Rotterdam School of Management
Erasmus University

Erasmus Platform for Sustainable Value Creation & Impact Institute

A toolkit for transition:

How the Integrated Value Model enriches corporate decision-making and promotes sustainable business

17 October 2022

Colophon

The Erasmus Platform for Sustainable Value Creation is an academic think-tank at Rotterdam School of Management (RSM), Erasmus University Rotterdam, that collaborates with leading sustainability experts in the financial sector. This project was initiated by the advisory board of the platform and executed in collaboration with the Impact Institute, using data from their Global Impact Database and based on the Impact Weighted Accounts Framework (IWAF). Impact Institute is a social enterprise with a mission to empower organisations and individuals to realise a more inclusive economy. IWAF is maintained by the Impact Economy Foundation and provides organisations with a harmonized, consistent way of measuring, reporting and steering on impact. The framework helps to quantify and monetize organisations' impact on social, human and natural capital for all stakeholders.

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Working group
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Executive Summary

Optimising for financial value alone puts the long-term viability of a company at risk

Organisations and their management need an interpretation of 'value' far broader than simple financial value if they want their business to thrive – or even survive – in a world tested by environmental and societal shifts. The decision in where and how to invest must take other values – societal and ecological values – into consideration.

According to a 2019 forecast from the UN-supported Principles for Responsible Investment (PRI) investor network, 'the 100 most carbon-intensive companies could stand to lose up to 43% of their value, totalling USD $1.4 trillion, while the 100 best performers will gain up to 33% of their value, totalling $0.7 trillion.' The Forecast further states that 'the best performing 10% of companies in the energy sector who invest heavily in renewables will see their valuations more than double, while the worst-performing 10% will see their values halve. Car manufacturers with the highest level of investment in electric vehicles could see their value increase by 108%' (UN PRI, 2019).

Decision-making focused on the long term: a new narrative is needed

The long-term viability of organisations may be at risk if executives do not enhance their way of decision-making. If executives, business managers, and relationship managers would better understand the positive and negative impacts of their business activities on their stakeholders they would have a much richer set of data points to help understand where business opportunities lie and what business risks to prepare for.

This is a particular challenge for (financially profitable) companies that operate in sectors with high negative externalities (Quadrant 1 with negative impacts). These externalities are often hidden effects that are borne by society and not factored into the financial performance of these companies. Such companies will inevitably be directly impacted by major societal challenges caused by these externalities, such as climate change, biodiversity collapse, inequality, and human rights violations. In other words, these businesses have:

1. a big need to transform their business models to reduce their negative impacts or even become regenerative (net positive); and/ or
2. an enabling role in the transition towards a more inclusive market economy helping others to transform. Think of Financial Institutions or front running companies that inspire others.

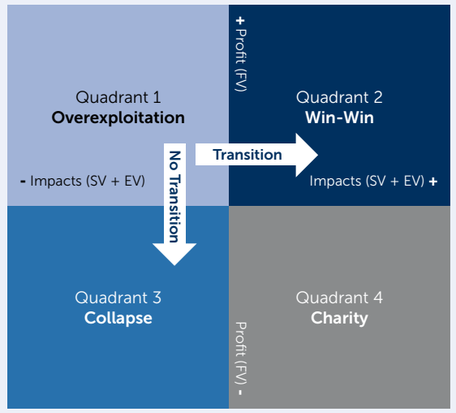


Figure 1 - Value Creation Matrix
Source: based on Schramade (2020)

One of the key flaws in the current decision-making processes is that there is a heavy focus on short-term financial metrics, without accounting for the wider impacts that the company has on a broader set of stakeholders within society. Ignoring the negative environmental and social externalities leads to overexploitation of the essential and valuable resources within society, like natural capital, social capital, human capital, and other. Because of this limiting thinking, organisations still allocate significant capital to activities that delay or do not contribute to the much-needed societal transitions. They will be a threat to the ability of current and future generations to thrive and survive.

The current decision-making paradigm may reduce a company's future business value

The future business value of organisations may be at risk if they do not become impact-driven, due to insufficient ownership of their strategic narrative, missed opportunities, less stable performance[1], and a limited ability to anticipate emerging risks:

1. **Support company valuation:** Company valuation is increasingly driven by intangible assets. In 2020, intangible assets accounted for 90% of the S&P500 market value (Ocean Tomo, 2020). Research shows that companies create more financial value if they better understand the value implications of key transitions that impact them and if they, at an early stage, develop the capabilities required for the related transformations. Companies should make transitions part of their strategic agenda to reap the early mover benefits of entering new markets and create long-term value (Kurznack, Schoenmaker and Schramade, 2021).
2. **Manage value at risk:** There is an increasing amount of evidence that externalities may become internalised and therefore increase the cost of doing business and/or put companies out of business (Quadrant 3). Example drivers of internalisation include regulation, taxation (e.g., carbon tax), technology advances or customer preferences.
3. **Understand drivers of business growth:** Insufficient capital is allocated to solutions that help accelerate transitions in response to the aforementioned societal challenges, e.g., energy transition, resource transition, etc. Executives with insufficient understanding of how they can contribute to the acceleration of these transitions may miss out on significant business opportunities.
4. **Credibly report on progress:** making all stakeholders aware of the commitments and impacts of the company; avoiding reputation risk; and retaining the social license to operate.

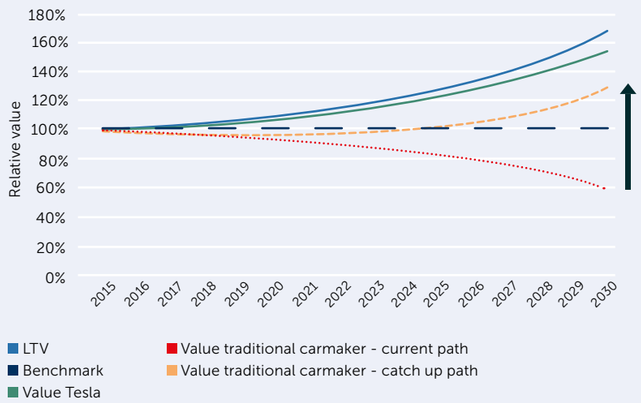


Figure 2 - Long-term value potential of electric vehicles
Source: Kurznack, Schoenmaker and Schramade (2021)

Note: The graph shows the long-term value (LTV) potential from the conversion from Combustion Engine Vehicles (CEV) to Electric Vehicles (ELV). Tesla is reaping the value benefits from early adoption of ELV. Traditional car manufacturers are losing value (red dotted line), unless they are able to catch up (yellow dotted line) at high cost.

[1] *Source: Real economy- Real returns: The business case for values-based banking. 2022*

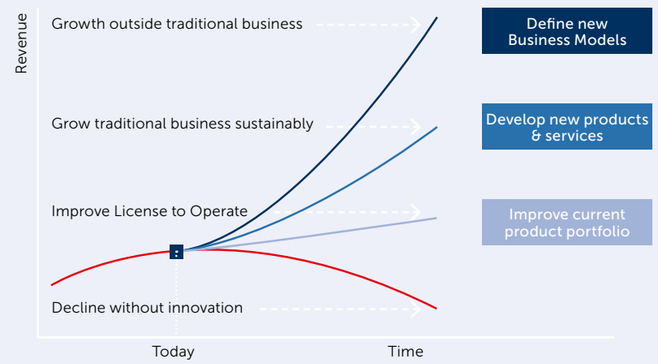


Figure 3 -Innovation mode
Source: Innovation model (True price, adopted from Deloitte sustainable Innovation)

Application of the Integrated Value Model (IV) and how it affects decision-making

One of the solutions to breakthrough this status quo thinking is to use the Integrated Value Model (IV) (Schramade, Schoenmaker and De Adelhart Toorop, 2022), which integrates the monetised social (SV) and environmental impacts (EV) with the financial values of the company.

For this model to be applied, companies need to understand the material social and environmental impacts of their business activities and their value chains and determine their value with Impact Measurement and Valuation (IMV) techniques. Executives need to provide an actionable alternative narrative to short-term profit-maximisation. Integrated Thinking will allow them to spot the key societal transitions that may impact their company. Embedding this into their strategic outlook helps them anticipate the relevant societal transitions and change their business model to become more sustainable as well as long-term viable.

This research project

The hypothesis we have tested is the following: "companies that measure and value their social and environmental impacts can use this information to better understand the value implications of the transition they have to go through; and better anticipate what is needed to develop the capabilities required for this transition."

We tried to answer the following two questions:

- Does integrated value help the transition to sustainable business models?
- Could a case be made for the CFO to embrace integrated value?

