

ANALYSIS OF UNIVERSITY OF GALWAY'S RESEARCH OUTPUT ALIGNED TO THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (SDGS) 2022



Planning & Institutional Research Office
Sept 2022

SDG 1: No Poverty
SDG 2: Zero Hunger
SDG 3: Good Health & Wellbeing
SDG 4: Quality Education
SDG 5: Gender Equality
SDG 6: Clean Water & Sanitation
SDG 7: Affordable & Clean Energy
SDG 8: Decent Work & Economic Growth

Industry, Innovation & Infrastructure: SDG 9
Reduced Inequality: SDG 10
Sustainable Cities & Communities: SDG 11
Responsible Consumption & Production: SDG 12
Climate Action: SDG 13
Life Below Water: SDG 14
Life on Land: SDG 15
Peace, Justice & Strong Institutions: SDG 16

Analysis of University of Galway's SDG Research Output 2017-2021

Purpose: The purpose of this paper is to analyse the distribution of research output that University of Galway is contributing to across 16 of the 17 UN Sustainable Development Goals (SDGs). Using SciVal data to assess the quality and impact of University of Galway's research towards the UN SDGs and also to help highlight our research strengths and opportunities for growth across the university. It can also serve as a tool to help find current and potential collaboration in multi-disciplinary research areas.



SciVal (the interface to the Scopus database) introduced a mapping of all publications on its database to the SDGs in 2020, using a keyphrase search analysis mapping key phrases to each of 16 the 17 UN SDGs (no SDG 17). It updated their methodology in 2021 introducing a different methodology "Machine Learning" to supplement their search query terms. *Therefore the data in this report is not directly comparable with our 2020 report given the different mapping methodology.*

All of these United Nations (UN) SDGs can be viewed as Research areas within SciVal and can be broken down by country and by institution. Each of the SDGs can be individually analysed further in terms of keywords, key topics, key authors and key collaborations.

We would highlight that this report is not the complete reflection of University of Galway's contribution to the UN SDGs, as much of our research, particularly in the Arts & Humanities and Social Sciences is not captured in the Scopus database. Hence this is a snapshot of only a section of it.

Note Scopus is Elsevier's abstract and citation database which covers nearly 36,377 titles (22,794 active titles and 13,583 inactive titles) from approximately 11,678 publishers, of which 34,346 are peer-reviewed journals in top-level subject fields: life sciences, social sciences, physical sciences and health sciences)

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SDG 1: No Poverty
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1 Introduction:

The data in this report summarises University of Galway’s research output across the 16 UN SDGs and compares it at an Irish level and also at a global level, to identify which SDGs University of Galway is performing well in and which present an opportunity for further development.

In the analysis below the number of Publications are examined to indicate which UN SDGs University of Galway is contributing to, and how it compares on a national and global level.

The Field Weighted Citation Ratio (FWCI) and the % of papers in the top 10% most cited per SDG is also investigated (to highlight which SDGs University of Galway’s research is being heavily cited in) as a measure of the impact of our research.

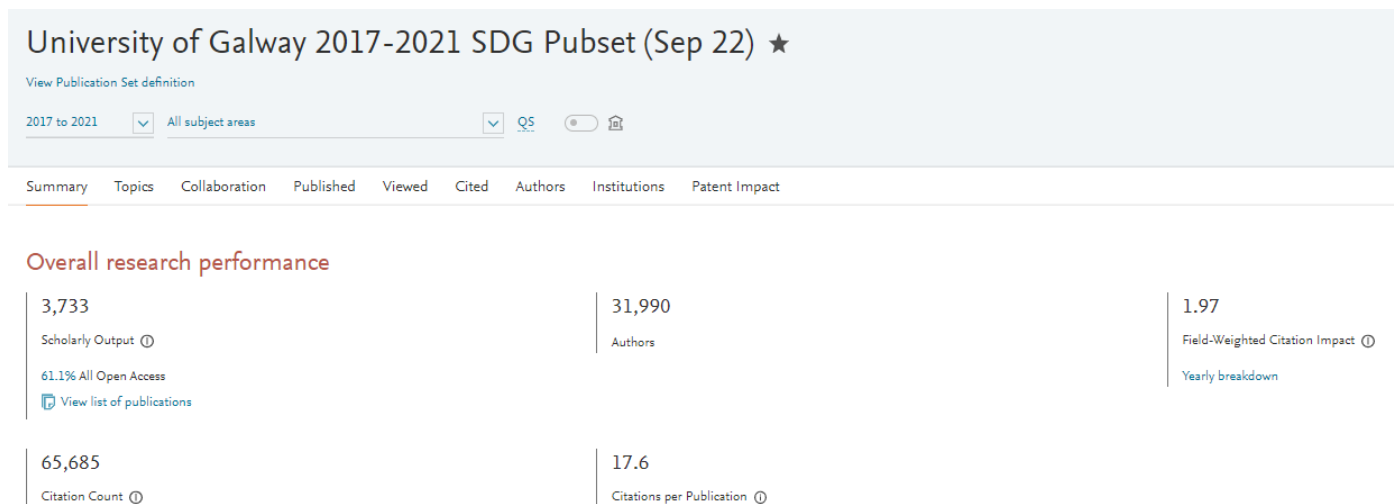
2 University of Galway publications per SDG 2017-2021

Over the 5 year period 2017-2021, per Scival, University of Galway published 3,733 papers related to the UN SDGs, as detailed in Graph 1 and Table 1 below. This is an increase of 67% from 2017 (an average of 14% per annum over the 5 years) although this growth has accelerated recently, with approx.80% of the growth coming in the past 2 years.

These SDG related publications represented **36%** of all University of Galway’s publications over the same 5 year period. However, the lower growth rate of the overall university’s output (33.3% since 2017) means SDG related publications represented **41%** of university’s total output in the year 2021.

Also of note is the higher FWCI of SDG related publications – at 1.97 compared to the University’s FWCI of 1.61 for the same period 2017-2021.

Graph 1: University of Galway – SDG related publications:



- SDG 1: No Poverty
- SDG 2: Zero Hunger
- SDG 3: Good Health & Wellbeing
- SDG 4: Quality Education
- SDG 5: Gender Equality
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Publication share by Subject Area

Donut Chart



Segment size represents relative publication share per Subject Area. Note that a publication can be mapped to multiple Subject Areas. [Learn more >](#)

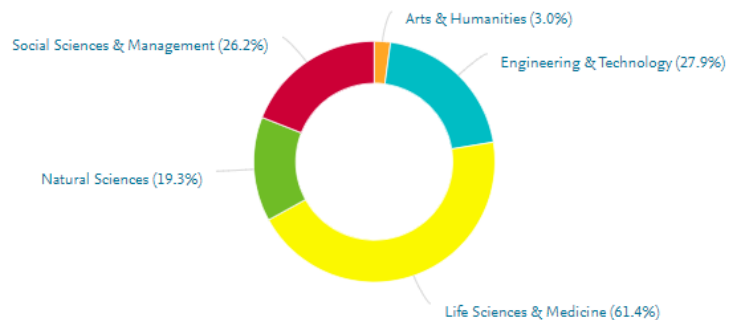


Table 1: University of Galway – Overall v's SDG related publications:

