Laidlaw Scholar Research Paper

Leading the Change? Insights from Executives on Integrating Sustainable Development into their firms

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Abstract

This study investigates how executives integrate sustainable development (SD) into their businesses by analysing their self-assessments and initiatives for their own companies, after a 12-week sustainability leadership program.

The study highlights executives approached SD integration in a similar way, yet the pathways of implementation vary across industries. While executives acknowledge a variety of sustainability challenges across their operations, our findings highlight a prioritization of actions related to SDG 12 (Responsible Consumption and Production) and 13 (Climate Action). This focus contrasts with executives' own internal assessments, which suggest potentially more material human capital and social gaps. Additionally, we show there exists a gap in executive understanding of how to analyse their business model's contribution to biodiversity and basic human needs.

The paper theories these results could be a function of social pressures, lack of education, measurement differences, or misallied incentives. This highlights further research needs to be performed to understand the executive decision process in integrating sustainable development into their firms.

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1 Introduction

Businesses are dependent on the environment and society they are forged in. Their existence impacts both. We have been able to rigorously prove for a few decades that the levels of production and consumption are not sustainable given our planetary boundaries [1] [2] [3] [4] [5]. The concept of sustainable development (SD) appreciates our planetary boundaries, the importance of society and the ability for economic growth to improve people's livelihoods. A sustainable business must appreciate these three forces, by meeting the needs of generations today and anticipating the futures.

1.1 Context on global sustainable development

NGOs have continuously worked towards SD. The 1987 Brundtland report, compiled by the UN, was one of the first reports into the link between development, social issues such as poverty and environmental concerns. It is credited with significantly raising the profile of SD on the global scale [6]. In 2000, the UN founded the Millennium Development Goals (MDGs). These were 8 goals nations agreed to, focused on significant development issues such as hunger and poverty, intending to meet them by 2015 [7]. In 2015, the MDGs were replaced with the current 17 sustainable development goals (SDGs), with a deadline of 2030. These include 169 sub-targets with key indicators, taking a more holistic approach to SD than the MDGs [8]. The global adoption of the SDGs and indicators allowed a more precise measurement and tracking of SD.

1.2 History of sustainable development in businesses

One of the first records of SD being considered within business was Howard Bowen's 1953 book "Social Responsibilities of the Businessman". This started the discussion on the considerations of ethical and social issues within traditional profit maximization, starting what would be known as corporate social responsibility (CSR) [9].
The 1950s-1970s saw greater social activism towards corporate sustainability actions, raising the appreciation of these issues to management. These decades also saw greater appreciation of the ability of financial firms' implication in CSR, through their funding of companies and ability to influence. This formed the foundation of socially responsible investing (SRI), leading to the formation of Pax World Funds (now Impax Funds managed by Impax Asset Management) in 1971. It was one of the first firms to consider environmental and social issues in investing [10]. In the 1980s-1990s CSR became more important, but it will still yet to be widely considered within business practices.
The 2000s saw the shift from CSR into ESG (environmental, social and governance), by the UN's 2006 Who Cares Wins reports. This report is credited with showing the link between company ESG actions and financial performance. Supported by the Freshfield report on ESG and financial valuation, ESG started to become a mainstream topic within the investment industry [11].
The 2010s saw greater investor focus on SD on company sustainability. Investors lacked disclosures from companies to accurately assess their ESG profile. This gap led to the formation of the Sustainability Accounting Standards Board (SASB) in 2011, which developed accounting rules to reflect ESG's impact on a company's financials within a specific industry. Supported by the Paris Agreement, further sustainability reporting standards were developed, such as Climate Reporting Standards with the Taskforce on Climate-related Financial Disclosures (TCFD) and more general

ESG disclosures under the Global Report Initiative (GRI).

1.3 Literature on the integration of SD in businesses

Investor pressure has been a significant driving force for companies developing sustainability assessments, reporting and practices. One reason for this is that the majority of evidence shows that more sustainable companies perform better financially. Reports have found companies with better ESG disclosures and reporting standards have a stronger competitive advantage [12] and perform better financially [13]. Most of the literature has focused on sustainability integration outcomes: what are the impacts of more sustainable businesses (are they better financially, do global emissions reduce, etc.)
This is an important topic of research, as we do need to know if SD integration in business models is worthwhile. An extension of this result is the comprehensive research on how to effectively integrate ESG into investment decisions. The current research agenda leaves a gap on how non-investment companies can effectively integrate SD into their business model.
A 2022 literature review on SD integration on 29 papers, found only two focused on the SD integration process, the remaining 27 focused on outcomes. Of those two, only one focused on business SD integration, with the other researching an asset manager's SD integration process [14]. The one SD integration paper highlighted the development of a circular business model of a bicentennial copper recycling company [15]. This case provides in-depth detail on the integration, yet fails to provide a holistic view of the SD integration across sectors and regions.
One holistic approach taken by a 2012 paper, shows that of 100 companies interviewed, 49 percent do not consider the sustainability concept during the strategic management process, yet 82 percent believe they contribute to sustainable development [16]. This difference between process and outcome highlights the historical lack of understanding of SD integration within business models.

1.4 Rationale and aims of this study

The next step in further SD integration adoption is to understand the integration process within a firm. We need to understand why firms develop only some SD practices, to help identify driving factors of SD gaps globally. To understand the SD integration process within a firm effectively, it is important to understand the executives who are making these decisions. Executives lead the integration of SD into the businesses:

- They must assess their current sustainability practices, then find an intersection of their material sustainability gaps and material stakeholders' views, to create sustainability-related opportunities.
- They must calculate the longer-term economic value of creating a sustainable business model, with the cost of a sustainable initiative.
- They must perform this under a changing regulatory environment, with large information gaps.

Imperial's sustainability leadership program starts to equip executives with these skills through a 100-hour 15-week online program. The program teaches executives: how to assess the impact of

their business, sustainable business models and innovations, stakeholder engagement and how to create a purpose-driven organisation. At the end of this program, executives must create a report that assesses their own company's practices to land on a final sustainability transformation proposal for their organization.
This study has explored these reports, to gain an insight into the executive decision-making process on the SD integration. These reports give us access to understand the executive thought process: they assess their company's sustainability performance knowing their assessment will remain private; select specific goals from the gaps they identified and then choose the most material goal to create a new sustainability initiative.

With this information, the main aims were to:

- Identify the type of SD gaps and goals executives have identified in their firms.
- Understand how executives prioritise different aspects of SD within their firm.
- Examine how executives plan to implement SD within their firms.

It is structured as follows: method, findings and discussion of results with conclusion.

2 Method

2.1 Creating the data set

From the leadership program, 432 reports were created. Each report has a specific analysis that must be included, with the majority following a predefined template provided by the program. The reports were anonymous. Table 1 shows the information contained within each report. Not every report had an identifiable company and or industry, the total number of these variables is less than 432. Executives were able to write down multiple points for the positives, negatives, gaps and goals. This is why some variables in Table 1 are greater than 432. Some executives suggested more than one initiative, explaining why this value is greater than 432.

