Creative Industries	11.9474	12.0940	211.2763	594.7596	628.6490	764.7794	6099.9065	5953.8302
Digital	29.7490	30.1140	191.3126	462.4573	485.3050	557.3627	5138.1352	5116.5036
Electronics	13.8476	14.0175	75.5794	111.9167	126.1554	157.5418	1106.3237	1139.4326
Energy - Renewables	68113.0201	68594.2542	69924.2545	107018.5087	116321.6827	123332.9058	139843.7269	147215.2268
Energy Intensive Industries	42.8627	43.3886	64.6155	175.6149	158.9726	167.3128	10890.6199	11659.9612
Health	62.0995	62.8613	145.0570	1757.8260	1964.8507	2368.6086	7932.1972	7046.9100
Mobility - Transport - Automotive	149.5301	151.3645	483.2644	1733.2588	1851.6348	2087.2786	9212.5511	9127.6508
Proximity, Social Economy and Civil Security	80.6206	81.6044	497.7388	3328.0764	3431.9790	3635.9808	19035.0569	18810.4301
Retail	433.1201	438.4380	1035.1303	2471.3201	2604.0055	2863.1436	21630.3139	21213.8755
Textile	8.7496	8.8570	15.6614	44.3109	46.5218	47.3819	2521.9073	2474.8888
Tourism	410.2376	3109.4330	2970.0735	21511.3459	21186.4996	21873.5653	36270.5792	37018.5797

TYPE	DATABASE	DATABASE CODE	VARIABLE	UNITS
	Business demography by size class (from 2004 onwards, NACE Rev. 2)	[BD_9BD_SZ_CL_R2]	[V11910] Population of active enterprises in t – number. Not disaggregation of 'C17_C18', 'C20_C21', 'C24_C25', 'C26_C27', 'C29_C30', 'C31_C32', 'E', Use SBS data to disaggregate Correlation= 0.9998 'A' and 'T' are missing in business demography database	Number of companies

HTML file:

Eurostat-NA-Demography.html

Distribution of enterprises (number) data from SBS for C17, C18,….E39 (see Eurostat-sbs-ration umber of companies.html and ratio-Enterprises - number.xlsx)

WARNING: 'A' and 'T' are missing in business demography database

	ENTERPRISES - NUMBER2011	ENTERPRISES - NUMBER2012	ENTERPRISES - NUMBER2013	ENTERPRISES - NUMBER2014	ENTERPRISES - NUMBER2015	ENTERPRISES - NUMBER2016	ENTERPRISES - NUMBER2017	ENTERPRISES - NUMBER2018	ENTERPRISES - NUMBER2019
nace_r2									
C17	0.142719	0.144014	0.142813	0.141727	0.142321	0.146802	0.145963	0.154977	0.147746
C18	0.857281	0.855986	0.857187	0.858273	0.857679	0.853198	0.854037	0.845023	0.852254
C20	0.876293	0.878456	0.874083	0.879588	0.886641	0.868502	0.888041	0.890197	0.886870
C21	0.123707	0.121544	0.125917	0.120412	0.113359	0.131498	0.111959	0.109803	0.113130
C24	0.044613	0.042943	0.043057	0.040022	0.039473	0.038860	0.037579	0.035533	0.036274
C25	0.955387	0.957057	0.956943	0.959978	0.960527	0.961140	0.962421	0.964467	0.963726
C26	0.431176	0.430538	0.439708	0.439024	0.441048	0.439283	0.447368	0.462338	0.463051
C27	0.568824	0.569462	0.560292	0.560976	0.558952	0.560717	0.552632	0.537662	0.536949
C29	0.579390	0.585392	0.585427	0.583907	0.570094	0.573379	0.564660	0.557615	0.557139
C30	0.420610	0.414608	0.414573	0.416093	0.429906	0.426621	0.435340	0.442385	0.442861
C31	0.469565	0.461590	0.450009	0.439626	0.440000	0.450866	0.443378	0.444444	0.447100
C32	0.530435	0.538410	0.549991	0.560374	0.560000	0.549134	0.556622	0.555556	0.552900
E36	0.228697	0.212448	0.214071	0.209534	0.212841	0.205711	0.202028	0.196796	0.187755
E37	0.157496	0.153549	0.151875	0.150071	0.141894	0.150854	0.154703	0.149552	0.150742
E38	0.578893	0.594444	0.593034	0.599621	0.595956	0.591596	0.590684	0.600123	0.605433
E39	0.034914	0.039559	0.041021	0.040774	0.049308	0.051839	0.052585	0.053529	0.056071