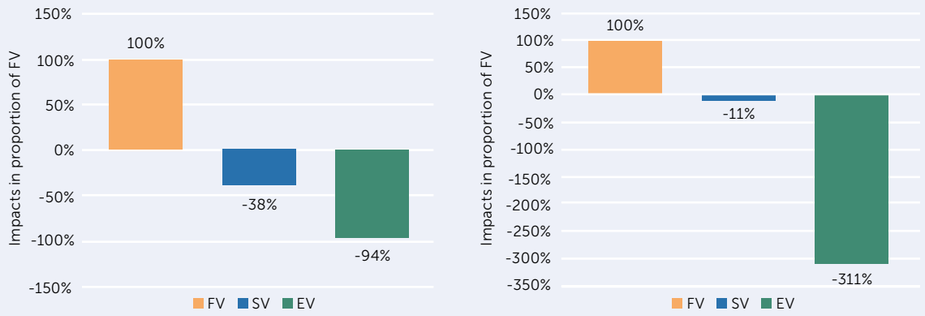
We tested the investment decision model for integrated value with two case studies:

1. An automotive company, and
2. A food company.

Case study results

The companies in both case studies are operating in sectors with high externalities that give rise to fundamental societal challenges. With the use of data driven quantitative IMV techniques some of the key externalities, the direct and indirect social and environmental impacts, were quantified and valued. It turned out that both companies overall destroy value for society, meaning: the sum of the negative social and environmental values and the positive financial value is less than zero (see figures below).

Figure 4 - Value assessment
Source: author's own, based on Global Impact Database, Impact Institute (2022).



Note: The left panel is the traditional CEV automotive company and the right panel the traditional meat company. In both cases, the financial value is normalised to 100%; the monetised social and environmental impacts are presented as a percentage of financial value.

The case studies showed the value improvements for both companies because of transforming toward more sustainable business models:

1. The automotive company: transition from combustion engine to electric vehicle, and
2. The food company: transition from meat to vegetarian substitute.

Both case studies demonstrate that Integrated Thinking enables senior management to balance FV, SV, and EV and retain their social license to operate. The pricing of externalities strengthens the transition business case and accelerates the transition to a sustainable business model and towards a more sustainable economy. This in turn leads to the ability to seize new business opportunities, and mitigation of emerging risks, as well as higher company valuation perspectives. Analysing social and environmental impacts enables senior management to understand the drivers of long-term value creation.

This report shows step-by-step how long-term value creation can be achieved. The case studies were presented and discussed through several rounds of workshops and group brainstorms. Among the participants were former CFOs, who were asked to reflect on the model.

Conclusions and recommendations

The integrated value model helps companies to align corporate decision-making with value-creation for different stakeholders. It is based on two key assumptions:

1. The internalisation of negative impacts moves the value frontier – a negative impact today rapidly becomes a large cost for the company tomorrow after internalisation (e.g., a high carbon tax)
2. Companies that can turn a negative impact into a positive impact in a timely way have a first mover advantage

The model also helps CFOs to understand the best timing for transition of the company's business model. Key recommendations are:

- To genuinely benefit from the integrated value model, companies first need to acknowledge the inevitability of the sustainability transition and the consequences this will have for the future of the company
- The need for long-term perspective to counter the current short-termism, like short pay-back periods, including adapting the incentive structures that are needed to bring the long-term perspective in place
- The integrated value model seems promising to understand transition and subsequent timing for companies. However, further research is required. This includes the need to develop indicators to spot societal trends at an early stage. Examples are: Incoming regulation and legislation, changing customer preferences, mergers and acquisition activity and IPOs, the taxation of externalities like a carbon tax and upcoming business models like circular/ modular design substitutes
- Although future research is needed on specific transition indicators (e.g., timing of conversion, etc.), measuring social and environmental value in and of itself shows that there is a *need* for the transition.
- Impact Weighted Accounts provide a useful framework to gain insight into quantified positive and negative impacts and a company's ability to build long-term resilience.

About the Report

The report consists of three parts. Part 1 consists of the explanation of the IV Model. In Chapter 1, the reader is introduced to the current problems in evaluating financial, environmental and social impacts and how using the Integrated Value (IV) Model could be a solution. Chapter 2 analyses the benefits of the model for future business value and shows the steps for applying the IV Model, using the point of view of the company CFO.

Part 2 of the report contains Chapter 3 which presents the overall results of the cases conducted with the IV Model and Chapter 4 with the conclusions and recommendations of the research.
Finally, Part 3 includes the Appendix, with a detailed explanation of the IV Model and the two cases conducted.

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Part I

The case for the integrated value model and its implications for corporate decision-making

1. Introduction of the Integrated Value Model

The Problem:
Most companies are overexploiting the environment and society and cannot quantify their impacts.

Based on their profit and impacts, companies can be divided into the Value Creation Matrix as displayed in Figure 5. Currently, most companies aim to maximise financial value (FV). Companies that have a positive financial value are in the top half of the matrix. On the other hand, most of the companies with a positive financial value still also have a negative impact on the environment and society. They are thus in Quadrant 1 of the matrix (Schramade, Schoenmaker, & De Adelhart Toorop, 2022). Current practices overexploit society and the environment. Since the impacts are not quantified and measured, they are not taken into consideration in the decision-making process. This is a real problem since the damages of climate change, loss of biodiversity and alarming increase of social inequalities are becoming more and more visible and problematic.

Companies are the main drivers of climate change and loss of biodiversity, and they cannot continue to operate their 'business as usual': a rapid sustainable transition is needed to avoid sudden shocks such as macroeconomic impacts of abrupt changes in energy use, stranded assets and a rise in the incidence of natural catastrophes (ESRB, 2016). On the social front, rising social inequalities (both within and across countries) are undermining the very fabric of societies (Acemoglu & Robinson, 2012). Societal concern for the impacts that companies produce has increased expectations about how they should operate. Companies need to be aligned with what society identifies as socially responsible, which includes addressing and improving their negative impacts (Schoenmaker & Schramade, 2019).

Therefore, companies should strive to follow the stakeholder model that aims to create positive value for all stakeholders. They need to move from Quadrant 1 to Quadrant 2 and have a positive impact on the environment and society to contribute materially to the goals of the United Nations' 2030 Agenda for Sustainable Development.

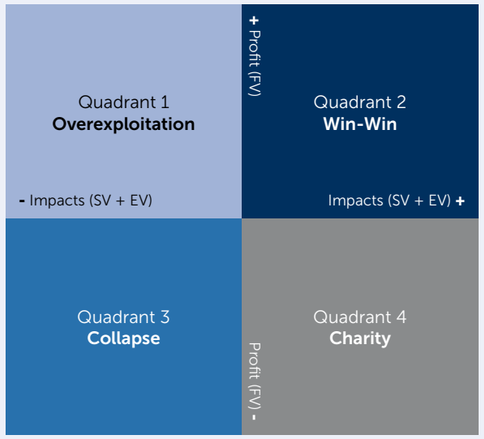


Figure 5 - Value Creation Matrix
Source: Based on Schramade (2020)

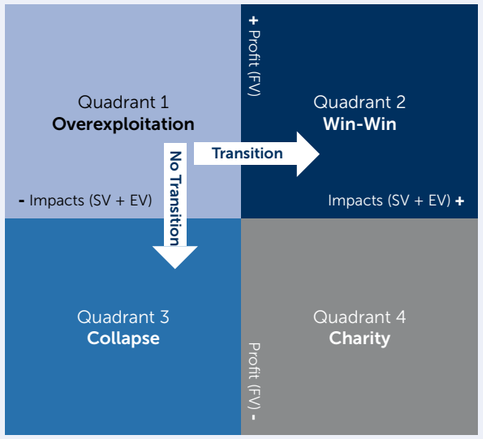


Figure 6 - Value Creation Matrix with Long-Term scenarios for Quadrant 1 Companies *Source: based on Schramade (2020)*

We argue that the long-term financial survival of companies in Quadrant 1, is at stake. Those companies that are currently in Quadrant 1 will need to move to Quadrant 2 or face collapse in the long-term, like companies in Quadrant 3 (Schramade et al., 2022). In fact, environmental and social issues are expected to have a great impact on companies and, therefore, also on the solidity of financial institutions financing these companies. In the first place, companies are exposed to physical risk because of geological and environmental changes affecting their assets. Secondly, companies are exposed to transition risk, since new regulations or a shift in consumer preferences may disrupt the company's market value or creditworthiness. Thirdly, they are exposed to reputation risk, since negative media exposure and social issues may cause the company to lose its license to operate (DNB, 2019). Thus, companies need to move to Quadrant 2 to reduce exposure to both transition and reputation risk, which hopefully will also reduce the exposure to physical risk.

The Question:
How can companies move to Quadrant 2?

So, to ensure long-term financial survival, the company in Quadrant 1 needs to take action to improve its impacts and move to Quadrant 2, otherwise the company will be exposed to the aforementioned risks that will threaten its existence in the long-term (Quadrant 3). The key question is: how can a company make the move from an overexploitation model to a win-win model where it can create environmental, social and financial value simultaneously?

The Solution:
Integrate Environmental and Social Factors with Financial Factors

Integrating environmental and social factors with financial factors enables companies to quantify their impact and have a better overview of the value created (or destroyed) by their activities; and of the areas where the company needs major impact improvements (social or environmental). With this overview, the company can understand the actions it needs to undertake to move from Quadrant 1 to Quadrant 2. Companies using integrated value (IV) are induced to embrace a transition perspective and to plan how to move towards Quadrant 2 and a more sustainable business model.

The IV Model integrates quantified social and environmental impacts, and it can be a toolkit for companies to understand their impact and evaluate investments.