No. of Pubs	2017	2018	2019	2020	2021	Total	CAGR 2017-2021
SDGs related Publications	597	618	675	841	1002	3733	14%
All University of Galway Pubs	1831	1882	1929	2209	2440	10291	7%
% of University	32.6%	32.8%	35.0%	38.1%	41.1%	36.3%	
Citations	2017	2018	2019	2020	2021	Total	
SDGs related Pubs	20247	13812	10862	14625	6139	65685	
All University of Galway Pubs	43426	34814	24799	25874	11800	140713	
% of University	47%	40%	44%	57%	52%	47%	
FWCI	2017	2018	2019	2020	2021	Total	
SDG related Pubs	2.59	1.87	1.65	1.93	1.9	1.97	
All University of Galway Pubs	1.8	1.57	1.36	1.57	1.73	1.61	

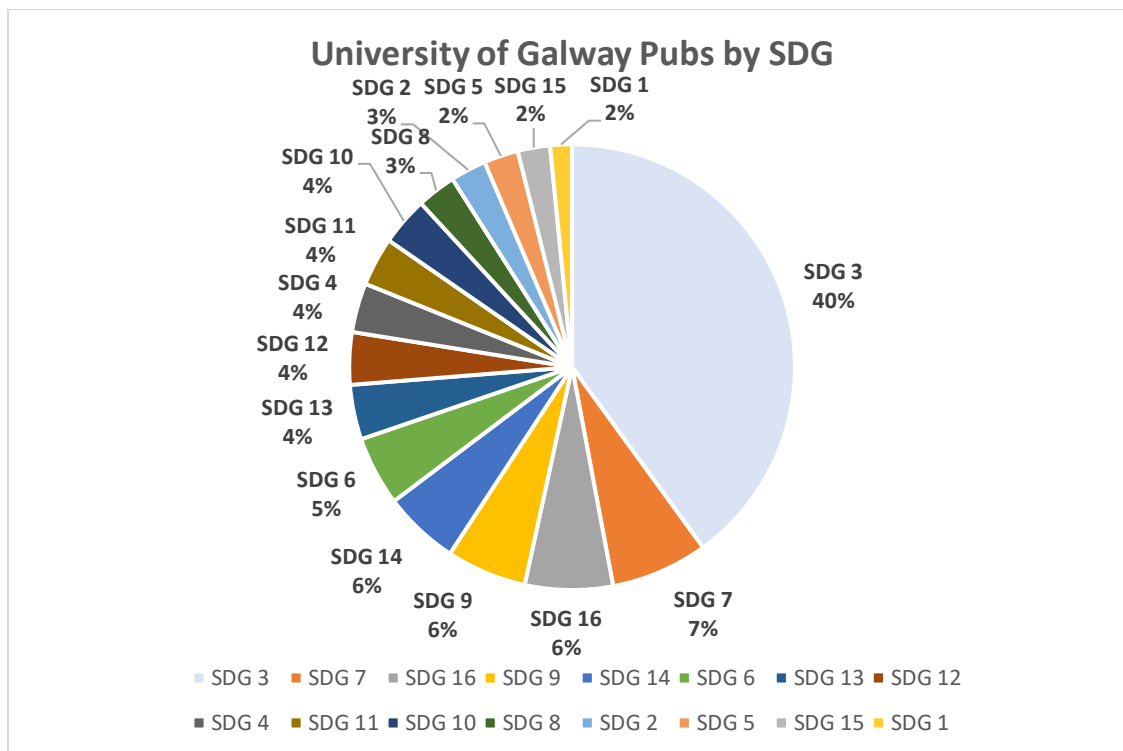
*Compound Annual Growth Rate – average annualised rate of growth.

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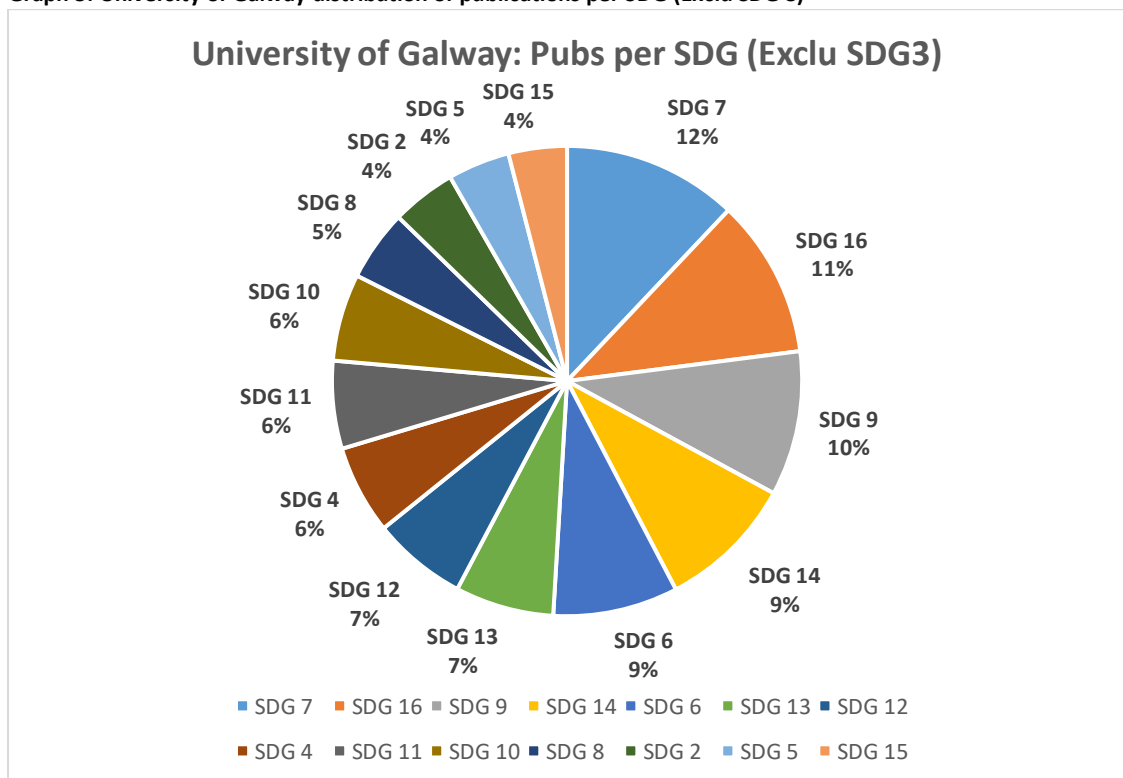
Graph 2 below details the distribution of University of Galway’s SDG related publications on Scopus across all SDGs 1-16. It demonstrates that 40% of University of Galway’s SDG related publications are in SDG 3 – similar to the global percentage (39% in 2021).

Graph 2: University of Galway distribution of publications per SDG



Excluding SDG 3, **Graph 3** below demonstrates the other main SDGs University of Galway is publishing in are **SDG 7, SDG 16, SDG 9 and SDG 14**.

Graph 3: University of Galway distribution of publications per SDG (Exclu SDG 3)



- SDG 1: No Poverty
- SDG 2: Zero Hunger
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- Life on Land: **SDG 15**
- Peace, Justice & Strong Institutions: **SDG 16**

Table 2 below details the data behind the above pie charts – the number of publications per SDG from 2017 to 2021. The final column also details the growth level of these publications to 2021 to highlight which SDGs we are increasing our focus on and which are declining.