The Planet, People and Purpose framework was used throughout the executives' reports. This enabled the analysis to be separated into different aspects of SD

With this data collected into Excel, it was determined that each specific point in each report would be assigned up to two SDGs. This would allow us to categorise the type of SD the point was talking about, enabling us to collate the data. The process was done systematically using a version of the subgoals within the SDGs.[1] Generative AI was used to check for consistency throughout the SDG selection phrase to minimise human error.
For ideation and action initiatives, a specific behaviour was assigned from Table 3.[2]

2.2 Data set descriptive statistics

The file was converted into a csv to allow for Python data analysis in a Jupyter notebook, which can be found attached to this paper.

[1] Mapping examples can be found in the appendix.
[2] See examples of mappings within the appendix

Item	Description	Number of values
Company	Company name	1157
Country	Located of headquarters	1223
Industry	The company's industry, using an adapted GICs classification [17]	1376
Region	Region of headquarters, split into continents with the UK separated from Europe	1223
Planet, People, Purpose positives	Aspects the executive believed they were performing well on	Planet: 1142, People: 1049, Purpose: 863
Planet, People, Purpose negatives	Aspects the executive believed they were performing badly on	Planet: 720, People: 653, Purpose: 615
Planet, People, Purpose Grade (A+-E-)	3 grades for each of the categories, ranking the executive's belief on their own company's performance.	Planet: 319, People: 309, Purpose: 279
Planet, People, Purpose gaps	Aspects the executive believed they were performing badly on, with analysis on competitor practices	Planet: 908, People: 824, Purpose: 755
Planet, People, Purpose goals	Specific SMART targets the executives were relevant for their company	Planet: 462, People: 421, Purpose: 455
Ideation	Selection of the SMART goal they believed most appropriate	354
Action Initiative	The specific initiatives they would implement to achieve the goal they selected from the ideation phase.	444

Table 1: Different variables created from Executive assessment reports

Table 4 shows a heavy bias towards the UK and Europe within the data set. This is as expected given the location of Imperial. It should be noted this shows the region of the company headquarters. A significant volume of those UK and European companies have global footprints.

A more significant issue is the large volume of financial companies within the data set at 35 percent, as well as professional services, mainly consultants. This high number is driven through a direct partnership with Imperial and a global leading bank, offering direct access to the leadership

Table 2: Behaviors and Their Descriptions

Behaviour	**Description**
Adoption of Standards	Implementing industry or government-defined standards
Assessment and Measurement	Evaluating and quantifying the impacts of the company.
Asset Modification	Upgrading or retrofitting existing equipment or facilities to improve efficiency and or change impact.
Association	Forming partnerships or joining industry groups to collaborate on sustainability initiatives.
Communication	Sharing information about sustainability efforts with stakeholders through reports, websites, or social media. This can be internal or external
Donation	Contributing funds or resources to support specific causes.
Incentives	Offering rewards or recognition to employees or customers for certain behaviors
Modification of Procedures	Changing operational processes.
New Products	Developing and launching products or services
Org. Structuring	Creating new departments/ roles or changing the organizational layout
Pricing	Changing pricing strategies for current products
Research and Development	Investing in research and development to create innovative solutions
Training	Providing employees with education
Volunteerism	Encouraging employees to participate in volunteer activities

Table 3: Behaviours used in the ideation and action initiatives

program. We decided to split professional services from their GICS classification of industrials, as we wanted to separate traditionally heavier-emitting production companies from service-based companies. Although the data set would be more interesting if it had a higher volume from higher impact industries, Table 5 does highlight that we have enough data to draw insights between industries.

2.3 Chi-squared test methodology

To assess executive prioritisation of SD gaps and goals identified within executives, a chi-squared test of independence was used. The test was used to investigate if there was an association be-

Region	Count	Percent
UK	610	38
Missing	365	23
Europe (ex-UK)	253	16
North America	129	8
Asia	110	7
Middle East & Africa	103	6
South America	18	1

Table 4: Regional breakdown

Industry	Count	Percent
Financials	558	35.0
Missing	212	13.0
Professional Services	140	9.0
Industrials	119	7.0
Information Technology	92	6.0
NGO	81	5.0
Energy	81	5.0
Consumer Discretionary	81	5.0
Materials	68	4.0
Consumer Staples	56	4.0
Health Care	49	3.0
Communication Services	28	2.0
Utilities	18	1.0
Real Estate	5	0.0

Table 5: Distribution of Industries

tween the type of SDGs selected in the ideation stage and the SDGs identified by executives in their gap analysis.

As the number of SDGs an executive identified in their gap analysis varied and there could be up to two ideation SDGs, to calculate the expected occurrence of each SDG has to be done for each report level. For this process, the number of each gap SDGs was calculated for each report and the unique SDGs were selected. The probability of a specific SDG being chosen given these two numbers was then calculated, accounting for the fact only two unique ideation SDGs could be selected. The expected value for each SDG was then summed up across all reports, to calculate their total expected frequency.

For the test, the null hypothesis was set as: There is no association between the type of SDGs selected in the ideation stage and the SDGs identified by executives in their gap analysis.

3 Results

3.1 Type of SD gaps and goals executives have identified in their firms

3.1.1 Gaps

Figure 1 shows the proportion of SDG type identified as gaps within business models, between different industries. Across all industries, we see a high proportion of SDG 12 (responsible consumption and production) and 13 (climate action) selected. SDG 12 is very broad and covers issues such as reducing waste, sustainable procurement, natural resource management and the circular economy. SDG 13 covers climate change-specific initiatives: adaptation, resilience, lobbying and climate change planning. The graph shows the executives did not find other biodiversity-related SDGs as gaps, such as 6 (water), 7 (renewable energy),14 (marine ecosystems) and 15 (land ecosystems). For people-related SDGs, SDG 8 (Decent work and economic growth) and 10 (reducing

