Interreg MEDITERRANEAN Programme

Priority axis-Investment Priority-Specific Objective 1-1-1

Priority Axis 1: Promoting Mediterranean innovation capacities to develop smart and sustainable growth

PI 1.b
1.1 To increase transnational activity of innovative clusters and networks of key sectors of the MED area

iBLUE

Investing in sustainable blue growth and competitiveness through 3-Pillar Business Model (3-PBM)

Project No. 830

SUSTAINABILITY INDICATORS SYSTEM

WP/ACT related to the Deliverable: WP3/ACT3.3

Deliverable no.: L3.5.2

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Project co-financed by the European Regional Development Fund

1. A SYSTEM OF SUSTAINABILITY INDICATORS FOR THE YACHTING SECTOR

KEDGE BUSINESS SCHOOL

1. Defining sustainability

The company is the smallest level of observation and analysis. The industry-level represents the set of all companies in a defined industry (here the service, manufacturing and infrastructure industries), and the sector-level depicts the set of all companies in all the defined industries.

1.1. Company-level

Sustainability is defined as constant individual company improvement over time and in relation to the performance of other actors in the industry and sector (Sikdar, Sengupta and Mukherjee, 2017)[i]

1.2. Industry-level

Sustainability is defined as constant average industry improvement over time and in relation to the average performance of the sector.

1.3. Sector-level

Sustainability is defined as constant average sector improvement over time.

2. Indicators, sub-pillars and pillars of sustainability

2.1. Sustainability indicators

We use the indicators listed in Deliverable no.: L3.5.1 for each of the three industries. We then list the indicators at the sector level, distinguishing between those common to the three sectors, and the ones listed only for one or two industries.

2.2. Sustainability pillars and sub-pillars

We use the pillars listed in Deliverable no.: L3.5.1 that are common to the three industries: the economic, ecological and social pillars. Each pillar is composed of one or several sub-pillars, as defined in Deliverable no.: L3.5.1, which each regroup one or several indicators.

The terms pillar and sub-pillar are used in the international reports relating to sustainability (see for example “Sustainable Tourism for Development Guidebook”, 2013)[ii] .

2.3. Global sustainability index

We define the global sustainability index as an index that combines all available indicators, sub-pillars and pillars into one single index. The global sustainability index can be measured at the company level, at the industry level, and at the sector level.

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LISTS OF SUSTAINABILITY INDICATORS SELECTED IN Deliverable no.: L3.5.1 (black: indicators common to the three industries, red: indicators specific to one or two industries)

	SERVICE INDUSTRY	MANUFACTURING INDUSTRY	INFRASTRUCTURE INDUSTRY	YACHTING SECTOR (sum of the 3 industries)
PILLAR	**ECONOMIC**	**ECONOMIC**	**ECONOMIC**	**ECONOMIC**
Sub-pillar	**Profitability**	**Profitability**	**Profitability**	**Profitability**
Indicators	Profit/(Loss) Return on investment (ROI) Earnings before interests and tax (EBITDA) Percentage of revenues in foreign markets	Profit/(Loss) Return on investment (ROI) Earnings before interests and tax (EBITDA) Percentage of revenues in foreign markets	Profit/(Loss) Return on investment (ROI) Earnings before interests and tax (EBITDA)	Profit/(Loss) Return on investment (ROI) Earnings before interests and tax (EBITDA) Percentage of revenues in foreign markets
Sub-pillar	**Added value**	**Added value**	**Added value**	**Added value**
Indicators	Newly created value (i.e. gross profit (net profit plus tax on profit) + salaries + all workforce related costs like bonuses, scholarships, rewards, gifts etc.)	Newly created value (i.e. gross profit (net profit plus tax on profit) + salaries + all workforce related costs like bonuses, scholarships, rewards, gifts etc.) **Efficiency** Inventory T/O	Newly created value (i.e. gross profit (net profit plus tax on profit) + salaries + all workforce related costs like bonuses, scholarships, rewards, gifts etc.)	Newly created value (i.e. gross profit (net profit plus tax on profit) + salaries + all workforce related costs like bonuses, scholarships, rewards, gifts etc.) **Efficiency** Inventory T/O
PILLAR	**ECOLOGICAL**	**ECOLOGICAL**	**ECOLOGICAL**	**ECOLOGICAL**
Sub-pillar	**Supplier environmental assessment**	**Supplier environmental assessment**	**Supplier environmental assessment**	**Supplier environmental assessment**
Indicators	Percentage of suppliers that demonstrate high environmental standards	Percentage of suppliers that demonstrate high environmental standards	Percentage of suppliers that demonstrate high environmental standards	Percentage of suppliers that demonstrate high environmental standards
Sub-pillar	**Energy consumption**	**Energy consumption**	**Energy consumption**	**Energy consumption**
Indicators	Number of initiatives to reduce electric energy consumption Percentage of energy saved due to conservation and efficiency improvements Electricity consumption in kwh	Number of initiatives to reduce electric energy consumption Percentage of energy saved due to conservation and efficiency improvements Electricity consumption in kwh	Number of initiatives to reduce electric energy consumption Percentage of energy saved due to conservation and efficiency improvements Electricity consumption in	Number of initiatives to reduce electric energy consumption Percentage of energy saved due to conservation and efficiency improvements Electricity consumption in kwh