Table 2: Publications per SDG - University of Galway

Publications	Scholarly Output					% Growth CAGR		
	2017	2018	2019	2020	2021	Overall	2017-2020	2016-2020
SDG 3	259	286	351	465	565	1926	22%	14%
SDG 7	70	64	66	64	75	339	2%	9%
SDG 16	77	53	54	55	68	307	-3%	-1%
SDG 9	39	46	50	56	89	280	23%	8%
SDG 14	43	49	49	64	60	265	9%	16%
SDG 6	34	48	39	55	66	242	18%	1%
SDG 13	24	36	31	42	58	191	25%	1%
SDG 12	27	25	37	42	52	183	18%	1%
SDG 4	22	36	34	26	54	172	25%	10%
SDG 11	40	29	25	42	34	170	-4%	7%
SDG 10	33	21	36	30	49	169	10%	2%
SDG 8	23	21	29	31	33	137	9%	2%
SDG 2	19	20	24	33	29	125	11%	16%
SDG 5	25	22	23	19	31	120	6%	8%
SDG 15	17	19	17	34	26	113	11%	30%
SDG 1	11	10	16	25	14	76	6%	33%

*Compound Annual Growth Rate = the average annualised rate of growth

** Note the data above contains multiple counts of the same paper where it is aligned to multiple SDGs. The distinct count of all papers is 3,733.

University of Galway's top output for the past 5 years in terms of publications is **SDG 3: Good Health & Wellbeing**, followed by **SDG7: Affordable & Clean Energy**, **SDG 16: Peace, Justice & Strong Institutions**, **SDG 9: Industry, Innovation & Infrastructure** and **SDG 14: Life below Water**.

University of Galway have the highest no. of outputs in **SDG 3** and this is common amongst most universities. Also as you would expect, it has grown strongly since 2019 bringing overall 5 year CAGR to 22% (compared to 14% in the last report). The other SDGs where we have demonstrated a high growth rate and a good presence are **SDG 9** with a CAGR of 23%, **SDG 13** and **SDG 4** both at a CAGR of 25% and **SDG 6 and 12** both at a CAGR of 18%, all surpassing global increases of between 10-13% in these SDGs.

What is also interesting is the differences in growth rates between the 2 periods, demonstrating those SDGs which have grown significantly in recent years. As mentioned, SDG 3 was understandably one of these recent rapid growth SDGs, but also **SDG 6, SDG 12, SDG 13 and SDG 4** have all shown accelerated increases in the number of publications by University of Galway in recent years.

SDG 16 and **SDG 11** are the only SDGs which saw a minor decline over the period.

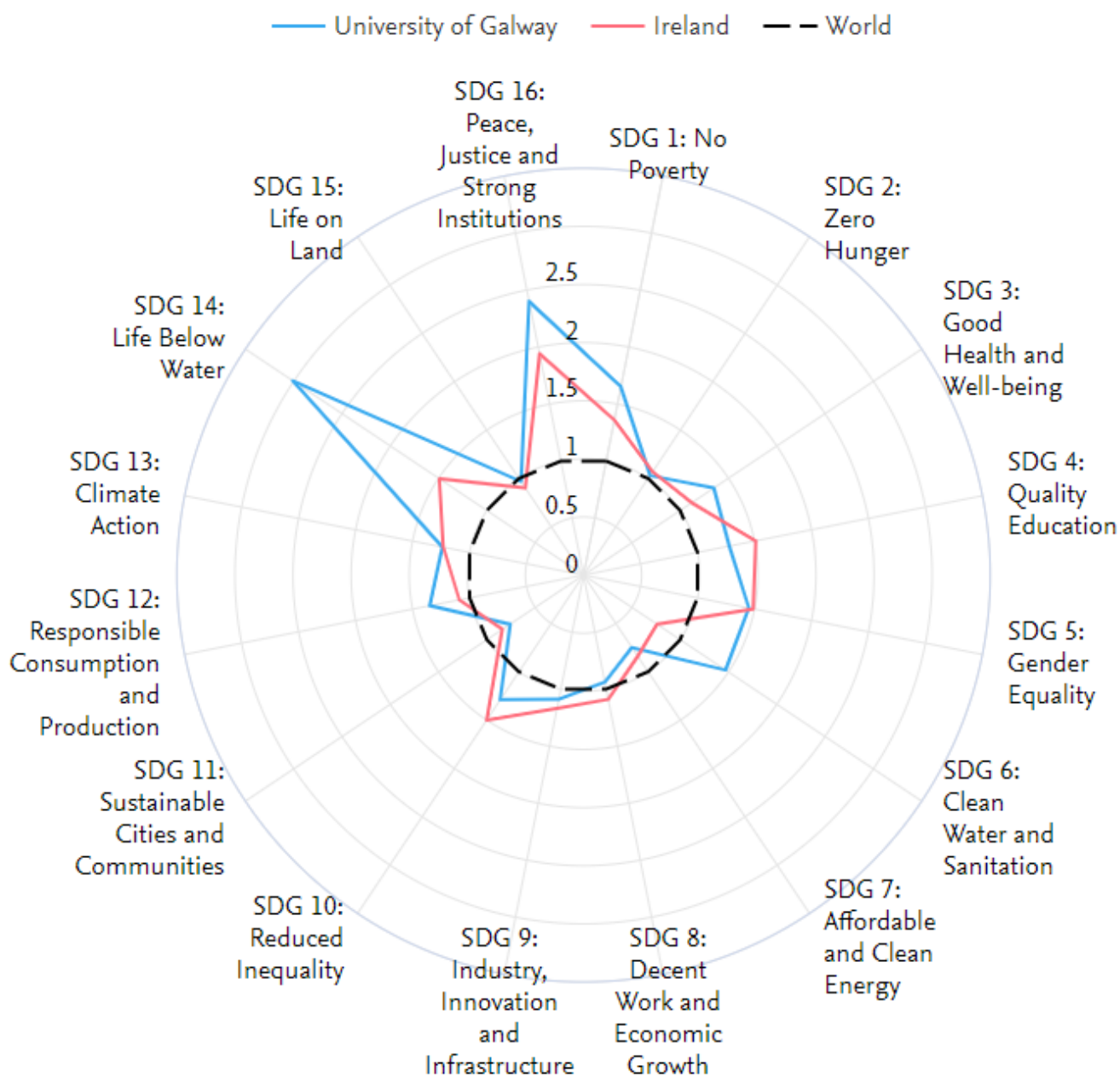
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3 Proportion of Output across the SDGS

Graphs 4a, 4b & 4c are comparisons of % of University of Galway output per SDG compared to Ireland and Global averages.

Graph 4a: Relative output per SDG, University of Galway, Ireland and the World:



Graph 4a demonstrates University of Galway’s share of publications in each SDG relative to the Irish and Worldwide share of publications in each SDG. A value of 1 indicates our output in that SDG is in line with global activity.

