

UPM impact valuation white paper



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IMPACT VALUATION

1 Responsible business

In today's operating environment companies need to consider triple bottom line instead of just one, which means that business decisions can no longer be based mainly on financial figures. The triple bottom line concept suggests that in addition to profit responsible businesses' strategy comprises also people and planet. The increasing concern about climate change, nature loss and social instability causes uncertainties in businesses and forces companies to create and execute strategies that go beyond economic value creation.



Figure 1 Triple bottom line

To succeed in the market and remain profitable, companies need to commit to long-term sustainable value creation which better takes into consideration the impacts on environment and society. Sustainable value creation combines economic development with environmental protection and social well-being. The interdependence of these three dimensions of sustainability, which, the nested model of sustainability (Giddings et al. 2002) represents create a so-called healthy society. Both inner dimensions of sustainability are highly dependent on functional environment which means that economy and society should operate within our planetary boundaries.

UPM's business is based on sustainable use of forests which means that environmental sustainability is at the heart of value creation. Only after the forests are sustainably and well-managed can the company create social well-being through economic value creation. The following figure represents UPM's responsibility focus areas in a nested model of sustainability.



Figure 2 UPM responsibility focus areas in a nested model of sustainability

2 Impact valuation

2.1 Introduction

The traditional financial reporting disclosures company's financial information and performance periodically. For long, this financial information has worked as a basis for decision making on all organisational levels. The operational environment in which companies nowadays work is in constant transformation due to climate change, biodiversity loss and social unrest throughout the world. Hence, different stakeholders are increasingly expecting and requiring companies to report about their sustainability performance which includes other than just financial measures and data.

Companies face a difficult challenge when deciding how to measure and evaluate sustainable behaviour since no similar standardized reporting system exist as the underlying accounting system which concerns nearly all businesses. At the moment probably the best known and most popular sustainability reporting standards are from Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB) and the International Integrated Reporting Council (IIRC). All these reporting frameworks are aimed at different audiences which means that they are poorly comparable with each other. Consequently, this hampers comparing the sustainability performance of companies when they are using different reporting standards. (Buchholz et al. 2020.)

Impact valuation or assessment is a method for companies to value their business activities' positive and negative impacts on the environment, society and economy.¹ The assessment does not necessarily include all these aforesaid dimensions but is of course the more comprehensive the more dimensions are considered. The method quantifies impacts along value chain and translates these impacts into financial value which is the most commonly used value in business context. Traditional sustainability reporting usually stops at the quantification of impacts while impact valuation goes beyond traditional sustainability reporting by providing a more systematic way to evaluate the impacts through quantification and monetisation. Monetisation improves the understanding of the scale of the impact and allows comparison between different impact areas. (S&P Global 2021; Value Balancing Alliance 2021.) The desirable end result of the valuation is company's monetised impacts but since the monetising methods and factors are still under research and development, some of the impacts can be presented in a qualitative form in order to get a comprehensive picture of company's impacts.

¹ This paper focuses especially on the environmental and social/human dimensions of impact valuation, giving less attention to the economic dimension.

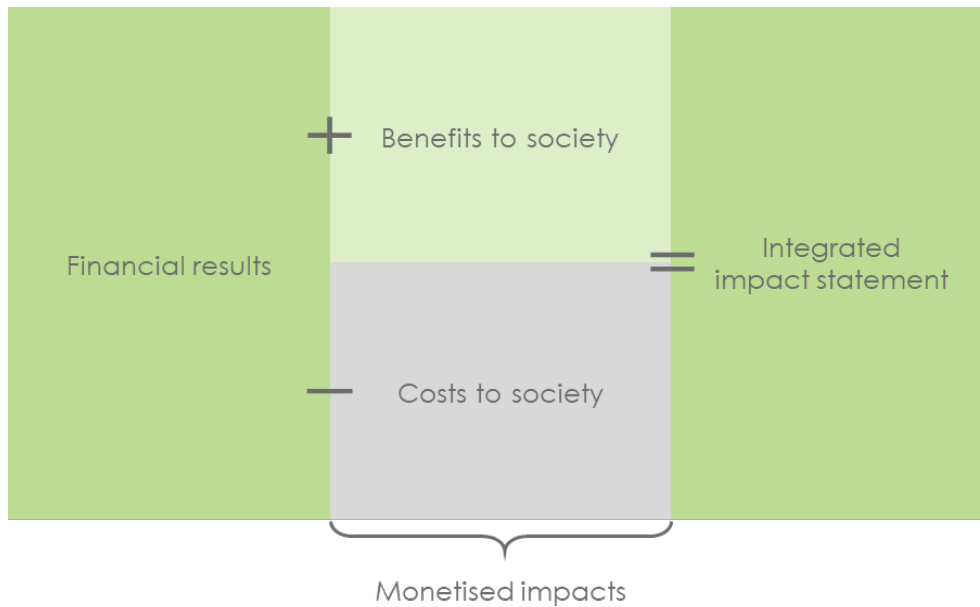


Figure 3 The basis of impact valuation (adapted from Lanxess 2021)

2.2 Method

The impact valuation framework helps companies to define and understand the objective of the assessment. The most commonly used frameworks are probably Natural and Social/Human Capital Protocols developed by WBCSD, Total Value framework developed by EY and TIMM developed by PwC. Many other frameworks exist too, and companies can utilise these different frameworks in several ways. Within the context of the frameworks, various methods are used to evaluate, quantify and monetise the impacts. Organisations can develop own methods, fully or partly utilise ready-made and accepted methods or use a combination of different methods. In construction of the method presented in this paper multiple sources are used and therefore is based on a combination of different methods. (Greenstoneplus 2018.)