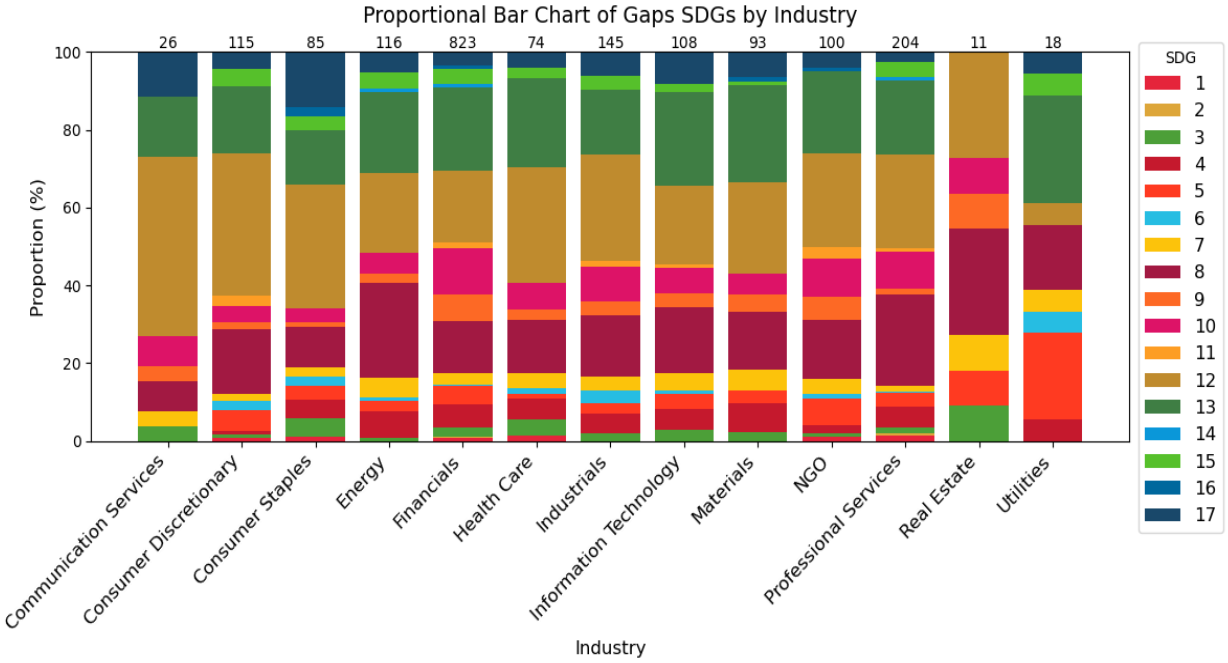

Figure 1: Proportion of SDGs related to gaps identified by executives, by industry

inequalities) are the most prevalent for the majority of industries. These goals relate to diversity and inclusion, as well as making the workplace inclusive for all. Other directly related human capital management SDGs 4 (education) and 5 (gender equality) were not as commonly identified as gaps. More human well-being SD issues, such as SDG 1 (poverty), 2 (hunger) and 3 (health) were the least commonly identified gaps.

There does not exist significant variance between industries, except for real estate and utilities. This result is likely a factor of their small sample sizes within the data set. The energy and professional service sectors do have a greater proportional focus on SDG 8, and consumer staples have a greater focus on SDG 17 (partnerships) compared to other industries.

3.1.2 Goals

Figure 2 shows the same analysis for the SDGs related to the goals that executives selected. There is a similar pattern between the SDG distribution of the gap analysis: there is a large focus on 12 and 13 and to a lesser extent SDG 8. The noticeable differences show a greater focus on SDG 17, specifically for communication services, as well as SDG 4 (education).

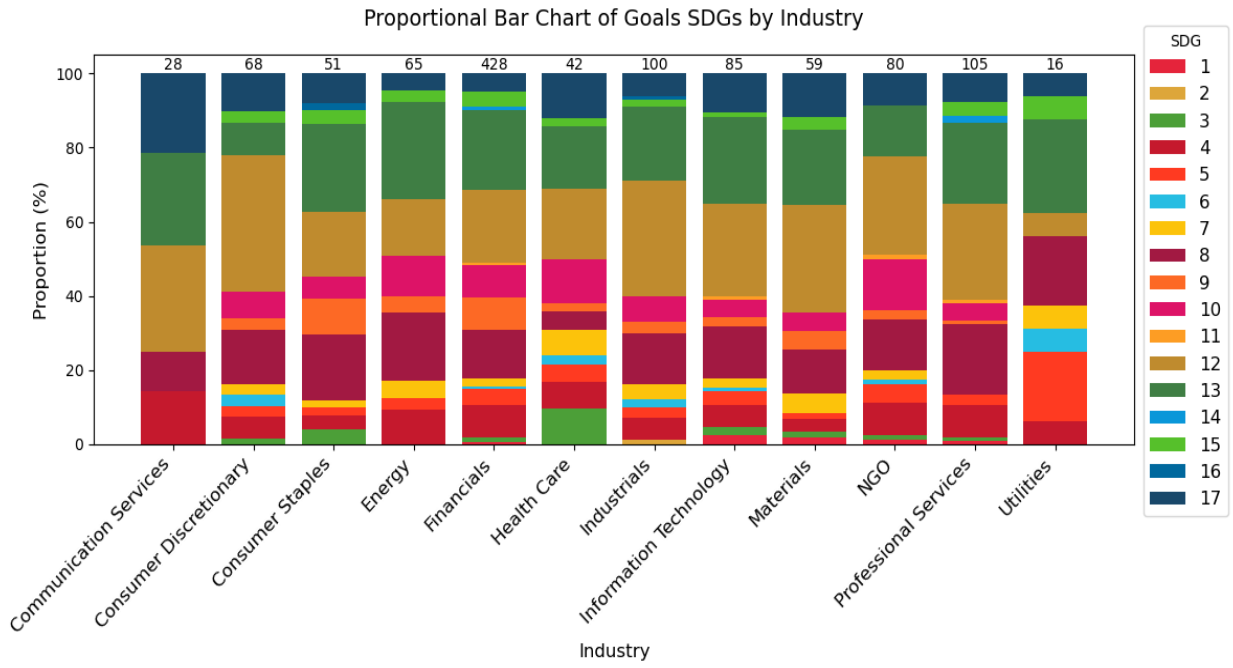

Figure 2: Proportion of SDGs related to goals identified by executives, by industry

3.2 Executive prioritisation of different aspects of SD within their firm

In the assessment report, executives had to specifically choose a goal in the ideation stage, as a solution to a gap they had identified. By selecting a specific gap/goal, the executive is indirectly showing their preference for a certain aspect of SD integration.

Figure 3 shows part of this executive decision process. By mapping specific gap SDGs the executive identified to the ideation SDG they ended up selecting and aggregating this across all reports, we can show the proportion of Ideation SDGs that stemmed from a specific gap SDG. For example, when an executive highlighted a gap related to SDG 12, we can see that 22 percent of the time they ended up picking a solution related to SDG 17.

Figure 3 shows despite executives identifying a wide range of SD issues within their company, a high proportion end up selecting SDG 12 and 13 to act on 20-30 percent of the time. Interestingly when SDG 12 or 13 is identified as a gap SDG 17 is highly selected. There does exist a leading diagonal with the figure, which does show to some extent executives are willing to act directly on the SD gaps they have identified.