Figure 7 - The Integrated Value Model
Source: Based on Schramade, Schoenmaker, & De Adelhart Toorop, (2022)

The Integrated Value Model:
Combining Financial (FV), Social (SV) and Environmental Value (EV)

The IV Model was first proposed by Schramade, Schoenmaker and De Adelhart Toorop (2022) and is based on the following principles:

- **Multi-value Creation:** Value creation is stimulated and is positive for all three value dimensions (FV, SV, EV). This is the long-term goal but is not always immediately possible for existing activities.
- **Transition:** Where value is destroyed, a transition pathway to recovery is established. The path to ending value destruction must be credible.
- **Non-substitution:** In principle, negative effects on one value dimension cannot be compensated for by positive effects on the other value dimensions.

The model tests how the impact of a current financially profitable but socially and environmentally unsustainable business model, would change when converting to a sustainable business model which can have a positive impact on all three value dimensions.

We develop two cases to test the IV model, using the Impact Institute's[2] monetised impact data on environmental and social impacts:

- The first case focuses on the **Automotive** sector, evaluating the impact improvements of a Combustion Engine Vehicles (CEV) manufacturer when transitioning towards Electric Vehicles (EV).
- The second case focused on the **Meat** sector, evaluating the impact improvements of a meat company when transitioning towards plant-based protein.

Relevance for stakeholder driven companies (in quadrant 2)

The model is not only relevant for companies in quadrant 1. Some companies are stakeholder-driven but are unable to quantify the impacts of their activities and investments and therefore do not own their strategic outlook. By not quantifying the positive impacts that they create, the management can insufficiently respond to accusations of not creating a satisfactory financial return, or the company could become the target of a hostile acquisition by a party that sees opportunities to further maximise financial value. One example is that in January 2022, Terry Smith, a major shareholder in Unilever, publicly accused the management of the company of being obsessed with showing off sustainability credentials at the expense of focusing on the fundamentals of running a business (Agnew, 2022). This problem leads to bad long-term decisions. By not quantifying social and environmental impacts, companies in Quadrant 1 will not understand the urgency for a transition towards a more sustainable business model and will face collapse; while companies in Quadrant 2 cannot show the positive impacts of their strategy, hindering future performance for those companies and for financial institutions.

[2] *https://www.impactinstitute.com/*

2. Future business value

The transition to a sustainable economy can come with shocks (Loorbach, Frantzeskaki and Avelino, 2017). Companies need to be aware of this. Adaptation to transition is a key determinant of a company's long-term value. Companies that steer on impact are early in the game and can reap the first mover benefits of transition. Companies that adapt later experience higher adaptation costs and may even not survive. We derive a set of characteristics of impact-driven companies that are either prepared for transition or operate well in a more inclusive market economy. The IV model helps to calculate impact and make impact visible.

Characteristics of an impact-driven organisation

Our research shows that impact driven organisations have higher chances of being successful in the long run as they leverage integrated thinking in their core strategy, decision making and reporting. This allows them to:

1. **Own their strategic narrative:** define their role in society and value of their unique worldview
2. **Uncover new value opportunities:** identify and tap into new business opportunities, new products, services and policies
3. **Drive long-term performance:** enhance the way they make decisions and monitor their performance
4. **Anticipate emerging risks:** identify and anticipate key societal transitions and driver of internalisation that may become a threat to their performance and license to operate

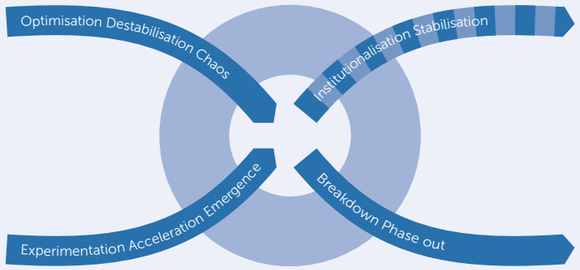


Figure 8 - The X-curve of transitions
Source: Loorbach, Frantzeskaki and Avelino (2017)

Own strategic narrative	Uncover new value opportunities	Drive long-term performance	Anticipate emerging risks
• Provide an actionable alternative narrative to short-term profit-maximisation • Integrate True Value in strategic outlook • Define core purpose • Identify the **key transitions** to focus on • Build a **compelling theory of change**	• Improve product portfolio incorporating True Value in **policies and processes** stimulating business with lower external costs, fair pricing, transparency • Innovate products and services and support transformation toward regenerative business models **across the value chain** (producers, retailers, consumers, finance)	• Integrate **financial, environmental and social value creation for all stakeholders** in decisionmaking • Strive for fair risk, return and impact balance • Manage impact drivers and key impact metrics • Align incentives and governance structure • **Credibly report** on value created with Impact-Weighted Accounts	• **Anticipate drivers and risks of internalisation** • Align with regulatory requirements • Responsible business conduct • Build ecosystems and engage a wide-stakeholder group • Build an attractive employee value proposition

Table 1 - Characteristics of an impact-driven organisation *Source: Impact Institue*

Practical application:
beyond the moral compass, the benefits for the CFO of using the IV model?

The real test for the IV Model is whether it is applicable in practice. To evaluate that, the perspective of the CFO is insightful[3].

Support company valuation

Company valuation is increasingly driven by intangible assets. In 2020, intangible assets accounted for 90% of the S&P500 market value (Ocean Tomo, 2020). Environment and society are clearly intangibles that companies exploit to operate. This warrants the need to get a better understanding of what drives the intangible assets (reported) and intangible resources that are not reported but that will bring future benefits to companies. With the IV Model, companies (and the CFO) can put a value on the impact of intangible resources (environment and society) that are not quantified. This enables better decision-making and can justify a short-term financial sacrifice that will be repaid by long-term value improvement and benefits.

Manage value at risk

Social and environmental externalities will become internalised at some point, although the question is when and to what extent. This warrants the need to better understand what these externalities are at an early stage; how they would become internalised and at what speed; as well as what the effect of internalisation on the company's value would be. The IV Model makes the company aware of its exposure to stranded assets or regulatory risk (alignment with EU taxonomy) leading to an earlier and faster sustainable transition and reducing the risk of moving to Quadrant 3 in the long-term (Collapse).

Regulation is rapidly catching up in terms of sustainability, for example through the EU Taxonomy and Corporate Sustainability Reporting Directive, and this increasingly forces companies to report on negative exposures.

Understand drivers of business growth

Using the IV Model can enable the CFO to uncover hidden business opportunities by increasing understanding of (1) the impact of a company's activities; and (2) how its products and services can contribute to solutions to society's challenges. Thus, the company will optimise not only its social, environmental and financial impacts but also its business model.

Credibly report on progress

The CFO can understand how the company makes a difference; what drives this; and how making a difference leads to a competitive advantage that could be further enhanced to reach the long-term objective of moving to Quadrant 2 (even if it goes against short-term financial decisions).

Credible reporting on progress and the value created; making all stakeholders aware of the commitments and impacts of the company; avoiding reputation risk; and retaining the social license to operate.

Tangible Steps for CFOs

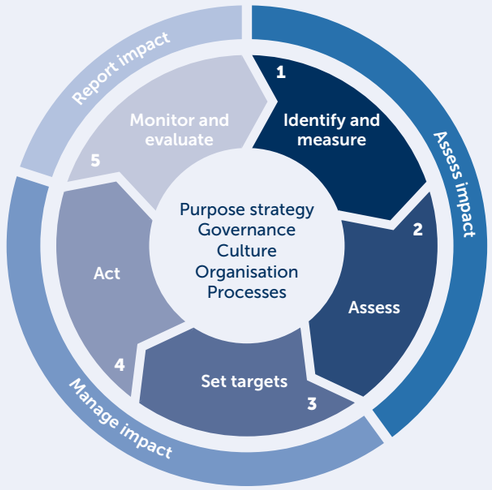
In sum, the model allows a CFO to select the investments with the best financial, social, and environmental returns in the long run. Faced with a limited investment budget, the IV model enables a ranking of investment projects on long-term profit and impact. Ultimately, quantifying and valuing the social and environmental impacts and bringing these together with the financial impacts. The CFOs can apply integrated thinking in five steps, as visualised in Figure 9.

1. **Identify and measure:** evaluate how the company creates or destroys value with monetised impact, which shows the company profile, based on integrated value. Understand the drivers of these impacts and how the company could act to improve its current value creation capability. This requires an In-depth analysis of the company's processes to understand how it generates positive or negative impacts, and how a possible internalisation of these impacts will affect the value of the company (IV company profile). This will enable the management team (CFO) to understand the investments needed to improve the IV company profile, while asset managers and banks will have a better overview of the relationship between the impact, return, and risks of the company.

[3] In a working group session, the IV Model was presented among a group of relevant stakeholders, including a former CFO. The insights of the session have been included in this chapter.