2.2.1 The objective of the assessment

The ultimate objective of Impact valuation is to support and guide organizations' decision-making process and inform the overall strategy by providing insightful information about the impacts of company's activities on the environment and society. The assessment starts by determining the target group and the purpose of the assessment. Relevant target groups could be internal stakeholders e.g. investors or managers or external stakeholders, such as government regulators or customers. When done properly the assessment will most likely raise interest among multiple stakeholders.

Purpose of the assessment	Example business application	Possible benefits from the assessment
Assess risks and opportunities	Impact valuation can be used to identify opportunities and estimate and evaluate risks in e.g. the value chain. A company operating in forest industry could do the assessment and identify and value risks concerning natural capital which allows the company to identify where improvements can be made.	Improved risk management; identified business opportunities; improved decision making
Compare options	Impact valuation allows comparison of the impacts of between companies, projects or products. Comparing options helps to inform business decisions such as procurements. For example, if a company is planning on establishing a new tree plantation it could compare the environmental impacts of growing different tree species on different sites.	Improved decision making; increased competitive advantage; improved reporting and communication
Estimate total value and/or net impact	By measuring the total impacts a company can gain a deeper understanding of the various impacts (and the size of the impacts) that they have on society, environment and economy. For example, the impacts of forest products could be compared to impacts of alternative products made from non-renewable resources.	Improved decision making; increased competitive advantage; improved reporting and communication
Assess impacts on stakeholders	Impact valuation can help in evaluating how company's business activities are affecting different stakeholders. For example, what kind of impact can a potential disruption in water supply have to local communities.	Improved risk assessment and management; improved decision making; improved reporting and communication

Communicate internally and/or externally	Communicating and reporting the results from the assessment e.g. in a form of Integrated Profit and Loss statement can enhance and improve the communication for different stakeholders. By translating impacts into monetary values, figures can be integrated into financial accounting which allows a more comprehensive understanding of business activities. Impact assessment can also support existing and ongoing projects concerning sustainability reporting initiatives and indices such as Dow Jones Sustainability Index.	Greater brand value; improved reporting and communication; increased competitive advantage
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Table 1 Examples of the intended use, applications and possible benefits of impact valuation (adapted from Natural Capital Coalition 2018)

The table above is adapted from Natural Capital Protocol which, in a sense, can be considered as the environmental part of impact valuation. Nonetheless, determining the objectives of total impact valuation is based on the same basic concepts so it can be applied when also social aspects are included in the assessment.

2.2.2 Scope

After determining the purpose of the assessment, the scope which supports and directs the data collection and valuation should be defined. In this method the scope is determined in the following four steps.

1. Determine the organizational focus: product, project or corporate

Impact valuation can be conducted on a scale of a single product, project or the whole organization. The organizational focus depends on the objectives that are set for the assessment. For example, a company might want to measure the impacts of a specific project in a specific site to determine how the operations impact local communities.

2. Determine value-chain boundary: own operations, downstream and/or upstream

The broadest scope would cover the whole value-chain because every business activity impacts the society somehow. However, for now data availability and current methods are setting significant boundaries for conducting a complete assessment for the whole value chain. Especially for communication and reporting purposes the assessment should cover at minimum own operations and potentially direct suppliers.

3. Determine the value perspective: business or society

The value perspective is also determined based on the objectives of the assessment, if it's made for business's value perspective the impacts are valued through different factors than in the society's value perspective. When valuing the impacts from business's value perspective, a change in a specific impact area can be translated into cost saving or increase due to the improvement or deterioration in that area. Society's value perspective seeks to value the positive and negative externalities

caused by company's operations. (Impact valuation roundtable 2017; We Value Nature 2020.)

- Determine the types of value that will be considered: qualitative, quantitative and/or monetary

The assessment can include qualitative, quantitative and monetary impact data. Even though the impact valuation strives to translate impacts into monetary value, there are still limitations to monetisation on certain areas. However, to cover all material topics, qualitative or quantitative assessment should be established in areas where monetary valuation is not possible. This way the assessment gives a comprehensive overview of company's impacts. (Value Balancing Alliance 2021.)