The focus in SDG 12 and 13 is not necessarily unjustified if executives feel these gaps are the most

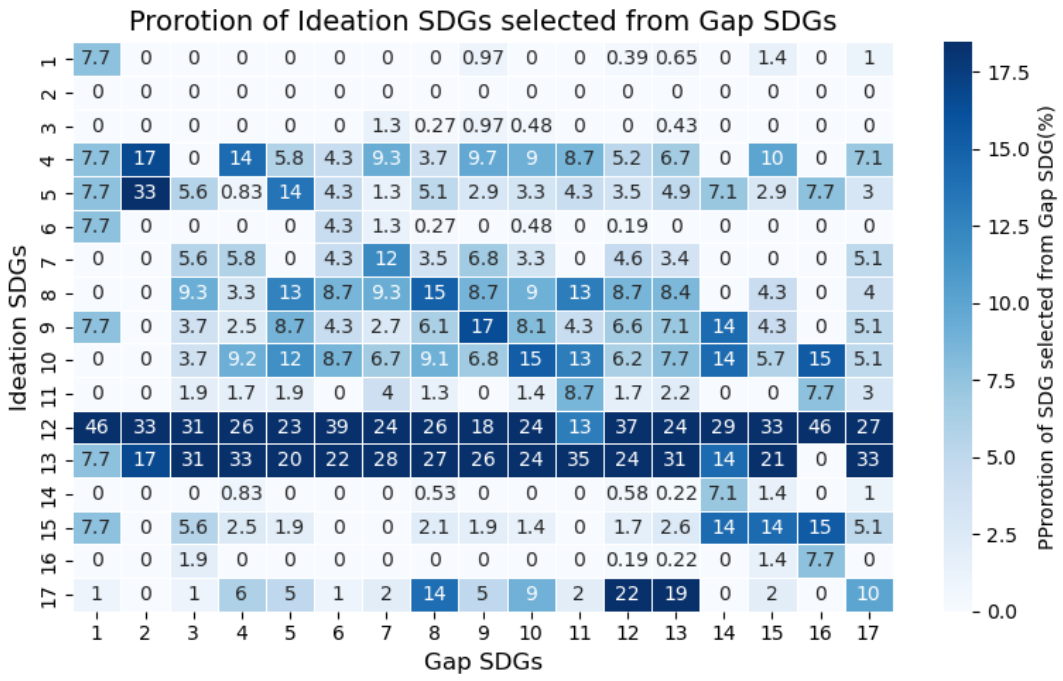

Figure 3: Ideation SDGs that stemmed from a specific Gaps SDGs, by proportion (percent)

significant within their business. Figure 4 explores this issue more directly, by mapping the own ratings executives gave their company on the planet and people pillars, against the ideation SDG they chose.

For companies with the lowest rating on Planet (B – E), we do see that executives are focusing on

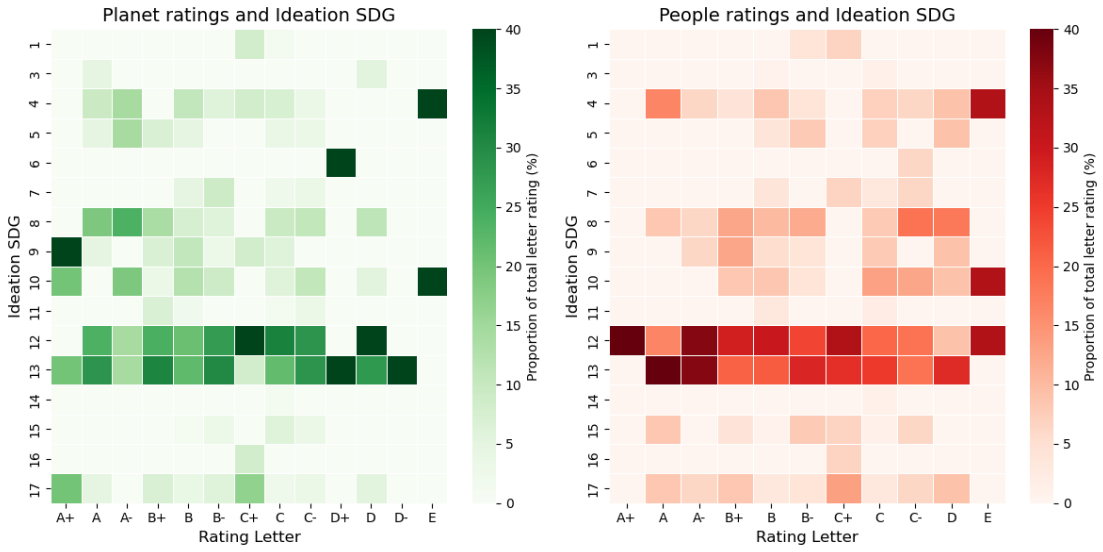

Figure 4: Proportion of Ideation SDGs that stemmed from a company with particular people/planet rating

planet-related SDGs 12 and 13, with some deviation from the lowest-rated companies. As compa-

nies become higher rated, executives are more likely to select non-planet related SDGs, such as 8 and 4, however there is still a higher concentration on SDG 12 and 13.
For the lower-rated People companies (C), we see more focus on non-planet related SDGs, especially SDG 8 and 10. Although compared to the B rated Planet companies, we see less focus on SDG 12 and 13, for these adequately rated people companies, there is significant concentration on SDG 12 and 13 at approximately 20 percent of ideation SDGs selected.
Another reason SDG12 and 13 could have been selected more from the ideation stage is that executives identified a higher volume of SDGs, leading to a higher probability of them being selected. This was statistically tested using a Chi-squared test of independence.
Table 6 shows the results of the test. The output was a p-value of 0.0227, and therefore the null hypothesis can be rejected under a 5 percent significance level. Consequently, there exists evidence to suggest that there is an association between the type of SDGs selected in the ideation stage and the SDGs identified by executives in their gap analysis.

Chi-squared statistic	p-value
29.2	0.0227

Table 6: Chi-squared test results

Figure 5 shows what is driving this output by plotting the expected frequency of each SDG with the observed frequency. It demonstrates that SDG 12,13 and 4 are over-selected, mainly through the under-selection of SDG 8.