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			kwh	
	Total energy consumption in kwh	Total energy consumption in kwh Total fuel consumption from non-renewable sources Total fuel consumption from renewable sources	Percentage of renewable sources of energy concerning the total consumption of energy	Total energy consumption in kwh Total fuel consumption from non-renewable sources Total fuel consumption from renewable sources Percentage of renewable sources of energy concerning the total consumption of energy
Sub-pillar	**Water consumption and recycled**	**Water consumption and recycled**	**Water consumption and recycled**	**Water consumption and recycled**
Indicators	Number of initiatives to reduce water consumption Total volume of water consumption Percentage of water recycled and reused by the organization	Number of initiatives to reduce water consumption Total volume of water consumption Percentage of water recycled and reused by the organization	Number of initiatives to reduce water consumption Total volume of water consumption Percentage of water recycled and reused by the organization	Number of initiatives to reduce water consumption Total volume of water consumption Percentage of water recycled and reused by the organization
Sub-pillar	**Recycled materials**	**Recycled materials**	**Recycled materials**	**Recycled materials**
Indicators	Percentage of recycled or renewable materials	Percentage of recycled or renewable materials Percentage of hazardous materials	Percentage of recycled or renewable materials	Percentage of recycled or renewable materials Percentage of hazardous materials
Sub-pillar	**Emissions**	**Emissions**	**Emissions**	**Emissions**
Indicators	Number of initiatives to reduce emissions	Number of initiatives to reduce emissions Reduction in gas emissions in percentage	Number of initiatives to reduce emissions Reduction in gas emissions in percentage	Number of initiatives to reduce emissions Reduction in gas emissions in percentage
Sub-pillar	**Waste**	**Waste**	**Waste**	**Waste**
Indicators	Number of initiatives to reduce effluents and waste	Number of initiatives to reduce effluents and waste Reduction of production waste in percentage	Number of initiatives to reduce effluents and waste	Number of initiatives to reduce effluents and waste Reduction of production waste in

			Number of significant spills **Biodiversity** Number of strategies for managing impacts on biodiversity Percentage of green areas that marina or port occupies in regard to entire area	percentage Number of significant spills **Biodiversity** Number of strategies for managing impacts on biodiversity Percentage of green areas that marina or port occupies in regard to entire area
PILLAR	**SOCIAL**	**SOCIAL**	**SOCIAL**	**SOCIAL**
Sub-pillar	**Suppliers**	**Suppliers**	**Suppliers**	**Suppliers**
Indicators	Percentage of suppliers that demonstrate ethical employment and trading policies Percentage of local suppliers	Percentage of suppliers that demonstrate ethical employment and trading policies Percentage of local suppliers	Percentage of suppliers that demonstrate ethical employment and trading policies Percentage of local suppliers	Percentage of suppliers that demonstrate ethical employment and trading policies Percentage of local suppliers
Sub-pillar	**Occupational health and safety**	**Occupational health and safety**	**Occupational health and safety**	**Occupational health and safety**
Indicators	Number of accidents/injuries at work Percentage of days of sick leave in the total number of working days Number of initiatives related to work and life balance (e.g. certificates such as family friendly company, promotion of work and life balance, etc.)	Number of accidents/injuries at work Percentage of days of sick leave in the total number of working days Number of initiatives related to work and life balance (e.g. certificates such as family friendly company, promotion of work and life balance, etc.)	Number of accidents/injuries at work Percentage of days of sick leave in the total number of working days Number of initiatives related to work and life balance (e.g. certificates such as family friendly company, promotion of work and life balance, etc.)	Number of accidents/injuries at work Percentage of days of sick leave in the total number of working days Number of initiatives related to work and life balance (e.g. certificates such as family friendly company, promotion of work and life balance, etc.)
Sub-pillar	**Diversity and equal opportunity**	**Diversity and equal opportunity**	**Diversity and equal opportunity**	**Diversity and equal opportunity**
Indicators	Number of initiatives to ensure diversity and equal opportunities and to prevent discrimination in the workplace	Number of initiatives to ensure diversity and equal opportunities and to prevent discrimination in the workplace	Number of initiatives to ensure diversity and equal opportunities and to prevent discrimination in the workplace	Number of initiatives to ensure diversity and equal opportunities and to prevent discrimination in the workplace