2. **Assess:** identify and understand the key societal transitions that may impact the company's long-term viability. Evaluate the IV profile of potential alternative business models, new projects or investments which can help the company to transform anticipating these transitions. Things that may help are the following:
   a. Zoom out for a broader perspective to gain understanding of the overall impacts of the sector and to check the competitive position of the company relative to its peers. Having this broader understanding enables managers to understand what the long-term perspectives of the sector might be, and whether a transition to a more sustainable business model is needed and feasible. This step also allows asset managers and banks to evaluate the long-term returns and risk exposure of a company to (lack of) sector transitions.
   b. Further zoom out to different sectors to understand their impacts. This is mainly for financial institutions that want to reduce the impact exposure to certain sectors. From a CFO's point of view, on the other hand, this could help to widen the horizon of investments to innovate the business model, or to prepare the company for a radical transition.
3. **Set targets:** use IV for long-term strategy and evaluate the benefits of a transformation against the risks of busiess-as-usual: with IV the company understands which impacts should improve in the long run, and have a more effective, sustainable improvement.
   a. Refine company's purpose: after having analysed in depth the impacts of the company and possible transition scenarios to hedge the long-term risk of these impacts, managers could set and make explicit the company purpose, related to the priority given to Environmental and Social Impact compared to the Financial Value.
   b. Develop KPIs on impact to speed up transition of business models. Impact KPIs makes impact more visible in the company. The non-executive board can include impact KPIs alongside financial KPIs in the variable renumeration of management. This incentivises management to manage for profit and impact. Financial institutions can also set impact KPIs internally and for their clients.
4. **Act:** allocate capital and deliver on deliver on the transformation to new business model, including governance, organisation, activities, but equally mindset, culture and behaviours.
5. **Monitor and evaluate:** show the commitment to improving the current impacts to all stakeholders by tracking KPIs and reporting on progress

Figure 9 - Impact loop
Source: Impact Institute



The Integrated Value model alllows the CFO to understand how the comany makes a difference; what drives this; and how making a difference leads to a comparative advantage.

Part II

Case studies and conclusions

3. Case Results

Overall Results:
The IV Model enables earlier recognition of the need for transition

The IV model was tested in two cases: one based on the automotive industry, one based on the food industry. Both cases show that implementing the model leads to an earlier and accelerated transition path to improving the annual value creation of the company.

This means that Environmental and Social Impact Values have the same importance as Financial Value. Figure 10 and Figure 11 show that monetising EV and SV clarifies the proportion of negative impacts created by the company as compared to the financial value created (FV).

The next step is to calculate when converting from the old business model to the new business model pays off. Figure 12 shows that by using the IV-model, improvement for a meat company is already achieved by converting a small percentage (8% in this case) of current business (Non-Meat conversion). On the other hand, by using only financial values (FV), the managers will be reluctant to make a transition to Non-Meat since the percentage of conversion to break even is 20%, and if they manage to convert only 8% they will destroy value.

The same can be seen in the percentages of conversion to Electric Vehicles (EV) for a Combustion Engine Vehicles manufacturer (30% for the IV model and 40% for FV), although the percentage of difference is smaller (because of fixed cost, as explained in the Appendix).

When companies take the Integrated Value lens, there is an earlier recognition of the need for transition toward a long-term sustainable business model.

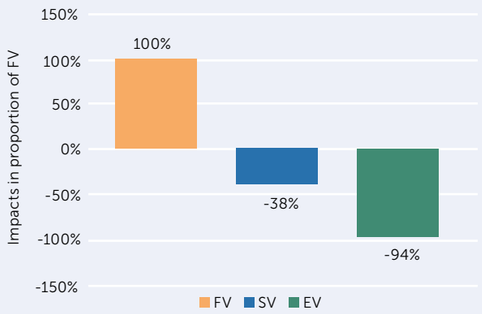


Figure 11 - IV Company Profile of a CEV company: Monetised impacts in proportion to FV
Source: Author's own, based on Global Impact Database, Impact Institute (2022)

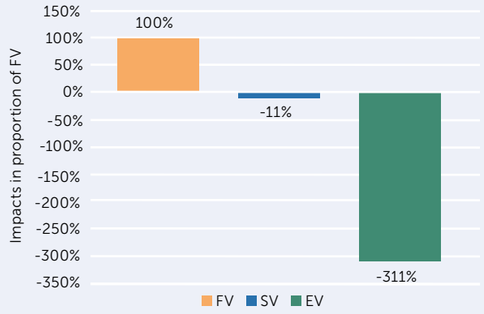


Figure 12 - IV Company Profile of Meat company: Monetised impacts in proportion to FV
Source: Author's own, based on Global Impact Database, Impact Institute (2022).

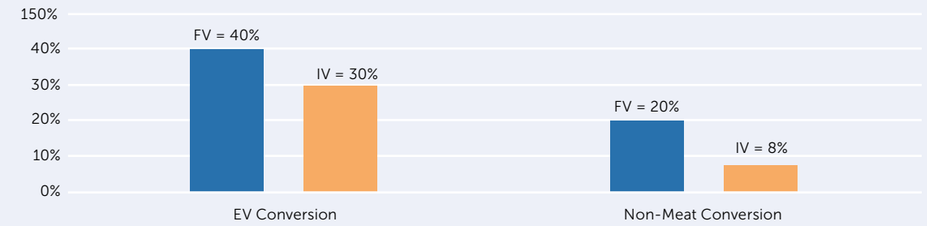


Figure 10 - Conversion Percentage to break-even FV versus IV
Source: Author's own, based on Global Impact Database, Impact Institute (2022).

The main finding is that the IV Model gives an incentive to decision-makers to start the transition earlier, when all impact values are given equal weights.

Overall Results:
The IV Model induces a faster conversion toward Quadrant 2

The IV model leads also to a faster transition towards the sustainable business model. Figure 13 and 14 show that the value improvement (%) of conversion is always higher for the IV Model (orange line) than for the FV Model (blue line).

This leads to a faster transition towards a sustainable business model as companies acknowledge the higher marginal benefits of conversion. By contrast, by using FV companies engage in a slower transition, since the value improvements are lower.

Even if Figures 13 and 14 have similar interpretations, there are also some differences. For the Automotive case, in which we also analysed the effect of a small percentage of conversion, we can see that there is not much difference in improvement between IV and FV with a small percentage of conversion; but the improvement steeply increases for IV when increasing the percentage of conversion. That is due to the role of fixed investments in production capacity needed for the conversion. The fixed investment delays the break-even point (Figure 12, left panel), but increases the benefits afterwards (Figure 13).

For the Food case on the other hand, we see that even if the IV line always has higher value improvements than the FV line, the FV line is steeper (see Figure 14). That is because in this case, the FV for the Non-Meat company is significantly higher than the FV of the Meat company; while the difference in FV in the Automotive case between CEV and EV is less impactful. Therefore, when converting from Meat to Non-Meat, the FV improvement is proportionally bigger than the improvements in EV and SV, even when accounting for the costs of conversion.

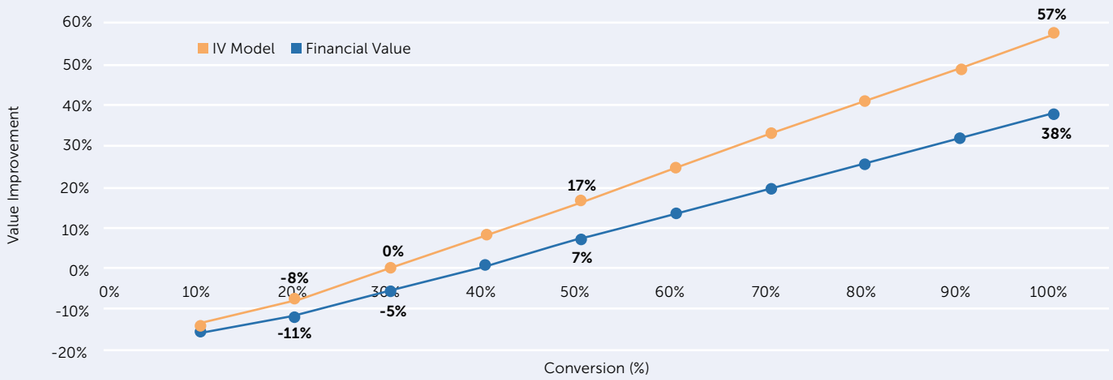


Figure 13 - Speed of Conversion Automotive Case
Source: Author's own, based on Global Impact Database, Impact Institute (2022)

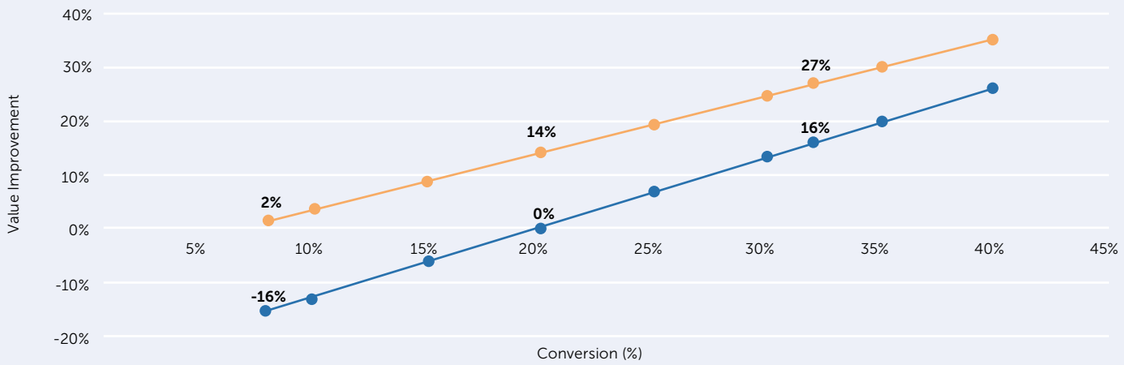


Figure 14 - Speed of Conversion Food Case
Source: Author's own, based on Global Impact Database, Impact Institute (2022)