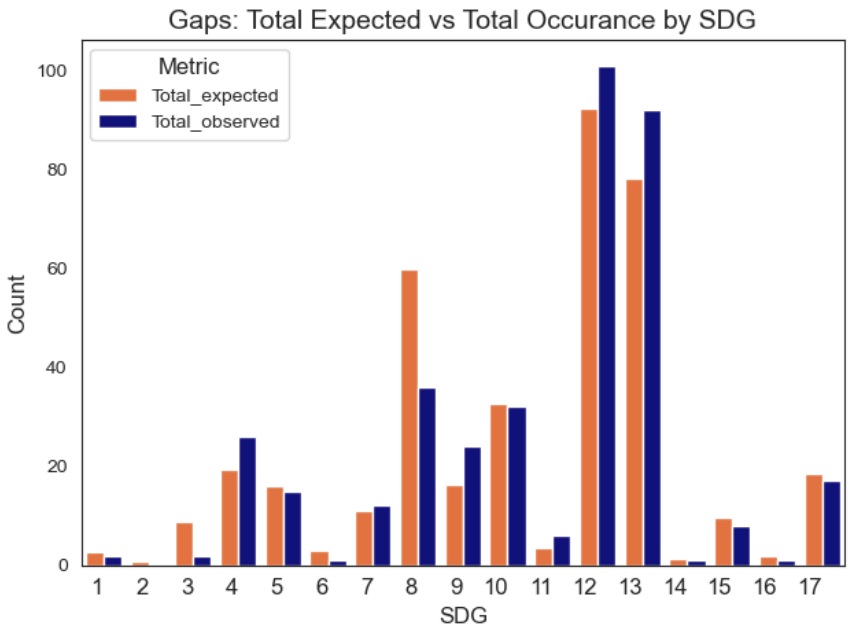

Figure 5: Expected vs observed ideation SDG frequency

Figure 6 displays a more visual way to express this over and under-selection. As demonstrated

by the graph, we can see a high proportion of SDG 8 flowing into SDG 12 and 13.

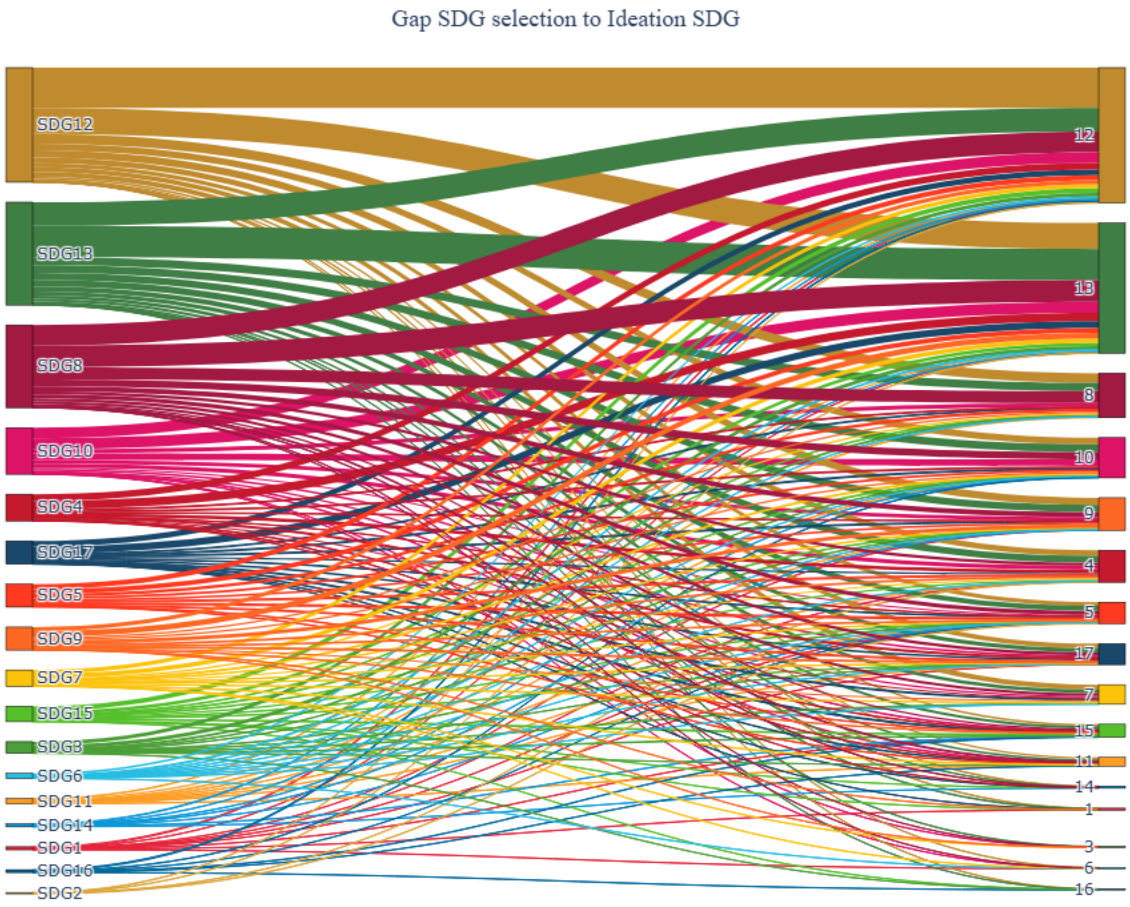

Figure 6: The flows from gap SDGs executive identified to ideation SDGs

3.3 How do executives plan to implement SD

Table 7 shows that executives showed variability in the behaviours they would implement, with modification of procedures and assessment and measurement being the most common. Figure 7 shows how these behaviours vary among the different industries. There is a significant variance between industries:

- For manufacturing and natural resource companies (energy, materials and industrials), there is a greater focus on assessment and modification, than modifying assets. Materials and Industrials do show some commitment to modifying procedures compared to the low proportion within the energy sector.
- Consumer staples, discretionary and materials lack any reference to implementing training as their new initiative.
- Materials shows the largest proportion focused on setting incentives, with only the energy sector also acknowledging this behaviour.

Action behaviour	Count	Percent
Modification of Procedures	108	24.6
Assessment & Measurement	76	17.3
Training	55	12.5
Org. Structuring	50	11.4
Asset Modification	31	7.1
Communication	28	6.4
New Products	22	5.0
Association	22	5.0
Volunteerism	14	3.2
Adoption of Standards	11	2.5
Incentives	8	1.8
R&D	6	1.4
Pricing	4	0.9
Donation	4	0.9

Table 7: Behaviour assigned to initiatives executive decided to implement

- The creation of new products is not a widely adopted initiative, apart from within the financial and industry sectors. However, the executives do acknowledge changes to pricing.
- Healthcare and NGOs have no reference to the modification of producers, instead they have a large proportion of behaviours focused on organisational structure and training.