	Percentage of employees with disabilities Percentage of female employees Percentage of employees from local communities	Percentage of employees with disabilities Percentage of female employees Percentage of employees from local communities	Percentage of employees with disabilities Percentage of female employees Percentage of employees from local communities	Percentage of employees with disabilities Percentage of female employees Percentage of employees from local communities
Sub-pillar	**Training and education**	**Training and education**	**Training and education**	**Training and education**
Indicators	Number of training or education courses that have been organized for employees Percentage of all employees involved in training and education courses	Number of training or education courses that have been organized for employees Percentage of all employees involved in training and education courses	Number of training or education courses that have been organized for employees Percentage of all employees involved in training and education courses	Number of training or education courses that have been organized for employees Percentage of all employees involved in training and education courses
Sub-pillar	**Employment**	**Employment**	**Employment**	**Employment**
Indicators	Paying wages above the industry average – specify how much in percentage Percentage of employee turnover Percentage of growth of new employee hires	Paying wages above the industry average – specify how much in percentage Percentage of employee turnover Percentage of growth of new employee hires	Paying wages above the industry average – specify how much in percentage Percentage of employee turnover Percentage of growth of new employee hires	Paying wages above the industry average – specify how much in percentage Percentage of employee turnover Percentage of growth of new employee hires
Sub-pillar	**Donations**	**Donations**	**Donations**	**Donations**
Indicators	Donations as percentage of revenues	Donations as percentage of revenues	Donations as percentage of revenues	Donations as percentage of revenues
Sub-pillar			**Port-city integration**	**Port-city integration**
Indicators			Number of port-city integration initiatives in order to improve quality of life in local communities	Number of port-city integration initiatives in order to improve quality of life in local communities

2. Constructing a system of sustainability indicators and indices at the company-level

Please consult the document entitled “Sustainability System Instruction Manual” for more detailed information regarding the steps to be taken at each stage.

2.1. Indicator identification

2.1.1. Step 1

Identify indicators in the Excel tool on the provided list (see Sheet “Indicators”) that are relevant (see stakeholders), available or possible to compile at the company level. Indicators must be available for the current and the previous year. The baseline is that companies comply with national and international regulation and standards.

2.1.2. Step 2

Identify indicators on the list that are compiled by other companies in the same industry.

2.1.3. Step 3

Decide on final list of indicators to select depending on legislation, industry standards, and strategy.

There should be at least 3 indicators by pillar.

2.1.4. Step 4

Identify where and by whom the indicators will be collected.

2.2. Data collection and transformation

2.2.1. Centralise data collection in original units

Indicators are input by each company in the Excel tool in the sheets "A-…" through to ""I-…" for at least two years (2016 and 2017 columns I & K).

Indicators that have not been chosen by the company, or indicators that have been chosen but have no available data should be left blank (please do not input a value of 0, as this would bias the sustainability indicators).

Companies input data in the unit displayed in column L.

For some indicators, companies should input levels (for example the “profit/loss” indicator). Please input levels with their adequate sign (for example, + for profits and – for losses).

For some indicators, companies are required to input percentages that are always positive or equal to 0, but never negative (for example “Percentage of suppliers that demonstrate high environmental standards”). Please input these as positive values.

For some indicators, a negative value means an increase in sustainability (for example “Reduction in gas emissions in percentage”). For these indicators, companies should indicate reduction as positive value, and any increase as negative value. For example, if the company has reduced its gas emissions by 4% in 2016, it should input +4% in the cell I23; if the company has increased it gas emissions by 2% in 2017, it should input -2% in cell K23.