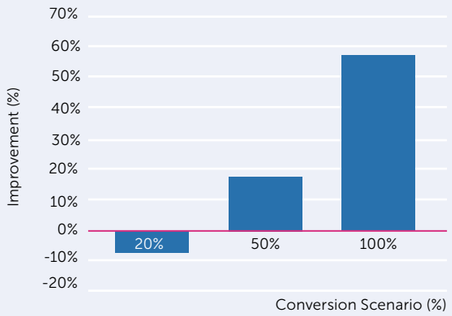


Figure 15a - Improvements per scenario Automotive Case
Source: Author's own, based on Global Impact Database, Impact Institute (2022)

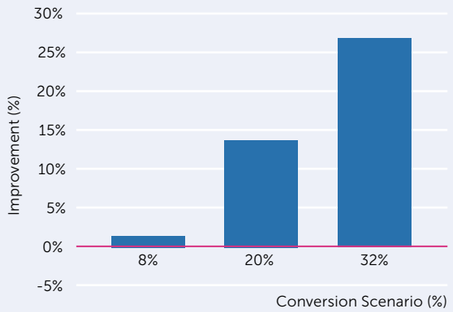


Figure 15b - Improvements per Scenario Food Case
Source: Author's own, based on Global Impact Database, Impact Institute (2022)

The overall conclusion is that the IV model supports transition: 1) the conversion to the sustainable business model happens earlier (due to earlier break-even point of conversion); and 2) the adoption of the sustainable business model happens faster (due to higher value improvements of conversion).

Automotive Case

The main result is that the Combustion Engine Vehicle (CEV) manufacturer benefits from converting into manufacturing Electric Vehicles (EV) (see Appendix Part D for the complete case).

Companies Selected:

- Non-sustainable business model (CEV): Volkswagen, German car manufacturer
- Sustainable business model (EV): BYD, Chinese car manufacturer

Transition Pathway:

We apply the IV Model using three possible conversion scenarios for the CEV manufacturer based on the percentage that will convert from CEV to EV manufacturing (see Figure 15A). Improvement due to the conversion to the more sustainable business model is calculated based on the proportion of IV improvement after conversion, compared to the IV profile of the CEV company before conversion.

Results:

- **20% Conversion → Do not do the project:**
  By converting 20% to EV, the CEV manufacturer will experience negative improvements due to the (fixed) costs of conversion, which for a small percentage of conversion have a significant impact on the IV;
- **50% Conversion → Do the project:**
  With a 50% conversion, the CEV manufacturer will improve its IV by 17%. That is due to the lower impact of the costs of conversion per vehicle and the greater improvements in environmental value (EV) which are made significant by the penalisation factor of 1.5 in the IV Model (see Appendix Part A);
- **100% Conversion → Do the project:**
  With a full conversion to EV, the IV of the CEV company is equal to the IV of the EV company minus the costs of conversion. This results in an improvement of 57% in IV for the CEV company.

Food Case

The main result is that the Meat company benefits from converting into a Non-Meat company (see Appendix Part E for the complete case).

Companies Selected:

- Non-sustainable business model (Meat): Maple Leaf Foods, Canadian Meat Products producer
- Sustainable business model (Non-Meat): Beyond Meat, U.S. Non-Meat Products producer

Transition Pathway:

We apply the IV Model using three possible conversion scenarios for the Meat company, based on the percentage of products converted from Meat to Non-Meat (see Figure 15B). The improvement due to the conversion to the more sustainable business model is calculated based on the proportion of IV improvement after conversion, compared to the IV profile of the Meat company before conversion.

Results:

- **8% Conversion → Do the project:**
  With an 8% conversion there is a small improvement in the IV of the Meat company (2%) due to the difference in environmental value between the Meat and Non-Meat company; and the low costs of conversion.
- **20% Conversion → Do the project:**
  With a 20% conversion, the IV further increases to 14% due to larger improvements in EV and the improvements in FV which offset the costs of conversion.
- **32% Conversion → Do the project:**
  With a 32% conversion the IV improvement increases to 27%. This is because the EV continues to improve, while the FV improvement becomes larger than the costs of conversion.

The percentages of conversion (three scenarios) differ from case to case (Food vs. Automotive) since they are based on sector forecasts and/or company strategy (see Appendix Parts D and E for complete explanation).

4. Conclusions, recommendations and next steps

Conclusions

The integrated value model is useful for companies that want to create value for their most important stakeholders. The IV model helps companies to align investment decision-making with value-creation for different stakeholders. It also helps CFOs to understand the best timing for transition of the company's business model. The IV model relies on two key assumptions:

1. The internalisation of negative impacts moves the value frontier – a negative impact today rapidly becomes a large cost for the company tomorrow after internalisation (e.g., a high carbon tax)
2. Companies that can turn a negative impact into a positive impact in a timely way have a first mover advantage

It is therefore important for companies to know which negative impacts will be internalised first. Transition thinking can guide this search for the question which material impacts will be internalised and when. What are the drivers of these impacts? And what action can the company take to anticipate internalisation? The IV model answers these questions by measuring material impacts and showing the value of alternative business models. It requires a long-term perspective to reveal the opportunities and risks of transitions. Companies need to adapt the incentive structures to bring the long-term perspective in place.

Recommendation for next steps

A key challenge remains the identification of the key transitions to anticipate. We suggest the following indicators, on which further research is needed:

- Incoming regulation and legislation
- Changing customer preferences
- Mergers and acquisition activity and IPOs
- Taxation of externalities – e.g. carbon tax
- Circular/ modular design substitute

Although future research is needed on specific transition indicators (e.g., timing of conversion, etc.), measuring social and environmental value in and of itself shows that there is a need for the transition.

Part III

Appendix

Appendix

A. IV Model: Explanation

The Integrated Value Model combines Environmental (EV), Social (SV) and Financial Value (FV):

$$IV=\{FV^{+}+\beta\cdot SV^{+}+\gamma\cdot EV^{+}\}+\delta*\{FV^{-}+\beta\cdot SV^{-}+\gamma\cdot EV^{-}\} \text{ with } \delta>1$$

The superscript + and - indicate positive and negative values, respectively. The parameters β and γ set the relative weight of SV and FV in comparison to FV. The parameter δ penalises negative values. These parameters are explained below. A company's board should set these parameters in dialogue with its stakeholders.

Characteristics of the IV Model:

As explained in Section 1.4, the three principles of the Integrated Value Model are:

- **Multi-Value Creation:** Companies ideally should create positive environmental value (EV), social value (SV) and financial value (FV): in this way they will not contribute to further exceeding of the safe operating space for planetary systems, and will be operating above social thresholds while generating profits (Schramade et al., 2022).
- **Transition:** Companies that are in Quadrant 1 with negative SV and/or EV should focus their efforts on fixing their negative values, rather than maximising the better-performing value dimensions. They should plan transition pathways to restore the negatives over a time-bound period.
- **Non-substitution:** In principle, negative effects on one value dimension cannot be compensated for by positive effects on the other value dimensions. So 'netting' is not allowed due to the precautionary principle of applying foundational social considerations and (environmental) planetary boundaries.

For a practical application of the model, in addition to the three principles above we need to take the following into consideration:

- **Purpose (Value Weights β and γ):** The model allows for the prioritisation of specific types of value in line with the company's purpose. Companies can define their own purpose and incorporate this into decision-making (strictly positive weights). Furthermore, based on the strategy and operations of the company it is possible to assign weights for β and γ as follows:
  - β = γ = 0 → The company is blind to sustainability and the formula is evaluating FV only.
  - β = γ = 0.5 → The company is still focused on FV and gives limited weight to EV and SV. This is the intermediate case of including impacts.
  - β = γ = 1 → The company gives the same importance to EV, SV and FV. Stakeholder-driven companies will set weights close to 1 (equal weights) or above.
- **Penalise Negatives (δ = 1.5):** Since in the long-term any negative value should be avoided, and to consider the non-substitution principle, any negative value receives a higher weight so that companies have a greater incentive to improve their negative values.

Application of the Model:

- **Case Study Approach:** Through the two case studies (Automotive and Meat), we have tested the Integrated Value Model with impact data (monetised values for EV and SV) and transition expectations.
- **Selection of Companies**: For each case study, we selected two companies. One represents the non-sustainable (Quadrant 1) business model (CEV and Meat). The other represents the more sustainable business model (EV and Non-Meat), which should be the long-term objective of the non-sustainable company. The companies selected are publicly listed.