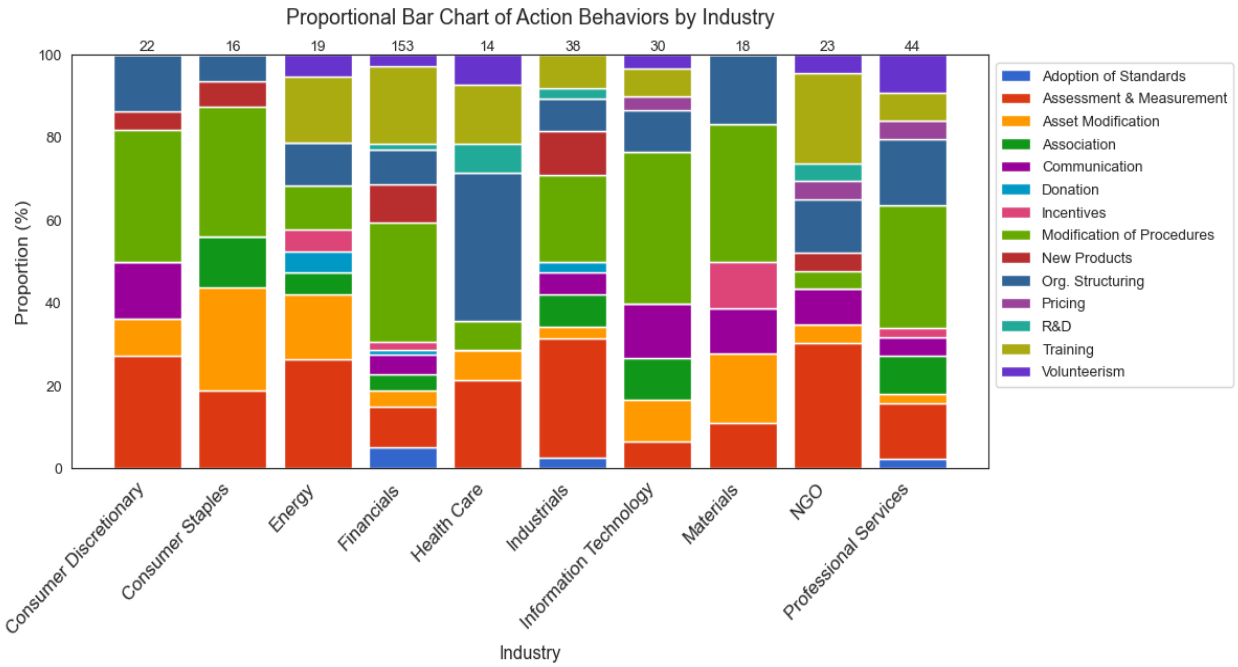

Figure 7: Proportion of behaviours related to actions executives selected, by industry

Figure 8 shows the mapping of these behaviours to the relevant SDG of the action. The Sankey diagram show the major flows being between the modification of procedures and assessment and measurement to SDG 12 and 13. As expected, the majority of training flows to SDG 4 (education). The majority of organisation structuring flow into SDG 12, which is likely a result of the high number of actions related to improving sustainability governance. The flows from asset modification are mainly associated with SDG 13 and 7 (renewable energy). On the whole, flows from association go into SDG 17 (partnerships), new products into SDG 9 (sustainable innovation) and communication into SDG 12 (as this SDG covers sustainability reporting).

Figure 9 illustrates the industry variability between the SDGs related to the action executives

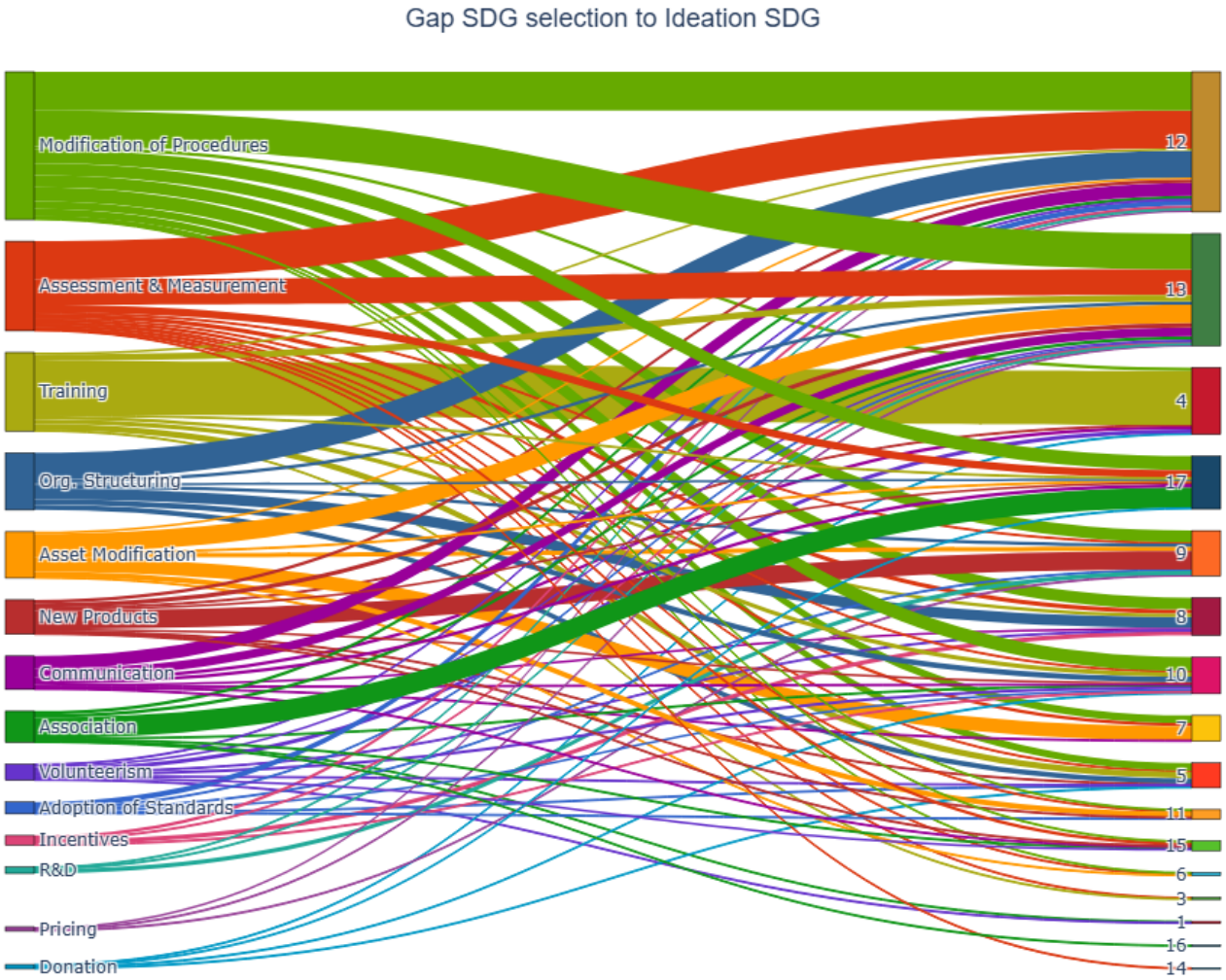

Figure 8: The flows from behaviours of actions executives selected to the SDGs they relate to

selected to implement. There is a strong focus on SD 12 and 13 throughout industries, but there are significant variances. Energy has a significant focus on people-related SDGs, such as 5 (gender),and 4 (education). This differs compared to other natural resource and manufacturing companies within the materials and industrial sectors. Materials, along with the consumer discretionary and staples sector, show a larger commitment towards SDG 7 (renewable energy) than other sectors. NGOs, industrials and financials show the largest commitment to SDG 9 (Innovation), with

energy, financials and professional services showing the most initiatives directly targeted at SDG 5 (gender equality). There is a lack of other biodiversity SDGs (6,14,15) within most sectors, as well as SDG 1,2 and 3, with 2 (hunger) not featuring in any of the actions.