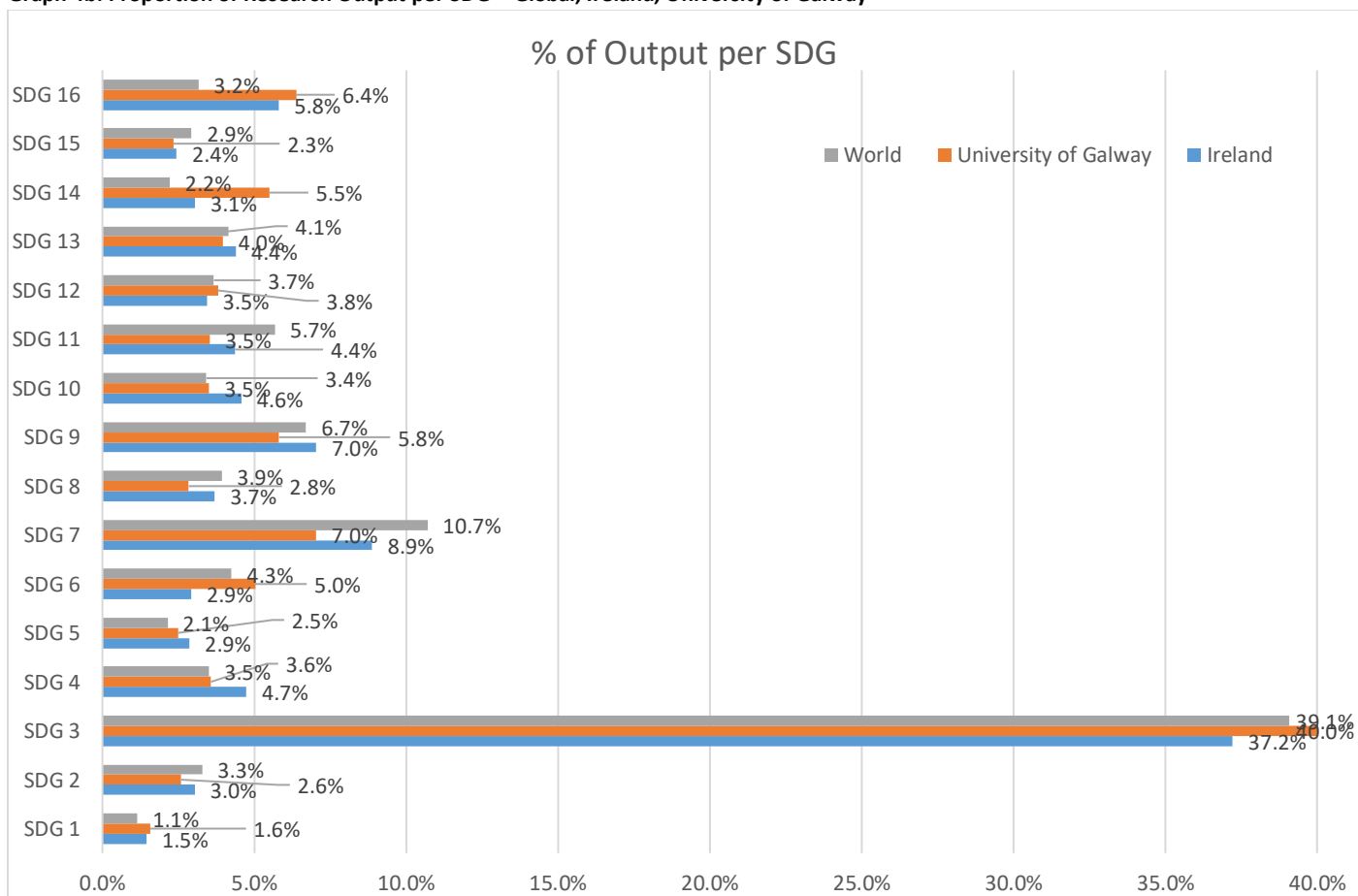
The above graph demonstrates that University of Galway has relatively higher activity than the Worldwide and Irish average in **SDGs 1, 3, SDG 6, SDG 12, SDG 14, SDG 16**.

We are below the Irish average in **SDGs 2, 4, 7, 8, 9, 10 and 11** and in line with the Irish average for **SDG’s 13 and 5**.

- SDG 1: No Poverty
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- SDG 3: Good Health & Wellbeing
- SDG 4: Quality Education
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Graph 4b: Proportion of Research Output per SDG – Global, Ireland, University of Galway



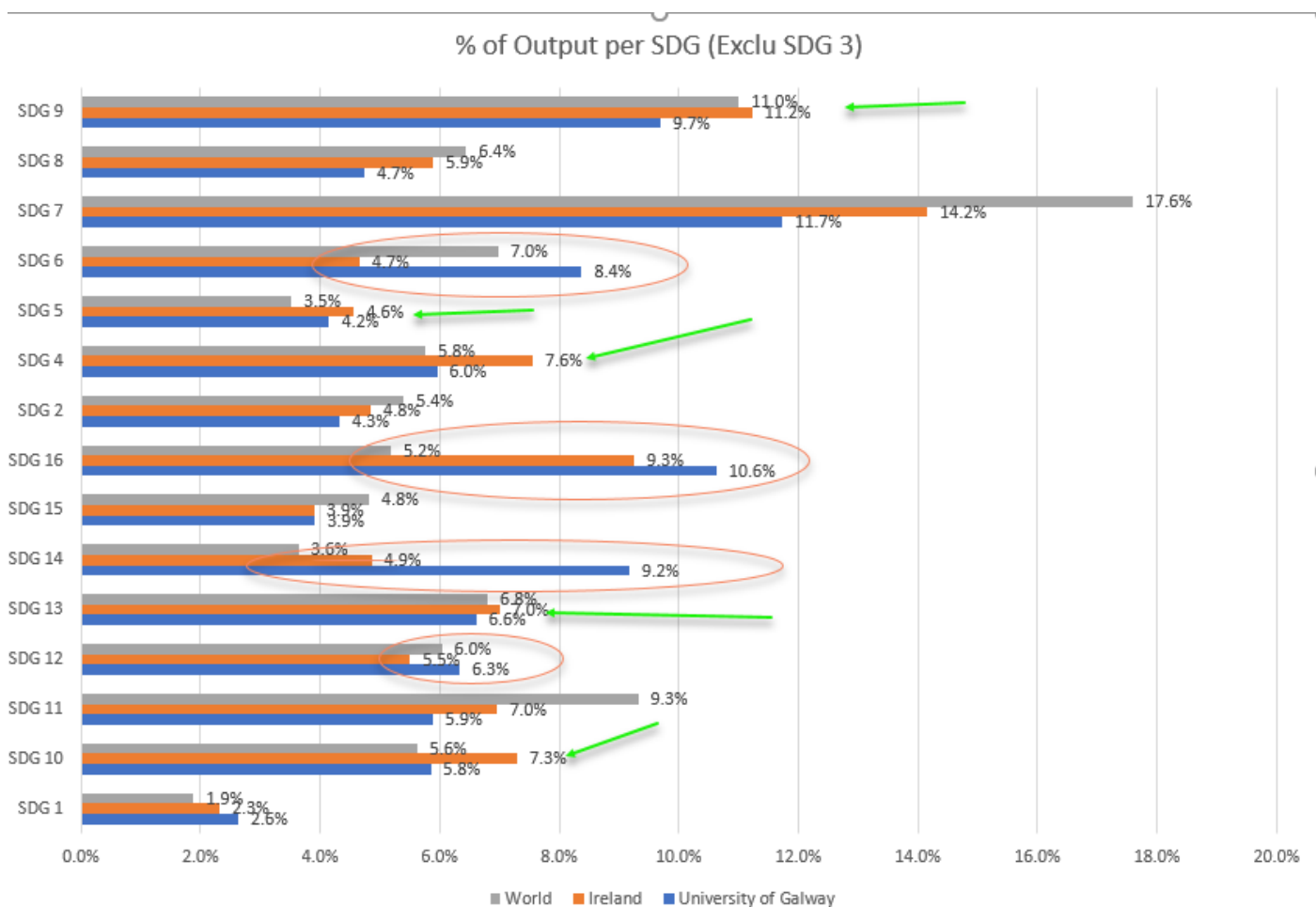
Graph 4a demonstrates the global dominance of research within SDG 3. Proportionally, University of Galway’s SDG 3 output at 40% is ahead of Ireland (at 37.2%) and the global percentage at 39.1%.