2.2.3 Impact drivers and pathways

Impact driver is a measurable, often non-product output of a business activity. Environmental and social/human impact drivers can vary between sectors and companies. The composition of impact drivers depends on company's business model, value chain position, operating environment and products and services. Each company selects their own comprehensive set of impact drivers based on the scope and the models and methods in use. (Vionnet & Blower 2021; Impact Valuation Roundtable 2017.) The following table represents examples of different impact categories and drivers.

	Impact driver category	Impact driver	Unit
Environmental	GHG-emissions	Tons of carbon dioxide (CO₂), methane CH₄, nitrous oxide (N₂O), etc.	Tonne CO ₂ -eq
	Other air pollutants	Particle matter emissions (PM_{2.5} and PM₁₀), Volatile Organic Compounds (VOCs), mono-nitrogen oxides (NO_x), chlorofluorocarbons (CFCs) etc.	Tonne
	Water use	Volume of used groundwater and surface water	m ³
	Water pollutants	Nitrates, phosphates, chemical oxygen demand (COD), biological oxygen demand (BOD)	Tonne

	Soil pollutant	Volume of waste matter discharged and retained in soil	Tonne
	Solid waste	Volume of landfill waste, hazardous waste, incineration (with and without energy recovery) and recycling	Tonne
	Fossil fuel use	Volume of non-renewable energy used	MJ
	Land use	Area of land occupied for company's operations	Ha
Social & Human	Safety	Health and safety accidents	Lost-time accident frequency, Total Recordable Injury Frequency
	Wages	Received income	EUR per year
	Training	Training provided by employer	Hours of training per year
	Taxes*	Taxes received by the state	EUR per year

Table 2 Examples of impact driver categories and impact drivers

*Tax impact can also be considered in economic impact valuation which is not covered in this document

“Impact pathways describe how, as a result of a specific business activity, a particular impact driver results in changes in natural capital and how these changes impact different stakeholders.” – Natural Capital Coalition 2016.

Standardised impact pathways add consistency to the impact valuation process. Even though impacts are often linked to each other, it is important to consider each impact separately through the specified impact pathway. For example, impacts on biodiversity cannot be considered separately from land use impacts because quantified biodiversity exists on land which is already taken into account in the land use indicator. (Vionnet & Blower 2021.)

“Changes in ecosystem services usually accounted for in the land use indicator relies on the biodiversity of the land, leading to double counting if both land use and biodiversity are accounted for separately.” – Vionnet & Blower 2021

This double counting can be avoided through standardised and specified impact pathway. The following figure represents the typical stages of impact pathway and related examples to each stage.