	ENTERPRISES2011	ENTERPRISES2012	ENTERPRISES2013	ENTERPRISES2014	ENTERPRISES2015	ENTERPRISES2016	ENTERPRISES2017	ENTERPRISES2018
Aerospace & Defence	283626	294431	293288	297534	300017	303202	312107	313733
Agri-food	574369	610537	614244	620206	627190	635091	647039	654705
Construction	5569773	5743358	5701793	5792562	5824930	5901444	6021463	6168989
Cultural and Creative Industries	1715732	1787767	1814703	1891825	1949543	1998080	2059004	2123008
Digital	1013599	1069843	1096598	1146058	1178568	1213868	1287600	1317840
Electronics	102086	105482	104760	107268	107531	107654	109287	111095
Energy - Renewables	94863	106218	107917	109321	111614	114517	116236	114484
Energy Intensive Industries	573137	586702	579335	592723	590709	584989	593246	593082
Health	1940468	2013373	2027006	2100670	2235291	2296553	2363186	2381649
Mobility - Transport - Automotive	1763605	1855587	1867164	1891616	1911729	1940270	1986637	2008897
Proximity, Social Economy and Civil Security	2577386	2676112	2717974	2788372	2883704	2930222	2991109	3011285
Retail	5954031	6199440	6180101	6194156	6152106	6105084	6079778	6032453
Textile	271808	280914	279471	284260	285125	287050	290686	293229
Tourism	3455341	3652237	3707571	3806323	3889009	3972676	4078365	4159412

ANNEX 11 DATABASES WITH ISSUES

In this table, additional databases are evaluated as potential sources for further indicators. As it stands, these databases do not allow for the calculation of ecosystem indicators due to their reporting units, level of granularity or other reasons (see column 3).

THEME	DATABASE	CAUSE
ECONOMY AND FINANCE	Investments. Gross capital formation by industry (up to NACE A*64) [NAMA_10_A64_P5] [CP_MEUR] Current prices, million euro Cross-classification of gross fixed capital formation by industry and by asset (flows) [NAMA_10_NFA_FL]	No EU_27 data Calculation by aggregation of country values) infeasible due to a lot of missing data in detailed NACE codes (for example, Produced non-financial assets (gross) missing for countries like Denmark or Germany for NACE codes like C10-C23) NACE codes are sufficient
	Business registration and bankruptcy index by NACE Rev. 2 activity - annual data [STS_RB_A]	No disaggregated data at NACE 2 digit level
GENERAL AND REGIONAL STATISTICS	European and national indicators for short-term analysis - Industry, trade and services	No disaggregated data at NACE 2 digit level (NACE codes by letter only) Data separated in different databases (Industry, construction, trade and services)
	European and national indicators for short-term analysis - International trade	No NACE breakdowns
	European and national indicators for short-term analysis - Labour market	No disaggregated data at NACE 2 digit level (NACE codes by letter only)
	European and national indicators for short-term analysis > National Accounts M > Basic breakdowns of main GDP aggregates and employment (by industry and assets)	NACE A*10 industry breakdowns (Gross value added and Employment) No NACE breakdowns for the rest of the databases
	Regional statistics by NUTS classification - Regional agriculture statistics	Information on economic activity not covered by in the Ecosystems (Agriculture)
	Regional statistics by NUTS classification - Regional economic accounts	No NACE breakdowns or No disaggregated data at NACE 2 digit level (NACE codes by letter only)
	Regional statistics by NUTS classification - Regional education statistics	Not related to companies
	Regional statistics by NUTS classification - Regional health statistics	Not related to companies Specific to one Ecosystem

THEME	DATABASE	CAUSE
	Regional statistics by NUTS classification - Regional transport statistics (road, maritime and air transport)	No NACE breakdowns
	Regional statistics by NUTS classification - Regional labour market statistics (e.g. Employment by sex, age, economic activity and NUTS 2 regions (NACE Rev. 2))	No disaggregated data at NACE 2 digit level (NACE codes by letter only)
	Regional statistics by NUTS classification - Regional digital economy and society	Related to individuals and households, not companies
	Regional statistics by NUTS classification - Regional environmental and energy statistics	Not related to companies
	Regional statistics by NUTS classification - Regional poverty and social exclusion statistics	Not related to companies
	Regional statistics by NUTS classification - Regional crime statistics	Not related to companies
	Regional statistics by typology E.g. Employment by NACE Rev. 2 activity and metropolitan typology Business demography and high growth enterprise by NACE Rev. 2 activity and metropolitan regions Employer business demography by NACE Rev. 2activity and metropolitan regions Employment by NACE Rev. 2 activity and other typologies Etc.	No disaggregated data at NACE 2 digit level (NACE codes by letter only) Not related to companies (population, crime, patents applications, etc.)
	Degree of urbanization	Not related to companies
	City statistics	Not related to companies
	Other sub-national statistics	Not related to companies
	Non EU countries	No EU_27 data
POPULATION AND SOCIAL CONDITIONS	E.g. NACE rev 2 databases: Population by current activity status, NACE Rev. 2 activity and NUTS 2 region Population by status in employment, NACE Rev. 2 activity and NUTS 2 region	Mostly not related to companies No disaggregated data at NACE 2 digit level (NACE codes by letter only)
AQUACULTURE, FORESTY AND FISHERIES		Not related to companies or ecosystems
TRANSPORT	Road, Maritime and Air transport safety, regional statistics, infrastructures, equipment, passengers, traffic, goods,..	Not related to companies or ecosystems
ENVIRONMENT AND ENGERGY	Emissions of greenhouse gases and air pollutants /Air emission inventories (source: EEA)	No NACE breakdowns