Model's Inputs

- FV: EBITDA/$ Value Added
- EV: Includes most externalities in Natural Capital (Unit: $/ $ Value Added)
- SV: Includes most externalities in Social and Human Capital (Unit: $/ $ Value Added)

The denominator for all three value components is the company's value added, which reflects the value generated by producing goods and services and is measured as the value of output minus the value of intermediate consumption.

B. IV Model Application: Methodology and Assumptions

Through the two case studies, the IV Model has been tested with impact data and transition expectations.

Main Assumptions used:

- Impact Institute's Environmental and Social country-sector impact data (direct and upstream) are suitable for comparison and capture the impact of the transition of the two companies selected.
- EBITDA is the most suitable proxy for the measurement of annual financial value creation for the IV Model.
- The impact of the non-sustainable company (e.g. CEV, Meat) will equal the impact of the sustainable company (e.g. EV, Non-Meat) if it converts 100% of its operations to the sustainable business model.
- The model is applied using scenarios of the transition of the sector and/or combined with the company's strategy.
- Costs of conversion are estimated as incremental expenses of the non-sustainable business to convert to the sustainable business model (impact of conversion on EBITDA).

IV Application Methodology:

- The Transition Pathway proposed for the non-sustainable company would be to convert part of its production to the sustainable business model.
- To evaluate the resulting impact, we calculated the weighted average of the FV, EV and SV, taking as weights the percentage of conversion; and then we applied the Integrated Value Model formula.

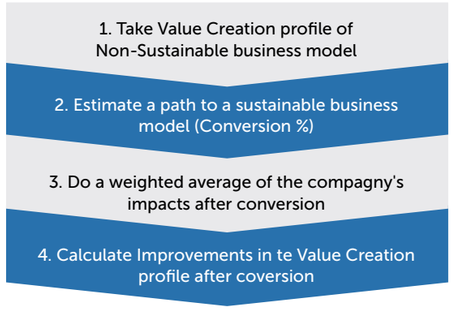


Figure 16 - IV Model Application Steps
Source: Author's own

C. IV Model: Data and Scope

The cases conducted to test the IV Model used financial data retrieved from companies' annual reports and Bloomberg, while monetised impact data to estimate social and environmental impacts were provided by Impact Institute's Global Impact Database (GID).

The GID quantitatively describes environmental, social and economic impact estimates for countries and sectors in the global economy. Economic activity causes impacts throughout the entire interconnected economy. GID estimates this impact with *Input-Output analysis* based on the interconnectedness of industries in various countries and their environmental, social and economic performance. The impact estimates produced are categorised into capitals and provided in monetised units (Impact Institute, 2021).

EV and SV are monetised according to the remediation of external costs and valuing well-being effects (Impact Institute, 2021; Impact Economy Foundation, 2022; True Price, 2021).

For the Automotive case, bottom-up data has been used to specifically tailor the input-output tables so that they represent CEV and EV value chains as used in the Impact Institute's DBS pilot case (Impact Institute, 2020).

For the Food case, no bottom-up data has been used, but only a combination of country-sector level data according to the operations of the company.

Impact Values taken into consideration are Direct and Indirect (Upstream and Downstream) so that they are representative of all the impacts that a company influences.

Impacts Scope for the conducted cases (Direct and Indirect):

Environmental Value:

- Air pollution
- Contribution to climate change
- Fossil fuel depletion
- Land occupation
- Material depletion
- Use of scarce water
- Water pollution

Social Value:

- Child labour
- Gender wage gap
- Underpayment
- Workplace health and safety incidents

D. Automotive Case

The Automotive Case is the first application of the Integrated Value Model (IV). The following is an explanation of the methodology and approach used to conduct the case and the results.

Methodology and Assumptions

Automotive Industry Data:
The data focused on two different types of vehicles: Combustion Engine Vehicles (CEVs) and Electric Vehicles (EVs) and was collected based on differentiating components: battery and engine. Components common to both vehicles, such as chassis, tires, and bumpers, are out of scope (Impact Institute, 2020).

The data is divided into two steps in the value chain: production and consumption. Decommissioning of vehicles after the consumption phase is out of scope (Impact Institute, 2020).

Impact Measure Used: $impact/ vehicle
The Environmental and Social impacts' scope includes both the production and use phase of the vehicle.

The impact data provided by Impact Institute is expressed in monetary terms to make environmental and social impacts comparable to financial impacts. Impact Institute's GID model uses monetisation factors (P) to convert impact data (Q) into monetary units (Q*P). and the conversion methodology is based on remediation of external costs and on evaluating well-being effects.

Environmental and Social Impacts
Assumption: Impact Institute's Environmental and Social impact data are suitable for our case and representative of the companies selected

For the case focused on the Automotive Industry, it has been decided to use Impact Institute's data for the environmental and social impact of both CEVs and EVs, since this data is already used in a previous case that measured the impact of lending in the Automotive Industry for DBS Bank (Impact Institute, 2020). The focus of our case is to measure the impact of the transition from CEV to EV and evaluate the effect on corporate decision-making thus, Impact Institute's data is compatible with the Integrated Value model which is applied in this automotive case. Furthermore, an evaluation of Impact Institute's data was provided by the Singaporean Management University by analysing both data and methodology used.

Financial Data:
The financial data is taken from Bloomberg and combined with data from annual reports (2019 and 2020) of the companies.

Financial Impact: EBITDA/ Vehicle
Assumption: EBITDA is a suitable proxy for the measurement of annual financial value creation according to the Integrated Value Model.

EBITDA removes factors such as the method of depreciation, which is not of interest in our analysis. Since our focus is on checking how the transition of a company affects its value (e.g. converting part of CEV into EV), EBITDA is thus a suitable measure.

It is better than net income, EBIT or FCF since it is less exposed to different accounting practices taken by different companies; and it normalises earnings across companies that have different levels of debt, different tax rates and different investment decisions. EBITDA shows earnings before the influence of accounting and financial deductions, and is thus a good measure for comparing two different companies in the same industry.

The value is scaled down per vehicle so that it is comparable with the data per vehicle for E and S provided by Impact Institute.

Assumption: Use-phase financial impact is represented by the savings in fuel consumption from owning an EV compared to CEV.

The EBITDA per vehicle is representative of the production phase of the vehicle. To give the Financial Value the same scope as that of Environmental and Social, the use-phase financial impact has also been estimated.

To evaluate the financial benefits of EVs in their use phase compared to CEVs, the Financial Value of EVs has been increased by the estimated fuel savings of EV owners, estimated to be between $2400 and $3300 per vehicle in China (Lutsey, Cui & Yu, 2021).

Company Selection

CEV: Volkswagen
Assumption: The impacts of Volkswagen's value chain are correctly represented by the value chain impacts used by Impact Institute in the DBS automotive case.

Volkswagen is the biggest car brand in China by sales, with a market share of around 18.5% in 2018 (Volkswagen, 2019). It has operated in the region since 1991 through joint ventures with FAW and SAIC, two of the biggest car manufacturers in China.

Volkswagen has a total of 24 production plants in China and the production volume accounts for around 40% of its total production of vehicles (Volkswagen, 2020).

The current production of EV vehicles at Volkswagen was around 1.3% in 2019, which becomes 0.6% when taking only pure electric vehicles into consideration (Table 1). Those numbers increased slightly in 2020. The percentage of pure electric vehicle sales reached 2.5% in 2020 which becomes 4.6% counting total electric vehicle sales (includes pure electric vehicle and plug-in hybrid electric vehicle sales). This means that despite its investments, the company still has very low production of electric vehicles and the impact of the company's EV production is irrelevant relative to the total impact of the company. Hence, for this case, Volkswagen is suitable as a combustion engine vehicle manufacturer.

EV: BYD
Assumption: The impacts of BYD's value chain are correctly represented by the value chain impacts used by Impact Institute in the DBS automotive case.

Regarding the selection of an EV manufacturer, the decision was less straightforward than the CEV choice since many companies have started producing electric vehicles and have also produced a substantial number of EVs. The problem is that relative to the auto manufacturers' total production, EV production is a very small percentage (between 1% to 5%).

On the other hand, the companies which produce 100% electric vehicles have a low volume of production and none of them is profitable (examples include NIO, Xpeng and LiAuto). Among the companies which have 100% of production in EVs, only Tesla has started to be profitable (in 2020).

One company which has a significant production of EVs relative to total production and to all other car manufacturers is BYD. The EV production of BYD corresponds to 44% of its total production.

The company is one of the biggest EV manufacturers in terms of units: it has a market share of around 6% in the EV global market and was the number one manufacturer for EV sales in China for six consecutive years (InsideEVs, 2020) (BYD Auto, 2022).

Assumption: BYD's financial impact is adjusted according to the % of sales of its automotive division and the financial impacts of BYD's CEV are assumed to be the same as BYD's EV.

Since the company's EV production corresponds to 44% of its total automobile production, we need to scale down EBITDA by this percentage to represent BYD's EV business only.

Furthermore, the revenue coming from the automotive division corresponds to 53.4% of the total revenue in 2020 (49% in 2019); so the EBITDA is scaled down by this percentage to represent only the financial impact of the automotive division of BYD.