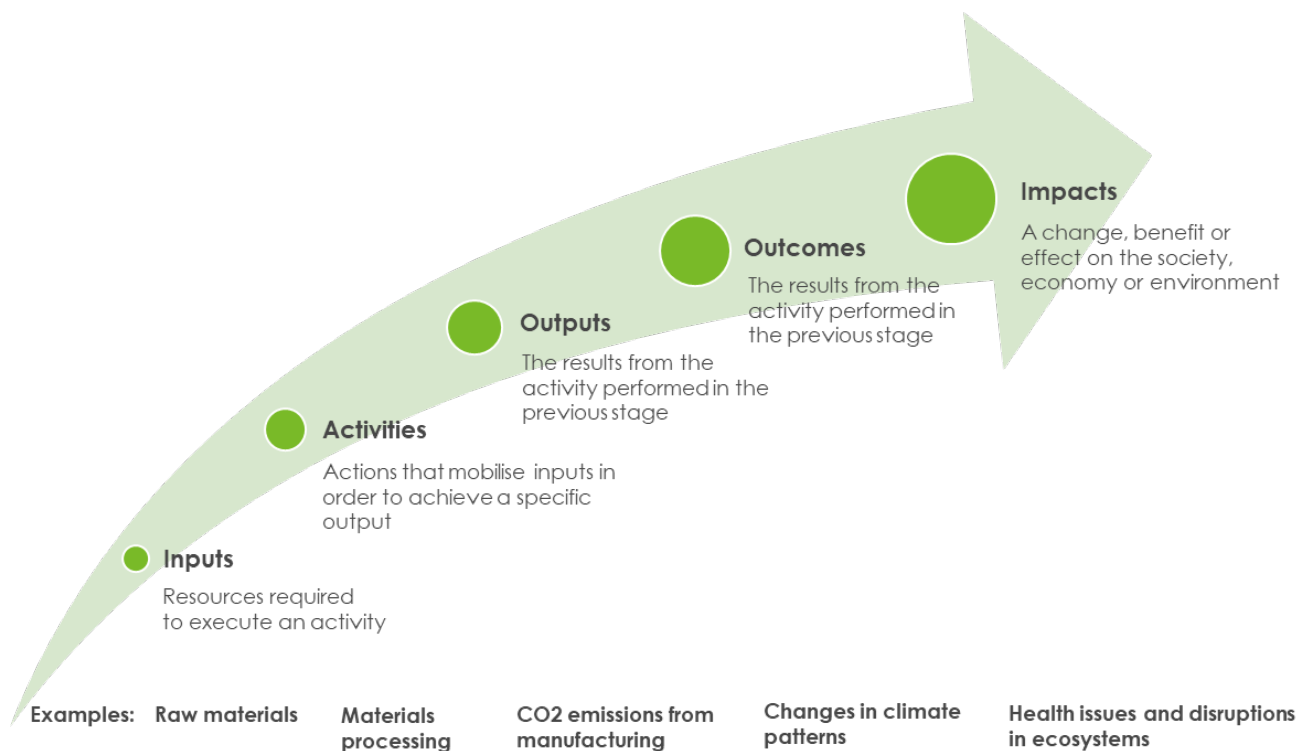


Figure 4 Impact pathway (adapted from Dowd 2016; Impact Valuation Roundtable 2017)

2.2.4 Impact indicators and impacts

Next step is to define the impact indicators and impacts caused by the impact drivers. The impacts on society and environment arise from changes in natural, social and human capital and these impacts include externalities (to individuals, communities and organizations) that are not captured by the current market system. It is also important build understanding on how impacts change over time and what are the possible cumulative effects. Impact indicators and impacts are added to the table on the next page to demonstrate how impact drivers are translated into impacts on environment and society. (Natural capital coalition 2016.)

	Impact driver category	Impact driver	Unit	Impact indicator	Impact
Environmental	GHG-emissions	Tons of carbon dioxide (CO ₂), methane CH ₄ , nitrous oxide (N ₂ O), etc.	Tonne CO ₂ -eq	Climate change, sea level rise, extreme weather events, mean temperatures, etc.	Economic disruption, health issues, disruptions to agriculture, disruptions to ecosystems and ecosystem services

	Other air pollutants	Particle matter emissions (PM2.5 and PM10), Volatile Organic Compounds (VOCs), mono-nitrogen oxides (NOx), chlorofluorocarbons (CFCs) etc.	Tonne	Ozone depletion, reduced air quality, acidification, etc.	Health issues, white/brown haze decreases visibility
	Water use	Volume of used groundwater and surface water	m3	Water scarcity	Decrease in crop yield, water-borne diseases, food shortages
	Water pollutants	Nitrates, phosphates, chemical oxygen demand (COD), biological oxygen demand (BOD)	Tonne	Marine or freshwater eutrophication, contaminated potable water	Health issues from polluted water, decrease in fish stock, disruptions to ecosystems and ecosystem services
	Soil pollutant	Volume of waste matter discharged and retained in soil	Tonne	Terrestrial eutrophication	Reduced life-quality due to health issues
	Solid waste	Volume of landfill waste, hazardous waste, incineration (with and without energy recovery) and recycling	Tonne	Dioxin and heavy metals to air, noise, odour, etc.	Health issues, disamenity
	Fossil fuel use	Volume of non-renewable energy used	MJ	Depletion of fossil fuels	Damage to resource availability
	Land use	Area of land occupied for company's operations	Ha	Change in ecosystem services	Disruptions to ecosystems and ecosystem services
Social & Human	Safety	Health and safety accidents	Lost-time accident frequency, Total Recordable Injury Frequency	The severity of accidents	Increase/decrease in human well-being (HUI)
	Wages	Received income	EUR per year	Received income compared to living wage	Increase/decrease in human well-being (HUI)

Training	Training provided by employer	Hours of training per year	Hours of training translated into change in income	Increase/decrease in human well-being (HUI)
Taxes	Taxes received by the state	EUR per year	SROI of taxes	Increase/decrease in human well-being (HUT)

Table 3 Examples of impact indicators and impacts

The following figure represents an example of impact from impact driver to impact for an imaginary pulp and paper mill.

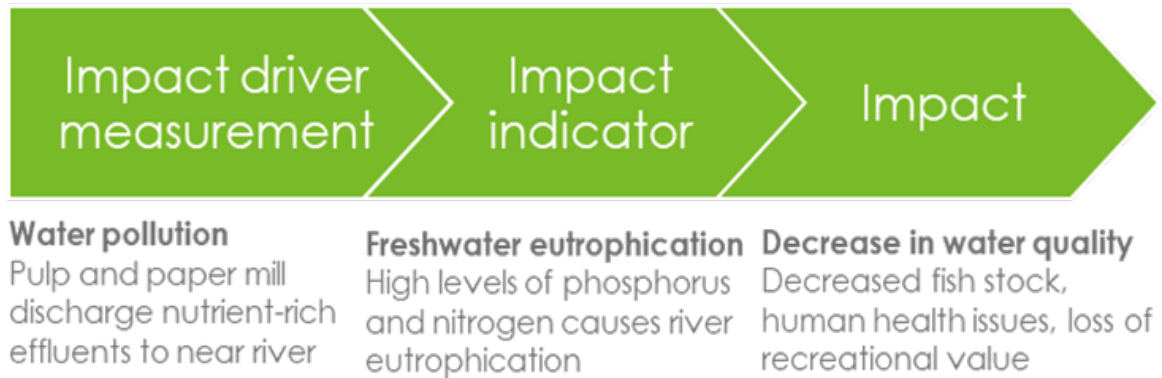


Figure 5 Example of a pathway from impact driver to impact (Adapted from Natural Capital Coalition 2016)

