

**Sport Satellite Account: Research into a new measure for estimating  
the value of sport: Feasibility and Methodology**

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## 1. Introduction

The Sport Industry Research Group (SIRG) at Sheffield Hallam University, in collaboration with SpEA and Econmove welcome the opportunity to present the feasibility findings of the research into the economic value of sport in the UK, England, Scotland, Wales, and Northern Ireland.

The report is accompanied with additional Excel files, providing the outputs of the 'regionalisation' of the UK's Input Output Tables (IOT) into the nations of England, Scotland, Wales and Northern Ireland and the estimation of the GVA matrix for the UK at the four-digit CPA level, which will serve as the basis of our sport investigations in each nation. To our understanding, this report also marks the first ever endeavour in the UK to regionalise the UK IOT, which adds significant value to this project.

The report examines the options we considered for constructing the Sport Satellite Accounts (SSAs) and the choice that was made, followed by the output of the 'regionalisation' of the IOTs, the output of the SSA framework (in terms of Gross Value Added), the data sources used in the analysis, an introduction of the consumption side of the Account, a presentation of the methodology used, and finally our way of dealing up to now with the company accounts deposited in the Companies House, through the dataset FAME.

Further, the report is based on the revised Vilnius definition, and the revised pan-European methodology agreed in the EU with the active and leading participation of SIRG, as well as the leading team of this research.

The primary outputs of SSAs globally are conducted in the UK, EU countries, Australia, and Japan. Previous economic evaluations have also been carried out in New Zealand, with the most recent one conducted by Sheffield Hallam University. They utilised the National Income Accounting methodology, a double-entry system previously employed by Sport England, taking into consideration the insights of the Vilnius definition and their research history. The Australian evaluation of the sport economy, detailed in the provided link<sup>1</sup>, follows a similar logic to the approach outlined in this report for establishing the shares of the sport economy.

In addition to national SSAs, there have been two Pan-European Accounts for the EU, which also included the UK<sup>2</sup>. The most recent one, published in 2018 using 2012 data, revealed that the UK's sport industry contributed 2.2% to the national GDP and 3.8% to employment (including indirect effects). The observation that the percentage of employment generated exceeded that associated with GDP or GVA suggested that sport is an efficient generator of

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<sup>1</sup> <https://www.health.gov.au/sites/default/files/documents/2020/05/sports-industry-economic-analysis.docx>

<sup>2</sup> [Study on the economic impact of sport through sport satellite accounts - Publications Office of the EU \(europa.eu\)](https://ec.europa.eu/economy_finance/studies/study_on_the_economic_impact_of_sport_through_sport_satellite_accounts_en)

employment. This implies that a given investment in sport, if demand exists, would yield more employment than an average sector of the economy. It was concluded that sport can serve as a policy tool to boost employment, particularly during periods of economic crisis and recession. The existence of a system of accounts in the UK facilitated a rapid response in evaluating the effects of Covid-19 on both national economies and specific sectors like golf, thereby influencing policy decisions.

As Table 1 below shows, the Pan-European SSA has identified the sectors driving the sport economy across the UK and the EU, highlighting the leading shares in terms of employment and GDP.

**Table 1: Employment contributions of 10 top sport related sectors**

Rank	CPA	Goods and Services	Employment. in heads	Share of total employment.
1	P	Education services	1,110,882	0.53%
2	R93_1	Sport services	749,291	0.36%
3	G47	Retail trade services, except of motor vehicles and motorcycles	586,516	0.28%
4	I	Accommodation and food services	585,892	0.28%
5	O	Public administration and defence services; compulsory social security services	503,059	0.24%
6	G46	Wholesale trade services, except of motor vehicles and motorcycles	345,683	0.17%
7	R90-92	Creative, arts, entertainment, library, archive, museum, other cultural services; gambling and betting services	240,952	0.12%
8	F	Construction and construction works	179,414	0.09%
9	Q86	Human health services	143,666	0.07%
10	C13-15	Textiles, wearing apparel, leather and related products	124,104	0.06%

*Source: EU, Pan-European Sport Account 2018*

In summary, the "Education services" sector emerges as the strongest, boasting over 1.1 million employees. Following closely is the "Sport services" sector with approximately 749,000 employees, and the retail services sector with more than 586,000 employed individuals. Both the sport services and retail sectors exhibit high employment generation relative to their GDP contribution. Sport tourism significantly contributes to the size of the Accommodation and food services sector, accounting for 586 thousand jobs across the EU. These top three sectors collectively provide employment for nearly 2.45 million people, constituting 1.17% of the EU's total employment (including the UK at that time).

In the case of the UK, reports regularly produced by DCMS focus on the headline GVA and employment contributions of the sport sector. These reports indicate that the direct impact

of sport is equivalent to 2.1% or 2.2% of the UK economy<sup>3</sup>. Compared to other countries, the UK possesses three significant advantages, outlined below:

1. A robust golf sector with strong ties to tourism. This implies a strong element of sport tourism compared to other countries, mainly through the golf resorts.
2. A well-established network of grassroots clubs, which serve as the foundation of the sport economy. A study conducted in Northern Ireland revealed that sport clubs recycle surpluses rapidly, thereby contributing to economic growth and employment. The implication of this is that the core element of the sport sector would generate more employment than the average sector, with most surpluses generating additional employment and growth.
3. The UK boasts a large number of sport volunteers (6.2 million), as studied in the recent EVIS<sup>4</sup> project, surpassing the number in eight other examined countries. The availability of such a vast pool of volunteers represents a considerable asset for the UK sport sector, allowing grassroots clubs to operate at minimal cost and sustaining the current level of sport participation. The implication of this advantage is that the core sector of sport services associated with clubs has a stronger presence in terms of GVA and employment compared to most other European countries.

The current research endeavours, for the first time, to present a Multinational Input-Output Table (MNIOT) for the UK, resulting in a comprehensive Sport Satellite Account for the entire UK, including (separately) England, Scotland, Wales, and Northern Ireland, along with the estimation of sport multipliers.

This research enhances previous UK Sport Satellite Accounts by incorporating the Multi-national Input Output Table to detail accounts for England, Scotland, Wales, Northern Ireland, and the UK as a whole. It also uses the final updated version of the Vilnius definition of sport and introduces a nuanced categorisation of goods related to sports, distinguishing between characteristic and connected items. Our goal is for this research to emerge as a significant policy tool utilised not only by national policymakers but also by sport federations in evaluating their economic activities.

## **2. Options for the Construction of a Sport Satellite Account**

In contrast to prior satellite accounts, this updated SSA methodology distinguishes itself by not only having sectoral analysis but also by regional and sports differentiation. Consequently, alongside the UK SSA, there would be national satellite accounts contributing to the UK values, as well as sport-specific values (on aggregate) that collectively contribute to the UK value across all sports considered.

Initially, a comparison between the SSA application in the UK and EU versus methodologies in Australia, New Zealand, and Japan was necessary. Japan's approach, aligned with the Vilnius definition, offers comparability with the UK and EU but places a greater emphasis on

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<sup>3</sup> [Sport Satellite Account 2016.pdf \(publishing.service.gov.uk\)](#)

<sup>4</sup> [Publications | EVIS \(evisproject.eu\)](#)

manufacturing. The notable distinction is Japan's focus on presenting GVA results without extending the analysis to employment or consumer spending yet. The anticipated updates in Japan's accounts, addressing the gap in employment and consumer spending analysis, should refine their approach and reinforce our own suggestion for proceeding with the project.

In the case of New Zealand, the last economic impact study was based on the National Income Accounting methodology that was developed for Sport England in the 1990s. The study took into account the definition of sport suggested by the Vilnius definition although did not internalise it within its methodological framework. The New Zealand study recognised the importance of constructing in the future an SSA and considered the last evaluation as a possible development in this direction.

Finally, the Australian economic evaluation is not dissimilar to our current approach, and it uses the UK and EU results as a benchmark for framing the Australian sport economy. The main difference is in the sport definition. The KPMG definition of sport they use has some differences from the foundations of the UK approaches so far. As the Australian report puts it: 'Although the definitions and methodologies used differ between the KPMG and EU investigations, using national accounts and statistical methods to analyse and extract the impact of the Sports Industry remains at the core of both studies'. Further, according to the Australian report: 'The greater depth of data available in the 2008 CPA classifications enables the Vilnius definition to identify granular sport-related activity that is not distinguished in the ANZSIC list'. The Australian report adjusts the Vilnius definition by dropping some elements of its (ex) broader definition, that are not relevant in the Australian sport economy. Some of these elements, such as employment services, and petroleum products have also been excluded from the last update of the Vilnius definition. Others such as Travel services and Wholesale services are very important in the UK context and it would be impossible for us to ignore. On the contrary we also adjusted the basic Vilnius definition according to the UK realities, and from this point of view the underlying logic of the Australian account and the present research is the same. Following this analysis the conclusion is that all three studies in Japan, New Zealand, and Australia, reinforce and do not contradict the suggested methodology in this report.

### ***2.1 The general process for the SSA construction***

The general process of constructing the SSA is outlined below:

1. Developing the methodology for SSA, utilising the updated Vilnius definition 3.0 (2023).
2. Create a matrix of the sports economy based on NACE categories, GVA, and total employment sizes. This entails a GVA distribution among NACE categories at the 4-digit level for the entire economy. This is a substantial undertaking, requiring the utilisation of employment data and/or the Annual Business Survey to link each NACE code to both GVA

and employment figures for the economy overall. This matrix will serve as the basis of the sports investigations across all nations.

3. Differentiate between Characteristic and Connected goods to align with the updated SSA standards. Characteristic goods encompass the sport services sector, and sport education, as they directly relate to participation. This addresses the distinction between 'participation' and 'passive consumption', while also considering the logic employed in previous projects. In terms of CPA categories, the characteristic goods include the sector 93.1 (sport services) and the sport element in the education categories (85); everything else are connected goods. Further details can be found in paragraph 4.1.
4. Utilise data available at the UK level for Education, Consumption, International Trade, Production (Prodcom), etc. Initially, data will be collected for the most significant activities, namely Characteristic goods, or services, and subsequently data for Connected goods, prioritised according to their importance.
5. For Connected goods, utilise the dataset from Companies House (via FAME) to pinpoint important companies in each NACE category from a sports perspective. Connections to sports can be traced through either the overall company title or their trade description. Typically, identifying the largest companies by sales or employment would indicate the share of sports within each NACE sector. An important assumption, supported by prior research<sup>5</sup>, is that the share of sports in GVA is roughly equivalent to the share of sports in employment. This is true only in the case of the connected goods: for example, in sport publications we don't have any evidence that sport employment would outweigh sport GVA (same percentages are assumed). Overall, the sport industry contributes more significantly to employment than to GVA, primarily due to the role of sport services and clubs, classified under category 93.1. For instance, the DCMS's narrow statistical definition of sport in 2022 indicates that sport accounts for 1.6% of employment but only 0.8% of GVA, underscoring the sector's substantial employment impact relative to its economic output.
6. Conduct surveys with the selected companies to determine the proportion of sports-related activities within their economic operations. This can be facilitated through the survey resources provided by Sheffield Hallam University or by directly communicating with the companies. On the basis of past experience, it is expected that around 60% of the sport related codes will be investigated through such a process.
7. Once the shares of sport have been determined, proceed to fill out the initial template necessary for constructing a preliminary approach to SSA (refer to the template provided in the Methodology section). This template outlines the essential data needed to

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<sup>5</sup>[Study on the economic impact of sport through sport-NC0517238ENN.pdf](#)

evaluate the economic significance of sport and aligns with the methodologies utilized in EU or Australia.

8. Ensure uniformity in prices, whether they are basic prices or purchaser's prices.
9. Multipliers will be estimated by inverting the matrix of technical coefficients, providing accurate values at the two-digit level of the examined categories.

The breakdown of UK sport related GVA and employment by sport will be conducted using the model developed for UK Sport. This model employs a pragmatic distribution method based on participation rates and financial exposure of individual sports. For the financial exposure aspect, annual reports from Companies House can be utilised, along with available consumer data, if accessible.

The distribution of evaluated national GVA and employment among local authorities will be determined by utilising sport participation rates and financial exposure per sector. Additionally, the 5-digit employment dataset can be examined to model sport services per local authority. The logic of previous studies on the Local Economies will also be considered<sup>6</sup>.

## ***2.2 Decisions on methodology***

Below is a list of the main decisions that had to be made for the methodology of the project:

The most important question was to decide between a methodology where we start from a UK level SSA and proceed, in a pragmatic way, to the national accounts, and a methodology where we start from the construction of the national accounts and add them up to a UK account. It was decided to take the more difficult second route when it became obvious that the data existed for the national breakdown of the UK IOT.

A second decision was the way to estimate the multipliers. The choice was between an approximation (adjusting the sport multipliers compared to the generic multipliers by taking into account the ratios of output and GVA, imports, interregional trade and production functions) against a strict estimation by inverting the matrix of technical coefficients. As before, the construction of the multinational table, allowed us to proceed with the second option.

A third decision was the modelling of the trade between the four nations. The two options were between the use a gravity model and utilising the existing datasets for interregional trade. After a detailed examination of the data sources, it was decided to base the modelling of the trade on direct data. More details on the data used can be found in the data sources section of this report.

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<sup>6</sup> [Economic Value of Sport - Local Model](#)



A fourth decision pertained to the selection of the study year, with the choice between 2019 and 2021. While Supply and Use Tables for the UK have been published up to 2021, enabling the construction of SSAs for both years, 2019 is not representative of the effects of Brexit, which have impacted the economy since then. Conversely, although 2021 incorporates the Brexit effects, it may also be affected by Covid-19, particularly in the case of events. The year 2020 was not considered due to the severe one-off effects of the pandemic. After careful consideration, it was determined that 2021 is the most suitable year for the study.

In summary, the decision was made to adopt the Sport Satellite Accounts (SSAs) methodology over National Income Accounting since the latter cannot generate satellite accounts or multipliers at its conclusion. It was also resolved to utilise existing inter-regional trade data over a gravity model for a more detailed trade analysis. Calculations and surveys will prioritise national data to maximise the use of the MNIOT table, offering a detailed overview of the sports industry. Finally, the year 2021 was chosen over 2019 for the SSA calculation to reflect the most recent data not heavily impacted by the COVID pandemic.

### **3. Regionalisation Procedure – A Multinational-Input-Output Table (MNIOT) for the UK**

#### **3.1 Task**

Input-output tables, which were originally only used at the national level, have proved to be a helpful and indispensable tool for a variety of economic analyses and effective economic policy. The increasing interest in economic analyses at the regional level led to the first attempts to create input-output tables at regional level as early as the 1950s. Since then, a variety of approaches and models have been developed to create regional input-output tables, with the focus shifting from single-region models to so-called multi-regional models.

The creation of regional input-output tables always involves a conflict of objectives between the four competing goals of

- accuracy,
- actuality,
- comparability and
- sufficient level of disaggregation

of the input-output table, whereby financial, human and time resources must also be considered. It is important to bear in mind that the lack of data - which already exists at national level - is even more pronounced at the regional level, meaning that a large amount of the data required to compile an input-output table is not statistically recorded and must therefore either be collected using primary data surveys or derived and estimated using so-called non-survey methods.

Depending on the objective and the question to be answered, a variety of methods for compiling regional input-output tables have been developed.

The aim of this work is to create a multi-national Input-Output table for the UK nations - England, Scotland, Wales, and Northern Ireland – as a basis for the creation of a multi-national Input-Output table in Sport (MNIOT:Sport). For this purpose, a so-called sport satellite account has to be integrated into the multi-national input-output table. To achieve this, a hybrid regionalisation approach is used. This approach is based on the UK input-output table and integrates existing national data.