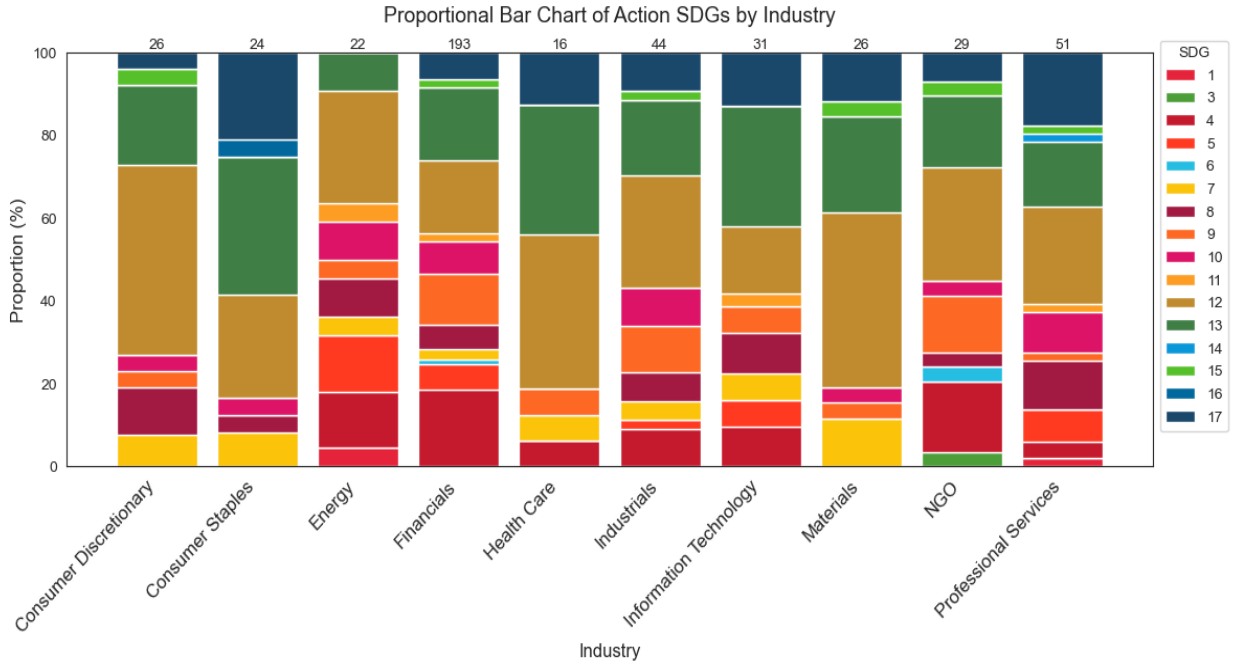

Figure 9: Proportion of SDGs related to actions identified by executives, by industry

4 Discussion of results and conclusion

There were three main findings from the results above:

1. Prioritisation of SDG 12 and 13 across all aspects of SD, especially into SD action
2. Industries want to implement SD in different ways, but approach SD in the same way.
3. Executives have gaps within their sustainability assessment ability

4.1 Prioritisation of SDG 12 and 13 across all aspects of SD, especially into SD action

Throughout the analysis, there is a greater prevalence of SDG 12 and 13. The Chi-squared test and figure 6 demonstrate a greater prioritization by executives, despite them highlighting gaps across the SD spectrum. Comparing the SDGs related to their solution and their own ratings on the planet people framework suggests that they might not be prioritising solutions in their weak areas.

One potential reason for this is that the company could see a large opportunity in developing a new product related to an area they already excel in. For example, figure 7 shows a high proportion of financial firms compared to other industries that chose to implement new products. This is likely being driven by the large international bank that has a direct partnership with the leadership program. This bank is strong in its climate change implementation compared to its peers. A high planet rating means the creation of a new climate-related financial product could lead to a large revenue gain. This gain is likely to be larger than the benefit of improving its people score, from the executive's point of view. However, as many of the other industries do not have as large of a focus on new products this argument is not consistent across the data set.

Another reason for this bias towards SDG 12 and 13 could be a form of social external pressure influencing executive decision-making. Climate change has traditionally been at the forefront of the SD agenda, led by international organizations and agreements, such as the UN's COP conferences. This has led to the large-scale adoption of corporate net zero targets. Executives could feel they need to work towards reducing their emissions, even if they believe other SD issues are more material to their company. This effect is multiplied by the fact SDG 13 is becoming increasingly easier to measure. The widespread availability of carbon emission data increases the ability of executives to target and measure their progress on SDG13.

SDG 12 represents a holistic approach to implementing SD within an organisation and includes activities, such as the integration of sustainability reporting standards, sustainability procurement programs and circular economy activities. This is critical for public companies to gain access to ESG funds from investors, as well as gaining credibility with consumers about a company's sustainability actions. One issue with SDG 12 initiatives is that is it difficult to separate actions that are intended to please stakeholders (eg reporting), compared to improving the sustainability of the business model (eg circular economy activities). Both interact with each other and do benefit SD, but the high volume of SDG 12 across the reports, could suggest greater stakeholder pleasing. One paper found that greater customer awareness led to companies improving their sustainable supply chain management, but it was not clear if new practices were used or the communication around their current practices was improved [18].

For public companies, the social pressure for better performance on SDG 12 and 13 is greater. ESG

ratings that many institutional investors rely on, require a large volume of sustainability disclosures from the company. One study that analysed how ESG rating agencies assessed companies, found a lack of "holistic and systematic reflection regarding the operationalization of companies' strategy" and a focus on "current stakeholder needs" [19]. The narrow view of ESG rating processes, could affect companies' access to capital, and therefore misalign incentives for executives in creating change in less popular aspects of SD.
In particular for SDG 13,

4.2 Uniform industry approach to SD, but variance within implementation

As shown by figures 1 and 2, there is a significant symmetry between the different industries and the proportion of SDGs for the gaps and goals executives selected. This result was surprising, as different aspects of SD might be more material to different industries. For example, the information technology sector and professional service industry have a high proportion of their actions focusing on SDG 13. A lot of these initiatives included implementing new flight policies. It is important for these sectors to de-carbonize, but I would argue we should expect to see greater representation of more material SD issues in these sectors, such as gender equality, sustainable innovation and diversity. This is the opposite for the energy sector, a sector where you would expect climate change and renewable energy to be significant, which has one of the lowest SDG 13 and 7 proportions.
The symmetry could reflect the same social norms on SD being expressed. Another reason could be the structure of the training course leading to greater emphasis on these issues, leading to a more uniform selection between the executives.
The symmetry between the ways industries will implement SD integration varies more, as shown by figure 7. One of the most interesting trends is that the heavy emitting sector (industrials, energy and materials) shows the lowest commitment to change (measured by percent of modification to processes and assets) compared to other industries. This is replaced by a larger proportion of actions focused on assessment and measurement. The heavy focus on assessment could be driven by a more complicated array of impacts from their business models. However other sectors face equally challenging tasks, such as the mapping of whole supply chains for food products to verify deforestation-free, yet have a larger commitment to change.