2.2.2. Compute yearly change in %

After the company has input all chosen and available indicators in columns I & K in the units indicated in column L, the Excel tool will automatically calculate the yearly change for all indicators (column H). The exhaustive list of indicators can be found on the "Indicators" excel sheet. Summary of notation is provided in Appendix.

We note companies as i, time (years) as t, and indicators IC_j (j=1,…n ; the total number of indicators). The yearly change for indicator IC_j at the company level i between years t-1 and t writes:

$$\Delta IC_{ij,t-1,t} = \frac{IC_{ijt} - IC_{ijt-1}}{IC_{ijt-1}} \times 100$$

For some indicators, a large number or percentage means less sustainability (for example "Number of accidents/injuries at work"). Companies should input raw numbers or percentages. The automatic calculation of the yearly change in column H will operate an inversion of sign for consistency. For example, if the company reports 34 injuries at work in 2016 (cell I31) and 12 injuries in 2017 (cell K31), then these two numbers should be input as positive values. The yearly change in cell H31 will however appear positive.

2.2.3. Aggregate data by sustainability sub-pillar

Data is then aggregated at the sub-pillar level. The sub-pillar indicator is the average of yearly change of all available indicators for that sub-pillar. For example, the indicator for the sub-pillar "Profitability" (cell F3) is the average of all available yearly change percentage of the indicators "Profit/Loss", "Return on Investment (ROI)", "Earnings before interests and tax (EBITDA)", and "Percentage of revenues in foreign markets" (cells H3 to H8). Missing values are not included in the calculation, so that companies can pick and mix the indicators that they wish. The exhaustive list of indicators and their classification into sub-pillars can be found on the "Indicators" Excel sheet.

We note sub-pillar indicators as SPI_{ik} (k=1,…,m; the total number of sub-pillars). The sub-pillar indicator SPI_{ik} composed of u<n (u=1,…,u) indicators IC_{ij} between years t-1 and t writes:

$$SPI_{ik,t,t-1} = \frac{\sum_{j \in u} \Delta IC_{ij,t-1,t}}{u}$$

2.2.4. Aggregate data by sustainability pillar

Data is then aggregated at the pillar level. The pillar indicator is the average of yearly change of all available sub-pillars for that pillar. For example, the indicator for the pillar "Economic" (cell D3) is the average of all available yearly change percentage of the sub-pillars "Profitability", "Added value", and "Efficiency" (cells F3 to F8). Missing values are not included in the calculation, so that companies can pick and mix the indicators and resulting sub-pillars that they wish. The exhaustive list of indicators and their classification into sub-pillars and pillars can be found on the "Indicators" Excel sheet.

We note pillar indicators as P_{il} (l=1,…,q). The pillar indicator P_{il} composed of v<m (v=1,…,v) sub-pillars SPI_{ik} between years t-1 and t writes:

$$P_{il,t,t-1} = \frac{\sum_{k \in v} SPI_{ik,t,t-1}}{v}$$

2.2.5. Aggregate data into a single sustainability indicator

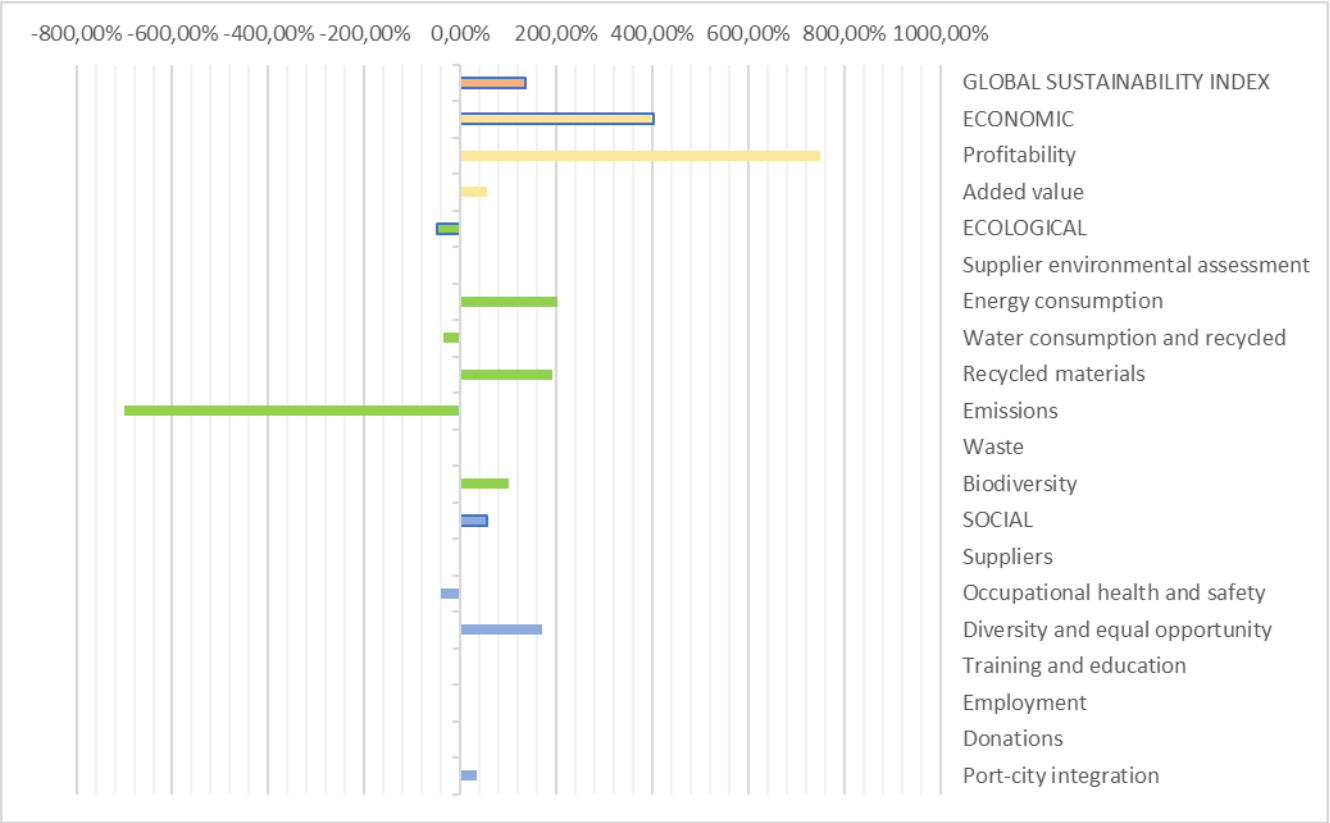
Data is then aggregated at the global level. The global indicator is the average of yearly change of the three pillars.

We note the global sustainability indicator GSI_i. The global sustainability indicator GSI_i composed of l pillars P_{il} between years t-1 and t writes:

$$GSI_{i,t,t-1} = \frac{\sum_l P_{il,t,t-1}}{l}$$

2.3. Data visualisation

The aggregated data at the global level are depicted in a graphical form such as presented below.



2.4. Data analysis and sharing

The final step of this process is to examine the results provided by the tool in order to draw conclusions about the information they contain and to enable the companies to make more-informed and sustainable business decisions.

2.4.1. Data analysis at company level

The first level answers the question “What can the data tell the companies?” from exploration and analysis. The objective is to develop understanding of the data to answer business questions and derive meaningful insights. In this phase, data are seen as a whole, and the companies look for some statistical insight. For example, a company may notice a huge energy consumption. The managers may want to explore the

causes of that consumption and how to reduce it. They can inversely notice a decrease in consumption and take advantage of it to promote their sustainable attitude.

The second level answers the question “What can the companies forecast based on the data?”. When the companies look at the history of their data, they will be able to predict what might occur in the future. They may spot and exploit historical trends to mitigate future risks or capitalize on opportunities. These historical data help them correctly plan potential needs and to develop strategies.

The third level answers the question “Based on the data, what should the companies do?”. This part of the analysis is where decision making happens. Based on findings from analysis of the previous two levels, companies should tap into better business practices. For example, they should decide how to allocate funds amongst existing activities or new projects.

The fourth level answers the question “How can companies combine all of these steps to make informed business decisions?”. This is the potential “optimisation phase”, combining all the efforts of the previous stages. Companies that have implemented changes during the previous phases can look at how the changes performed.

The companies, depending on their needs, may use a single level or decide to go through the whole process to facilitate the optimisation of their decisions, to innovate and predict the results of their actions.

In the WP4, the pilot actions can help them discover the tool and use it in a better way.

2.4.2. Data sharing

In order to foster B2B data access and transfer in the Med area, we propose that companies share their data with other companies, following the directives and studies of the European Commission (2017)[iii]. This means that their data and those from other companies are available to every company.

The main objective is for business purposes, and is to enhance business opportunities or to identify missed ones, so as to improve internal efficiency. Companies can compare themselves with their main competitors in other countries; they can develop partnership with companies with similar vision, etc.