The detailed steps outlined below illustrate the complexity of the regionalisation procedure and highlight the importance of considering both, intra-regional and inter-regional, trade linkages for an accurate representation of England, Wales, Scotland, and Northern Ireland.

### 3.2 Regionalisation procedure

To better illustrate the approach, the individual steps of the regionalisation process will be graphically presented using a simplified example of a 3-sector model (instead of 75 sectors used in the final MNIOT). Figure 1 outlines the task: from the original UK Table a multi-national input-output-table, according to the Isard scheme<sup>7</sup>, has to be created: The Isard scheme is an input-output model with  $m$  regions (here: the 4 nations England, Wales, Scotland and Northern Ireland) and  $n$  sectors (75 sectors according to Table in the Appendix) each, which depicts both intra-regional trade (within the region<sup>8</sup>) and inter-regional trade (between the regions) in the first quadrant. International trade is covered by a single row “imports” and a single column “exports”. Compared to other versions of input-output tables (e.g. the multiregional input-output-table by Chenery and Moses or the balanced model of Leontief), the Isard schema is the one with the highest level of detail.

**Figure 1: The task of the regionalisation procedure**

		UK			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
UK	1								
	2								
	3								
Imports									
Total intermediate use									
GROSS VALUE ADDED									
TOTAL OUTPUT									



<sup>7</sup> Isard et al. (1960) Chapter 8.

<sup>8</sup> We refer to the nations as regions to avoid confusion with terms such as international trade which also are used in the usual context. Hence, terms as intra-regional and inter-regional are used

		England			Wales			Scotland			Northern Ireland			Sum	Final Demand	Total Use
		1	2	3	1	2	3	1	2	3	1	2	3			
England	1															
	2															
	3															
Wales	1															
	2															
	3															
Scotland	1															
	2															
	3															
Northern Ireland	1															
	2															
	3															
Imports (rest of the world)																
Total intermediate use																
GROSS VALUE ADDED																
TOTAL OUTPUT																

Source: Own illustration.

The regionalization process of the UK Input-Output table can be divided into several steps:

- Step 1: Harmonisation of existing input-output tables for Wales, Scotland and Northern Ireland with regard to base year and level of disaggregation
- Step 2: Calculation of the missing IOT for England
- Step 3: Balancing row and column sums using the RAS<sup>9</sup> method
- Step 4: Creation of a multi-national Input-Output table (MNIOT) according to the Isard model
- Step 5: Implementation of a 3-dimensional RAS method
- Step 6: Update for the year 2021.

### 3.2.1 Step 1: Harmonisation of existing input-output tables

National IOTs are available for

- Wales<sup>10</sup>
- Northern Ireland<sup>11</sup> and
- Scotland.<sup>12</sup>

<sup>9</sup> The RAS method is suitable for creating a new or updated table from already existing, older and consistent input-output tables and new marginal values. Originally only used to forecast the coefficients of national input-output tables, the method is now also used to convert national tables into regional tables. The method goes back to Stone, R., Bates, J. and Bacharach, M. (1963) Input-Output-Relationships 1964-66. A Program for Growth, University of Cambridge Paper No. 3 and is categorised as a biproportional/bivariate method as both row and column changes are taken into account.

<sup>10</sup> Cardiff Business School (2022) Input-output tables for Wales, 2019: Projekt Report & Outline Methodology: [https://orca.cardiff.ac.uk/id/eprint/151984/1/Project\\_Report\\_Input\\_Output\\_Tables\\_Wales\\_2019.pdf](https://orca.cardiff.ac.uk/id/eprint/151984/1/Project_Report_Input_Output_Tables_Wales_2019.pdf)

<sup>11</sup> Northern Ireland Statistics and Research Agency (2022) Input-Output Analytical Tables and Multipliers 2018. <https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/Input-Output-Analytical-Tables-and-Multipliers-report-2018-6-December-2022.pdf>

<sup>12</sup> Scottish Government (2023) Supply, Use and Input-Output Tables. <https://www.gov.scot/publications/about-supply-use-input-output-tables/>

At the time of writing, the base years of the tables are: 2019 for Wales, 2018 for Northern Ireland, and for Scotland 1998 to 2020.

For the UK the latest IOT<sup>13</sup> refers to the year 2019 (although Supply and Use Tables exist up to the year 2021). Therefore, only the IOT for Northern Ireland has to be extrapolated from 2018 to 2019. For this purpose, Gross Value Added figures<sup>14</sup> and employment data<sup>15</sup> are used, while keeping input coefficients and final demand ratios the same. That means that the shares of sectors  $j=1,\dots,n$  in all intermediate consumption (column-wise) and the shares of final demand components (row-wise) remain unchanged. The MNIOT will therefore initially be prepared on the basis of 2019 and only then updated to 2021 in a last step.

The updating process is illustrated in Figure 2 by using the following simplified example: starting from an IOT 2018, the entire table is to be updated based on GVA data from 2019. To do this, the technical coefficients are first formed for each column: these show the share of each cell in the total output, column by column, and add up to 1 accordingly. The composition of final demand is also shown row by row as the share of each final demand component in total final demand per sector.

In this example, the value-added increases from 2018 to 2019 for sectors 2 and 3. A new value added of 60 in sector 2 corresponds to a share of 0.67 or 67%, so the output must amount to  $60/0.67=90$ . The same procedure is followed for all other components. Row by row, the final demand results from the difference between total use (given by the output) and the intermediate input deliveries. This amount is divided according to the share of final demand components. For sector 2, this means that final demand is defined by total use (90) minus intermediate consumption (53) = 37. This amount is divided into 15% consumption (5.6), 25% investment (9.3) and 60% exports (22.1).

Efforts should also be made to harmonise the tables with regard to the degree of sectoral disaggregation of the national input-output tables. For example, the input-output table for the UK shows a total of 105 sectors, the table for Scotland shows 98 sectors, Northern Ireland has 62 sectors and Wales has a table at a highly aggregated level with only 8 sectors. A detailed list comparing the sectoral disaggregation level can be found in the annex. The most detailed table that can be produced with the available data for each nation is an input table based on 75 sectors.

***Figure 2: Simple example for updating an IOT from 2018 to 2019, based on Gross Value Added (values freely invented)***

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<sup>13</sup> Office for National Statistics (2023) UK input-output analytical tables, product by product.

<sup>14</sup> Office for National Statistics (2023) Regional Gross Value Added (balanced) by industry: all ITL regions. Table 1c: ITL1 & UK, current price estimates, pounds million.  
<https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry>

<sup>15</sup> [Nomis official census and labour market statistics. Business register and employment survey: open access](#)

2018		Nother Ireland			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
Northern Ireland	1	10	4	4	18	25	20	7	70
	2	14	8	18	40	3	5	12	60
	3	20	5	12	37	20	18	25	100
Imports		6	3	6	15				
Total intermediate use		50	20	40	110				
GROSS VALUE ADDED		20	40	60	120				
TOTAL OUTPUT		70	60	100	230				

<b>GROSS VALUE ADDED 2019</b>	20	60	90	170
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Technical coefficients		Nother Ireland			Sum
		1	2	3	
Northern Ireland	1	0,14	0,07	0,04	0,08
	2	0,20	0,13	0,18	0,17
	3	0,29	0,08	0,12	0,16
Imports		0,09	0,05	0,06	0,07
Total intermediate use		0,71	0,33	0,40	0,48
GROSS VALUE ADDED		0,29	0,67	0,60	0,52
TOTAL OUTPUT		1	1	1	3

Final Demand			TOTAL USE
Consumption	Investment	Exports	
0,48	0,38	0,13	1,00
0,15	0,25	0,60	1,00
0,32	0,29	0,40	1,00

2019		Nother Ireland			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
Northern Ireland	1	10,0	6,0	6,0	22,0	23,1	18,5	6,4	70
	2	14,0	12,0	27,0	53,0	5,6	9,3	22,1	90
	3	20,0	7,5	18,0	45,5	33,2	29,8	41,5	150
Imports		6,0	4,5	9,0	19,5				
Total intermediate use		50,0	30,0	60,0	140,0				
GROSS VALUE ADDED		<b>20,0</b>	<b>60,0</b>	<b>90,0</b>	<b>170,0</b>				
TOTAL OUTPUT		70,0	90,0	150,0	310,0				

Source: Own illustration.

At the conclusion of step 1, the UK input-output table and the national Input-Output Tables (IOTs) for Scotland, Wales, and Northern Ireland, each containing 75 sectors, are obtained for the year 2019. This is illustrated in Figure 3 below.

**Figure 3: Output of regionalisation step 1**

2019		UK			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
UK	1	2019			Sum	Final Demand			TOTAL USE
	2	1	2	3		Consumption	Investment	Exports	
	3								
Imp	Total intermediate	2019			Sum	Final Demand			TOTAL USE
	GROSS VALUE ADDED	1	2	3		Consumption	Investment	Exports	
	TOTAL OUTPUT								
Scotland	1	2019			Sum	Final Demand			TOTAL USE
	2	1	2	3		Consumption	Investment	Exports	
	3								
Imp	Total intermediate	2019			Sum	Final Demand			TOTAL USE
	GROSS VALUE ADDED	1	2	3		Consumption	Investment	Exports	
	TOTAL OUTPUT								
Northern Ireland	1	2019			Sum	Final Demand			TOTAL USE
	2	1	2	3		Consumption	Investment	Exports	
	3								
Imp	Total intermediate	2019			Sum	Final Demand			TOTAL USE
	GROSS VALUE ADDED	1	2	3		Consumption	Investment	Exports	
	TOTAL OUTPUT								
Wales	1	2019			Sum	Final Demand			TOTAL USE
	2	1	2	3		Consumption	Investment	Exports	
	3								
Imp	Total intermediate	2019			Sum	Final Demand			TOTAL USE
	GROSS VALUE ADDED	1	2	3		Consumption	Investment	Exports	
	TOTAL OUTPUT								
		Imports							
		Total intermediate use							
		GROSS VALUE ADDED							
		TOTAL OUTPUT							

Source: Own illustration.

### 3.2.2 Step 2: Calculation of the missing IOT for England

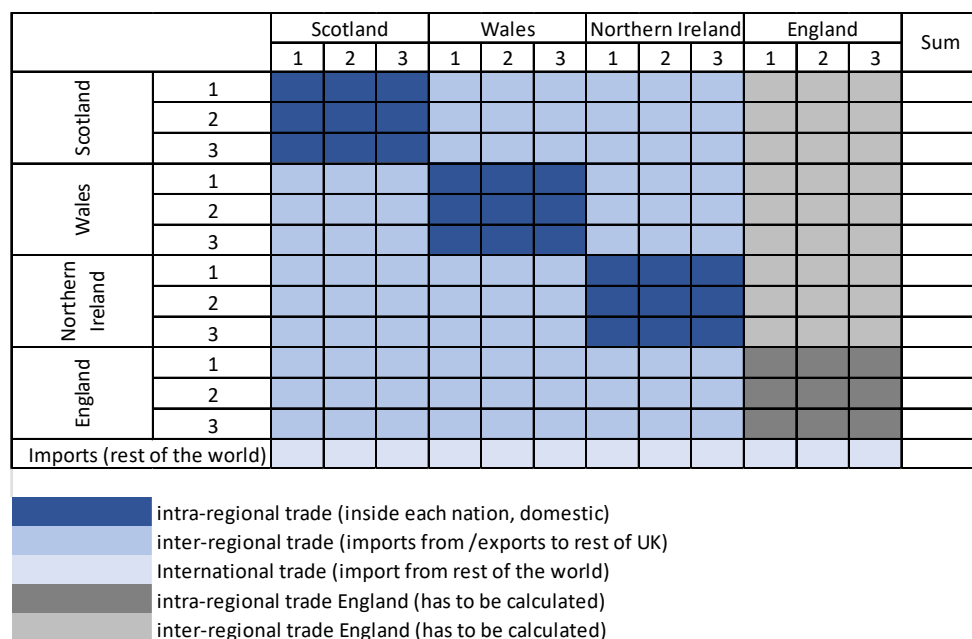
In the second step, starting from the latest UK Input Output Table (IOT) 2019, and the updated national input-output tables for Wales, Scotland, and Northern Ireland, an IOT for England is calculated.

For this, the national IOT values must be subtracted from the UK IOT. This is best done column-wise, starting with output, gross value added (total) and the individual components of gross value added separately. This step is straightforward.

In the next step, the intermediate consumption is estimated. It should be noted here that the domestic, intermediate consumption of the IOT for England is not simply obtained by subtracting the national intermediate consumption matrices from the UK intermediate consumption matrix. This is because if you recall the Isard scheme of the intermediate input matrix (see Figure 4 below), the UK table includes not only the national, domestic intermediate input matrices (here marked dark blue) but also the interrelationships between the nations, i.e. also interregional trade (here: light blue).

In the best-case scenario, interregional imports (light blue) are already shown separately in one row (e.g. in the Scottish IOT). In all other cases, the interregional imports from the other nations are included in the import row and must first be subtracted from it.

**Figure 4: Intraregional and interregional linkages**



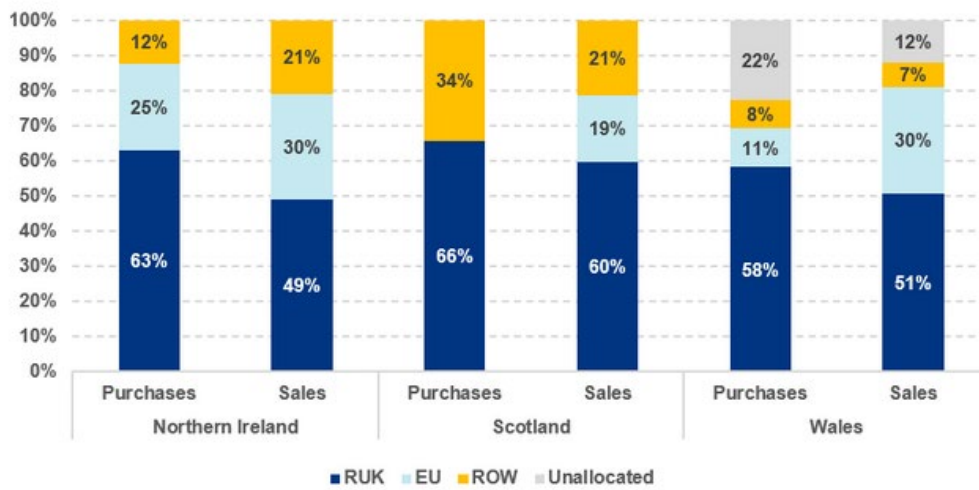
Source: Own illustration.

For this estimation, the Annual Report on the Operation of the Internal Market (OIM) 2022-23<sup>16</sup> is extremely helpful. This report already summarises all available information on imports and exports at national level and clearly shows the interdependent structures among the nations.

The bar graph below (Figure 5) shows external purchasing and selling 2019 data for Scotland, Wales, and Northern Ireland. What is needed to split the total imports into Rest of the World and Rest of the UK is the first bar for each nation. It shows the proportion of total purchases split by whether their origin is Rest of the UK (RUK), EU or Rest of World (ROW) or Unallocated. With 63%, 66% and 58% the three nations show broadly similar proportions for purchases from the Rest of UK. The second bar shows the proportion of sales for each nation going to the same destination groups. This information is needed later when the rows of total use are taken into account.

<sup>16</sup> <https://www.gov.uk/government/publications/oim-annual-report/oim-annual-report-on-the-operation-of-the-internal-market-2022-23#appendix-a-trade-data-used-in-this-report>

**Figure 5: Proportion of external purchases and sales by origin/destination in 2019 for Scotland, Wales and Northern Ireland**



Source: OIM, referring to *Broad Economy Sales and Statistics, 2019*; *Trade Survey Wales, 2019*; *Quarterly National Accounts Scotland, 2019*; *Export Statistics Scotland, 2019*.