2.2.5 Quantification

In order to assign a monetary value for impacts, they need to be quantified. Different quantification techniques can be applied when assessing the externalities on society. The quantitative data can be primary, received straight from the company (e.g. LCA) or secondary, which is received from other than primary data sources (e.g. Input-output model). (Impact Valuation Roundtable 2017.) LCA methodology application gives a good basis for environmental impact measurement and valuation and it is quite frequently used by businesses to assess their environmental impacts on corporate or product levels. The framework provides different methods to translate quantified impact drivers into environmental impact indicators and supports the efforts to standardise impact pathways and valuation factors. (Vionnet & Blower 2021.)

In the societal impact pathway changes in social, human and natural capital are expressed as change in human well-being which is quite frequently indicated with DALY (disability adjusted life years). DALY measures the difference between the ideal health situation and a health current situation. One DALY equals one year of healthy life lost.



Figure 6 Example of DALY calculation for accidents

Figure 6 represents an example of DALY calculation for accidents. Note, that this is just a simplified example in order to explain the idea behind the calculation. In this example the DALY value depends on the severity of the injury due to accident and the duration of the injury. An assumption can be made that the injury from the accident reduces a person's life quality 10% (the weight) and that the period of life with reduced life quality lasts 4 months. With these assumptions the calculation would go as follows:

$$DALY = 10\% \times \frac{4}{12} = 0,033^2$$

It is important to keep in mind that the measurement techniques and methods are in early stages of development which means that any result from the calculation is rather a rough estimate of the impact than a precise figure. (Impact valuation roundtable 2017.)

2.2.6 Monetary valuation

Valuation means estimating the relative importance or worth of a specified impact to people or society, and in financial accounting terms valuation means monetisation. Assigning monetary value to social, environmental and economic impacts deepens the understanding of the impacts of company's operations. The assessment can bring forth important impact drivers and significant impacts which could possibly be otherwise left unnoticed. Expressing impacts in monetary terms may raise interest of different stakeholders but probably especially the interest of e.g. board members who are used to discuss and make decisions based on financial figures. (Natural capital coalition 2016; Impact valuation roundtable 2017.)

In order to get relevant results from the assessment to support decision making and provide insights, it is important to keep consistency throughout the whole process and especially in using the valuation techniques and factors. (Vionnet & Blower 2021.) For communication and reporting of the outcomes, Impact valuation roundtable (2017) suggests transparency in terms of applied valuation techniques and factors. The chosen factors should come from an independent third-party source to avoid biased results. By explaining the logic behind the choice of factors, the understanding on the discourse, objectives and possible applications of the

² This calculation is made based on the discussions with Samuel Vionnet.

assessment could improve. Transparency will also most likely increase trust among different stakeholders.

Impact valuation methodology provides different pricing models that can be applied in order to monetise impacts. The chosen model often depends on the chosen value perspective of the assessment. If the assessment is made from business' value perspective, the chosen pricing model would most likely market price, as it indicates possible cost savings or increases related to a specific impact driver. The use of market price does not usually indicate the externalities of company's operations. When the assessment is conducted from society's value perspective, the model which reflects societal costs and benefits is chosen. Mitigation cost model falls somewhere in between these two previous models. It reflects the price that should be paid to mitigate mostly environmental impacts e.g. the costs of water treatment. When the mitigation cost is still hypothetical (not realized) it is not necessarily a good indicator of value. The cost reflects value only when e.g. an organisation is truly prepared to undertake it or becomes obligated to pay it. There are several different valuation techniques for monetising impacts but in order to keep it simple, the following figure represents three of the different pricing models. (Impact valuation roundtable 2017; Natural capital coalition 2016.)

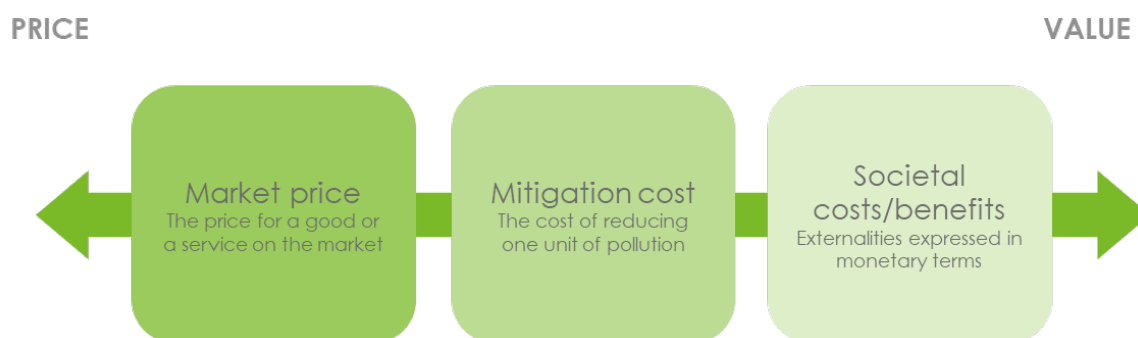


Figure 7 Impact valuation pricing models

Impact valuation roundtable participants suggest using the societal costs and benefits model.