2.4.3. Industry and sector comparisons

For a group of companies that operate in the same segment of the economy or share a similar business type, a sector refers to a large segment of the economy (i.e. Yachting sector) , while an industry describes a much more specific group of companies or businesses (i.e. Superyacht industry). In our tool, the sector can be broken down into 3 industries: Service, Manufacturing and Infrastructure.

In their sector, encompassing a broad range of producers, it is important to compare similar companies engaged in the same industry to obtain meaningful comparative evaluations. Economic values can easily be used to evaluate similar firms in the industry and more generally in the sector. Ecological and environmental values need also to be used for a better comparison.

3. Constructing a system of sustainability indicators and indices at the industry- and sector-levels

3.1. Data collection

Compile all n indicators' yearly change $\Delta IC_{in,t-1,t}$ in % (from sheets "A-…" through to ""I-…" column H) provided on the list at the company level, for all companies i. Industries compile data from companies in their industries. The sector compiles data in all industries.

Industries compile data in sheets "Service average.", "Manufacturing average", or "Infrastructure average". The sector compiles data in sheet "Sector".

3.2. Data transformation

At the industry level, aggregate data by indicator (average over all companies) (see column G in industries sheets). Each industry indicator value is the average of that indicator for all companies in the industry.

We note an industry F_r and an industry indicator IC_{rj}. The yearly change of the industry indicator j for industry r between t-1 and t writes:

$$\Delta IC_{rj,t,t-1} = \frac{\sum_{i \in F_r} \Delta IC_{ij,t-1,t}}{\sum i \in F_r}$$

Data is then aggregated at the sub-pillar level. The sub-pillar indicator is the average of yearly change of all available indicators for that sub-pillar. For example, the indicator for the sub-pillar "Profitability" (cell F3) is the average of all available yearly change percentage of the indicators "Profit/Loss", "Return on Investment (ROI)", "Earnings before interests and tax (EBITDA)", and "Percentage of revenues in foreign markets" (cells H3 to H8). Missing values are not included in the calculation, so that industries sub-pillars reflect the mix of indicators that companies have chosen.

We note industry sub-pillar indicators as SPI_{rk} (k=1,…,m; the total number of sub-pillars). The sub-pillar indicator SPI_{rk} in industry r, composed of u<n indicators IC_{rj} between years t-1 and t writes:

$$SPI_{rk,t,t-1} = \frac{\sum_{j \in u} \Delta IC_{rj,t-1,t}}{u}$$

Data is then aggregated at the pillar level. The pillar indicator is the average of yearly change of all available sub-pillars for that pillar. For example, the indicator for the pillar "Economic" (cell D3) is the average of all available yearly change percentage of the sub-pillars "Profitability", "Added value", and "Efficiency" (cells F3 to F8). Missing values are not included in the calculation, so that industries pillars reflect the mix of indicators and sub-pillars that companies have chosen.

We note industry pillar indicators as P_{rl} (l=1,…,q). The industry pillar indicator IP_{rl} composed of v<m (v=1,…,v) industry sub-pillars SPI_{rk} between years t-1 and t writes:

$$P_{rl,t,t-1} = \frac{\sum_{k \in v} SPI_{rk,t,t-1}}{v}$$

Data is then aggregated at the global level. The global indicator is the average of yearly change of the three pillars.

We note the industry global sustainability indicator GSI_r. The global sustainability indicator GSI_r composed of l pillars P_{rl} between years t-1 and t writes:

$$GSI_{r,t,t-1} = \frac{\sum_l P_{rl,t,t-1}}{l}$$

At the sector level, aggregate data by indicator (average over all industries) (see column G in "Sector" sheet). Each sector indicator value is the average of that indicator for the three industries.

We note the sector indicator j IC_{sj}. The yearly change of the sector indicator j between t-1 and t writes:

$$\Delta IC_{sj,t,t-1} = \frac{\sum_r \Delta IC_{rj,t,t-1}}{r}$$

Data is then aggregated at the sub-pillar level. The sub-pillar indicator is the average of yearly change of all available indicators for that sub-pillar. For example, the indicator for the sub-pillar "Profitability" (cell F3) is the average of all available yearly change percentage of the indicators "Profit/Loss", "Return on Investment (ROI)", "Earnings before interests and tax (EBITDA)", and "Percentage of revenues in foreign markets" (cells H3 to H8). Missing values are not included in the calculation, so that the sector sub-pillars reflect the mix of indicators that industries have chosen.