By applying the information of Figure 5 on the total imports of Northern Ireland and Wales, a separate row with interregional imports is obtained. Then, by subtracting the national intermediate input matrices (dark blue in Figure 4) and the interregional imports of Wales, Scotland and Northern Ireland (light blue) from the UK intermediate input table, a matrix is obtained for England that includes both the intraregional linkages of England (

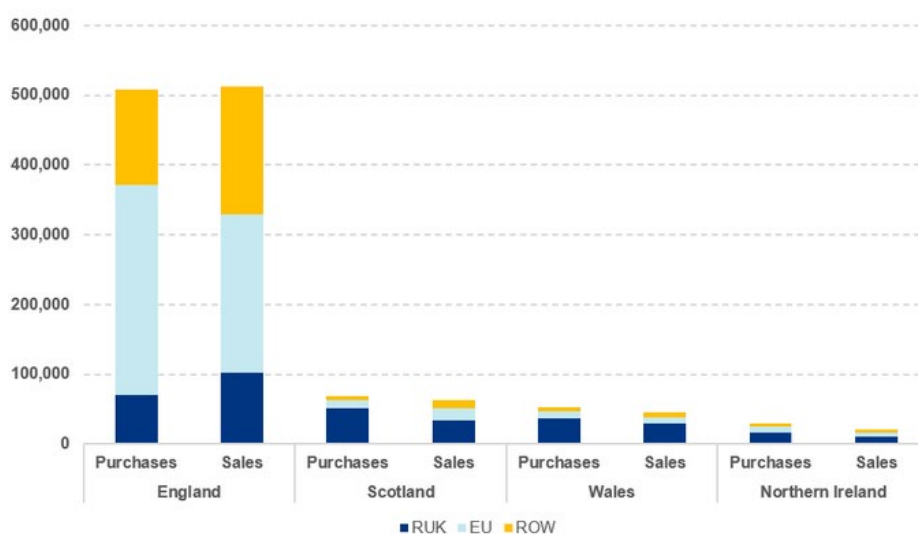


Figure 4, dark grey) and the imports from Wales, Scotland and Northern Ireland (Figure 4, light grey).

OIM data is again used to split the England matrix into the domestic matrix (dark grey) and interregional imports (not as a matrix, but as a single row). Since for England no UK trade measures are available for 2019, OIM uses 2 sources to infer trade values and proportions for England: the EUREGIO database<sup>17</sup>, which estimate figures for intra-UK and external trade as of 2010 and the ESCoE publication<sup>18</sup> in 2021, which estimates intra-UK sales as of 2015.

The EUREGIO data, shown in Figure 6, present estimates of purchases and sales in £ millions for each UK nation, split between Rest of UK, EU and Rest of World. As expected, the data shows significantly higher value purchases and sales for England compared with Scotland, Wales and Northern Ireland. Note that although this is an old dataset, it can be used in conjunction with more recent datasets, as referenced before. This is a preferable option to using a gravity model, as it provides greater detail of inter-regional trade.

**Figure 6: Estimates of Intra-UK-trade, £m, (2010)**



Source: OIM, referring to EUREGIO 2010.

Figure 7 presents the same information in percentage terms. The use of the EUREGIO data enables the estimation of the distribution of sales and purchases in England from the rest of the UK, the EU and the rest of the world, as it is presenting for the other nations in Figure 5.

<sup>17</sup> See <https://data.europa.eu/data/datasets/pbl-euregio-database-2000-2010?locale=de>. Download of the tables is possible here: [https://dataportal.pbl.nl/PBL\\_Euregio/](https://dataportal.pbl.nl/PBL_Euregio/)

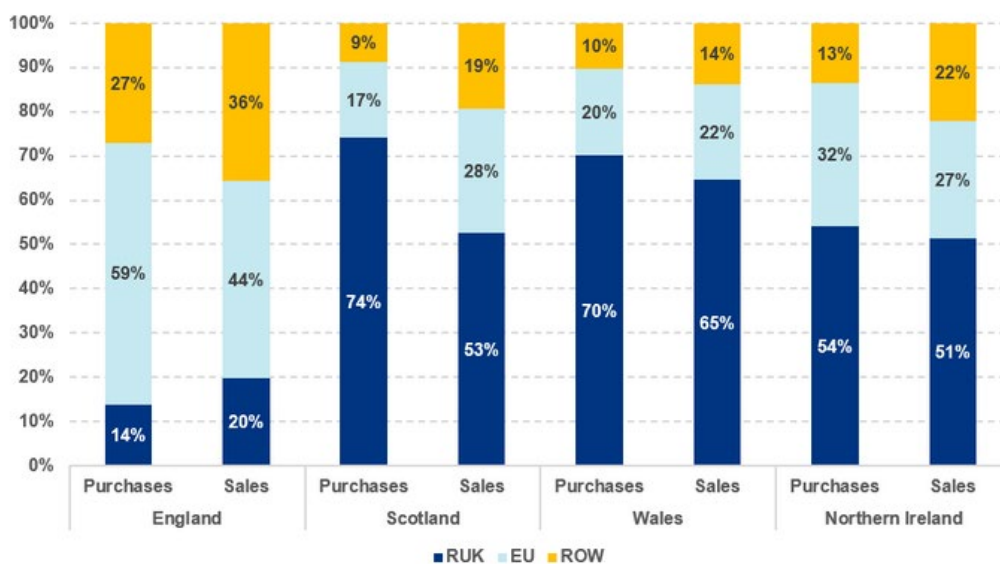
<sup>18</sup> Spowage, M. and Davidson, S.N. (2021) Improving the Quality of Regional Economic Indicators in the UK: A Framework for Interregional Trade Data Collection and Estimation, ESCoE Technical Report TR-13. <https://www.escoe.ac.uk/publications/improving-the-quality-of-regional-economic-indicators-in-the-uk-a-framework/>

This result, illustrated in Figure 7, shows that England trades proportionally more with the EU and the Rest of the World (only 14% of purchases from Rest of UK and 20% sales to Rest of UK), than do Scotland, Wales and Northern Ireland, who trade more within the UK (purchases of 74%, 70% and 54% respectively).

At the end of step 2 we get four national input-output tables for Scotland, Northern Ireland, Wales and England reflecting:

- the input-matrix of intra-regional (inside the nation) trade,
- interregional imports (as a sum in one row) and
- international imports (also one row) as well as
- gross value added and
- output.

**Figure 7: Estimates of proportions of Intra-UK-trade (2010)**



Source: OIM, referring to EUREGIO 2010.

Regarding the inter-regional trade linkages among the nations – both in terms of imports and exports – it is not yet known from which UK nation these inter-regional imports originate or to which nation inter-regional exports are made. This is analysed in step 4 via information on the interrelationships between the nations.

A graphical representation of Step 2 is shown in the following Figure 8.

**Figure 8: Result of Step 2 in the regionalisation procedure**

2019		Wales			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
Wales	1								
	2019	Northern Ireland			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
Total int GROSS	Northern Ireland	2019			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
Total in GROSS	Scotland	2019			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
Total in GROSS	England	2019			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
		Imports (UK)							
		Imports (ROW)							
		Total intermediate use							
		GROSS VALUE ADDED							
		TOTAL OUTPUT							

Source: Own illustration.

### 3.2.3 Step 3: Balancing row and column sums using the RAS method

To ensure the overall balance of the national Input-Output Tables, the row and column sums have to be adjusted using the RAS method. The RAS method proportionally adjusts the values in a matrix in such a way that (a) the row and column sums correspond to given vectors and (b) the deviations from the initial values are minimised.

Figure 9 shows an example of using the RAS algorithm. A 3x3 matrix with certain starting values is given along with two vectors holding the pre-specified values (Matrix 1). The following figure shows the starting values in white, the actual sums in yellow ("Sum") and the required marginal sums in green ("S"). The 'marginal sums' should ensure that total demand equals total supply and that any data for which we are confident stay unchanged. In the example, obviously, there are discrepancies. The first row should sum to 20, but only adds up to 6. The ratio between these two values is 3.33 and is given in the red vector to the right. The two other rows are also too small by factors of 1.67 and 1.46.

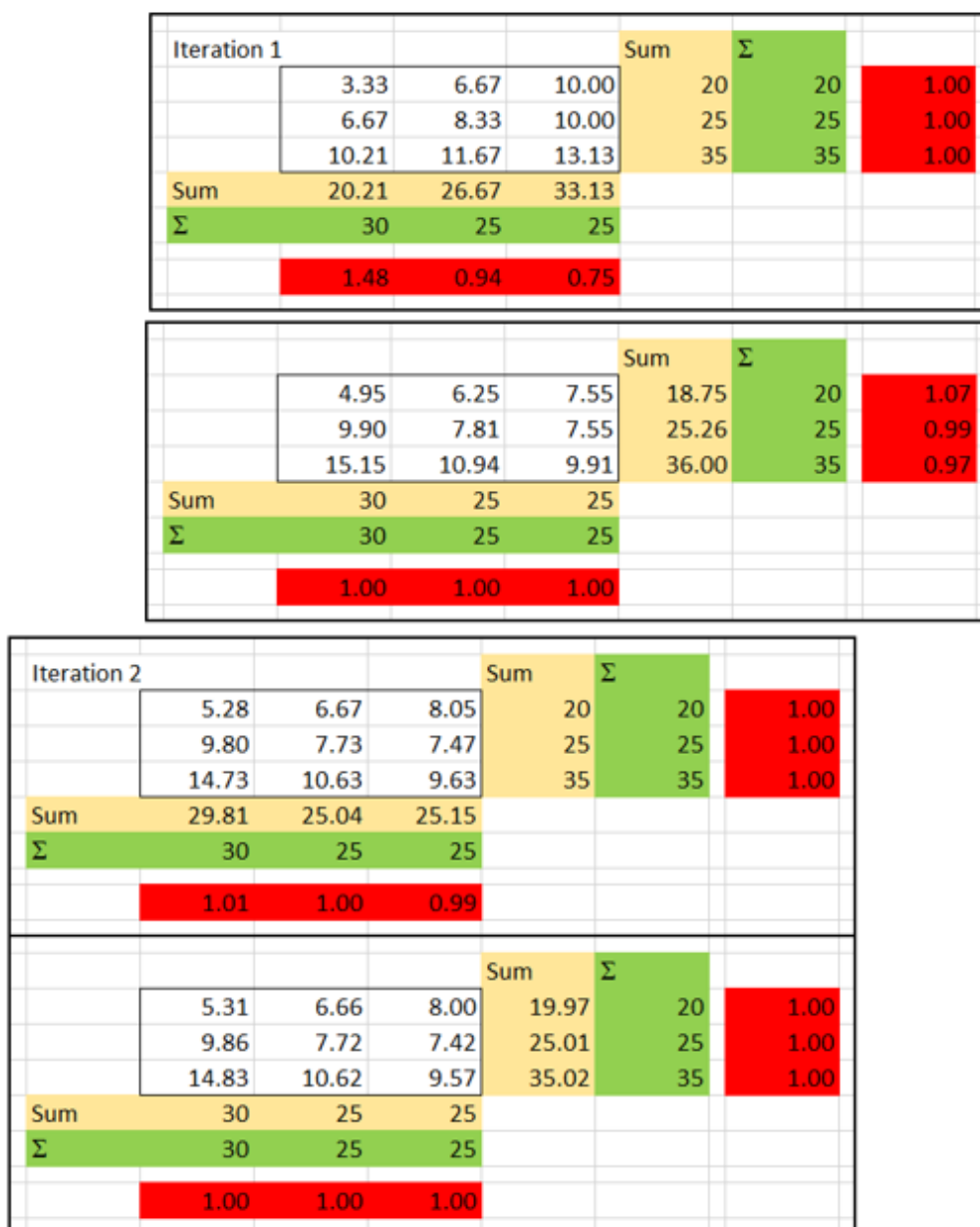
The first step of the RAS-algorithm now is, to scale each row by exactly the factor they need to meet the required values. Thus, the first row is multiplied by 3.33, the second by 1.67 and the third by 1.46 (Matrix 2). The row-wise sums now indeed match their specified values as can be seen by the red factors and the sums of the yellow and green columns.

However, the columns are still wrong. The first column is too small by a factor of 1.48, the second and third are too large and need to be reduced to 94 per cent and 75 per cent of their current values correspondingly. Doing so ends the second iteration of the algorithm and produces Matrix 3.

As can be expected, column-wise sums are perfect, but the rows are now off their values. However, the differences are much smaller than those of the starting values. The RAS-algorithm now starts over with the current matrix into its third iteration (Matrix 4).

Already after this third iteration, sums along both dimensions are so close to their specified values that the red factors' two-digit precision is not enough to show them anymore. Even more iterations can be calculated to increase the precision further. After either a certain number of iterations is done, or the largest error is smaller than a pre-defined threshold the algorithm stops, and the matrix can be used.

**Figure 9: How the RAS-algorithm works**



In the case of the regionalisation procedure, the row sums (Total Use) are adjusted to match the total intermediate supply, and the column sums are adjusted to match the total intermediate demand deliveries and the final demand.

The result is a set of balanced national input-output tables, where the row and column sums reflect the correct total output and total use, gross value added, the total intermediate purchases and final demand for each nation.

**Figure 10: Result of Step 3 in the Regionalisation Procedure**

2019		Northern Ireland			Sum	Final Demand			TOTAL USE	
		1	2	3		Consumption	Investment	Exports		
Northern Ireland	2019		Scotland			Sum	Final Demand			TOTAL USE
			1	2	3		Consumption	Investment	Exports	
Total in GROSS	2019		Wales			Sum	Final Demand			TOTAL USE
			1	2	3		Consumption	Investment	Exports	
Total intermediate GROSS	2019		England			Sum	Final Demand			TOTAL USE
			1	2	3		Consumption	Investment	Exports	
		Imports (UK)								
		Imports (ROW)								
		Total intermediate use								
		GROSS VALUE ADDED								
		TOTAL OUTPUT								

Source: Own illustration.

### 3.2.4 Step 4: Creation of a multi-national Input-Output Table (MNIOT) according to the Isard model

Following the construction of the balanced national Input-Output Tables from step 3, the next step is to create a multi-national Input-Output Table following the Isard model. The multinational IOT is structured as follows:

**Figure 11: Scheme of the Multi-national IOT UK**

		England			Wales			Scotland			Northern Ireland			Sum	Final Demand	Total Use
		1	2	3	1	2	3	1	2	3	1	2	3			
England	1	■	■	■												
	2	■	■	■												
	3	■	■	■												
Wales	1				■	■	■									
	2				■	■	■									
	3				■	■	■									
Scotland	1							■	■	■						
	2							■	■	■						
	3							■	■	■						
Northern Ireland	1										■	■	■			
	2										■	■	■			
	3										■	■	■			
Imports (rest of the world)		■	■	■	■	■	■	■	■	■	■	■	■			
Total intermediate use																
GROSS VALUE ADDED																
TOTAL OUTPUT																

■ intra-regional trade (inside each nation)

■ inter-regional trade (between nations)

■ international trade (with countries outside the UK)

Source: Own illustration.

After carrying out steps 1 to 3, all data required to create the Input-Output Table (i.e. intraregional trade matrices, the GVA quadrant and the final demand matrix) should be available and can be transferred unchanged to the Table.