THEME	DATABASE	CAUSE
	Emissions of greenhouse gases and air pollutants / Nitrogen dioxide concentrations in European capital cities - monthly averages (source: EEA), experimental statistics	Experimental statistics
	Material flows and resource productivity	No NACE breakdowns
	Environmental protection expenditure Environmental protection investments of corporations as ancillary producers by environmental protection activity and NACE Rev. 2 activity [ENV_AC_EPIAP] Production of environmental protection services of corporations other than specialist producers by economic characteristics and NACE Rev. 2 activity [ENV_AC_PEPSNSP] Intermediate consumption of environmental protection services by institutional sector and NACE Rev. 2 activity [ENV_AC_CEPSGC] Environmental subsidies and similar transfers from general government to corporations, by environmental activity, ESA category of transfer and NACE Rev. 2 activity of recipient [ENV_ESST_GGCP] Environmental protection expenditure by environmental domains (NACE Rev. 2, B-E) [SBS_ENV_DOM_R2]	Availability for limited NACE codes
	Environmental protection expenditure/ Environmental goods and services sector	Availability for limited NACE codes
	Waste Generation of waste by waste category, hazardousness and NACE Rev. 2 activity [ENV_WASGEN]	Availability for limited NACE codes
	Water Water use in the manufacturing industry by activity and supply category [ENV_WAT_IND]	Availability for limited NACE codes
	Chemicals	No NACE breakdown
	Biodiversity	Not related to ecosystems
	Energy statistics - quantities	No NACE breakdown
	Prices of natural gas and electricity	No NACE breakdown
	Market structure indicators	No NACE breakdown
	Cooling and heating degree days	No NACE breakdown
SCIENCE AND TECHNOLOGY	Research and development (R&D) Gross domestic expenditure on R&D (GERD) at national and regional level R&D personnel at national and regional level Government budget allocations for R&D (GBARD)	No NACE breakdowns

THEME	DATABASE	CAUSE
	High-tech industry and knowledge-intensive services (e.g. Enterprises in high-tech sectors by NACE Rev. 2 activity)	Availability for limited NACE codes
	Human Resources in Science & Technology Employed HRST by category, age and NACE Rev. 2 activity [HRST_ST_NSEC2] Employed HRST by category, sex, age and NACE Rev. 2 activity [HRST_ST_NSECSEX2] Job-to-job mobility of HRST by NACE Rev. 2 activity [HRST_FL_MOBSECT2]	No disaggregated data at NACE 2 digit level (NACE codes by letter only)
	Intellectual property rights Patent applications to the EPO by priority year by NACE Rev. 2 activity [PAT_EP_NNAC2]	Availability for limited NACE codes No NACE breakdowns (the rest)
DIGITAL ECONOMY AND SOCIETY	ICT usage in households and by individuals	Not related to companies
	ICT usage in enterprises Summary of EU aggregates [ISOC_CI_EU_EN2] Digital Intensity [ISOC_E_DII] E-commerce sales [ISOC_EC_ESELN2]	Data available for companies with 10 or more employees. Additional aggregations There is an error in the first Indicator: Internet access by NACE Rev.2 activity [ISOC_CI_IN_EN2] No. Additionally there are missing codes (problem of Ecosystem coverage) and aggregated codes (that would need disaggregation). For example missing NACE codes: A, P, Q, R, S, T. Many aggregated values for the non-missing.
	Digital skills Enterprises that employ ICT specialists [ISOC_SKE_ITSPEN2] Employed ICT specialists – total [ISOC_SKS_ITSPT] Enterprises that provided training to develop/upgrade ICT skills of their personnel [ISOC_SKE_ITTN2]	Data available for 10 or more employees. Additional aggregations: missing codes (problem of Ecosystem coverage) and aggregated codes (that would need disaggregation). For example missing NACE codes: A, P, Q, R, S, T. Many aggregated values for the non-missing.
	ICT sector	Availability for limited NACE codes
	Digital economy and society - historical data	Past data
CROSS CUTTING TOPICS	Quality of life: Average number of usual weekly hours of work in main job, by sex, age, professional	Not related to companies Availability for limited NACE codes