Probably the most studied and standardized impact pathway and driver are constructed for CO₂-eq impact and most of the companies in the field are using the societal based cost as a monetising factor. An example of monetised CO₂-eq impacts is presented next. The following table introduces the inflation-adjusted prices that were used in the example:

Pricing model	EUR/tonne	Source
Market price	61,7	Carbon price on the market 3.9.2021
Mitigation cost	103	The cost of meeting the temperature goal of the Paris agreement (EIB Group 2020)
Societal cost	106,11	Damage cost of carbon (EEA report 2020)

Table 4 Cost of carbon based on different pricing models

Note, that for example the mitigation cost 103 EUR/tonne for CO₂-eq in 2021 is still quite moderate. The increase during the following years is quite significant as it is estimated in the EIB group's climate roadmap (2020) that the price in 2025 will be 165 EUR/tonne and in 2030 already 250 EUR/tonne.

Figure 8 introduces an example of calculation results where the impacts of CO₂-eq emissions are valued and monetised based on different pricing models.

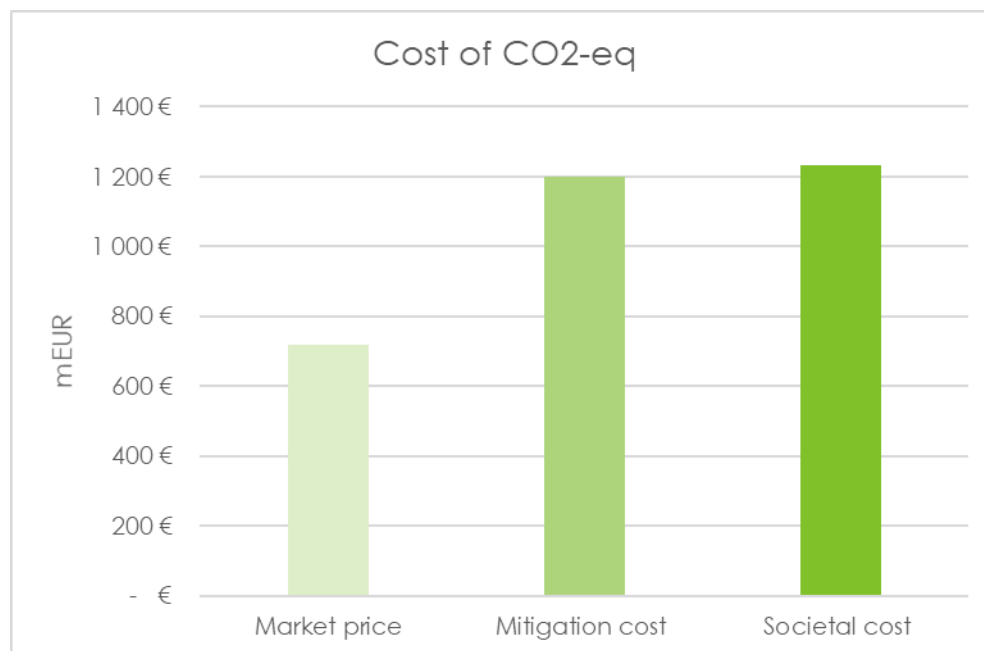


Figure 8 The monetised impacts of UPM's CO₂ emissions based on different pricing models

2.2.7 Limitations and challenges

As the impact valuation methodology is under constant development it includes limitations and challenges. In their paper Vionnet and Blower (2021) identified four main challenges that came up during the interviews with ten leading companies who are using or experimenting impact valuation at some level.

1. The first challenge related to scope, more specifically how to determine the value-chain boundary. Some indicators are measured differently along the value-chain e.g. occupational safety might cover only own operations while CO₂ emissions might be covered more widely across value-chain.
2. The second challenge identified was to keep consistency in definition of impact across indicators. For example, if taxes are defined by their monetary flow, it doesn't reflect the actual impact. So, describing something in monetary units doesn't always lead to comparability and not keeping consistency in using impacts throughout the process can lead to confusion.
3. The third challenge is to maintain the same monetary valuation techniques throughout the assessment. As stated earlier there are several different pricing models available but in order to ensure comparability, it would be good to stick to the chosen model. Currently different valuation techniques are used

within the same assessment, e.g. CO2 are monetised by using damage cost and water pollution by using mitigation cost.

4. The fourth challenge is to keep consistency in definition of impact pathways. For example, water consumption is quite commonly valued through determining the additional economic cost to deliver this water while also reporting the costs to society arising from the impacts of water scarcity.