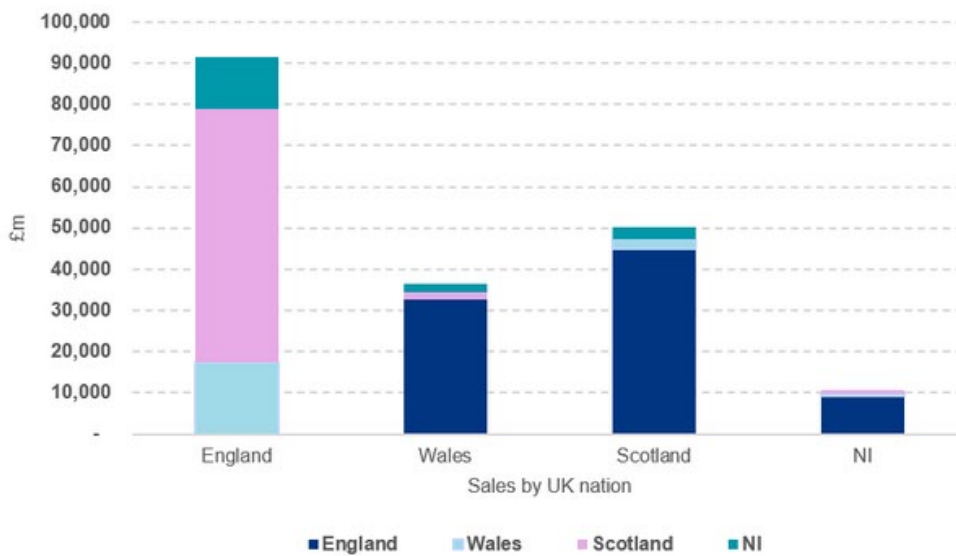
Once the four GVA-quadrants are copied side by side and the domestic parts of the intermediate good matrices (IGM) are arranged along the main diagonal of the UK-wide IGM, the second quadrant, containing final consumption, needs to be calculated.

Total use is simply the transposed output-vector. Final consumption of private households, the government and non-profit organisations serving households (NPISH) are known from domestic IOTs as well as exports to other countries (not just other nations), the marginal row sums of the intermediate good matrix can be derived. As intermediate demand plus final use equals total use, intermediate demand can be calculated row-by-row as the difference of total use minus final use. Column-wise, intermediate demand equals the difference of output minus GVA. Note that net-taxes on products and imports need to be subtracted as well.

What's missing are the inter-regional imports and exports matrices, representing trade among England, Wales, Scotland, and Northern Ireland (coloured in light blue).

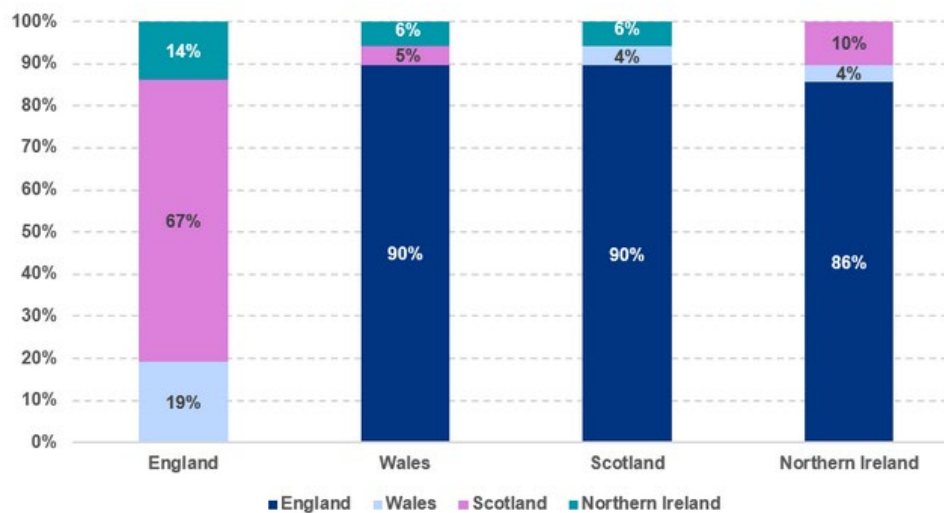
The OIM data is again used for this purpose. In addition to the data already used in step 2, to estimate the shares of international and inter-regional imports and exports, there is also data available to estimate the shares of trade between the nations. This can be done both in absolute figures (Figure 12) and in relative terms (Figure 13).

**Figure 12: 2015 estimates of inter-regional-UK sales by UK nation**



Source: ESCoE (2021)

**Figure 13: 2015 estimates of proportions of inter-regional-UK sales**



Source: ESCoE (2021)

This information can now be used to split the inter-regional imports row to the individual sub-quadrants in such a way that both the distribution between the nations and the absolute values are correct.

Therefore, the inter-regional imports row is divided into 3 values (the other 3 nations) per sector, which - in order to obtain individual sub-matrices - must still be divided between the individual sectors in each nation. For this purpose, the technical coefficients of the domestic input-output table are used as a starting solution and an entire sub-matrix is developed column by column with each of the 3 rows.

**Figure 14: Simplified example for calculating the inter-regional matrices for England (values freely invented)**

		England		
		1	2	3
England	1			
	2			
	3			
Wales	1			
	2			
	3			
Scotland	1			
	2			
	3			
Northern Ireland	1			
	2			
	3			
Imports (RUK)				
Imports (ROW)				
Total intermediate use		2700	2800	1100
GROSS VALUE ADDED		1300	2200	900
TOTAL OUTPUT		4000	5000	2000

→

		England		
		1	2	3
England	1			
	2			
	3			
Wales	1			
	2			
	3			
Scotland	1			
	2			
	3			
Northern Ireland	1			
	2			
	3			
Imports (RUK)				
Imports (ROW)				
Total intermediate use		2700	2800	1100
GROSS VALUE ADDED		1300	2200	900
TOTAL OUTPUT		4000	5000	2000

→

		England		
		1	2	3
England	1			
	2			
	3			
Wales	1			
	2			
	3			
Scotland	1			
	2			
	3			
Northern Ireland	1			
	2			
	3			
Imports (RUK)				
Imports (ROW)				
Total intermediate use		2700	2800	1100
GROSS VALUE ADDED		1300	2200	900
TOTAL OUTPUT		4000	5000	2000

Starting point: result from step 3

Next step: Breakdown of interregional import values (RUK) between the 3 nations (according to the breakdown in Figure 13), i.e. for England: 19% from Wales, 67% from Scotland and 14% from Northern Ireland.

Followed by: Allocation of these values to the individual sectors according to the technical coefficients in the intra-regional trade matrix (sector 1 receives from sector 1 a share of 800/1700, from sector 2 a share of 400/1700 and a share of 500/1700 from sector 3)

Source: Own Illustration.

The result of step 4 is a complete multi-national input-output table, which, however, is

- not yet balanced in terms of rows and columns in the 1<sup>st</sup> quadrant: Although the interregional import linkages are adjusted, it is unlikely that the resulting shares for interregional export linkages will reach the values that can be derived from the Sale figures in Figure 13;
- not consistent with the UK input-output table: For example, the sum of all sales from sector 2 to sector 2 (domestic and interregional, i.e. in a 4x4 nation matrix a total of 16 values) should result in the original value from the UK IOT.



**Figure 15: Illustration of the basic requirement that the sum of the MNIOT must result in the UK values**

		England			Wales			Scotland			Northern Ireland		
		1	2	3	1	2	3	1	2	3	1	2	3
England	1												
	2												
	3												
Wales	1												
	2												
	3												
Scotland	1												
	2												
	3												
Northern Ireland	1												
	2												
	3												

		UK			Sum	Final Demand			TOTAL USE
		1	2	3		Consumption	Investment	Exports	
UK	1								
	2								
	3								
Imports									
Total intermediate use									
GROSS VALUE ADDED									
TOTAL OUTPUT									

Source: Own illustration.

**Digression:**

If data such as that from the OIM were not available, there would be several other methods in the literature for estimating the inter-regional trade links between the four nations.

A well tested economic practice is the use of a gravity model of trade. The idea behind it derives from Newton’s gravity-formula, but instead of mutually attracting bodies, the force is interpreted as the trade-flows between two geographically distant regions (see as examples Savage and Deutsch (1960)<sup>19</sup>, Tinbergen (1962)<sup>20</sup>, Pöyhönen (1963)<sup>21</sup> and Linnemann (1966)<sup>22</sup>. Depending on the analysed questions there are slightly different approaches, but typically Newton’s formula is substituted by the following formula:

<sup>19</sup> Richard Savage and Karl Deutsch (1960) „A statistical model of the gross analysis of transaction flows” *Econometrica*, 28(3), 1960.

<sup>20</sup> Jan Tinbergen (1962): „Shaping the World Economy: Suggestions for an International Economic Policy” Twentieth Century Fund, New York, 1962.

<sup>21</sup> Pentti Pöyhönen (1963). “A Tentative Model for the Volume of Trade between Countries” *Weltwirtschaftliches Archiv* Nr. 90, 1963.

<sup>22</sup> Hans Linnemann (1966). “An Econometric Study of International Trade Flows” North-Holland, Amsterdam, 1966.

$$F_{ij} = e^{\beta_0} \cdot \frac{Y_i^{\beta_2} Y_j^{\beta_3}}{D_{ij}^{\beta_1}}$$

The economic interpretation is that the trade flows  $F_{ij}$  between region  $i$  and region  $j$  are proportional to their Gross Value Added (or a similar indicator) to the power of  $b_2$  and  $b_3$ . The distance  $D_{ij}$  between the regions decreases trade-flows exponentially. After taking the logs on both sides, the coefficients  $b_n$  can be estimated. An OLS-regression serves as an easy starting point – if necessary, more complex methods can be applied. This method has been applied and adopted multiple times. Such a model would allow to estimate interregional trade flows between the nations depending on distance and costs (expressed in traveling time) to overcome the distance. It is expected that goods of low value-density (like sand or crops) are strongly affected by transportation costs while goods showing a high value-density (such as electronic components) are transported much farther. If the necessary data is not available or not detailed enough, values from other studies can be applied. Knowing the demand and supply of goods in each nation, the travel time between them and the effect of travel time on transportation, the so far unknown trade flows between the nations on a sectorial bases can be estimated.

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### *3.2.5 Step 5: Implementation of a 3-dimensional RAS method*

The final step of the regionalisation procedure involves the implementation of a 3-dimensional RAS method (the so-called TRAS-algorithm) to ensure the balancing of row and column sums and to ensure that the sum of national tables and inter-regional trade equals the UK Input-Output Table.

The TRAS-algorithm is a special form of RAS and allows to fix single values. Unfortunately, it is known that it does not converge if those fixed cells divide the matrix into different, unconnected parts – which is the case in this MNIOT, as the domestic IGMs run straight along the main diagonal. Therefore, a different approach was chosen: After a full run of the standard RAS-algorithm, the well-known domestic IOTs were copied into their place and the algorithm was started again. This provides that the correct domestic IOTs always serve as starting values while the inter-national trading volumes are allowed to converge.

The result is a multi-national Input-Output Table with balanced row and column sums, which is consistent with the UK Input-Output Table. If the absolute values of all errors in domestic trade are considered, they sum to around 0.8 per cent of the sum of domestic trade.

The IOT itself is thus calculated. In a last step, employment data can be added. To check compatibility with IOT-values, the compensation of employees per employee was also calculated.

### *3.2.6 Step 6: Update to 2021*

The MNIOT, as outlined above, is initially prepared for the year 2019 and only then updated to 2021. From this point of view, Step 6 is – strictly speaking – not part of the ‘regionalisation process’. To update for the year 2021, the 2021 values for value added<sup>24</sup> and employment data<sup>25</sup> (if GVA data have to be disaggregated) are used. The process corresponds to the updating process as described in step 1 for the input-output table of Northern Ireland from 2018 to 2019.

## **4. Some further aspects of methodology**

Harmonised sports satellite accounts have been developed in Europe since 2006, with the UK leading the initiative from the outset. These accounts were based on an agreed 'Vilnius' definition, which identified economic codes significantly associated with sport, providing a basis for investigations. The initial definition underwent a major revision in 2012 to align with reclassifications in official statistics. In 2022, the European Commission established a Task Force on the harmonisation of Sport Statistics and Sport Satellite Account Methodologies. This Task Force aimed to examine available data, address new stakeholder queries, revise the Vilnius definition, and harmonize the SSA methodology. Concerning the economic significance of sport, this task force recently finalised a new framework, which is immediately applicable and has been considered within the scope of the present study.

### **4.1 Changes in methodology**

The Vilnius Definition of Sport provides specific guidelines regarding which activities within the European classification of economic activities (NACE) can be deemed as sport related. In the development of a national Sport Satellite Account (SSA), the Vilnius Definition is put into practice through an Input-Output Table Sport (IOT:S). This table filters the National Accounts to isolate all sport-related activities from non-sport activities and extracts all sport-related figures without altering the structure of the National Account.

The new version of the Vilnius definition, which will soon be available to the public, represents a significant improvement as it incorporates specifications from the European System of Accounts manual, ESA 2010<sup>26</sup>. It allows for methodological comparability with other satellite accounts, such as the tourism satellite accounts. This was achieved by introducing the

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<sup>24</sup> <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregionalgrossvalueaddedbalancedbyindustry>


<sup>25</sup> <https://www.nisra.gov.uk/statistics/annual-employee-jobs-surveys/business-register-and-employment-survey>

<sup>26</sup> [European system of accounts. ESA 2010 \(europa.eu\)](https://ec.europa.eu/economy_finance/economic_accounts/economic_accounts_en)

concepts of 'Characteristic' and 'Connected' goods, which replace the previously common distinction between core, narrow, and broad definitions of sport. Following consultations, Characteristic goods were defined as those with a direct relationship to participation, including sport services, sport education, and police and military sports (although the latter is not relevant anymore in the context of the UK). The template illustrating this distinction can be seen below (Template 1). The template initiates with the collection of data for Characteristic goods and services, encompassing categories such as GVA, employment, and demand. Particularly crucial is the assessment of intermediate demand for sport clubs, which often necessitates a dedicated survey of clubs. Estimating exports and imports per activity is of secondary importance in this phase. Following the collection of data for Characteristic goods, the Template guides towards the collection of data for Connected goods and services across the same categories, prioritised by importance. It's noteworthy that no further data collection for intermediate demand is required beyond sport clubs.

### Template 1: First Data Collection

Use NACE values			Demand side			Production side			
			private demand	public demand	exports	Gross value added	Intermediate demand		Employment
						total	thereof imports	in persons	in full time equivalents
Characteristic goods	Sport services	Sports facility operation services							
		Services of fitness facilities							
		Services of sport clubs							
	Education	School sport, dancing schools, ...							
	Public administration	Police and military sports							
Total			Σ	Σ	Σ	Σ	Σ	Σ	Σ
Connected goods	Tourism incl. daily tourists	Hotels and restaurants							
		Retail							
		Domestic travel expenses							
		Event entry tickets (passive)							
		Tickets for using sport facilities (active)							
	Other expenses								
	Construction	Sport infrastructure							
	Health services	Sport related health services							
	Other large fields of sport economy	Broadcasting and TV rights							
		Production of sport equipment incl. clothes and shoes							
		tourism							
		Betting on sport events							
		Retail and wholesale							
	Public administration of sport excl. police and military sport								
	Other fields of sport economy	Reservation services for package tours							
Repair services for bicycles									
films									
	Production of ski-wax								
Total			Σ	Σ	Σ	Σ	Σ	Σ	Σ



The resulting dataset will not only suffice for constructing the national SSAs but also enable us to estimate the sport-related multipliers per activity. The multipliers are determined by inverting the matrix of technical coefficients, whereby a distinction can be made between domestic multipliers (which only reflect the intensity of integration in their own nation) and UK multipliers, which show the overall effect in the UK. International multipliers (worldwide effect) can also be determined but are not necessary for our purposes.