THEME	DATABASE	CAUSE
	status, full-time/part-time and economic activity (from 2008 onwards, NACE Rev. 2) [LFSA_EWHUN2]	
	Migrant integration and children in migration	Not related to companies
	Economic globalization indicators - International trade - Foreign direct investment - Employment - Research and development - Value added	No NACE breakdowns
	Equality (age and gender) - Age equality - Gender equality i.e. - Gender pay gap in unadjusted form by age - NACE Rev. 2 activity (B-S except O), structure of earnings survey methodology - Gender pay gap in unadjusted form by NACE Rev. 2 activity - structure of earnings survey methodology [EARN_GR_GPGR2]	Not related to companies Or No NACE breakdowns Or No disaggregated data at NACE 2 digit level (NACE codes by letter only)
	Quality of employment. For example Persons reporting exposure to risk factors that can adversely affect mental well-being by sex, age and NACE Rev. 2 activity [HSW_EXP5B] Persons reporting exposure to risk factors that can adversely affect physical health by sex, age and NACE Rev. 2 activity [HSW_EXP6B] Average number of usual weekly hours of work in main job, by sex, age, professional status, full-time/part-time and economic activity (from 2008 onwards, NACE Rev. 2) [LFSA_EWH] Temporary employment agency workers by sex, age and NACE Rev. 2 activity [LFSA_QOE_4A6R2] Precarious employment by sex, age and NACE Rev. 2 activity [LFSA_QOE_4AX1R2]	No NACE breakdowns No disaggregated data at NACE 2 digit level (NACE codes by letter only)
	Agri-environmental indicators	No NACE breakdown
	Climate change - Greenhouse gas emissions (already considered in environment. E.g. Air emissions accounts by NACE Rev. 2 activity [ENV_AC_AINAH_R2])	Already considered No NACE breakdown
	Climate change - Drivers-Energy (already considered e.g. Energy supply and use by NACE Rev. 2 activity Climate change -Drivers-Transport Climate change -Drivers-Industrial processes and product use (e.g. [ENV_AC_PEFASU]) or	Already considered Climate change - Greenhouse gas emission (already considered in environment. E.g. Air emissions accounts by NACE Rev. 2 activity [ENV_AC_AINAH_R2])

THEME	DATABASE	CAUSE
	limited NACE (Production in industry - annual data [STS_INPR_A]) Climate change -Drivers-Waste Climate change -Drivers-Agriculture Climate change -Drivers-Land use, land use change and forestry	No NACE breakdown (transport, waste) NACE codes for production only (Industrial processes and product use) Not related to companies (Agriculture, land use,…)
	Climate change - Mitigation	Already considered No NACE breakdown
	Climate change - Impact and adaptation	Not related to companies
	Climate change - Climate action initiatives	Not related to companies
	Skills-related statistics Skills supply - indirect measures Skills supply - self-reported measures Skills demand - indirect measures Skills demand - direct measures Skills demand - self-reported measures Skills development NACE Rev2 stat: Employment by sex, age and economic activity (from 2008 onwards, NACE Rev. 2) – [1 000 LFSA_EGAN2]	Not related to companies No disaggregated data at NACE 2 digit level (NACE codes by letter only)
	Youth	Not related to companies
TABLES EU POLICY	Macroeconomic imbalance procedure indicators Euro indicators / PEEIs Resource efficiency indicators Circular economy indicators Sustainable development indicators Information note Employment and social policy indicators European pillar of social rights (EPSR)	No NACE breakdowns
Environment	Emissions of greenhouse gases and air pollutants	No NACE breakdowns
Environment	Physical energy flow account Energy supply and use by NACE Rev. 2 activity [ENV_AC_PEFASU] Key indicators of physical energy flow accounts by NACE Rev. 2 activity [ENV_AC_PEFA04]	No NACE breakdowns
	Environmental protection expenditure Environmental protection investments of corporations as ancillary producers by environmental protection activity and NACE Rev. 2 activity [ENV_AC_EPIAP]	ENV_AC_EPIAP only covers A, B, C, D and E. The rest of the NACEs are missing (E.g. N or M), affecting to horizontal activities which weight on all the Ecosystems.

ANNEX 12 DATABASES FOR ALTERNATIVE GEOGRAPHICAL BREAKDOWN OF ECOSYSTEMS

Regional statistics by NUTS classification. Regional labour costs statistics. (E.g. Labour cost, wages and salaries, direct remuneration by NACE Rev. 2 activity and NUTS 1 regions - LCS surveys 2008, 2012 and 2016)	NACE codes available EU27 or countries not available. POTENTIAL USE TO EVALUATE ECOSYSTEMS REGIONALLY

Regional breakdowns have an additional complication to the ones we have evaluated in the report. Besides the 2-digit NACE breakdown NUTS breakdown is also needed. Most of the Eurostat public databases lack on either one of these two limiting the possibilities to evaluate regional evolution of ecosystems in EU regions.

ANNEX 13 WEIGHTS ALLOCATION

Weights for the calculations were provided by Eurostat. The file provided can be found in Ecosystem files/Weights/IES_Weights.xlsx.