- SDG 1:** No Poverty
- SDG 2:** Zero Hunger
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- Life on Land:** **SDG 15**
- Peace, Justice & Strong Institutions:** **SDG 16**

Graph 4c shows the proportion of research output per SDG excluding SDG 3

Graph 4c: Proportion of Research Output per SDG exclu SDG 3 – Global, Ireland, University of Galway



Graph 4c demonstrates that **University of Galway** has a proportionally higher than the Irish and global average output in addition to **SDG 3** in:

- **SDG 14:** Life below Water (by a considerable proportion)
- **SDG 16:** Peace, Justice & Strong Institutions (Ireland is also ahead of the global average for this SDG)
- **SDG 6:** Clean Water & Sanitation (we are quite a bit ahead of the Ireland average)
- **SDG 12:** Responsible Consumption and Production (this was not the case last year)

Graph 4c also demonstrates that Ireland has proportionally more output than the global average in **SDG 4, SDG 5, SDG 10 and SDG 13**, and to a lesser extent **SDG 9**

Ireland has a lower proportion of its research output aimed at **SDG 2, SDG 7, SDG 8, SDG 11 and SDG 15**, than the global average.

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4 Domestic comparison of Research output

Table 3 below details the proportion of SDG related publications for the traditional Irish Universities. It demonstrates that University of Galway has a higher percentage of its publications related to the SDGs at **36%** over the period, compared to the average of the traditional Irish Universities at 33%.

Table 3: Portion of all publications related to the SDGs in Ireland:

	University of Galway	All Traditional Irish Unis
SDG Related Publications	3733	24497
All Publications	10292	73954
% of SDG Pubs	36%	33%

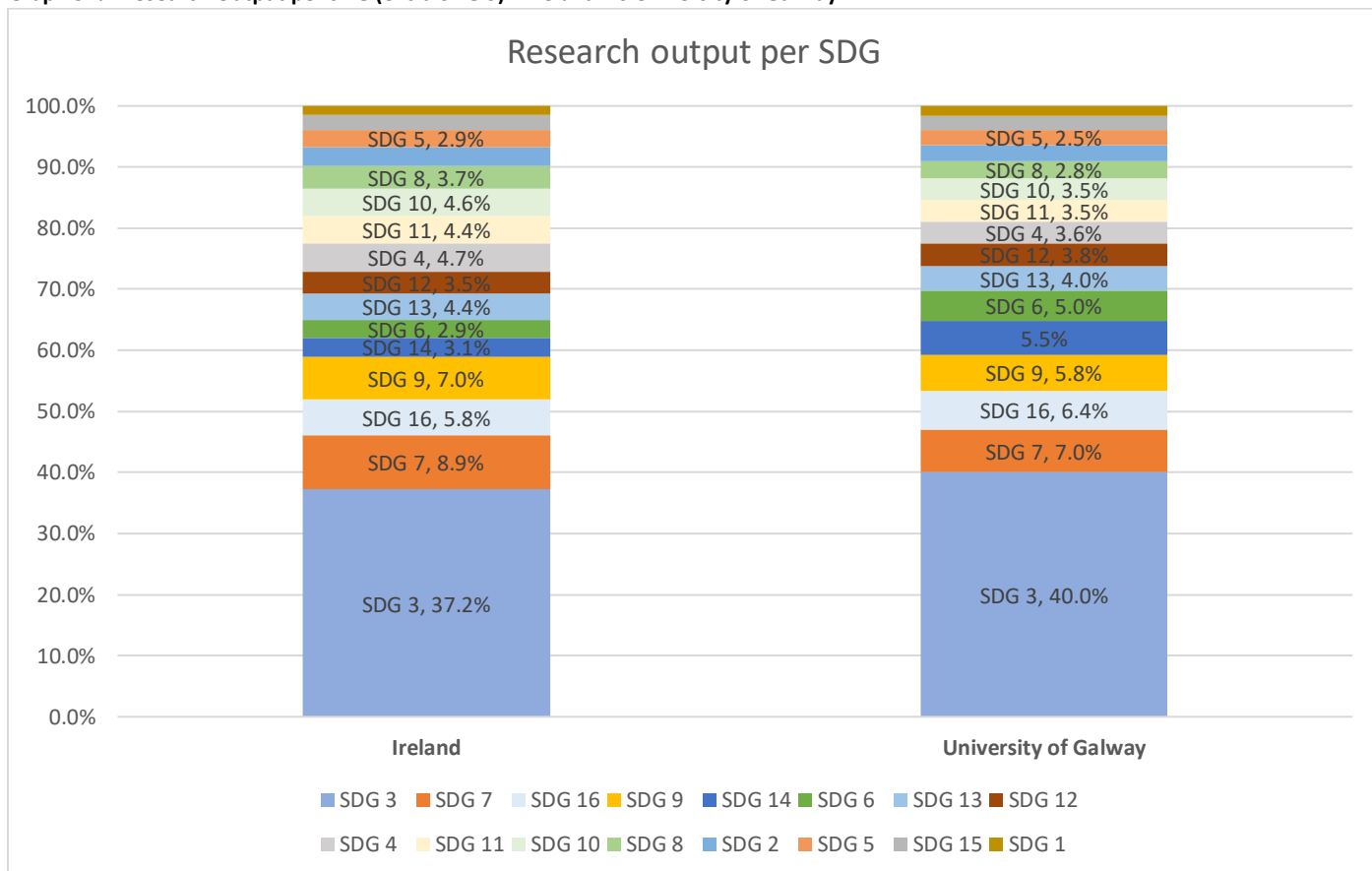
Table 4 details the research output growth per SDG for all of Ireland (not just the traditional Universities) and for University of Galway, to highlight those SDGs where University of Galway is growing faster than the average for Ireland:

Growth in No of Pubs	CAGR 2017-2021	
	Ireland	Univ of Galway
SDG 1	14%	6%
SDG 2	13%	11%
SDG 4	17%	25%
SDG 5	16%	6%
SDG 6	16%	18%
SDG 7	6%	2%
SDG 8	13%	9%
SDG 9	19%	23%
SDG 10	18%	10%
SDG 11	12%	-4%
SDG 12	20%	18%
SDG 13	25%	25%
SDG 14	18%	9%
SDG 15	13%	11%
SDG 16	11%	-3%

The table above highlights that University of Galway is growing faster in terms of volume of publications than the rest of Ireland in SDGs 4, SDG 6 and SDG 9, we are in line with Ireland growth in SDG 13 but showing lower growth in all other SDGs.

Graph 5 details the output per SDG of Ireland v's University of Galway

Graph 5: % Research Output per SDG (exclu SDG 3) – Ireland v's University of Galway



Graph 5 helps to highlight the variation of focus amongst the Irish Universities.