Another notable aspect is the differentiation between active sports and passive sports consumption. This distinction is poised to become increasingly significant in the future, enabling the reconciliation of results from the Sport Satellite Account (SSA) with the levels of sport participation rates and facilitating appropriate conclusions in terms of economic policy. Active consumption is also important to identify when evaluating sport interventions and the effect of new sport infrastructure. The characteristic goods are by definition associated to active engagement. However, active engagement can be behind many connected goods as well. For example, the portion of sport footwear bought for sport participation purposes (rather than fashion) is classified in this category. A preliminary evaluation of participation-related categories in the Vilnius definition is provided in the SSA section of this report.

#### ***4.2 Revisions of the Vilnius definition of sport***

The revised version of the Vilnius definition, agreed upon at the European level, including the UK, has introduced several new categories that have not been universally considered in the past. These include:

- 84.22.11 Military defence services (army athletes)
- 84.24.11 Policy services (police athletes)
- 71.1 Architectural and engineering services: some architectural and engineering services and related technical consultancy services are especially relevant with regard to maintain or extent public sport facilities.
- 62: ICT, Computer Consultancy activities, sport relevant ICT services, sport-related apps
- 43: sport-related maintenance and repair activities for sport facilities (CPA 41 and 42 have more relevance for new constructions and fundamental renovations)
- 28: cable cars, racing systems/engines, and snowmaking equipment,

On the other side there are some categories that were investigated in previous versions of the Vilnius definition that now have been abandoned. These include:

- C18 printing services
- C19 Coke and refined petroleum products (apart from specific racing fuels for exports)
- K64 Financial services
- N78 Employment services

Lastly, it is crucial to emphasize that in this research, we have incorporated some codes outside the scope of the Vilnius definition, as they hold unique importance in the UK context. The Vilnius definition permits such deviations at the discretion of the researcher. The codes not in Vilnius were examined for sport content using the FAME dataset. The overview of the codes showed that there may be a point to examine some codes further. For instance, the category 'museums' in the UK includes football museums, reflecting the birth of this sport in the country. The complete list of the additional codes we have considered is as follows:

- 46.69 Wholesale of other machinery and equipment
- 46.90 Nonspecialised wholesale trade
- 47.54 Retail sale of electrical household appliances in specialised stores
- 74.90 Other professional, scientific and technical activities n.e.c.
- 91.02 Museums activities
- 96.04 Physical well-being activities
- 96.09 Other personal service activities n.e.c.

## 5. Data Sources for MNIOT and the SSA framework

The Starting point is the rich tradition that exists in the UK for Sport Satellite Accounts and Economic impacts of Sport in general. DCMS has a database<sup>27</sup> of Sport Satellite Accounts, while UK Sport also has made a similar study showing the economic contribution by sport<sup>28</sup>. Reports on the economic importance of sport, using the National Income Methodology, have been produced in Scotland<sup>29</sup>, Wales<sup>30</sup>, and Northern Ireland<sup>31</sup>.

In the case of the Multiregional Input-Output Table, a critical aspect of data research was international and interregional trade. The most comprehensive international trade data for transactions involving the UK, England, Wales, Scotland, and Northern Ireland are provided by UK Trade Info<sup>32</sup>. However, interregional data were not available in its various datasets. Guidance for interregional trade was derived from the 'Experimental methodology for producing UK interregional trade estimates'<sup>33</sup> published by the Office for National Statistics (ONS). This study offered recommendations for all trade between the four nations, and some of these recommendations were considered.

Of paramount importance were the reports from the Office for Internal Market (OIM)<sup>34</sup>, which provide aggregate data on trade among England, Scotland, Wales, and Northern Ireland. Since UK trade measures are not available for England in 2019, OIM utilises two sources to estimate trade values and proportions for England: the EUREGIO database<sup>35</sup>, which provides estimates for intra-UK and external trade as of 2010, and the ESCoE publication<sup>36</sup> in 2021, which estimates intra-UK sales as of 2015. These publications were extensively used in the modelling of MNIOT. Additional data sources on trade can be found in the Appendix.

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<sup>27</sup> <https://www.gov.uk/government/collections/sport-satellite-account-for-the-uk-statistics#:~:text=This%20report%20provides%20figures%20on,the%20number%20of%20people%20employed>

<sup>28</sup> <https://www.uk sport.gov.uk/~media/files/full-economic-impact-report.pdf?la=en>

<sup>29</sup> <https://sportsotland.org.uk/media/qwzjt332/economic-importance-of-sport-in-scotland-1998-2016-full-report.pdf>

<sup>30</sup> <https://www.sport.wales/content-vault/social-return-on-investment-in-sport/#:~:text=The%20sport%20industry%20in%20Wales,jobs%20in%20the%20same%20year>

<sup>31</sup> <http://www.sportni.net/wp-content/uploads/2014/08/EconomicImportance.pdf>

<sup>32</sup> <https://www.uktradeinfo.com/trade-data/#regional-trade>

<sup>33</sup> [Experimental methodology for producing UK interregional trade estimates - Office for National Statistics \(ons.gov.uk\)](https://ons.gov.uk/experimental-methodology-for-producing-uk-interregional-trade-estimates)

<sup>34</sup> [OIM Annual Report on the Operation of the Internal Market 2022-23 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/oim-annual-report-on-the-operation-of-the-internal-market-2022-23)

<sup>35</sup> <https://data.europa.eu/data/datasets/pbl-euregio-database-2000-2010?locale=de>. Download of the tables is possible here: [https://dataportal.pbl.nl/PBL\\_Euregio/](https://dataportal.pbl.nl/PBL_Euregio/)

<sup>36</sup> Spowage, M. and Davidson, S.N. (2021) Improving the Quality of Regional Economic Indicators in the UK: A Framework for Interregional Trade Data Collection and Estimation, ESCoE Technical Report TR-13. <https://www.escoe.ac.uk/publications/improving-the-quality-of-regional-economic-indicators-in-the-uk-a-framework/>

After addressing interregional trade, it was crucial to establish datasets for Input-Output Tables (IOTs) in all nations and the UK. At the very least, such datasets existed at an aggregate level for every nation except England. For England, it was estimated as the difference between the UK's IOT and the IOTs of the other nations. The most detailed IOT was that of the UK<sup>37</sup>, followed by Scotland<sup>38</sup>, Northern Ireland<sup>39</sup>, and Wales<sup>40</sup>. However, in the case of Wales, only a very aggregate IOT was found from the University of Cardiff.

For both the Multiregional Input-Output Table and the Sport Satellite Account framework, a detailed framework of Gross Value Added (GVA) data for the UK and the four nations was required. Several sources exist for the UK, but national data tend to be more aggregate. UK sources include the Input-Output Tables, as referenced previously, and the Annual Business Survey<sup>41</sup> (ABS), which surveys a sample of 73,000 companies across the UK, excluding the financial sector. The ABS draws its sample from the Inter-Departmental Business Survey.

The Regional Gross Value Added (balanced) tables from the Office for National Statistics (ONS) provide high-level information on GVA per Standard Industrial Classification (SIC) per region in the UK<sup>42</sup>. Additionally, other ONS datasets break down overall GVA by local authority<sup>43</sup>, which can be utilised for subsequent parts of this project. Figures 16 and 17 below provide glimpses of these datasets. Figure 16 illustrates an instance of the high level of aggregation per Standard Industrial Classification (SIC) code per 'region', specifically England in this case. Typically, SIC codes are presented at the two-digit level, meaning that, for example, there is one GVA value for Education, rather than its individual subdivisions. Finally, Figure 17 demonstrates the extent of geographical detail incorporated in the data.

Employment data are available at a highly granular level, extending up to five-digit codes, sourced from the Business Register and Employment Survey<sup>44</sup> (BRES). These encompass data for both the UK (up to three-digit codes) and Great Britain (up to five-digit codes). The BRES datasets, combined with the Annual Business Survey dataset, were instrumental in developing the SSA framework for the UK, providing detail at the four-digit code level. Further

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<sup>37</sup> [Input-output supply and use tables - Office for National Statistics \(ons.gov.uk\)](https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/nonfinancialbusinessesconomyukandregionalannualbusinesssurvey/2021results)

<sup>38</sup> [Supply, Use and Input-Output Tables - gov.scot \(www.gov.scot\)](http://www.gov.scot)

<sup>39</sup> [The Analytical Input-Output tables | Northern Ireland Statistics and Research Agency \(nisra.gov.uk\)](http://www.nisra.gov.uk)

<sup>40</sup> [Project\\_Report\\_Input\\_Output\\_Tables\\_Wales\\_2019.pdf \(cardiff.ac.uk\)](https://www.cardiff.ac.uk)

<sup>41</sup>

<https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/nonfinancialbusinessesconomyukandregionalannualbusinesssurvey/2021results>

<sup>42</sup> [Regional gross value added \(balanced\) per head and income components - Office for National Statistics \(ons.gov.uk\)](https://www.ons.gov.uk)

<sup>43</sup> [Regional gross domestic product: all ITL regions - Office for National Statistics](https://www.ons.gov.uk)

<sup>44</sup> [Industry \(two, three and five-digit Standard Industrial Classification\) – Business Register and Employment Survey \(BRES\): Table 2 - Office for National Statistics \(ons.gov.uk\)](https://www.ons.gov.uk)



employment data are also available for regions of England and Wales<sup>45</sup>, as well as for the local authorities within these nations<sup>46</sup>.

Additional datasets specific to Wales include the 'Statistics Wales Quarterly Update'<sup>47</sup>, which provides insights into the latest developments in Welsh statistics, covering aspects such as the economy, the labour market, wellbeing, and demographic statistics. Moreover, the Trade Survey for Wales<sup>48</sup> collects information directly from businesses operating in Wales to assess trade flows, encompassing sales and purchases of goods and services to and from Wales. However, it's important to note that the methodology employed is still in development, leading to some issues with data quality that need to be addressed when utilising the dataset.

Regarding Scotland, there exists a substantial database of economic data. Several publications were taken into account, such as the 'Exports Statistics of Scotland'<sup>49</sup> and 'Scotland's contribution to the UK economy, wellbeing, and quality of life'<sup>50</sup>. The latter publication revealed that Scotland had a trade deficit amounting to 7.6% of Scottish GDP in 2020. Additionally, it encompasses links to a broad spectrum of topics associated with this research. Further, a detailed labour market profile for Scotland is available through the nomis website<sup>51</sup>, bringing together data from several sources.

Regarding Northern Ireland, the data of Labour Force Summary Report<sup>52</sup> were considered for the year ending December 2021. Furthermore, data were examined to provide context for the sport economy in terms of participation and comparable economic contributions from other countries. This involved reviewing the EU 2018 Pan-European Satellite Account<sup>53</sup> and data from Sport England pertaining to economic development<sup>54</sup> and Active Places<sup>55</sup>. For a comprehensive list of data sources for this section, please refer to the Appendix.

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<sup>45</sup> [Employment in regions of England and the country of Wales - Office for National Statistics](#)

<sup>46</sup> [Employment in local authorities, England and Wales: Census 2021 - Office for National Statistics \(ons.gov.uk\)](#)

<sup>47</sup> [Statistics Wales quarterly update: December 2022 | GOV.WALES](#)

<sup>48</sup> [Trade Survey for Wales: 2021 | GOV.WALES](#)

<sup>49</sup> [Introduction - Exports statistics Scotland 2021 - gov.scot \(www.gov.scot\)](#)

<sup>50</sup> [Scotland's contribution to the UK's economy, wellbeing and quality of life - House of Lords Library \(parliament.uk\)](#)

<sup>51</sup> [Labour Market Profile - Nomis - Official Census and Labour Market Statistics \(nomisweb.co.uk\)](#)

<sup>52</sup> [Labour Force Survey Annual Summary Report 2021 | Northern Ireland Statistics and Research Agency \(nisra.gov.uk\)](#)

<sup>53</sup> [study on the economic impact of sport through sport-NC0517238ENN.pdf](#)

<sup>54</sup> [Economic development | Sport England](#)

<sup>55</sup> [Active Places Power / Open Data Download](#)

Figure 16: GVA (balanced) by SIC by region

Region name	SIC07 code	SIC07 industry	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
England	B (5-9)	Mining and quarrying	1,969	1,792	1,978	1,744	1,813	1,775	1,700	1,762	2,162	1,967	2,153	1
England	CA (10-12)	Manufacture of food, beverages and tobacco	17,547	18,056	18,610	18,610	18,705	18,841	18,992	18,542	18,926	19,686	19,290	19
England	CB (13-15)	Manufacture of textiles, wearing apparel and leather	6,216	6,009	5,864	5,310	4,945	4,541	4,038	3,758	3,561	4,116	3,523	3
England	CC (16-18)	Manufacture of wood and paper products and printing	8,895	8,843	8,880	8,512	8,873	9,094	9,036	9,499	9,442	9,787	9,782	9
England	CD-CE (19-20)	Manufacture of coke, refined petroleum and chemicals	11,108	10,535	10,380	9,237	8,791	9,065	8,022	8,543	7,979	7,676	8,046	7
England	CF (21)	Manufacture of pharmaceutical products	6,017	7,120	7,761	8,355	9,236	9,179	9,578	10,021	11,410	11,002	12,672	12
England	CG (22-23)	Manufacture of rubber, plastic and non-metallic minerals	9,876	10,246	10,525	11,000	10,653	11,035	10,972	11,126	10,508	10,360	9,304	8
England	CH (24-25)	Manufacture of basic and fabricated metal products	14,354	14,406	14,465	14,384	14,902	15,345	14,188	15,317	13,893	13,857	15,188	11
England	CI (26)	Manufacture of computer, electronic and optical products	7,940	7,039	6,488	5,848	6,912	6,536	7,516	7,051	7,420	7,462	8,549	8
England	CJ (27)	Manufacture of electrical equipment	4,389	4,286	4,331	4,273	4,197	4,053	3,949	3,792	3,745	3,918	3,976	3
England	CK (28)	Manufacture of machinery and equipment	10,162	10,024	9,976	9,649	9,727	10,157	10,131	10,218	10,074	10,436	9,989	6
England	CL (29-30)	Manufacture of transport equipment	13,528	13,294	14,759	14,801	14,310	14,620	15,014	15,124	15,315	14,821	15,887	12
England	CM (31-33)	Other manufacturing, repair and installation	10,650	11,586	11,302	10,656	11,163	11,089	10,604	10,701	11,352	11,666	11,035	10
England	D (35)	Electricity, gas, steam and air conditioning supply	10,193	9,865	9,420	9,063	9,750	10,618	11,585	12,054	16,045	17,139	19,302	24
England	E (36-39)	Water supply, sewerage and waste management	10,379	10,268	10,644	10,915	10,905	11,902	11,813	13,291	14,064	14,905	15,819	16
England	F (41-43)	Construction	39,640	44,263	48,546	51,318	55,817	60,021	63,213	69,266	72,312	77,348	78,215	66
England	G (45-47)	Wholesale and retail trade; repair of motor vehicles	95,493	98,964	100,895	106,599	110,698	115,734	118,705	122,009	127,480	132,928	135,927	133
England	H (49-53)	Transportation and storage	35,237	37,282	39,167	40,774	40,709	42,918	45,008	46,216	47,461	49,152	51,783	48
England	I (55-56)	Accommodation and food service activities	19,647	20,745	22,004	22,923	24,591	26,122	28,038	30,166	30,644	32,050	32,050	29
England	J (58-63)	Information and communication	46,962	50,181	55,891	57,838	60,616	65,892	68,859	72,627	73,100	80,631	83,548	81
England	K (64-66)	Financial and insurance activities	57,205	57,810	59,145	59,971	63,123	68,828	78,315	90,490	102,493	111,724	107,368	121
England	L (68)	Real estate activities	112,352	118,016	122,486	126,057	128,275	132,922	135,800	141,697	146,020	154,476	167,495	152
England	M (69-75)	Professional, scientific and technical activities	44,823	48,455	52,332	55,903	60,255	64,971	69,866	73,360	79,546	84,248	86,667	86
England	N (77-82)	Administrative and support service activities	30,953	31,967	34,134	37,485	39,423	40,949	42,285	44,428	45,911	50,080	51,930	50
England	O (84)	Public administration and defence	35,446	37,274	38,581	40,567	42,284	46,233	49,284	53,620	55,973	57,170	60,056	63
England	P (85)	Education	37,138	39,832	43,021	47,272	50,416	53,248	57,225	61,390	64,926	69,741	74,849	78
England	Q (86-88)	Human health and social work activities	39,832	41,575	44,586	50,496	54,767	60,664	66,890	71,623	76,343	79,205	81,287	84
England	R (90-93)	Arts, entertainment and recreation	8,747	9,352	9,985	10,714	12,178	13,947	14,928	16,272	16,858	16,724	16,959	16
England	S (94-96)	Other service activities	11,508	11,589	12,489	13,127	14,455	14,531	15,753	16,651	17,623	18,593	19,430	20
England	T (97-98)	Activities of households	1,331	1,421	1,708	1,737	1,493	1,313	1,441	1,763	1,893	1,520	1,668	1