Other factors make BYD the preferred company for this case. Tesla for example, still does not have most of its operations in China. It would therefore not be comparable to the value chain used in the DBS case. BYD is also more suitable than Tesla for comparison with Volkswagen, since BYD's cars have a market position with greater similarities to Volkswagen (volume production, medium-low price), while Tesla is still positioned as a premium car brand.

Decision Model:

Assumption: The impact of the non-sustainable company (CEV) will equal the impact of the sustainable company (EV) if it converts 100% of its operations to a more sustainable business model.

The transition pathway proposed for the CEV manufacturer would be to convert part of its production to EV. To evaluate the resulting impact for the CEV manufacturer we do a weighted average of the financial, environmental and social impact of CEV and EV, taking as weights the % of conversion from CEV to EV and then applying the integrated annual value creation formula.

The model is applied using scenarios of the conversion based on information taken from Volkswagen's New Auto Strategy. The strategy expects that EV sales will account for 20% of total sales in 2025, 50% in 2030, reaching 100% in 2040 (InsideEVs, 2021). Thus, we can apply the decision model using the 20%, 50% and 100% percentage split to see how this will affect the current impacts of the company.

The Integrated Value Model is applied with equal weighting for E and S ($\beta = \gamma = 1$) and is compared to using Finance Value only 1 ($\beta = \gamma = 0$). The Integrated Value model is applied penalising negatives ($\delta = 1.5$) (See Part A of this Appendix).

Costs of Conversion:

Assumption: Costs of conversion used here are Financial only. Environmental and Social costs of conversion are out of the scope of this case.

Financial Costs of Conversion

Assumption: Financial Costs of Conversion are represented by the planned budget that the company wants to invest solely in electromobility in the next planning round (2021 – 2025) to reach the objective of 20% of EV to total production.

Volkswagen Group is planning to invest EUR 35 billion in electromobility (battery-electric vehicles). This amount is what the company will invest for the next five years to reach its objective of 20% EV production (Volkswagen, 2020). Hence the number is assumed to be the difference in investments between the company that remains CEV, and the company that wants to convert part of its production into EV. Since the planning round is estimated to be five years, the investment is divided by five to represent the financial impact costs of transition on annual value creation. Finally, to make the number suitable for our model, it is divided by the total number of vehicles to yield the monetised impact per vehicle.

In addition, Volkswagen is faced with pressure to increase its production efficiency due to competition from new entrants that could erode Volkswagen's market share if the company does not have a fast transition to electric vehicles. To achieve this, the company plans to cut up to 5,000 jobs through an early retirement scheme. The estimated cost of this programme (which depends on how many employees will accept the offer) is around USD $598 million. Furthermore, to re-skill the remaining workforce for the new EV production, the company has set up a training budget of USD $239 million (Reuters, 2021).

Thus we can conclude that the financial costs of conversion for the company is the sum of the costs of the early retirement programme, training budget and investments for the conversion of production. The resulting number is scaled down on a per vehicle level to be suitable for the model.

Assumption: The more the CEV manufacturer converts to EV, the lower the impact of the costs of conversion. Therefore, the financial costs of conversion per vehicle is lower with a higher conversion.

Since the financial costs of conversion are taken from the Volkswagen New Auto strategy to reach the objective of 20% EV production, the resulting value per vehicle is applied for the % of conversion up until 20%. On the other hand, when a significant conversion (like 20%) has been reached, the increase in investment to further increase the EV percentage of production is less than exactly proportional on a per vehicle level, benefitting from economies of scale. Thus we will multiply the adjusted conversion costs by a factor of 1 minus the increase in EV% from 20% (e.g. for a 50% split, the conversion cost is multiplied by a factor of [1-(0.5-0.2)]).

Main Results Integrated Value Model (Equal Weighting: $\beta = \gamma = 1$)

20% Conversion → Model Output:
Do not do the project
With a 20% conversion to EV (the remaining 80% is CEV) the annual value creation of the company remains negative, and the IV improvement is negative (-8%).

The EV company has slightly higher social impact costs; hence those costs do not improve but deteriorate slightly with the conversion, and the financial positive impact decreases due to the costs of conversion.

The model suggests that by converting only 20% of production, there is a negative improvement, hence a higher percentage of conversion is needed for a CEV to improve its IV.

50% Conversion → Model Output: Do the project
With a 50% conversion, the annual value creation is still negative, but there is an improvement in IV of 17%. Social impacts slightly deteriorate but are far better compensated by positive improvements in environmental and financial impacts.

The model suggests that by converting 50% of its production, the CEV's IV will improve, hence, the CEV should engage in this project.

100% Conversion → Model Output: Do the project
With a 100% conversion, the Integrated annual value creation remains negative but with an improvement in IV of 57%.

The model therefore suggests that converting a higher part of its production to EV will lead to higher improvements in the IV of the company. The best possible improvement the model suggests for a CEV would thus be to convert 100% of its production to EV.

On the other hand, by converting its production into EV the social impacts of the CEV do not improve; the improvement in annual value creation for the CEV is mainly driven by lower environmental impact and higher financial value creation, which outweigh by far the negative improvement on social impact.

Financial Value Only ($\beta = \gamma = 0$)

The model applied using only financial value delivers similar results to the Integrated Value model, since the financial value creation of EV is higher than the financial value creation of CEV. Thus, in this case, the two the two different applications of the model will lead to the same decisions.

20% Conversion → Model Output:
Do not do the project
With a 20% conversion, the annual value creation of the company decreases by 11%.

50% & 100% Conversion → Model Output:
Do the project
With a 50% conversion, the annual value creation improves by 7% and with a 100% conversion, the annual value creation improves by 38%.

Overall, in terms of improvement after conversion, the two models deliver the same results (higher conversion leads to higher improvement).

Moreover, another important note is on the financial value, which for EV also includes the fuel savings per vehicle compared to CEV (use-phase). Without including that value, and taking into consideration only the financial value creation for the company (production-phase) the results will deliver negative improvement for a CEV converting to EV for any percentage of conversion. It is more logical, further, to include the financial value of fuel savings (use-phase) so that the Financial impact has the same scope as the Environmental and Social impacts, having both production and use-phase data.

Monetised Data and Calculations

» Financial Value per Vehicle

FV		
	CEV	EV
Production	$ 4,069	$ 2,464
Use	$	$ 3,300
TOTAL	**$ 4,069**	**$ 5,764**

The production phase financial value created per vehicle equals the EBITDA of the company divided by the number of vehicles produced during the year. The use phase financial value for the EV company is the dollar saving (fuel costs) of using an EV compared to a CEV. Source: The International Council on Clean Transportation.

» Environmental Impact per Vehicle

EV		
	CEV	EV
Production	$ -1,585	$ -2,681
Use	$ -2,257	$ -424
TOTAL	**$ -3,842**	**$ -3,105**

Environmental Impacts include: Contribution to Climate change, Air pollution, Water pollution, Blue water use, Fossil fuel depletion, Material depletion, Land occupation.

For both CEV and EV production a key driver of impact is air pollution. On the other hand, the environmental impact of EV production is higher with all the different components being higher, in particular, Contribution to climate change and Fossil fuel depletion.

The use phase is where one sees the main difference is between CEV and EV. In fact, in the use phase of CEV, fossil fuel depletion has a very high impact; while for the use-phase of EV all the different components have a lower impact value. This is seen by the total use-phase impact which is more than five times bigger for CEV than for EV.

» Social Impact per Vehicle

SV		
	CEV	EV
Production	$ -1,350	$ -1,739
Use	$ -207	$ -41
TOTAL	**$ -1,557**	**$ -1,780**

Social Impacts include: Health and Safety incidents, Gender skills gap, Underpayment wage gap, Child labour, Forced labour, Harassment, Overtime, Denied freedom of association.
As can be seen, EVs have a slightly higher social impact than CEVs. That is mainly due to the impact in the production phase. In fact, EV's impact components with the highest impact are the Gender skills gap, Underpayment wage gap, Child labour and Harassment.

» Integrated Value per Vehicle (Formula Application)

Value Dimensions & Parameters	Company 1: CEV	Company 2: EV
SV	$ -1,557	$ -1,780
EV	$ -3,842	$ -3,104
FV	$ 4,069	$ 5,764
β	1	1
γ	1	1
δ	1.5	1.5
$\beta*SV^{+}$	-	-
$\gamma*EV^{+}$	-	-
FV^{+}	$ 4,069	$ 5,764
$\delta*\beta*SV^{-}$	$ -2,336	$ -2,669
$\delta*\gamma*EV^{-}$	$ -5,763	$ -4,657
$\delta*FV^{-}$	-	-
Annual Value creation (Simple Summing)	**$ -1,330**	**$ 880**
Annual Value creation (Integrated Value)	**$ -4,030**	**$ -1,562**

The table above represents the Integrated Value formula (Part A of this Appendix) and the Integrated Value of CEV and EV. It can be seen that the main difference between the two is the lower environmental impact for the EV company.