This file contains one error in Industrial Ecosystem 03 NACE M71 (it indicates 1256805448 and should be 1.256805448). The resulting weight matrix is the one used as auxiliary file in most of the scripts called ecosystemweights.xlsx. Based on NACEs reported in Eurostat databases an extended version of the weights matrix (exosystemweightsextended.xlsx) was created with the disaggregation of NACE codes that are aggregated (E.g. C10-C12 is reported aggregated in ecosystemweights.xlsx and disaggregated as C10, C11 and C12 in exosystemweightsextended.xlsx). The extended version of the matrix is used in those kpi calculations where the database had disaggregated NACE codes values.

Eurostat weights differ from the ones in ASMR 2022 in several aspects:

- Generally speaking ASMR 2022 weights are truncated in the number of decimal values. This results in insignificant differences in the 10e-5 level.
- ASMR 2022 is missing the value for Ecosystem 4 and NACE M75 (It only reports M74 with a value of 0,44). This also differs from Eurostat weights (it reports M74_M75 with a value of 0,64) and from ASMR 2021 (It reports M74_M75 with a value of 0,64).
- ASMR 2022 and Eurostat weights differ in 5 values more than 1% (0,01).

Eurostat weights have insignificant differences from the ones in ASMR 2021 because ASMR 2021 weights are truncated in the number of decimal values. ASMR 2022 and ASMR 2021 do not differ on the horizontal distribution of the weights. The differences between the weights in ASMR 2021 and ASMR 2022 are:

ECOSYSTEM	NACE_R2	DIFFERENCE ASMR 21-22	DIFFERENCE ASMR21-EUROSTAT*
Aerospace & Defence	C25	0,02	0
Aerospace & Defence	C27	-0,01	0
Aerospace & Defence	C33	0,01	0
Cultural and Creative Industries	M74_75	0,2	0
Cultural and Creative Industries	N77	0,0005	0
Digital	C26	-0,07	0
Mobility - Transport - Automotive	H50	0,09	0
Tourism	H50	0,01	0
Tourism	R90-R92	-0,01	0

* the 0 indicates insignificant differences due to the truncated values reported in ASMR 2021

The file Weights comparison Eurostat-AMSR2022.xlsx includes a complete tables with the differences between Eurostat, ASMR 2021 and ASMR 2022 distribution of weights.

Table ____ Weights matrix (rearranged from Eurostat data in IES_Weights.xlsx)

	WEIGHT													
IES	IES01	IES02	IES03	IES04	IES05	IES06	IES07	IES08	IES09	IES10	IES11	IES12	IES13	IES14
NACE2														
A	0	1	0	0	0	0	0	0	0	0	0	0	0	0
C10-C12	0	1	0	0	0	0	0	0	0	0	0	0	0	0
C13-C15	0	0	0	0	0	0	0	0	0	0	0	0	1	0
C16	0	0	0	0	0	0	0	1	0	0	0	0	0	0
C17	0	0	0	0	0	0	0	1	0	0	0	0	0	0
C18	0	0	0	1	0	0	0	0	0	0	0	0	0	0
C19	0	0	0	0	0	0	0	1	0	0	0	0	0	0
C20	0	0	0	0	0	0	0	1	0	0	0	0	0	0
C21	0	0	0	0	0	0	0	0	1	0	0	0	0	0
C22	0	0	0	0	0	0	0	1	0	0	0	0	0	0
C23	0	0	0	0	0	0	0	1	0	0	0	0	0	0
C24	0	0	0	0	0	0	0	1	0	0	0	0	0	0
C25	0,097362	0,066168	0,305189	0,008982	0,020901	0,0196	0,015553	0,036324	0,051639	0,235501	0,023466	0,0442	0,008535	0,036845
C26	0,44	0	0	0	0,222517	1	0	0	0	0	0	0	0	0
C27	0,23	0	0	0	0	0	0,378114	0	0	0,025089	0	0	0	0
C28	0,067894	0,078244	0,198393	0,012618	0,030525	0,122558	0,015984	0,040056	0,056225	0,277642	0,029954	0,057346	0,009986	0,050067
C29	0	0	0	0	0	0	0	0	0	1	0	0	0	0
C30	0,681044	0	0	0	0	0	0	0	0	0,318958	0	0	0	0
C31	0	0	1	0	0	0	0	0	0	0	0	0	0	0