Source: ONS

Figure 17: GVA by Local Authority

ITL	ITL code	Region name	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
UK	UK	United Kingdom	900,616	937,087	987,906	1,030,305	1,072,233	1,134,233	1,190,196	1,260,800	1,326,726	1,391
Other	TLC	England	766,249	798,389	836,540	872,980	911,494	963,592	1,009,316	1,067,675	1,122,036	1,180
ITL1	TLC	North East	28,853	29,299	30,184	31,407	33,548	35,530	38,358	40,149	42,268	43
ITL2	TLC1	Tees Valley and Durham	12,219	12,719	13,137	13,356	14,058	15,090	16,125	16,714	17,663	18
ITL3	TLC11	Hartlepool and Stockton-on-Tees	3,345	3,502	3,592	3,619	3,819	4,098	4,377	4,526	4,845	5
ITL3	TLC12	South Teesside	2,734	2,810	2,885	2,861	2,959	3,205	3,367	3,546	3,693	3
ITL3	TLC13	Darlington	1,519	1,553	1,671	1,776	1,898	2,024	2,159	2,142	2,178	2
ITL3	TLC14	Durham CC	4,622	4,854	4,989	5,099	5,382	5,762	6,221	6,500	6,948	7
ITL2	TLC2	Northumberland, and Tyne and Wear	16,634	16,580	17,047	18,051	19,490	20,440	22,233	23,435	24,605	24
ITL3	TLC21	Northumberland	3,053	3,048	3,103	3,205	3,468	3,596	3,857	3,987	4,191	4
ITL3	TLC22	Tyneside	10,085	10,106	10,385	11,092	11,981	12,612	13,742	14,576	15,288	15
ITL3	TLC23	Sunderland	3,496	3,426	3,560	3,754	4,041	4,232	4,635	4,873	5,127	5
ITL1	TLD	North West	88,391	92,536	94,855	100,575	105,316	111,246	117,236	123,335	130,398	135
ITL2	TLD1	Cumbria	6,540	6,739	6,681	6,698	7,117	7,632	7,874	8,249	8,919	9
ITL3	TLD11	West Cumbria	3,009	3,119	2,884	2,827	2,989	3,148	3,210	3,439	3,697	3
ITL3	TLD12	East Cumbria	3,531	3,620	3,797	3,871	4,128	4,483	4,664	4,810	5,222	5
ITL2	TLD3	Greater Manchester	33,382	35,002	35,925	38,041	39,855	41,668	43,879	46,777	49,299	51
ITL3	TLD33	Manchester	8,895	9,326	9,545	10,300	10,935	11,554	12,423	13,454	14,442	15
ITL3	TLD34	Greater Manchester South West	7,601	7,966	8,184	8,696	9,118	9,550	10,037	10,691	11,274	11
ITL3	TLD35	Greater Manchester South East	5,499	5,796	6,000	6,239	6,501	6,781	7,004	7,389	7,685	8
ITL3	TLD36	Greater Manchester North West	5,620	5,862	5,982	6,315	6,518	6,789	7,086	7,514	7,861	8
ITL3	TLD37	Greater Manchester North East	5,767	6,052	6,215	6,492	6,783	6,994	7,329	7,730	8,038	8
ITL2	TLD4	Lancashire	17,716	18,447	18,849	19,483	20,409	22,108	23,433	24,253	24,827	25

Source: ONS

## 6. Consumer sector and further data investigations

The allocation of sport shares for constructing the Sport Satellite Account relies on Gross Value Added and employment indicators, which may not accurately represent household consumption. For instance, in the case of sports footwear, household consumption is substantial but primarily relies on imports rather than domestic production. Consequently, the share of consumption within the NACE category could significantly surpass the share of sport in GVA or employment (production category). In the UK, data on household consumption of sport goods and services can be found in the ONS publications " Family Spending<sup>56</sup> " and " Consumer Trends<sup>57</sup>". While these publications do not offer a breakdown by nation at a detailed level, indicative estimates can be derived using datasets from archived surveys in the UK. Similar data are also available from Eurostat<sup>58</sup> for EU countries, enabling comparability. The COICOP categories reported in the household surveys are the following:

- CP0921 Major durables for outdoor recreation
- CP09222 Major durables for indoor recreation
- CP0923 Maintenance and repair of other major durables for recreation and culture
- CP0932 Equipment for sport, camping and open-air recreation
- CP09321 Equipment for sport
- CP09322 Equipment for camping and open-air recreation
- CP09323 Repair of equipment for sport, camping and open-air recreation
- CP0941 Recreational and sporting services
- CP09411 Recreational and sporting services – Attendance
- CP09412 Recreational and sporting services – Participation

Data on international trade can assist in the estimation of consumer spending in the case of some sport goods and sportswear. For example, it is reasonable to assume that the share of sport footwear imports in the retailing categories could serve as a reliable estimate for the consumption pattern. For this reason, trade data can be used by both domestic sources<sup>59</sup> and the UN datasets.

The following categories in Table 2 illustrate the extent that the international trade data can capture consumer spending categories.

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<sup>56</sup>

<https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/expenditure/bulletins/familyspendingintheuk/april2021tomarch2022>

<sup>57</sup>

<https://www.ons.gov.uk/economy/nationalaccounts/satelliteaccounts/bulletins/consumertrends/previousReleases>

<sup>58</sup> [Statistics | Eurostat \(europa.eu\)](#)

<sup>59</sup> [Trade data - UK Trade Info](#)

**Table 2: Aggregate international trade categories**

SKI	Snow-skis and other snow-ski equipment, ski-boots, cross-country ski footwear and snowboard boots
SKATE	Ice skates and roller skates, including skating boots with skates attached
WATER	Vessels for pleasure and sport, sailboats, sailboards, other water-sport boats and boards and water-sport equipment
GOLF	Golf clubs and other golf equipment
RACKET	Articles and equipment for table tennis; tennis, badminton and similar rackets BALL Tennis balls, inflatable balls, other balls (excl. golf balls, and table tennis balls)
GYM/SWIM	Articles and equipment for general physical exercise, gymnastics or athletics, sport and outdoor games, swimming and paddling pools
FISHING	Fishing rods, fish-hooks, fishing reels and other fishing equipment
CYCLE	Bicycles and other cycles (including delivery tricycles), not motorised
PARACHUTES	Parachutes (including dirigible parachutes and paragliders) and rotochutes; parts thereof and accessories thereto
SPORTWEAR	Swimwear, ski-suits, gloves designed for use in sports
FOOTWEAR	Sports footwear
SHOTGUNS	Sporting, hunting or target-shooting shotguns

Source: [Microsoft Word - sprt\\_trd\\_esms\\_an1.docx \(europa.eu\)](#)

A detailed code by code list of the above aggregate categories can be found in Eurostat publications<sup>60</sup>.

When considering Input-Output Tables, particular focus should be directed towards retailing categories, as they directly reflect consumption patterns. The codes, presented in Table 3 below are of interest for detailed evaluation.

In Table 3, it's important to acknowledge that there isn't a direct correspondence between the CPA and SIC classifications. Additionally, certain categories, like retail services in sport equipment and camping equipment, can be considered 100% sport related. Therefore, the Input-Output Tables can be utilised to contribute to consumer estimates in these cases.

<sup>60</sup> [Microsoft Word - sprt\\_trd\\_esms\\_an1.docx \(europa.eu\)](#)

**Table 3: Retailing codes in the IOTs**

<b>CPA</b>		<b>SIC</b>
G 47.00.23	Retail trade services of homogenised food preparations and dietetic food	47.11 47.29 47.81
G 47.00.26	Retail trade services of other beverages	47.25
G 47.00.51	Retail trade services of textiles	47.51
G 47.00.61	Retail trade services of books	47.61
G 47.00.62	Retail trade services of newspapers and magazines	47.62
G 47.00.64	Retail trade services of music and video recordings	47.63
G 47.00.65	Retail trade services of sporting equipment	47.64
G 47.00.66	Retail trade services of camping equipment	47.64
G 47.00.67	Retail trade services of games and toys	47.41
G 47.00.71	Retail trade services of clothing	47.71
G 47.00.72	Retail trade services of footwear	47.72
G 47.00.73	Retail trade services of leather goods and travel accessories	47.72
G 47.00.74	Retail trade services of pharmaceutical goods	47.73
G 47.00.75	Retail trade services of medical and orthopaedic goods	47.74
G 47.00.81	Retail trade services of automotive fuel	47.3
G 47.00.82	Retail trade services of watches and jewellery	47.77
G 47.00.83	Retail trade services of photographic, optical and precision equipment, services of opticians	47.78

Information regarding the manufacturing sector can be accessed from the UK Manufacturers' sales by product (Prodcom) dataset<sup>61</sup>. However, it's important to note that the dataset's significant level of detail is hindered by a considerable amount of suppressed information. To

<sup>61</sup>

<https://www.ons.gov.uk/businessindustryandtrade/manufacturingandproductionindustry/bulletins/ukmanufacturerssalesbyproductprodcom/2016intermediateand2015finalresults>

derive meaningful conclusions on sport shares, it's crucial to examine data across a series of years rather than solely focusing on 2021.

Beyond the scope of official statistics, a valuable resource for estimating spending in fitness clubs is the report by Deloitte & EuropeActive: European Health & Fitness Market (2022)<sup>62</sup>. This report provides estimates for total revenues from fitness clubs, excluding VAT and including secondary revenues such as food, beverages, subscription fees, and personal training. Some spending categories examined are:

- Revenue of fitness clubs
- Number of fitness clubs
- Number of members
- Fitness clubs' penetration rate
- Leading operators and market shares
- Participation rates in associated activities

For the activities of Farming/ Breeding of racehorses, an important report to consider is the recent Thoroughbred Breeders' Association economic impact study in the sector<sup>63</sup>. The report analysed over 7.5 million data points, unveiling the evolution of established trends and the emergence of new ones, influenced by both Brexit and Covid-19.

Data for the sport shares of magazines and newspapers can be found from ABC. The latter are presented in various free publications to be found online. See for example the content in press gazette for magazines<sup>64</sup> and newspapers<sup>65</sup> correspondingly.

In the case of television and sport related administration, the annual reports of organisations such as BBC, Sport England, DCMS, Sport Scotland, Sport Wales, Sport Northern Ireland, UK Sport etc. have to be examined in detail.

In the context of primary and secondary education, sport shares are determined by the proportion of hours allocated to sports instruction per week. These data can be readily obtained from both domestic and European sources. Given that these shares tend to remain relatively stable from year to year, past estimates can also be utilised if accessible. Regarding higher education, sport shares are identified using statistics from the Higher Education Statistics Agency (HESA). While sports and recreation education predominantly consists of

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<sup>62</sup> [https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-business/EHFMR\\_2022\\_Auszug\\_Report.pdf](https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-business/EHFMR_2022_Auszug_Report.pdf)

<sup>63</sup> <https://www.ifhaonline.org/resources/TBA-Economic-Impact-Study-2023-report.pdf>

<sup>64</sup> <https://pressgazette.co.uk/news/uk-magazine-circulation-2021/>

<sup>65</sup> [https://pressgazette.co.uk/media-audience-and-business-data/media\\_metrics/most-popular-newspapers-uk-abc-monthly-circulation-figures-2/](https://pressgazette.co.uk/media-audience-and-business-data/media_metrics/most-popular-newspapers-uk-abc-monthly-circulation-figures-2/)

sport-related activities, conducting a FAME investigation would be necessary to accurately establish the sport share.

In the case of gambling, a sport share can be established by the details provided by the Gambling Commission's reports<sup>66</sup>. Despite the very high turnovers, it has to be taken into account that a very large part is associated with remote operators and very small tax rates. This creates a problem in terms of how we measure the sector. From the point of view of consumption all domestic and international provision can be included; however, from the point of view of production (leading to GVA and employment) only domestic operators are considered. From the aforementioned Gambling Commission's statistics, the sectors that relate to sport spending include parts of general betting, pools, and some lotteries. The main elements of off course betting are identified as gambling on horses, dog racing and football. From past experience, the sport related gambling spending is likely to correspond to a third of all betting.

Sport shares for tourism and accommodation can be derived from the statistical publication of organisations such as Visit Britain. The data of main motivations of tourists can also be considered. It is a usual practice to include all the tourist spending in cases when the main motivation is sport participation or sport attendance.

## 7. The SSA framework and FAME investigations

The constructed SSA framework will direct the investigations towards establishing sport shares per economic activity across the four nations. It utilises employment data for the UK and Great Britain from the BRES database, as well as data from the Annual Business Survey, to establish GVA estimates for economic activities at the four-digit code level. In most instances, we began with UK employment data, which are only available at the three-digit level. We then supplemented this information by incorporating GB data and, finally, ABS data obtained from surveyed companies.

A snapshot of the SSA framework is depicted in Figure 18. The first column presents the SIC code of the economic activity, while the second column provides a general description of the economic activity. For instance, the economic activity with code 92.00 is described in the national accounts as Gambling, while code 93.11 pertains to the operation of sport facilities. The third column offers an example of sport content. For category 92.00, this includes sport betting, whereas category 93.11 is entirely within the domain of sport. Moving on, the fourth column displays the total employment for the four-digit sector in 2021 for the UK according to the BRES dataset. However, this information was only available for gambling, amounting to 78.9 thousand employees. The fifth column indicates the UK-level employment for the

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<sup>66</sup> <https://www.gamblingcommission.gov.uk/statistics-and-research/publication/industry-statistics-november-2022>

associated two-digit sector in the IOT, which is detailed in the subsequent column. For instance, for 'Operation of sport facilities', we found that UK employment was 465.9 thousand for the code 93, and the same holds true for all other categories starting with 93. The following column, labelled 'IOT 2021 £million', presents the value of GVA for the associated IOT category. Consequently, all categories starting with 93 exhibit the same generic GVA copied from the Input-Output Tables. Moving forward, the 'Total employment, GB detail' column denotes employment associated with the four-digit code for Great Britain, while the subsequent column showcases the total GB employment linked to the corresponding two-digit code from the IOTs. The same logic is applied to the GVA figures in the ABS columns, although in this case, they were not required as there were no data gaps.