The challenge overall is that there are no standardized impact pathways or valuation techniques which leads to low comparability of results. Also, the lack of consistency in the valuation techniques and pathways limits the utilisation possibilities. Due to the challenges mentioned above, the calculation includes a lot of uncertainty meaning that the resulting figures might not be very precise. The following figure represents the accuracy, relevance, comparability and consistency throughout the impact pathway and the relationship between them.

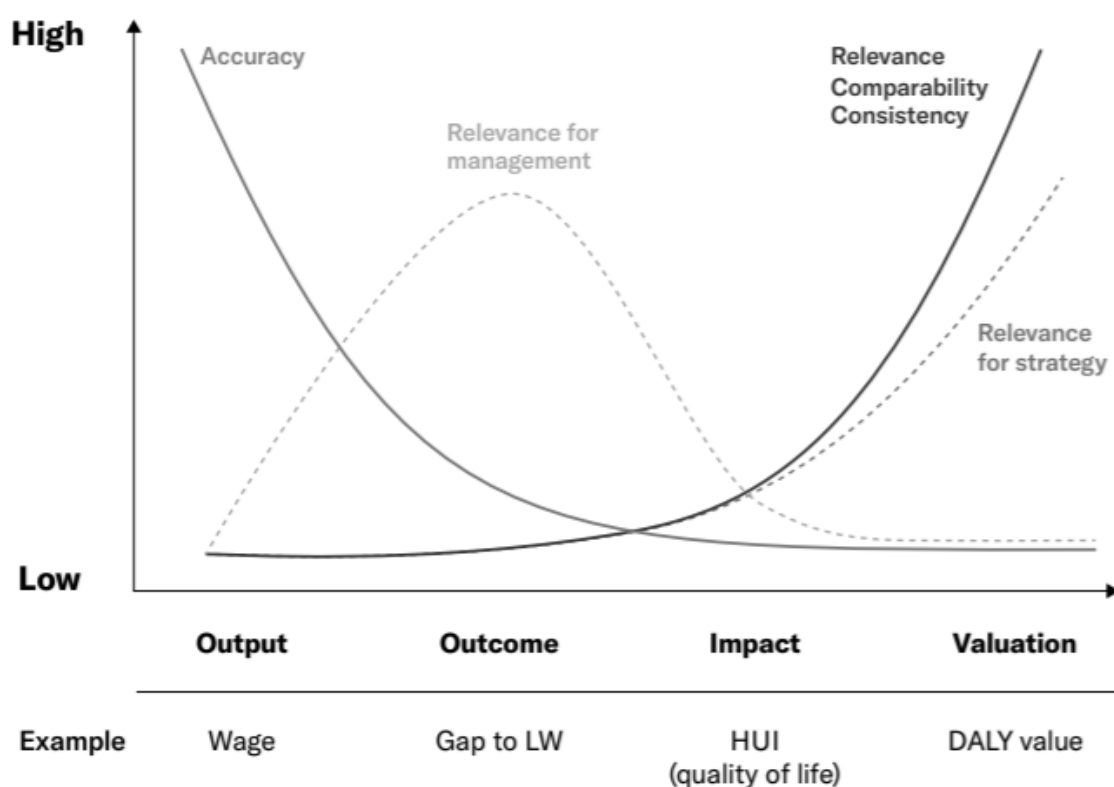


Figure 9 The relationship between accuracy, relevance, comparability and consistency (from Vionnet & Bleasdale 2021 paper)

Currently there are no frameworks that would instruct how to communicate the results of the assessment which poses a challenge to comparison. Therefore, standardisation and guidance on how to report the results should be developed in the future.

2.2.8 Current state of the field and applications

Since the whole methodology is still under development, companies are at different stages of implementing or experimenting with impact valuation. The paper from Vionnet and Blower (2021) regarded mostly about natural capital accounting but

assumably similar overall trends concern social and human capital accounting also. The key insights from the business cases they studied were:

1. The businesses mostly chose impact to society as the perspective for their assessment. The objective was to raise awareness externally and internally.
2. The cases were relatively comprehensive as they quite frequently covered natural and social/human capital. The assessment also often covered the whole value chain.
3. Materiality was not used as a guideline when choosing the impact drivers. Companies tended to choose the impact drivers based on the models and methods in use or available rather than materiality. In fact, impact valuation can support materiality assessments.
4. In external communication companies using impact valuation often reported high level and aggregated results but provided little information about the methods used in the assessment.
5. In terms of transparency and business integration, most of the studied companies were at the early stages of maturity and impact.
6. LCA was widely utilized in impact valuation and this connection should be strengthened to improve consistency and standardisation in the models.

The following figure represents the maturity model of the integration impact valuation. Most of the companies are currently located at the first two maturity steps of impact valuation integration, meaning that they are mostly raising awareness of the methodology or piloting by conducting a first assessment at some scope/level.