- University of Galway's top 4 outside of SDG 3 are **SDG 7, SDG 16, SDG 9 and SDG 14** (combined 42%).
- Irelands top 4 outside of SDG 3 are **SDG 7, SDG 9, SDG 16 and SDG 4** (combined 42%).

The most common SDG'S amongst the Irish Universities (exclu SDG 3) are **SDG 7 – Affordable & Clean Energy, SDG 9 – Industry, Innovation & infrastructure and SDG 16 – Peace, Justice & Strong Institutions.**

SDG 1: No Poverty
 SDG 2: Zero Hunger
 SDG 3: Good Health & Wellbeing
 SDG 4: Quality Education
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Industry, Innovation & Infrastructure: **SDG 9**
 Reduced Inequality: **SDG 10**
 Sustainable Cities & Communities: **SDG 11**
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 Life Below Water: **SDG 14**
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 Peace, Justice & Strong Institutions: **SDG 16**

5 Assessing Impact per SDGs

5.1 Impact per SDGs' in University of Galway

Table 5 details the **FWCI of each SDG for University of Galway**. Please note any SDGs with less than 100 publications are greyed out as the FWCI is statistically unreliable.

Table 5: FWCI per SDG for University of Galway 2017-2021

University of Galway	FWCI	No of Pubs*
SDG 1	1.11	76
SDG 10	1.86	169
SDG 11	2.37	170
SDG 12	1.71	183
SDG 13	1.72	191
SDG 14	1.92	265
SDG 15	1.36	113
SDG 16	2.46	307
SDG 2	1.5	125
SDG 3	2.38	1926
SDG 4	1.23	172
SDG 5	4.82	120
SDG 6	1.51	242
SDG 7	1.75	339
SDG 8	1.29	137
SDG 9	1.87	280

*No. of Pubs < 100 FWCI not statistically reliable.

Overall University of Galway are achieving well above global impact in almost all the SDGs.

In terms of University of Galway's FWCI – our highest impact publications are in **SDG 5** – Gender Equality, **SDG 11** – Sustainable Cities & Communities, **SDG 16** – Peace, Justice and Strong Institutions and **SDG 3** – Good Health & Wellbeing.

In terms of the impact of our other large areas of publications **SDG 7** – Affordable & Clean Energy has an FWCI of 1.75 (75% higher than global average), **SDG 9** –FWCI is 1.87 and **SDG 14** FWCI is 1.92–92% higher than the global average.

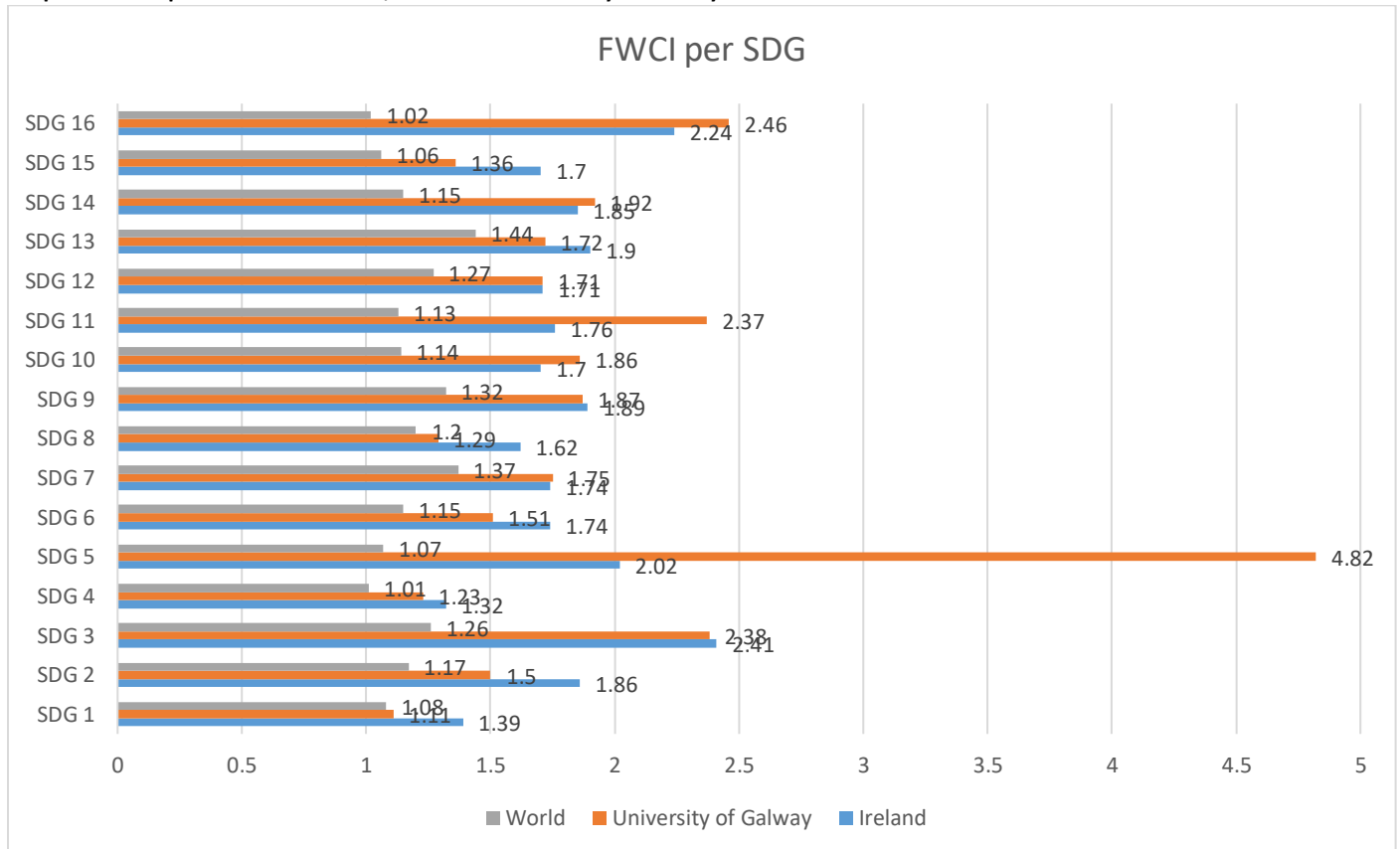
The SDGs where University of Galway is having a higher impact (FWCI) compared to the global and Irish average are detailed in **Graphs 6a and 6b** below:

SDG 1: No Poverty
 SDG 2: Zero Hunger
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5.2 Assessing Impact per SDG in University of Galway, Ireland and the Globe