	WEIGHT													
C32	0	0	0	0,079	0	0	0	0	1	0	0	0	0	0
C33	0,166456	0,118497	0,155381	0,013205	0,032879	0,015305	0,016405	0,047373	0,068633	0,165263	0,035659	0,064677	0,00967	0,07166
D	0	0	0	0	0	0	0,29	0	0	0	0	0	0	0
E36	0,017444	0,121809	0,102483	0,02467	0,022172	0,006887	0,01128	0,040057	0,110972	0,0582	0,07653	0,074141	0,012856	0,104587
E37-E39	0,027442	0,094801	0,136681	0,018941	0,027805	0,010187	0,014313	0,086234	0,085284	0,098157	0,053702	0,07756	0,01437	0,07119
F	0	0	1	0	0	0	0	0	0	0	0	0	0	0
G45	0	0	0	0	0	0	0	0	0	1	0	0	0	0
G46	0	0	0	0	0	0	0	0	0	0	0	1	0	0
G47	0	0	0	0,012	0	0	0	0	0	0	0,155	1	0	0
H49	0	0	0	0	0	0	0	0	0	0,517742	0	0	0	0,445221
H50	0	0	0	0	0	0	0	0	0	0,77724	0	0	0	0,222225
H51	0,092866	0	0	0	0	0	0	0	0	0	0	0	0	0,907134
H52	0,178	0	0	0	0	0	0	0	0	0,393612	0	0	0	0
H53	0	0	0	0	0	0	0	0	0	0	0	1	0	0
I	0	0	0	0	0	0	0	0	0	0	0,14	0	0	1
J58	0	0	0	1	1	0	0	0	0	0	0	0	0	0
J59_J60	0	0	0	1	0	0	0	0	0	0	0	0	0	0
J61	0,069	0	0	0	0,972721	0	0	0	0	0	0	0	0	0
J62_J63	0	0	0	0,004	1	0	0	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0	0	0	0	0,0836	0	0	0
M69	0,024984	0,07721	0,115127	0,027735	0,051335	0,011667	0,00965	0,049054	0,087623	0,086191	0,057233	0,134521	0,011523	0,067615
M71	0,033689	0,060163	1,256805	0,173047	0,04423	0,014561	0,011725	0,036812	0,076141	0,092899	0,044152	0,080038	0,011156	0,054884
M72	0,056517	0,072081	0,104068	0,027198	0,069032	0,050716	0,008286	0,030642	0,142165	0,129971	0,046536	0,081408	0,011505	0,048453

	WEIGHT													
M73	0	0	0	1	0	0	0	0	0	0	0	0	0	0
M74_M75	0	0	0	0,64	0	0	0	0	0	0	0	0	0	0
N77	0,027148	0,082093	0,129191	0,029051	0,051669	0,013045	0,008469	0,031288	0,099961	0,085503	0,061228	0,126924	0,009894	0,082765
N78	0,027148	0,082093	0,129191	0,028451	0,051669	0,013045	0,008469	0,031288	0,099961	0,085503	0,061228	0,126924	0,009894	0,082765
N79	0	0	0	0	0	0	0	0	0	0	0	0	0	1
N80	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N81	0	0	1	0	0	0	0	0	0	0	0,28	0	0	0
N82	0	0	0	0	0	0	0	0	0	0	0,11	0	0	1
P	0	0	0	0,1	0	0	0	0	0	0	0	0	0	0
Q86	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Q87_Q88	0	0	0	0	0	0	0	0	1	0	1	0	0	0
R90-R92	0	0	0	0,8	0	0	0	0	0	0	0	0	0	0,66
R93	0	0	0	0	0	0	0	0	0	0	0	0	0	1
S94	0	0	0	0,02	0	0	0	0	0	0	0	0	0	0
S95	0	0	0	0,26	0,48	0	0	0	0	0	1	0	0	0
S96	0	0	0	0	0	0	0	0	0	0	1	0	0	0
T	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Most of the kpis require NACE codes to be manually disaggregated based on information from other databases (E.g. disaggregation of C31_32 Value added into C31 and C32 using SBS data for Value added at factor cost)

This disaggregation files (scripts, auxiliary, html, excel) are included in the Ecosystem files folder:

- Ecosystem files/SBS Ratio value added
- Ecosystem files/SBS Ratio number of companies
- Ecosystem files/SBS Ratio employment

Then for example for to disaggregate C31_32 Value added from National Accounts into C31 and C32 we used SBS data for Value added at factor cost.

\ We retrieved Value added at factor cost from SBS data for C31 and C32 for the years of the study

	VALUE ADDED AT FACTOR COST - MILLION EURO2011	VALUE ADDED AT FACTOR COST - MILLION EURO2012	VALUE ADDED AT FACTOR COST - MILLION EURO2013	VALUE ADDED AT FACTOR COST - MILLION EURO2014	VALUE ADDED AT FACTOR COST - MILLION EURO2015	VALUE ADDED AT FACTOR COST - MILLION EURO2016	VALUE ADDED AT FACTOR COST - MILLION EURO2017	VALUE ADDED AT FACTOR COST - MILLION EURO2018	VALUE ADDED AT FACTOR COST - MILLION EURO2019
nace_r2									
C31	25942.9	25351.6	25126.6	25992.3	27118.8	29000.0	29953.3	31000.0	32152.1
C32	39156.6	37505.3	37603.5	39289.1	40551.1	41874.3	47133.7	50000.0	48014.0
N80	24979.4	25000.0	25126.8	25293.1	27000.0	29108.0	29828.8	31000.0	31731.8
N81	69700.0	70543.8	74000.0	77019.1	79840.2	84973.4	90000.0	101568.8	107844.9
N82	56000.0	58000.0	59419.4	63732.8	64085.4	67738.3	71860.2	80000.0	77889.3