Following this initial process, we weighted the GVA from the IOT to derive up to three estimates of GVA for the UK for the four-digit economic activity. The first GVA estimate is based directly on the IOT or on UK employment data. The second estimate relies on GB employment data, while the third (not utilized here) is based on ABS GVA data.

Finally, the column labelled 'GVA economy final' displays the GVA we adopt for the four-digit economic sector under examination. For instance, in the case of the operation of sports facilities, the GVA estimation is based on GB employment:

$$3,742.1 = 11,703 * (146.0/456.6)$$

The final column labelled 'Participation sectors' is colour-coded to indicate whether the category is related to active sport participation. A green colour signifies a direct relationship with sport participation, while an orange cell indicates elements of non-active consumption. For example, the operations of sport clubs are marked orange because these clubs may have activities related to bars or food service, which are not directly related to sport participation. Similarly, any category including sport footwear is marked orange, as many people use sport footwear for leisure rather than active sport participation.

Following the framework for SSAs, data were collected from the annual reports deposited in the Companies House. A comprehensive collection was made for each economic sector under investigation. As the presented information is often uneven, with missing data, we targeted the profit and loss accounts for the period 2020 to 2022. The information we collected included:

- Gross profit (2020-2022);
- Profit (loss) before tax
- Taxation
- Profit (loss) after tax
- Remuneration
- Wages and Salaries



- Employment
- Exports/imports

Companies were identified according to their primary trading address and their trading postal addresses. This enabled us to associate their economic activity in each nation. A syntax was developed (see Appendix) which was applied to each four-digit code of economic activity. An example of a file of an economic activity (93.11) showing the information collected is attached to this report.

After the initial data collection results, an additional syntax was formulated to address dataset challenges stemming from the inclusion of separate trading addresses. This inclusion resulted in numerous rows with predominantly empty cells. To uphold transparency and facilitate the replication of the current research, this syntax is also included in the Appendix.

Figure 18: Example of the SSA framework

SIC	General description	Sport content	Total employment detail,2021, th	Total employment total,2021, th	iot code	IOT-2021, £m	Total employment GB-detail	Total employment GB total th	ABS GVA detail	ABS GVA iot code	GVA-ALL- from UK employment or IOT	GVA-ALL- based on GB employment	GVA based on ABS £m	GVA economy final	Participation sectors
92.00	Gambling and betting activities	Betting on sports events	78.9	78.9	92	4,862	76.7	76.7	0		4,862.0	4,862.0	0	4,862.0	0
93.11	Operation of sports facilities	Sports facility operation services; operation of swimming pools and stadium; operation of other sports arenas and stadiums	0	465.9	R93	11,703	146.0	456.6	0	0	0	3,742.1	0	3,742.1	Green
93.12	Activities of sports clubs	Services of sport clubs;	0	465.9	R93	11,703	140.9	456.6	0	0	0	3,611.4	0	3,611.4	Orange
93.13	Fitness facilities	Services of fitness facilities	0	465.9	R93	11,703	43.5	456.6	0	0	0	1,114.9	0	1,114.9	Green

SIC	General description	Sport content	Total employment detail,2021, th	Total employment total,2021, th	iot code	IOT-2021, £m	Total employment GB-detail	Total employment GB total th	ABS GVA detail	ABS GVA iot code	GVA-ALL- from UK employment or IOT	GVA-ALL- based on GB employment	GVA based on ABS £m	GVA economy final	Participation sectors
93.19	Other sports activities; activities of race horse owners	Services of athletes; Support services related to sports and recreation; other sports and recreational sports services; sports and recreational sports event promotion services	0	465.9	R93	11,703	42.2	456.6	0	0	0	1,081.6	0	1,081.6	Green
93.29	Other amusement and recreation activities n.e.c	Services of lockboxes and changing rooms in recreation parks and bathing beaches, services of marinas and skislopes, services of table football games, coin operated machines for car racing games	465.9	R93	11,703	64.6	456.6	0	0	0	0	1,655.7	0	1,655.7	Green
94.11	Activities of business and employers' memberships organisations	Operation of sports facilities	0	237.2	S94	8,967	10.9	228.9	0	0	0	427.0	0	427.0	Green

SIC	General description	Sport content	Total employment detail,2021, th	Total employment total,2021, th	iot code	IOT-2021, £m	Total employment GB-detail	Total employment GB total th	ABS GVA detail	ABS GVA iot code	GVA-ALL- from UK employment or IOT	GVA-ALL- based on GB employment	GVA based on ABS £m	GVA economy final	Participation sectors
94.12	Activities of professional membership organisations	e.g. a group engaged in preservation of human life by teaching swimming lifesaving and survival techniques	0	237.2	S94	8,967	25.9	228.9	0	0	0	1,014.6	0	1,014.6	Orange
94.99	Activities of other membership organisations	e.g. the provision of live and virtual greyhound racing, including betting and other information, and horse racing suitable for transmission to licensed betting shops	0	237.2	S94	8,967	112.4	228.9	0	0	0	4,403.2	0	4,403.2	Orange
95.23	Repair of footwear and leather goods	Repair of orthopaedic shoes, footwear and leather goods used by athletes	0	53.5	S95	2,853	1.6	52.8	0	0	0	86.5	0	86.5	Orange

## 8. Conclusions

The current report demonstrates how the proposed Sport Satellite Account (SSA) methodology can effectively assess the SSAs of the four UK nations and, subsequently, the UK as a whole. A key challenge in implementing the 'bottom-up' approach was developing the Multinational Input-Output Table (MNIOT) for the UK and modelling interregional trade among the four nations. These tasks have now been successfully completed. The creation of the MNIOT is particularly noteworthy, marking the first of its kind in the UK and providing significant added value to this research.

The SSA framework is presented independently and transparently, allowing for detailed scrutiny and critique. For the first time, the report introduces a participation pattern linked to the SSA framework, which holds potential for further social research, particularly in Social Return on Investment (SROI) analysis. This provides a robust foundation for finalising the SSAs. Compared to other methodologies, such as National Income Accounting, the SSA offers the most detailed framework and is directly comparable to similar studies in the EU and Japan. It is also the only framework capable of calculating detailed sport multipliers, which can be leveraged by public bodies and research institutions for economic evaluations. Additionally, the SSA framework allows for comparability with other satellite accounts, such as those for Tourism and the Environment.

However, there are limitations to what a Sport Satellite Account can reveal about the sport economy. While the SSA enables the assessment of the direct and indirect economic impacts of sport, it does not fully capture other key areas such as the effects of volunteering, health benefits, and broader social factors like educational attainment and crime reduction—areas that are difficult to quantify within the Input-Output framework. Recent research highlights the significant contributions of sport to subjective well-being and social capital, both of which are closely linked to sport participation and volunteering. Therefore, the value estimated by an SSA should be considered a minimum estimate of the economic impact of sport, serving as a starting point for further analysis rather than a comprehensive evaluation.

A complete valuation of the impact of sport should consider its effects on the following areas:

- **Well-being:** Monetising the positive effects on indicators such as happiness.
- **Social capital:** Generated through participation and volunteering, fostering social integration and reducing inequalities. This effect can also be monetised.
- **Health expenditure:** Reducing government spending on mental health, cardiovascular diseases, cancers, back injuries, Type II diabetes, and hip fractures.

- **Educational attainment and crime reduction:** Although these are harder to monetise and are often excluded from international evaluations, they represent important societal benefits.

One frequently cited drawback of SSAs is the time lag in the data. In this case, the time lag is three years (two years when the study began), largely due to the availability of Input-Output Tables (IOTs) from the Office for National Statistics (ONS). While some countries have raised concerns about this, the efficiency of the ONS mitigates the issue in the UK. Avoiding the use of IOTs could reduce the time lag by one year, but this would come at the cost of sacrificing a fully developed SSA, including the estimation of multipliers and the potential for using the account as a policy tool. However, the results can be updated using more recent data, assuming the IOT relationships remain constant. This would also suggest unchanged multipliers. As long as this process is transparent, such an approach would likely be well-received.

#### Appendix A: Sectoral correspondence of the IOT categories of the UK, Scotland, Northern Ireland and Wales

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_A01	Products of agriculture, hunting and related services	01	Agriculture	01	Crop and Animal Production, Hunting and Related Service Activities	Primary
CPA_A02	Products of forestry, logging and related services	02.1, 02.4	Forestry planting	Aother	Forestry and fishing	Primary
0	0	02.2-3	Forestry harvesting	Aother	Forestry and fishing	Primary
CPA_A03	Fish and other fishing products; aquaculture products; support services to fishing	03.1	Fishing	Aother	Forestry and fishing	Primary
0	0	03.2	Aquaculture	Aother	Forestry and fishing	Primary
CPA_B05	Coal and lignite	05	Coal and lignite	B	Mining and quarrying products	Primary

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_B06 & B07	Extraction of crude petroleum and natural gas & mining of metal ores	06-08	Oil and gas extraction, metal ores and other	B	Mining and quarrying products	Primary
CPA_B08	Other mining and quarrying products	06-08	Oil and gas extraction, metal ores and other	B	Mining and quarrying products	Primary
CPA_B09	Mining support services	09	Mining Support	B	Mining and quarrying products	Primary
CPA_C101	Preserved meat and meat products	10.1	Meat processing	10	Manufacture of food products	Manufacturing
CPA_C102_3	Processed and preserved fish, crustaceans, molluscs, fruit and vegetables	10 2-3	Fish and fruit processing	10	Manufacture of food products	Manufacturing
CPA_C104	Vegetable and animal oils and fats	10.4-5	Dairy products, oils and fats processing	10	Manufacture of food products	Manufacturing
CPA_C105	Dairy products	10.4-5	Dairy products, oils and fats processing	10	Manufacture of food products	Manufacturing
CPA_C106	Grain mill products, starches and starch products	10.6	Grain milling and starch	10	Manufacture of food products	Manufacturing
CPA_C107	Bakery and farinaceous products	10.7	Bakery and farinaceous	10	Manufacture of food products	Manufacturing
CPA_108	Other food products	10.8	Other food	10	Manufacture of food products	Manufacturing
CPA_C109	Prepared animal feeds	10.9	Animal feeds	10	Manufacture of food products	Manufacturing
CPA_C11.0 1-6 and C12	Alcoholic beverages and tobacco products	11.01-04	Spirits and wines	11-12	Manufacture of beverages and tobacco products	Manufacturing

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_C11.0 1-6 and C12	Alcoholic beverages and tobacco products	11.01-06	Beer and malt	11-12	Manufacture of beverages and tobacco products	Manufacturing
CPA_C11.0 1-6 and C12	Alcoholic beverages and tobacco products	12	Tobacco	11-12	Manufacture of beverages and tobacco products	Manufacturing
CPA_C1107	Soft drinks	11.07	Soft drinks	11-12	Manufacture of beverages and tobacco products	Manufacturing
CPA_C13	Textiles	13	Textiles	13	Manufacture of textiles	Manufacturing
CPA_C14	Wearing apparel	14	Wearing apparel	14-15	Manufacture of wearing apparel and leather products	Manufacturing
CPA_C15	Leather and related products	15	Leather products	14-15	Manufacture of wearing apparel and leather products	Manufacturing
CPA_C16	Wood and of products of wood and cork, except furniture, articles of straw and plaiting materials	16	Wood and wood products	16	Manufacture of wood and products of wood and cork except furniture; manufacture of articles of straw	Manufacturing
CPA_C17	Paper and paper products	17	Paper and paper products	17	Manufacture of paper and paper products	Manufacturing
CPA_C18	Printing and recording services	18	Printing and recording	18	Printing and reproduction of recorded media	Manufacturing
CPA_C19	Coke and refined petroleum products	19,20B	Coke, petroleum and petrochemicals	19-20	Manufacture of coke, refined petroleum and chemicals	Manufacturing



UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_C203	Paints, varnishes and similar coatings, printing ink and mastics	20.3	Paints, varnishes and inks etc	19-20	Manufacture of coke, refined petroleum and chemicals	Manufacturing
CPA_C204	Soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	20.4	Cleaning and toilet preparations	19-20	Manufacture of coke, refined petroleum and chemicals	Manufacturing
CPA_205	Other chemical products	20.5	Other chemicals	19-20	Manufacture of coke, refined petroleum and chemicals	Manufacturing
CPA_C20A	Industrial gases, inorganics and fertilisers (all inorganic chemicals)-20.11/13/15	20AC	Inorganic chemicals, dyestuffs and agrochemicals	19-20	Manufacture of coke, refined petroleum and chemicals	Manufacturing
CPA_C21	Basic pharmaceutical products and pharmaceutical preparations	21	Pharmaceuticals	21	Manufacture of basic pharmaceutical products and pharmaceutical	Manufacturing
CPA_C22	Rubber and plastic products	22	Rubber and plastic	22	Manufacture of rubber and plastic products	Manufacturing
CPA_C235_6	Cement, lime, plaster and articles of concrete, cement and plaster	23.5-6	Cement, lime and plaster	23	Manufacture of other non-metallic mineral products	Manufacturing

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_C23OT HER	Glass, refractory, clay, other porcelain and ceramic, stone and abrasive products- 24.1-4/7	23OTHER	Glass, clay and stone etc	23	Manufacture of other non-metallic mineral products	Manufacturing
CPA_C241_3	Basic iron and steel	24. 1-3	Iron and steel	24	Manufacture of basic metals	Manufacturing
CPA_C244_5	Other basic metals and casting	24. 4-5	Other metals and casting	24	Manufacture of basic metals	Manufacturing
CPA_C254	Weapons and ammunition	25	Fabricated metal	25	Manufacture of fabricated metal products	Manufacturing
CPA_C25OT HER	Fabricated metal products excluding machinery and equipment and weapons and ammunition- 25.1-	25	Fabricated metal	25	Manufacture of fabricated metal products	Manufacturing
CPA_C241_3	Basic iron and steel	24.1-3	Iron and steel	24	Manufacture of basic metals	Manufacturing
CPA_C244_5	Other basic metals and casting	24.4-5	Other metals and casting	24	Manufacture of basic metals	Manufacturing
CPA_C254	Weapons and ammunition	25	Fabricated metal	25	Manufacture of fabricated metal products	Manufacturing
CPA_C25OT HER	Fabricated metal products excluding machinery and equipment and weapons and ammunition- 25.1-	25	Fabricated metal	25	Manufacture of fabricated metal products	Manufacturing
CPA_C26	Computer, electronic and optical products	26	Computers, electronics and opticals	26	Manufacture of computer, electronic and optical products	Manufacturing

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_C27	Electrical equipment	27	Electrical equipment	27	Manufacture of electrical equipment	Manufacturing
CPA_C28	Machinery and equipment n.e.c	28	Machinery and equipment	28	Manufacture of machinery and equipment N.E.C	Manufacturing
CPA_C29	Motor vehicles, trailers and semi-trailers	29	Motor vehicles	29	Manufacture of motor vehicles, trailers and semi-trailers	Manufacturing
CPA_C301	Ships and boats	30	Other transport equipment	30	Manufacture of other transport equipment	Manufacturing
CPA_C303	Air and spacecraft related machinery	30	Other transport equipment	30	Manufacture of other transport equipment	Manufacturing
CPA_C30OTHER	Other transport equipment 30.2/4/9	30	Other transport equipment	30	Manufacture of other transport equipment	Manufacturing
CPA_C31	Furniture	31	Furniture	31	Manufacture of furniture	Manufacturing
CPA_C32	Other manufactured goods	32	Other manufacturing	32	Other manufacturing	Manufacturing
CPA_C3315	Repair and maintenance of ships and boats	33	Repair and maintenance	33	Repair and installation of machinery and equipment	Manufacturing
CPA_C3316	Repair and maintenance of aircraft and spacecraft	33	Repair and maintenance	33	Repair and installation of machinery and equipment	Manufacturing
CPA_C33OTHER	Rest of repair; installation- 33.11-14/17/19/20	33	Repair and maintenance	33	Repair and installation of machinery and equipment	Manufacturing