Graph 6a: FWCI per SDG for the Globe, Ireland and University of Galway

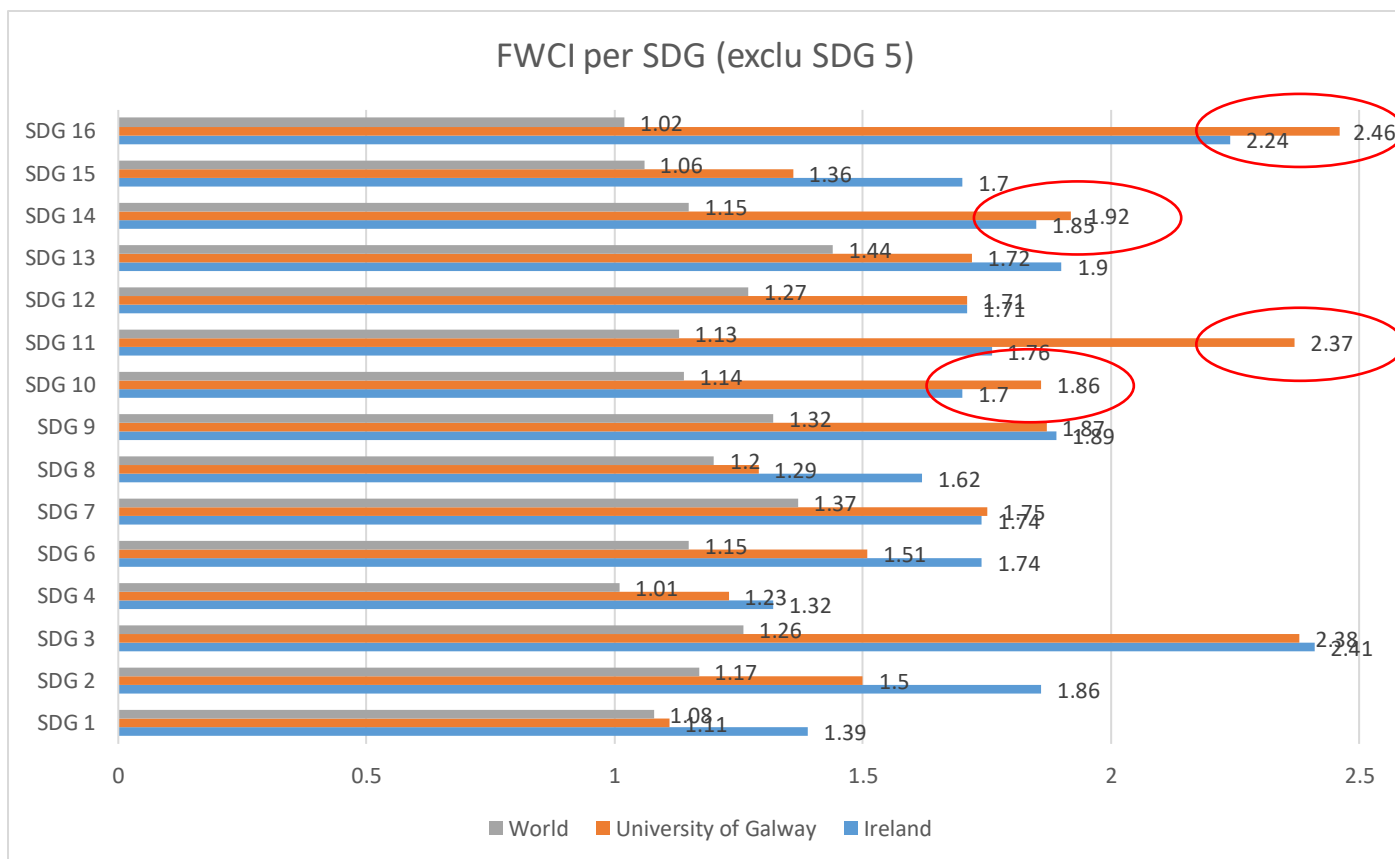


University of Galway’s output in **SDG 5** shows an exceptionally high FWCI (off 120 papers). **Graph 6b** below excludes **SDG 5** to analyse the others in more detail:

- SDG 1: No Poverty
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- Peace, Justice & Strong Institutions: SDG 16

Graph 6b: FWCI per SDG (exclu SDG 5) for the Globe, Ireland and University of Galway



Generally, you will note Irelands FWCI is higher than the global average across all the SDGs.

University of Galway has higher FWCI than Ireland and Global average in **SDGs 16, SDG 14 and SDG 11 and SDG 10.**

However, in those other SDGs where University of Galway has a higher proportion of publications:

- **SDG 7, SDG 9 and SDG 3** – University of Galway is only slightly behind the Irish average but well ahead of the global average

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6 Percentage Highly Cited Papers per SDG, University of Galway

Table 6 details the SDGs where **University of Galway's papers** are among the most highly cited in the world for that field – in the top 10% most highly cited papers:

Table 6: University of Galway's % of publications in top 10% citation percentiles

2017-2021	Output in Top 10% Citation Percentiles	No of Pubs
SDG 13	40.3	191
SDG 12	35	183
SDG 6	33.1	242
SDG 9	32.5	280
SDG 14	32.1	265
SDG 7	26.8	339
SDG 11	26.5	170
SDG 2	26.4	125
SDG 3	24.7	1926
SDG 15	22.1	113
SDG 8	20.4	137
SDG 5	10.8	120
SDG 4	9.9	172
SDG 16	9.8	307
SDG 10	8.9	169
SDG 1	7.9	76

Looking at those SDGs where a proportion of University of Galway is highly cited – in the top 10% most highly cited. This metric is useful to identify those SDGs where our publications could be considered influential.

Despite not being in our top SDGs in terms of publications or FWCI – **SDG 13** has the highest % of papers in the top 10% citation percentiles at over 40%. Next is **SDG 12** – which has seen strong growth in the no. of publications in the last 2 years, at 35%. Over 30% of University of Galway's papers published in **SDG 6: Clean Water & Sanitation**, **SDG 9: Industry, Innovation and Infrastructure** and **SDG 14** – Life below Water, were in the top 10% citation percentiles – meaning they are highly cited.

In terms of those SDGs where we have high volume of publications – **SDG 3** has 24.7% in top 10% Citation percentiles, **SDG 7** has 26.8% and **SDG 16** has only 9.8%.

The combination of data in the above charts for University of Galway and the Ireland and Global data are merged and visually presented in the bubble graphs (Graphs 8-9) from SciVal on the following pages.

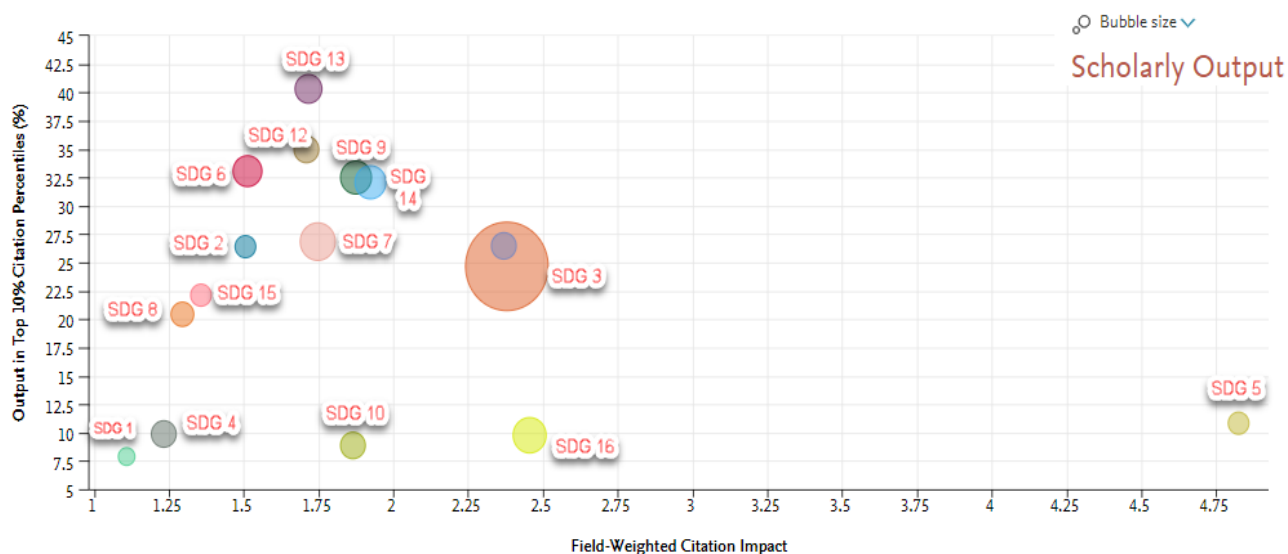
SDG 1: No Poverty
SDG 2: Zero Hunger
SDG 3: Good Health & Wellbeing
SDG 4: Quality Education
SDG 5: Gender Equality
SDG 6: Clean Water & Sanitation
SDG 7: Affordable & Clean Energy
SDG 8: Decent Work & Economic Growth