We note sector sub-pillar indicators as SPI_{sk} (k=1,…,m; the total number of sub-pillars). The sector sub-pillar indicator SPI_{sk}, composed of u<n indicators IC_{sj} between years t-1 and t writes:

$$SPI_{sk,t,t-1} = \frac{\sum_{j \in u} \Delta IC_{sj,t,t-1}}{u}$$

Data is then aggregated at the pillar level. The pillar indicator is the average of yearly change of all available sub-pillars for that pillar. For example, the indicator for the pillar "Economic" (cell D3) is the average of all available yearly change percentage of the sub-pillars "Profitability", "Added value", and "Efficiency" (cells F3 to F8). Missing values are not included in the calculation, so that the sector pillars reflect the mix of indicators and sub-pillars that industries have chosen.

We note sector pillar indicators as P_{sl} (l=1,…,q). The sector pillar indicator P_{sl} composed of v<m (v=1,…,v) sector sub-pillars SPI_{sk} between years t-1 and t writes:

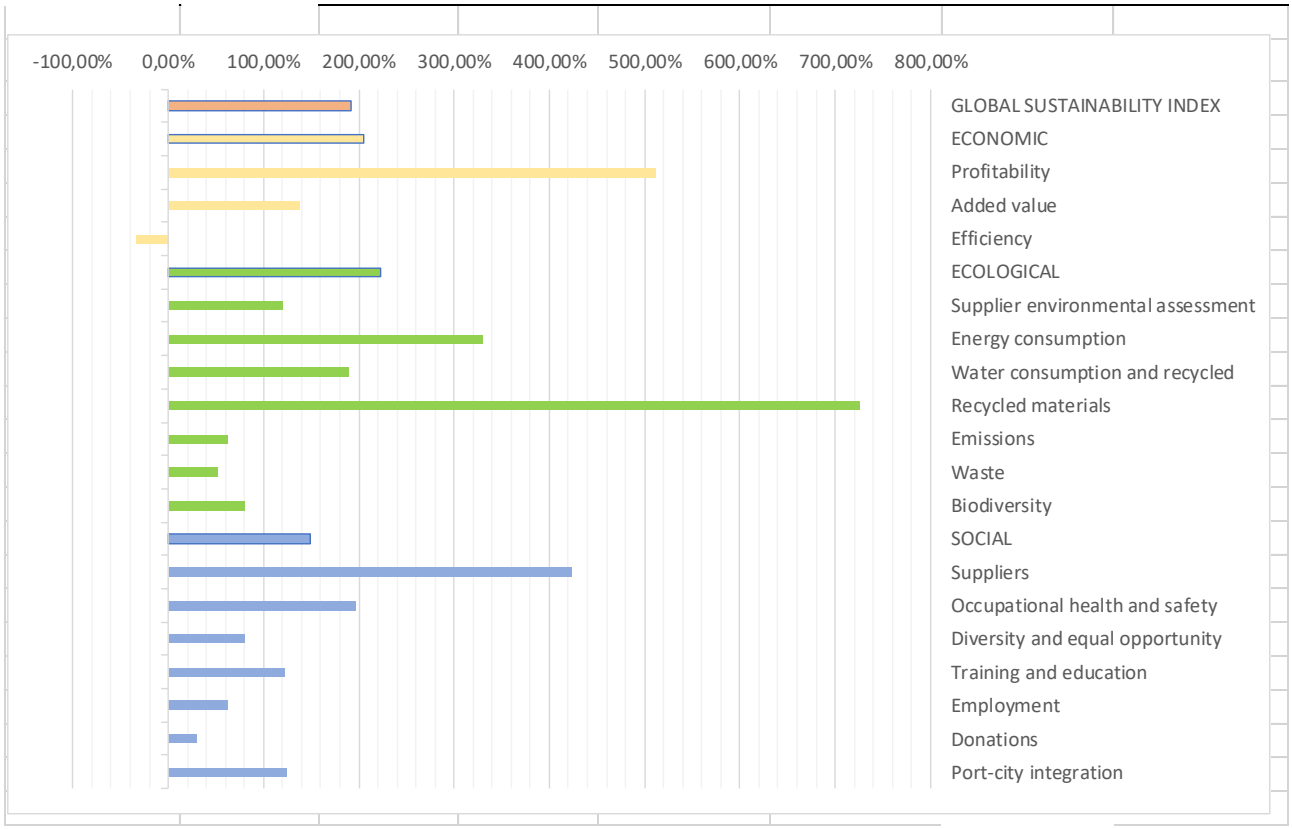
$$P_{sl,t,t-1} = \frac{\sum_{k \in v} SPI_{sk,t,t-1}}{v}$$

Data is then aggregated at the global level. The global indicator is the average of yearly change of the three pillars.