4.3 Gaps in Executive analysis

Across all the analysis there is a lack of exposure to certain SDGs. Not only were these not picked in ideation and action phase, but their frequency in the gap analysis across all industries is low. In figures 1 and 2 there is a significantly low representation of SDGs 1,2,3,6,14,15, and 16.
SDGs1, 2 and 3 have usually been a strong focus of international organizations and focus on directly human well-being. The low frequency could be explained by these SDGs not directly linking to corporate action. However, for certain sectors, we would expect greater representation. For example, figures 1 and 2 show that the consumer staples industry, which contains many food production firms, does not identify hunger as a gap and does not set many goals focused on hunger (SDG 2). This is similar to the healthcare sector on SDG 3. A reason for this, apart from social pressure to focus on other issues, is that executives might not have considered these issues as related to sustainability, or could have found it hard to assign them under the planet, people and purpose

framework.
SDGs 6,14 and 15 are strongly related to biodiversity: a topic gaining greater visibility in the last few years. The issue of water use and land ecosystems is material for certain sectors and therefore it is surprising it is not more prevalent in executive analysis. For example, the materials industry, containing mining, pulp and paper and fertilisers, is strongly exposed to issues of deforestation, water use and water pollution. Overall, only three report's specific actions directly mentioned biodiversity, with two of them mentioning partnerships with academics and NGOs to develop their capabilities in these areas. This would suggest a lack of executive awareness on these issues.

4.4 Next Steps for Further Research

As highlighted in the introduction, there is a gap in the current literature on how executives should integrate SD into their firms. This study has investigated how this decision process takes place, but there is a need to understand the most effective strategies for integration. In particular, more research needs to be done to understand:

- How can executives stay focused on the SD issues and goals most material to their relevant stakeholders and not broader society trends.
- What is the most effective way to implement a new sustainability initiative in a firm.
- How can executives be educated on all aspects of SD effectively.

Appendix

SDG Mapping Examples

Variable	Text	SDGs
Planet (positive)	Net zero goal for scope 1&2 emissions by 2030 and scope 3 all financed emissions by 2050 or sooner.	13
People (negative)	Global split of professionals female to male 19% to 81%	5
Purpose (positive)	Involvement in the industry lobbying institutions	17
Planet (gaps)	Gaps in reporting - both as investee company and manufacturer	12
People (gaps)	More could be done to educate and support customers at risk of scams, financial distress, etc.	4
Purpose (gaps)	Integrated reporting will enhance communication with stakeholders by offering a more complete and transparent account of the organization's activities.	12
Planet (goals)	Implement a comprehensive recycling initiative and paperless program within the organization, aiming to achieve a 30% reduction in paper consumption	12
People (goals)	To implement a target to ensure there is at least one Board member or senior management is from an ethnic background	8, 10
Purpose (goals)	Embed stronger governance into product approval forums so that ESG risk stewards and thought leaders can provide their inputs on impact to ESG practices to ensure that products are appropriate	12
Ideation	Increase % of women in leadership	5, 8
Action	Improve Training & Development in Communication Skills by focusing on training workshops	4

Table 8: SDG Mapping examples for all variables

Behaviour Mapping Examples

Text	Behaviour
If sustainability is expected to become an integral aspect of all decision-making processes, what kind of training needs to be provided to ensure top-down and bottom-up buy-in?	Training
Petron HQ Carbon footprint improvement by reducing air travel	Modification of Procedures
Report on sustainability and KPI's	Communication
Review current supply contracts and do a competitor analysis with sustainability in mind (i.e., production and transport)	Assessment & Measurement
Create a Staff "management committee" from more junior staff across the Bank	Org. Structuring
$10m annually with social enterprises and my goal is to commit to increasing the spend by at least 50% globally in the next 3 years. The overall aim is to create social value and to positively impact lives.	Donation
Invest in R&D to introduce a new way of selling green products, which could create a new revenue stream and increase the top line and consequently the number of green deals	R&D
Incentivize employees with a participatory social impact initiative; develop proprietary financial literacy training "Money Smart - Money Safe"	Incentives
Develop an app that children would use to learn about money, for parents to set up tasks for the children and pay them for completing those, with a debit card that the children could use to pay from their account (with parental controls)	New Products
Work with clients in hard-to-abate industries but charge them a premium price if they do not have actionable climate plans in place	Pricing
Implement solar panels as the main source of energy for the farm	Asset Modification
Implementation process of ISO 22458:2022	Adoption of Standards
Partner with Environmental Organizations: Leverage expertise for effective strategy development	Association
Introduce an employee volunteering scheme that is tied to our mission statement and sustainability commitments	Volunteerism

Table 9: Action and Ideation Behaviour Mapping examples

What I learned from the project

My main two takeaways from this 6-week program can be split into three categories:

- Development of my understanding of academic research
- Development of my data analysis skills

Research Process

This project highlighted to me the process of academic research. For the 6-week project, 4 weeks were spent creating the data set, 1 week analysing the data and 1 week writing up the results. I now appreciate how much work is done goes into producing just one graph in an academic paper. This has highlighted the importance of academic methods, as I appreciate the significance of the methodology in deriving the final output.

I also learned that you need to be focused on what you are trying to analyse/show. The data set I created had many uses, but it was important I only try and show 2/3 of the most interesting insights from it and not show everything that is interesting. I then needed to communicate these outputs in a clear way for readers.

Data Analysis skills

In my first term this year I took an introductory class in R for data analysis, as well as a similar course in Python in the summer term. I was keen to further my ability to use Python on data analysis and so I chose this language to complete this project. This was the first time I had completed a data analysis project of this size in Python.

I was able to develop new graph techniques, such as heatmaps and Sankey diagrams, as well as how to perform statistical testing in Python. I did rely on generative AI at the start to help me with the coding of these graphs, but now I feel confident doing them independently.

Another skill I developed with data exploration. As the aims of the study were formulated after creating data, I had no preconceived way I wanted to use the data. I was pleased with my ability to go down a particular data analysis path, once I had found an interesting pattern in the exploration phase. The executive prioritisation of SDG 12 and 13 was a result of this data exploration after I created some simple bar charts showing how common SDG 12 and 13 was selected. This also taught more that it is more interesting when you find a pattern to perform more analysis to explain the pattern, instead doing more analysis that finds a similar pattern.

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