\ -Then we calculate the ratio for each year. For example:

Ratio C31(2011)= Value added C31(2011)/(Value added C31(2011)+ Value added C32 (2011) = 25942,9/(25942,9+39156,6)= 0,398512

	VALUE ADDED AT FACTOR COST - MILLION EURO2011	VALUE ADDED AT FACTOR COST - MILLION EURO2012	VALUE ADDED AT FACTOR COST - MILLION EURO2013	VALUE ADDED AT FACTOR COST - MILLION EURO2014	VALUE ADDED AT FACTOR COST - MILLION EURO2015	VALUE ADDED AT FACTOR COST - MILLION EURO2016	VALUE ADDED AT FACTOR COST - MILLION EURO2017	VALUE ADDED AT FACTOR COST - MILLION EURO2018	VALUE ADDED AT FACTOR COST - MILLION EURO2019
nace_r2									
C31	0.398512	0.403322	0.400551	0.398158	0.400751	0.409175	0.388565	0.382716	0.401069
C32	0.601488	0.596678	0.599449	0.601842	0.599249	0.590825	0.611435	0.617284	0.598931
N80	0.165778	0.162820	0.158483	0.152327	0.157963	0.160093	0.155610	0.145835	0.145916
N81	0.462572	0.459438	0.466741	0.463845	0.467105	0.467350	0.469511	0.477816	0.495916
N82	0.371650	0.377742	0.374777	0.383828	0.374932	0.372558	0.374879	0.376349	0.358168

For each database a different base ratio might need to be used and different NACE codes might need to be disaggregated.

For example:

- for Demography files we used the number of enterprises based on SBS data with the file ratio-Enterprises - number.xlsx, compared to Value Added in National Accounts where we used the value added at factor cost based on SBS data with the file ratioCN-Value added at factor cost – million euro.xlsx
- For Demography files C17 _C18, C20_C21, C24_C25, C26_C27, C29_C30, C31_C32 and E needed to be disaggregated while for Value Added in National Accounts only C31_C32 and N80-N82 needed to be disaggregated.

For example, for Energy we used also Value Added at factor cost from SBS to disaggregate C31_C32 and N80-N82, because there was no better comparable indicator to disaggregate these values.

The scripts indicate the ratio file used for disaggregation and the disaggregated NACES (calculations are done over moddf_target matrix in the scripts).

Only in few cases aggregation of data was required. For example, for Demography C13-C15 as an aggregation of C13_C14 and C15, J59_J60 as an aggregation of J59 and J60 among others (calculations are done over moddf_target matrix in the scripts).

ANNEX 14 USE OF DEMOGRAPHY DATA

Business demography by size class (from 2004 onwards, NACE Rev. 2) [BD_9BD_SZ_CL_R2] to calculate Population of active enterprises in t – number [V11910] and derivative measures from Business demography by legal form (from 2004 onwards, NACE Rev. 2) [BD_9AC_L_FORM_R2] such as:

- [V11920] Births of enterprises in t - number
- [V11930] Deaths of enterprises in t - number
- Birth rate
- Death rate
- Business Churn

Do not cover the following 'A' and 'T' NACE codes. Therefore Agri-food (NACE code 'A') and Proximity, Social Economy and Civil Security (NACE code 'T') are incomplete.

Although there is no disaggregation for 'C17_C18', 'C20_C21', 'C24_C25', 'C26_C27', 'C29_C30', 'C31_C32', 'E', SBS data is virtually the same (Correlation= 0.9998) to the data in Business Demography database and can be used to distribute these values with confidence.

ANNEX 15 USE OF TRADE DATA

Trade by NACE Rev. 2 activity and enterprise size class [EXT_TEC01]

Characteristics:

- Includes stock flows: Imports and Export
- Different partners: Intra-EU, Extra-EU, All countries of the world
- No aggregated data for EU27
- Data for all the EU27 countries
- Not all the codes in the database are disaggregated at a level that will allow to distribute them into the ecosystems
- No values for certain EU27 countries for 2012 and 2013. For example, for 2013 DE, DK, EE, ES, IT values are missing (see Trade['EXP']['INT_EU']['TOTAL']-year-2013.xlsx).
- Includes a NACE category call 'OTH' that includes ('I','P', 'Q86', 'Q87_Q88', 'R90-R92', 'R93', 'S94', 'S95', 'S96', 'T','U')