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_D351	Electricity, transmission and distribution	35.1	Electricity	35	Electricity transmission and distribution, gas distribution, steam and air conditioning distribution and supply	Utilities
CPA_D352_3	Gas; distribution of gaseous fuels through mains; steam and air conditioning supply	35.2-3	Gas etc	35	Electricity transmission and distribution, gas distribution, steam and air conditioning distribution and supply	Utilities
CPA_E36	Natural water; water treatment and supply services	36,37	Water and sewage	E	Water supply; sewerage and waste management	Utilities
CPA_E37	Sewerage services; sewage sludge	36,37	Water and sewage	E	Water supply; sewerage and waste management	Utilities
CPA_E38	Waste collection, treatment and disposal services; materials recovery services	38,39	Waste, remediation and management	E	Water supply; sewerage and waste management	Utilities
CPA_E39	Remediation services and other waste management services	38,39	Waste, remediation and management	E	Water supply; sewerage and waste management	Utilities
CPA_F41, F42 and F43	Construction	41-43	Construction	F	Construction	Construction

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_G45	Wholesale and retail trade and repair services of motor vehicles and motorcycles	46	Wholesale and retail vehicles	45	Wholesale and retail trade and repair of motor vehicles and motorcycles	Retail, distribution and transport
CPA_G46	Wholesale trade services, except of motor vehicles and motorcycles	46	Wholesale excluding vehicles	46	Wholesale trade except of motor vehicles and motorcycles	Retail, distribution and transport
CPA_G47	Retail trade services, except of motor vehicles and motorcycles	47	Retail excluding vehicles	47	Retail trade except of motor vehicles and motorcycles	Retail, distribution and transport
CPA_H491_2	Rail transport services	49.1-2	Rail transport	49	Land transport	Retail, distribution and transport
CPA_H493_5	Land transport services and transport services via pipelines, excluding rail transport	49.3-5	Other land transport	49	Land transport	Retail, distribution and transport
CPA_H50	Water transport services	50	Water transport	50	Water transport	Retail, distribution and transport
CPA_H51	Air transport services	51	Air transport	51	Air transport	Retail, distribution and transport
CPA_H52	Warehousing and support services for transportation	52	Support services for transport	52	Warehousing and support services for transportation	Retail, distribution and transport
CPA_H53	Postal and courier services	53	Post and courier	53	Postal and courier activities	Retail, distribution and transport
CPA_I55	Accommodation services	55	Accommodation	55	Accommodation	Private services

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_I56	Food and beverage serving services	56	Food and beverage services	56	Food and beverage serving activities	Private services
CPA_J58	Publishing services	58	Publishing services	58	Publishing activities	Private services
CPA_J59 and J60	Motion picture, video and tv programme production, sound recording and music publishing activities and programming and broadcasting activities	59,60	Film, video and TV etc; broadcasting	59-60	Motion picture, video and tv programme production, sound recording and music publishing activities and programming and broadcasting activities	Private services
CPA_J61	Telecommunications services	61	Telecommunications	61	Telecommunications services	Private services
CPA_J62	Computer programming, consultancy and related services	62	Computer services	62	Computer programming, consultancy and related activities	Private services
CPA_J63	Information services	63	Information services	63	Information services activities	Private services
CPA_K64	Financial services, except insurances and pension funding	64	Financial services	K	Financial and insurance activities	Private services
CPA_K65.1-2 and K65.3	Insurance, reinsurance and pension funding services except compulsory social security	65	Insurance and pensions	K	Financial and insurance activities	Private services

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_K66	Services auxiliary to financial services and insurance services	66	Auxiliary financial services	K	Financial and insurance activities	Private services
CPA_L683	Real estates services on a fee or contract basis	68.3	Real estate- fee or contract	68.21 MP	Imputed rent	Private services
CPA_L68A	Owner-occupiers' housing services	68.1-2	Real estate-own	68 OTHER	Real estate activities (excluding imputed rent)	Private services
CPA_L68B X L683	Real estate services, excluding on a fee or contract basis and imputed rent	68.2 IMP	Imputed rent	68 OTHER	Real estate activities (excluding imputed rent)	Private services
CPA_M691	Legal services	69.1	Legal activities	69	Legal and accounting activities	Private services
CPA_M692	Accounting, bookkeeping and auditing services; tax consulting services	69.2	Accounting and tax services	69	Legal and accounting activities	Private services
CPA_M70	Services of head offices; management consulting services	70	Head office and consulting services	70	Activities of head offices and management consultancy	Private services
CPA_M71	Architectural and engineering services; technical testing and analysis services	71	Architectural services etc	71	Architectural and engineering service; technical testing and analysis	Private services
CPA_M72	Scientific research and development services	72	Research and development	72-73	Scientific research and development, and advertising and research	Private services

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_M73	Advertising and market research services	73	Advertising and market research	72-73	Scientific research and development, and advertising and research	Private services
CPA_M74	Other professional, scientific and technical services	74	Other professional services	74-75	Other professional and scientific and technical activities and veterinary activities	Private services
CPA_M75	Veterinary services	75	Veterinary services	74-75	Other professional and scientific and technical activities and veterinary activities	Private services
CPA_N77	Rental and leasing services	77	Rental and leasing services	77-78	Rental and leasing and employment activities	Private services
CPA_N78	Employment services	78	Employment services	77-78	Rental and leasing and employment activities	Private services
CPA_N79	Travel agency, tour operator and other reservations services and related services	79	Travel and related services	79-80	Travel agency, tour operator and other reservation services and security and investigation activities	Private services
CPA_N80	Security and investigation services	80	Security and investigation	79-80	Travel agency, tour operator and other reservation services and security and investigation activities	Private services
CPA_N81	Services to buildings and landscape	81	Building and landscape services	81	Services to buildings and landscape activities	Private services



UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_N82	Office administrative, office support and other business support services	82	Business support services	82	Office administrative, office support and other business support activities	Private services
CPA_O84	Public administration and defence services; compulsory social security services	84	Public administration and defence	84	Public administration and defence	Public sector and social services
CPA_P85	Education services	85	Education	85	Education	Public sector and social services
CPA_Q86	Human health services	86	Health	86	Human health activities	Public sector and social services
CPA_Q87 and Q88	Residential care and social work activities	87, 88	Residential care and social work	87-88	Residential care and social work activities	Public sector and social services
CPA_R90	Creative arts and entertainment services	90	Creative services	90-91	Creative arts and entertainment services and libraries, archives, museums and other cultural activities	Creative, sport and other services
CPA_R91	Libraries, archives, museums and other cultural services	91	Creative services	90-91	Creative arts and entertainment services and libraries, archives, museums and other cultural activities	Creative, sport and other services

UK IOT	UK IOT	Scotland	Scotland	Northern Ireland	Northern Ireland	Wales
CPA_R92	Gambling and betting services	92	Gambling	92	Gambling and betting services	Creative, sport and other services
CPA_R93	Sports services and amusement and recreation services	93	Sports and recreation	93	Sports services and amusement and recreation activities	Creative, sport and other services
CPA_S94	Services furnished by membership organisations	94	Membership organisations	S	Other services activities	Creative, sport and other services
CPA_S95	Repair services of computers and personal and household goods	95	Repairs-personal and household	S	Other services activities	Creative, sport and other services
CPA_S96	Other personal services	96	Other personal services	S	Other services activities	Creative, sport and other services
CPA_T97	Services of households as employers of domestic personnel	97	Households as employers	T	Activities of households as employers of domestic personnel	Creative, sport and other services

## Appendix B: Data used for the construction of MNIOT and the SSA framework

The datasets below are helpful for the **inter-regional trade** and one link suggests an experimental methodology for it.

<https://www.uktradeinfo.com/trade-data/#regional-trade>

<https://www.uktradeinfo.com/trade-data/regional/2023/uk-regional-trade-in-goods-statistics-second-quarter-2023/>

<https://www.ons.gov.uk/releases/experimentalmethodologyforproducingukinterregionaltradeestimates>

<https://www.escoe.ac.uk/uk-interregional-trade-estimation/>

Trade of Wales with the rest of the UK:

<https://www.business-live.co.uk/economic-development/value-welsh-exports-imports-rest-23502401>

The Office for Internal Market Report has some aggregate data below, using experimental statistics. If you scroll down there are sections for England, Scotland, Wales and Northern Ireland with links. The links will take you to footnotes and then to data publications. These as far as I can see are aggregate, but they can be useful to regulate the model.

<https://www.gov.uk/government/publications/oim-annual-report/oim-annual-report-on-the-operation-of-the-internal-market-2022-23>

The following link is a very good summary of **Welsh** data. Cardiff University did an experimental **Input Output Table**, but very general. The Trade statistics for Wales has, if you download the table, aggregate **interregional** tables.

<https://www.gov.wales/statistics-wales-quarterly-update-december-2022-html>

[Trade Survey for Wales: 2021 | GOV.WALES](#)

[https://orca.cardiff.ac.uk/id/eprint/151984/1/Project\\_Report\\_Input\\_Output\\_Tables\\_Wales\\_2019.pdf](https://orca.cardiff.ac.uk/id/eprint/151984/1/Project_Report_Input_Output_Tables_Wales_2019.pdf)

**Employment** data below. The 5 digit classification is for UK and GB.

5 digit employment codes

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/industry235digitsicbusinessregisterandemploymentsurveybrestable2>  
[Employment in regions of England and the country of Wales - Office for National Statistics](#)  
[Employment in local authorities, England and Wales: Census 2021 - Office for National Statistics \(ons.gov.uk\)](#)

**GVA** data. The balanced dataset has industry related data up to 2021

<https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/regionalgrossvalueaddedincomeapproach>

<https://www.ons.gov.uk/economy/grossdomesticproductgdp/datasets/regionalgrossdomesticproductallnutslevelregions>

[Regional gross value added \(balanced\) per head and income components - Office for National Statistics \(ons.gov.uk\)](#)

UK Input Output Tables

<https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/inputoutputsupplyandusetables>

[UK input-output analytical tables, product by product - Office for National Statistics \(ons.gov.uk\)](#)

ABS UK and regional tables

<https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/nonfinancialbusinesseconomyukandregionalannualbusinesssurvey/2021results>

Pan European Sport Account

[study on the economic impact of sport through sport-NC0517238ENN.pdf](#)

BRES data

[Industry \(two, three and five-digit Standard Industrial Classification\) – Business Register and Employment Survey \(BRES\): Table 2 - Office for National Statistics \(ons.gov.uk\)](#)

Sport England economic development, active places

[Economic development | Sport England](#)

<https://www.activeplacespower.com/OpenData/download>

## International Trade

The following publication has a detailed trade profile in the regions but not interregional trade:

<https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/bulletins/internationaltradeinuknationsregionsandcities/2021>

The following has international trade for the nations but not among them:

<https://www.gov.uk/government/statistics/uk-regional-trade-in-goods-statistics-third-quarter-july-to-september-2023/uk-regional-trade-in-goods-statistics-third-quarter-july-to-september-2023-commentary>

<https://www.gov.uk/government/statistics/uk-regional-trade-in-goods-statistics-third-quarter-july-to-september-2023>

## Scottish Data

### Scottish Trade

<https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2021/10/export-statistics-scotland-2019/documents/export-statistics-scotland-2019---publication/export-statistics-scotland-2019---publication/govscot%3Adocument/Export%2BStatistics%2BScotland%2B2019%2B-%2BPublication.pdf#page=3>

The following states that 6% of Scotland exports went to the rest of the UK:

<https://lordslibrary.parliament.uk/scotlands-contribution-to-the-uks-economy-wellbeing-and-quality-of-life/#:~:text=Scotland%20had%20a%20trade%20deficit,%25%20to%2039%25%20of%20GDP>

For 2018: UK, biggest trading partner

<https://www.gov.uk/government/news/scotlands-biggest-trading-partner-continues-to-be-the-uk>

There is also a publication named 'Exports Statistics Scotland' and a Survey: 'Global Connections Survey' that can provide information:

<https://www.gov.scot/publications/exports-statistics-scotland-2021/pages/introduction/>

### Scottish Input Output Tables

[https://www.gov.scot/publications/about-supply-use-input-output-tables/Supply,UseandInput-OutputTables:1998-2020-gov.scot\(www.gov.scot\)](https://www.gov.scot/publications/about-supply-use-input-output-tables/Supply,UseandInput-OutputTables:1998-2020-gov.scot(www.gov.scot))

Nomis data, Scottish economy by industry- employment

[Labour Market Profile - Nomis - Official Census and Labour Market Statistics \(nomisweb.co.uk\)](https://www.nomisweb.co.uk/labour-market-profile)

## Northern Ireland Data

### Input Output Tables

[The Analytical Input-Output tables | Northern Ireland Statistics and Research Agency \(nisra.gov.uk\)](https://www.nisra.gov.uk/the-analytical-input-output-tables)

### Employment

[Labour Force Survey Annual Summary Report 2021 | Northern Ireland Statistics and Research Agency \(nisra.gov.uk\)](https://www.nisra.gov.uk/labour-force-survey-annual-summary-report-2021)

## Appendix C: FAME Syntax

COMPANY->Number of Employees->Values->All companies with known values

->Include estimates

....->Time->2020; 2021; 2022; latest year

->At least one period (of the above)

LOCATION->Country->England; Scotland; Wales; Northern Ireland

->Address type -> select all

ACTIVITIES-> UKSIC-> choose code from list.

->Code type->Primary code only

VIEW RESULTS

ADD COLUMNS->Profit and Loss-> Gross Profit->2020; 2021; 2022; latest year

->Profit (loss) before tax ->2020; 2021; 2022; latest year

->Taxation->2020; 2021; 2022; latest year

->Profit (loss) after tax->2020; 2021; 2022; latest year

->Remuneration-> 2020; 2021; 2022; latest year

->Wages and Salaries->2020; 2021; 2022; latest year

->Contact information->Primary Trading Address (Country)

->Other Trading Addresses (Country)->All values

## Appendix D: Processing of FAME Data

1. Add excel sheet 'sheet 1'
2. Select column A and B in 'results', copy and paste into 'sheet 1'
3. Sort and filter. Custom sort. Sort by column A
4. Type 'England' 'Nothern Ireland' (FAME spells Northern Ireland this way) 'Scotland' 'Wales' "" 'Total' in column C,D,E,F,G,H
5. Results sheet select column B
6. Select the range where you have the company names.
7. Press **Ctrl + G** to open the "Go To" dialog box.
8. Click on the "Special..." button.
9. Select "Blanks" and click "OK". This will select all the blank cells in your selected range.
10. Now, without deselecting the cells, type **=** and then press the **Up** arrow key. This will create a formula that refers to the cell above.
11. Press **Ctrl + Enter** to fill all the selected blank cells with the content from the cell above.
12. 'Sheet 1' input the following equation into rows C2-G(dependant on number of companies)
13. =COUNTIFS(Results!\$B\$2:\$B\$6816,Sheet1!\$B2,Results!\$A1\$2:\$A1\$6816,Sheet1!C\$1)  
- highlighted in yellow is dependent on number of companies, highlighted in pink is dependent on column of 'trading address(es) country'
14. Fill in h2 with the following equation =SUM(C2:G2)
15. Select all in column H and press Ctrl D.
16. Select H1, and to data filter Press Alt D F F
17. Check that no company presents a 0.
18. In 'Results' copy and paste all into Sheet 1
19. Sort and filter copied text. Custom Sort. Sort by column ''
20. Complete final checks