We note the sector global sustainability indicator GSI_s. The sector global sustainability indicator GSI_s composed of l pillars P_{sl} between years t-1 and t writes:

$$GSI_{s,t,t-1} = \frac{\sum_l P_{sl,t,t-1}}{l}$$

3.3. Data visualisation



3.4. Data analysis and standards creation

With these three firsts steps (data collection, data transformation and data visualisation), the system of indicators provides a clear understanding of the actions done and their results.

3.4.1. Data analysis

The tool ensures that data contents are identified, understood and implemented, that is to say they can be managed in order to promote sustainability. It may foster exchange of economic, social and environmental information.

3.4.2. Standards creation

Data fields and the content of those fields need to be standardised. We recommend to companies and policy-makers to define data standards in order to maintain the quality and consistency of data.

Furthermore, data standards should been defined to provide better information about what is done at the different level (companies, industry, national and transnational level). The list of data standards is a helpful reference guide when more detailed or comprehensive information is required.

The main objectives are to:

- Assess organisational readiness
- Increase knowledge and understanding of data content

- Address organisations as well as local, national and transnational industries and sectors needs.
- Contribute to the development and harmonization of industry and professional standards
- Generate a general data management processes to ensure information integrity and reliability.

4. Disclaimer and limitations

Since sustainability for the yachting sector had not been defined prior to choosing the indicators in Deliverable no.: L3.5.1, and the objectives for a system of sustainability indicators have not been set a priori either, we rely on a crude definition of sustainability (broadly, progress in any of the indicators). The system could be modified to accommodate a more thoroughly researched sustainability definition in line with a fully though through set of objectives for companies, industries and sectors.

A second limitation relates to the "who" sets objectives, "who" collects data at the company, industry and sector level. This question will need to be addressed prior to data collection. This will condition the success of the implementation of the sustainability indicators system.

A third limitation resides in the initial choice of indicators in Deliverable no.: L3.5.1. In order to be able to analyse the collected data on each indicator, one would need to rely on assumptions about the meaning of each indicator in terms of yearly change: do we consider for example that an increase in profits contributes positively to sustainability? This goes back to the first limitation in terms of the general definition of sustainability. Obviously, this will need to be addressed at a future point in time. Additionally, and it is probably resulting from the lack of definitions exposed previously, some indicators are in levels (in €, kwh, m3, etc), some are ratios, and some are percentage changes, which renders aggregation, meaning that comparisons and trade-offs are difficult to analyse, which is why we have decided to work only with yearly rates of changes. This is not ideal, but it has the merit of normalising the varied indicators picked up in Deliverable no.: L3.5.1.

Appendix: Summary of notation for formulas

i	Companies' subscript	IC	Indicator
t	Time	SPI	Sub-pillar indicator
j	Indicators' subscript	P	Pillar indicator
n	Total number of indicators	GSI	Global sustainability indicator
k	Sub-pillars' subscript	F	Industry
m	Total number of sub-pillars		
u	Number of indicators composing sub-pillar k		
l	Pillars' subscript		
q	Number of pillars		
v	Number of sub-pillars composing pillar l		
r	Industries' subscript		
s	Sector's subscript		

[i] Sikdar S.K., Sengupta D., Mukherjee R. (2017) Systems, Indicators, and Sustainability Assessment. In: Measuring Progress Towards Sustainability. Springer, Cham https://link.springer.com/chapter/10.1007/978-3-319-42719-5_4

[ii] Sustainable Tourism for Development Guidebook (2013), World Tourism Organization – UNWTO, with the financial support of the European Commission, http://whc.unesco.org/sustainabletourismtoolkit/sites/default/files/13.%20UNWTO%20%282013%29%20Sustainable%20Tourism%20for%20Development%20Guidebook.pdf

[iii] Data sharing between companies in Europe – results from a study by the European Commission and way forward (2017), https://ec.europa.eu/digital-single-market/en/news/data-sharing-between-companies-europe-results-study-european-commission-and-way-forward

Building a European Data Economy (2017), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017DC0009&from=EN