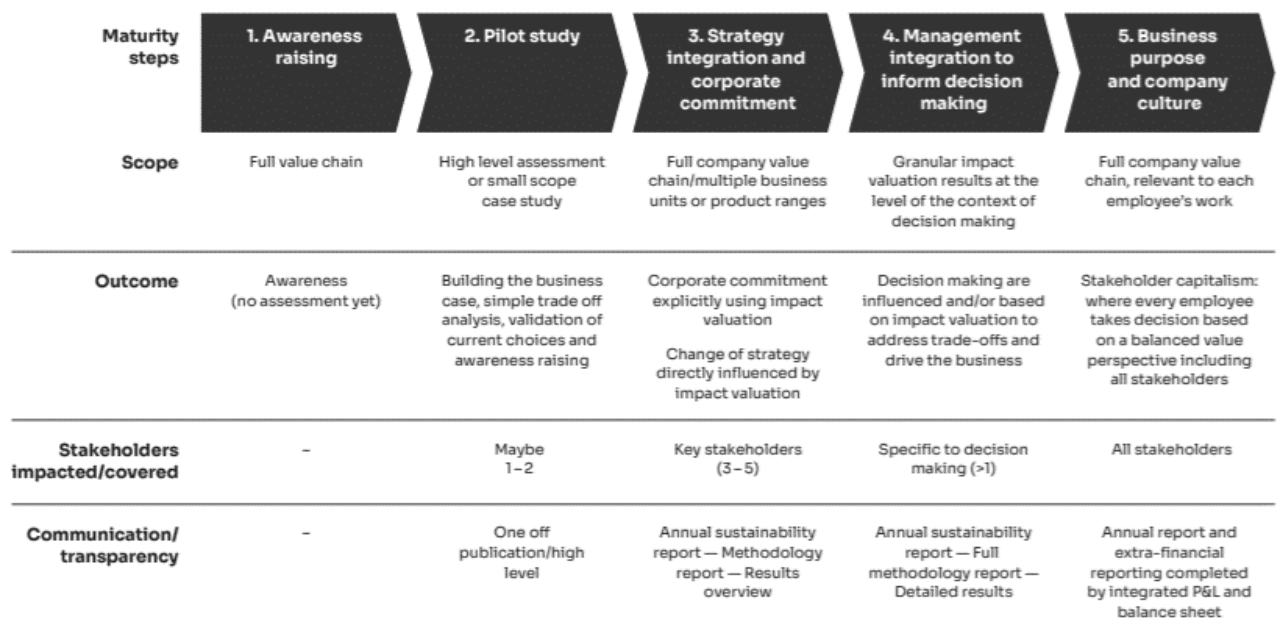


Figure 10 Model showing how capitals accounting is applied at different stages of maturity consistency (from Vionnet & Blower 2021)

At the first step companies are aware of impact valuation and are interested in it but haven't conducted any assessment. At the second step companies build a business case which might be relatively simple at this point but could also be a high-

level assessment. At the third step the assessment is already quite comprehensive, and the outcome might already directly influence strategy. At the fourth step the assessment is often finely detailed and decision making can be based on or influenced by impact valuation results. At the final step the outcome of the assessment drives the decision making of every employee and it includes full company value chain.

2.3 Conclusions

As can be seen from figure 10, most of the companies using impact valuation are at early stages of implementation. In their paper Vionnet & Blower (2021) recognize a clear need of base rules for natural capital accounting and state that this would improve the consistency. Standardising impact valuation would bring several different benefits to businesses as well as different stakeholders. Vionnet & Blower stated that it could possibly:

1. Lower the barrier to entry the field by enabling more companies to develop capitals accounting and impact valuation
2. Support sustainable development by improving the visibility and credibility of the method
3. Accelerate sustainable finance
4. Provide insightful and relevant results that would enable sustainable business practises by supporting decision making and strategies
5. Improve the connection with reporting standards

Conducting the assessment forces companies to consider different impacts they have on the society and environment. This can help businesses to identify gaps in data and improve the understanding of the impacts of different operations. As mentioned earlier, the methodology is under constant development and lacking standardisation which means that the results from the assessment might still include assumptions, simplifications and uncertainty. However, conducting the assessment with existing techniques and data can bring several benefits as gives a great overview of the magnitude of the impacts, even without the exact monetised figures. It can bring forth topics that could otherwise be left unnoticed and provide information on the relative significance of different impacts.

Investing all efforts on technical elements and calculations will probably not lead to the desired outcome and benefits of impact valuation. At least equally important is to discuss and think about the objectives and implications of the assessment. Companies should consider how they are going to use the gained information and how it could support decision making, affect strategy and ultimately create value.

By providing information and being transparent about the used methods, techniques and factors companies can increase the reliability and validity of the assessment. Incorporating sources and explanations for e.g. the used valuation factors can improve the understanding about the idea behind the assessment as well as the meaning and significance of the results. If the company only communicates the results from the assessment without explaining the chosen value

perspective, pricing techniques or valuation coefficients the outcome might seem vague. By rationalising the impact pathways and valuation techniques, company can increase the informational value of the assessment and its results.

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