Therefore:

- Because there is no EU27 aggregate the only way to obtain the aggregated value is by adding country data. This implies more error than in the proposed methodology. A missing value (for example, for confidentiality) from one country in a certain NACE code will introduce an error on the estimation of the EU27 aggregated that it is calculated for that NACE code as an aggregation of the country values.
- The lack of disaggregation in many NACE codes requires to use a criteria to disaggregate the original NACEs in the database into a more granular level required by the Ecosystems procedure of calculation. In this regard we cannot use for example well known measures such as Value Added because they are not related to trade. However, there is a detailed version of this database Trade by NACE Rev. 2 activity sector (optional table) [EXT_TEC09]

Other databases

The following databases present a very aggregated measure in terms of NACE

- Concentration of trade by NACE Rev. 2 activity [EXT_TEC02]
- Trade by partner country and NACE Rev. 2 activity [EXT_TEC03]
- Trade by number of partner countries and NACE Rev. 2 activity [EXT_TEC04]

Eg. [TOTAL] Total - all NACE activities, [A_F_H-U] All NACE activities (except industry; wholesale and retail trade; repair of motor vehicles and motorcycles) , [B-E] Industry (except construction), [G] Wholesale and retail trade; repair of motor vehicles and motorcycles, [UNK] Unknown NACE activity

The following databases present same NACE codes as [EXT_TEC01]

- Trade by commodity and NACE Rev. 2 activity [EXT_TEC05]
- Trade by type of trader [EXT_TEC06]
- Trade by type of ownership (optional table) [EXT_TEC07]
- Trade by exports intensity (optional table) [EXT_TEC08]

The following databases present no NACE codes:

- Trade by partner country and enterprise size class (optional table) [EXT_TEC10]

Trade by NACE Rev. 2 activity sector (optional table) [EXT_TEC09]

Characteristics:

- Includes stock flows: Imports and Export
- Different partners: Intra-EU, Extra-EU, All countries of the world
- No aggregated data for EU27
- Data for less than 18 countries of the EU27 countries. EU27 countries missing all the years are 'BG', 'CY', 'DK', 'EE', 'EL', 'FI', 'HU', 'IE', 'SE'. Countries have been incorporated to these databases from 2 countries in 2012 to 18 countries in 2020.
- Disaggregated codes to cover all the ecosystem weights

Therefore:

- It can be used to disaggregate the aggregated NACE codes in Trade by NACE Rev. 2 activity and enterprise size class [EXT_TEC01]
- As only 18 (or less) countries are present then we are assuming that the EU_27 countries distribution of trade values are the same as the 18 (or less) countries in the database. Thus, years closer to 2020 are more representative of the actual distribution of trade, but it is an approximation of the EU27 value using only an aggregated measure of a few country values.

Additional problems:

\ Country data in the detailed database [EXT_TEC09] has missing data (e.g. confidential) for several countries. Then, the aggregated value of the countries for a particular aggregation of NACE, for example H, is not equal to the aggregated value of the countries for its components, in the example, H49+….+ H53. Thus, the ratios are calculated with the aggregated components, otherwise the sum of the resulting rations will not be equals to 1.

If no data was missing H = H49+H50+H51+H52+H53.

Then ratioH49 =H49/H,…. ratioH53=H53/H

As data is missing H <> H49+H50+H51+H52+H53.

Then ratioH49=H49/(H49+H50+H51+H52+H53),…,

ratioH53=H53/ (H49+H50+H51+H52+H53)

e.g. I+ P+ Q86+ Q87+ Q88+ R90+ R91+ R92+ R93+ S94+ S95+ S96+ T+ U in the database [EXT_TEC09] is not equals to OTH in the database [EXT_TEC01]. For the year 2020 Austria (AT) Q87 and Q88 are missing (confidential).

Then the ratios have also some errors on them.

\ These differences happen also at a country level.

E.g. H aggregated for a Austria AT is not H49+H50+H51+H52+H53 for 2020 because H50 and H53 are missing.

Conclusions:

\ It is possible to calculate values for ecosystems with the existing data. However the disaggregation relies on the assumption that EU27 trade distribution is alike the trade distribution for the countries that are included in the [EXT_TEC09] database, which is not very realistic. However, the aggregation of new countries to this database till the 18 present now improves the approximation. If the detailed information is completed (in the [EXT_TEC09] database) for the missing EU countries ('BG', 'CY', 'DK', 'EE', 'EL', 'FI', 'HU', 'IE', 'SE'), the information will improve significantly, besides the commented problems related to the lack of a EU27 total value.

\ This example can be customized by selecting the stockflow, partner, size,... quite easily at the beginning of the script:

- imports instead of exports
- extra-EU or World instead of Intra-EU
- big or SMEs instead of Total

\ From these metrics other metrics, such as, Trade Balance or Exports over GDP, could be calculated