Industry, Innovation & Infrastructure: **SDG 9**
 Reduced Inequality: **SDG 10**
 Sustainable Cities & Communities: **SDG 11**
 Responsible Consumption & Production: **SDG 12**
 Climate Action: **SDG 13**
 Life Below Water: **SDG 14**
 Life on Land: **SDG 15**
 Peace, Justice & Strong Institutions: **SDG 16**

6.1 University of Galway's output and impact per SDG.

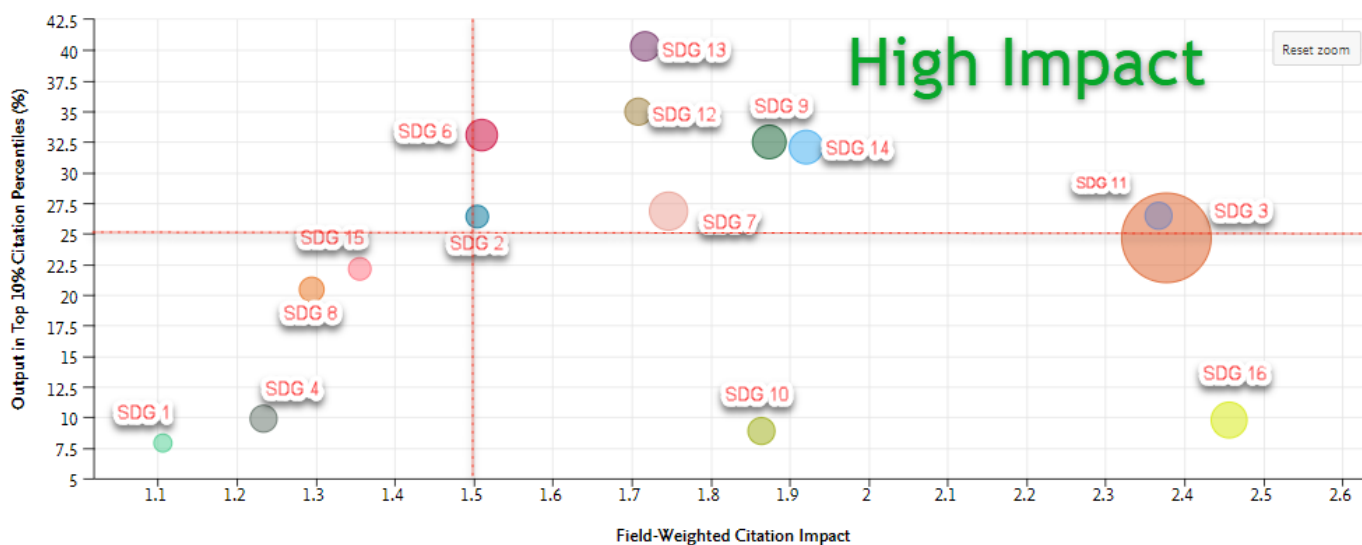
The size of the Bubble indicates the no. of papers published, the x-axis details the FWCI, the y-axis details the percentage of our publications that are in the top 10% most cited for their field (this indicates how many of our papers are getting heavily cited, and is an indication of impact).

Graph 7: University of Galway output in top 10% citation percentiles, FWCI and Scholarly output.



As detailed above, SDG 5 is an exceptionally high FWCI, therefore **Graph 8** below excludes SDG 5 to get a closer look at the others:

Graph 8: University of Galway output in top 10% citation percentiles, FWCI and Scholarly output (exclu SDG 5)



- SDG 1: No Poverty
- SDG 2: Zero Hunger
- SDG 3: Good Health & Wellbeing
- SDG 4: Quality Education
- SDG 5: Gender Equality
- SDG 6: Clean Water & Sanitation
- SDG 7: Affordable & Clean Energy
- SDG 8: Decent Work & Economic Growth

- Industry, Innovation & Infrastructure: SDG 9
- Reduced Inequality: SDG 10
- Sustainable Cities & Communities: SDG 11
- Responsible Consumption & Production: SDG 12
- Climate Action: SDG 13
- Life Below Water: SDG 14
- Life on Land: SDG 15
- Peace, Justice & Strong Institutions: SDG 16

7 Summary

Reviewing the data above, we can surmise the following:

University of Galway has the highest percentage of their publications related to the SDGs at 36% over the 5 year period 2017-2021, and this is growing rapidly, particularly over the past 2 years such that in the year 2021 they represent 41% of all publications.

Those SDGs which have seen the highest growth rate over the period are **SDG 13, SDG 4, SDG 9, SDG 3, SDG 6 and SDG 12.**

Those SDGs where we have high output:

SDG 3 – University of Galway’s highest no of publications. Grew by 22% over the period, FWCI of 2.38 above global average but below Ireland FWCI.

SDG 7 – University of Galway’s second highest no. of publications, grew by only 2% over the period. Lower presence and FWCI than other Irish Universities.

SDG 16 – University of Galway’s third highest no. of publications, but slight decline in no. of pubs over the period. 3rd highest no of publications in Ireland, above average global representation and second highest FWCI at 2.46.

SDG 9 – 4th highest no of publications in University of Galway, showing growth at 23% over the period. 4th in Ireland in terms of no. of publications and 5th in terms of FWCI.

SDG 14 – While this is only University of Galway’s 5th highest no. of publications, it is growing at 9% and is the highest no of publications in Ireland and above global average representation. University of Galway are third in Ireland for FWCI at 1.92.

Those SDGs where we have high impact and thus possibly the opportunity to grow:

SDG 13 – 191 Papers over the period, having grown at 25%. Only 4th in Ireland in terms of output but highly cited with over 40% of papers in top citation percentiles and FWCI of 1.72.

SDG 12 –183 papers over the period, no 3 in Ireland, having grown at 18% over the period. Achieving high impact in this SDG –FWCI at 1.71 and over 35% of our papers are in most highly cited percentiles.

SDG 6 – 242 papers over the period, no 2 in Ireland, having grown at 18%. Achieving high impact with over 33% of its papers in top citation percentiles, while FWCI is at 1.51.

SDG 5 – 120 papers over 5 years, no 3 in Ireland in terms of no. of pubs, with growth of 8% over the period. It is University of Galway’s highest impact in terms of FWCI at 4.82. However this may be driven off a few highly cited papers, as only 10% of its papers are in the top citation percentiles.