E. Food Case

Methodology and Assumptions

Meat and Non-Meat Industry Impact Data:
The impact data for the Meat and Non-Meat proxy has been retrieved from Impact Institute's Global Impact Database according to the country where most of the manufacturing production of the company takes place, and based on the sector of the products that the company produces and sells:

Meat country-sector: Canada, Meat products.

Non-Meat country-sector: United States, Food products.

The impacts used and available with that combination of country-sector are:

Air pollution, child labour, contribution to climate change, fossil fuel depletion, gender wage gap, land occupation, material depletion, underpayment, use of scarce water, water pollution, workplace health and safety incidents (see Impact Weighted Accounts Framework).

Impact Measure Used: $ Impact/ $ Value Added
"Value-added reflects the value generated by producing goods and services and is measured as the value of output minus the value of intermediate consumption. Value-added also represents the income available for the contributions of labour and capital to the production process" – (OECD, 2022)

Environmental and Social Impact data with the $ Impact / $ Added Value unit have been retrieved from the Global Impact Database (GID 3.1.3).

The value-added for the two companies is calculated by adding up the Net Income of the company with wages, salaries and other benefits going to employees, taxes paid during the period, interest expense and depreciation and amortisation; and subtracting subsidies (Bagieńska, 2016).

The direct and upstream impacts have been used for the case. The direct impact is the impact caused directly by the company's operations. The upstream impact is the indirect impact caused by upstream value chain partners of the company (Impact Economy Foundation, 2022). Upstream impacts are based on the country-sector average supply chain of that specific combination.

Environmental and Social Impacts
Assumption: Impact Institute's Environmental and Social country-sector impact data (direct and upstream) are suitable for our case and representative of the two companies selected.

The impact data provided by Impact Institute is expressed in monetary terms to make environmental and social impacts comparable to financial impacts. Impact Institute's GID model uses monetisation factors to convert impact data into monetary units and the conversion methodology is based on remediation of external costs and on valuing well-being effects (Impact Institute, 2021).

The procedure to retrieve impact data for the companies is a combination of country-sector data as explained in the previous section, and it could be applied to any company.

Financial Data:
The financial data is taken from Bloomberg combined with data from annual reports (2019 and 2020) of the companies. All financial data taken from Bloomberg were in USD, the data that were in CAD for Maple Leaf Foods were converted into USD with the respective annual exchange rate taken from the Federal Reserve Economic Data.

Financial Value: EBITDA/ $ Value-Added
Assumption: EBITDA is a suitable proxy for the measurement of annual financial value creation according to the Integrated Value Model.

The value is scaled down per $ Value-Added so that it is comparable with the Environmental and Social impacts provided by Impact Institute.

The EBITDA used is taken from 2019 since the two companies have a similar EBITDA margin, therefore the efficiency and impact of their operations are more comparable.

Companies Selection
The companies selected for the case should be public companies that have good financial health.

For this specific case, one company is needed as a Meat Proxy and another is needed as a Non-Meat proxy.

Assumption: The value chain impacts of Maple Leaf Foods are correctly represented and estimated through the monetised impact values provided by Impact Institute.

Maple Leaf Foods is a consumer packaged-meats company, headquartered in Canada. The company produces prepared meats and meals, fresh pork, poultry and turkey products; and registered a revenue of USD $3 billion in 2020. The company's main markets are Canada, the United States, Japan, and China.

The company has two reported segments: Meat Protein Group and Plant Protein Group.

The company evaluates the two groups on different performance measures due to their different strategies. The Meat Protein Group's performance is evaluated on revenue growth, operating earnings, and adjusted EBITDA. On the other hand, the Plant Protein Group's performance is evaluated predominantly on revenue growth rates and gross margin optimisation.

The Meat Protein Group accounts for 95% of the company's revenue while the Plant Protein Group accounts for the remaining 5%.

Meat Protein group:
The Meat Protein Group is comprised of prepared meats, ready-to-cook and ready-to-serve meals, hog production and value-added fresh pork and poultry products that are sold to retail, food service and industrial channels.

Plant Protein Group:
The Plant Protein Group is comprised of refrigerated plant protein products, premium grain-based protein and vegan cheese products sold to retail, food service, and industrial channels.

The company's vision is to become the "Most Sustainable Protein Company on Earth" and the strategy is to use the Meat Protein Group to drive the profitable growth of the company, aiming to increase profit margins and to continue investing in the growth (focus on sales) of the Plant Protein Group.

The company is a meat manufacturer, but its strategy shows that a transition towards more sustainable products to improve its impact has already begun. The company, which achieved carbon neutrality in 2019, is also ranked second globally in the Coller FAIRR Protein Producer Index, which is the world's only comprehensive sustainability ranking of the 60 largest publicly-traded animal protein producers (Maple Leaf Foods, 2020). Furthermore, the company is among three of the companies rated as "low risk" investments compared to other animal protein producers. It is the only meat manufacturer to disaggregate financial information between its plant and meat protein business, and one of the two companies to set a time-bound goal to diversify protein sources (Maple Leaf Foods, 2020).

In 2019 the company set the goal of achieving USD $2.2 billion in sales in the Plant Protein Group by 2029 (FAIRR, 2021).

These characteristics make Maple Leaf Foods a suitable proxy of a Meat company for our case - it is a publicly-listed company, it is profitable and, even though it is still mainly an animal protein company, it has already acknowledged that a transition toward more sustainable products is needed.

Non-Meat: Beyond Meat
Assumption: The value chain impacts of Beyond Meat are correctly represented and estimated through the monetised impact values provided by Impact Institute.

The company offers a portfolio of plant-based meats. It builds meat directly from plants, an innovation that enables consumers to experience the taste, texture and other sensory attributes of popular animal-based meat. The company was the first plant-based meat company to go public in 2018 and, together with Impossible Foods, which is still private, is one of the market leaders in the plant-based meat market. The company experienced significant revenue growth during the past few years with sales of USD $298 million in 2019 and USD $407 million in 2020.

On the other hand, the company is still not profitable in terms of net income. Thus a challenge for the company would be to maintain strong revenue growth while improving profitability, since the competition - both from start-ups and multinationals - is increasing in the fast-growing plant-based meat market. The net loss of the company is driven mainly by increased operating expenses to expand manufacturing and supply chain operations. On the other hand, the adjusted EBITDA of the company is positive, making it a suitable proxy for our case.

The company has contracts with Whole Foods and at the beginning of 2022 launched a new partnership with KFC, becoming the first plant-based product to launch in fast-food restaurants across America (Terazono, 2022). Furthermore, in November 2021, McDonald's started testing Beyond Meat's burger in selected locations with positive results; they will expand the offering of Beyond Meat's burger to 600 restaurants across the US (Lucas, 2022).

The strategy of the company is to capture an increasing share of the global meat industry with their products that, in terms of sensory experience, are comparable to traditional meat. The company operates two facilities in Columbia and Missouri where they produce the woven protein used in all their products.

In comparison with other companies taken into consideration, Beyond Meat is the only public company that produces nothing but plant-based meat. Most plant-based meat brands are either start-ups (e.g. Impossible Foods) or brands of larger corporations where the plant-based meat segment accounts for a very small portion of the total revenue (e.g. Danone, Nestlé, Kellogg). Thus, Beyond Meat is the most suitable proxy of a Non-Meat Company for this case.

Decision Model:
Assumption: The impact of the non-sustainable company (Meat) will equal the impact of the sustainable company (Non-Meat) if it converts 100% of its operations to a more sustainable business model.

The transition pathway proposed for the Meat company would be to convert part of its production to Non-Meat. To evaluate the resulting impact for the Meat company we would do a weighted average of the financial, environmental and social impact of Meat and Non-Meat, taking as weights the % of conversion from Meat to Non-Meat and then applying the integrated annual value creation formula.

Assumption: The model is applied using scenarios from the growth of the global alternative protein market and its market share, compared to the traditional Meat market, by 2030. We assume that the three different scenarios of the percentage of market share of Non-Meat to Meat are representative of the strategy of the Meat company.

To apply the model, the strategy of the Meat company and the estimates of growth for the global alternative protein market have been considered in order to estimate the conversion scenarios.

Maple Leaf is committed to significantly increasing its plant-based revenues by 2029, but does not mention the percentage of total revenue that the plant-based group will account for. On the other hand, according to the FAIRR estimates, the market share of alternative proteins will reach 20% by 2030 in the medium scenario (FAIRR, 2021; Exhibit 2). Assuming that the company will follow the market trend, the model will test the impacts of the company converting 20% of its production and sales into plant-based alternative proteins.

The model is also tested with the estimate of the high and low scenario, in which the market share of alternative proteins will reach 32% in 2030 (high scenario) against around 8% (low scenario) (FAIRR, 2021; Exhibit 2).

The company has a clear goal in terms of revenue generated by its Plant Protein Group. The percentage of this to the total revenue will also depend on strategic decisions regarding the Meat Protein group. On the other hand, the company does not disclose its goals related to the Meat Protein Group in terms of sales (for example if the company is willing to reduce the meat output to influence consumer choices, or if the meat output will be dependent on consumer demand). It is therefore more suitable to estimate the conversion percentages with the values of market shares of the alternative proteins market in different estimated scenarios, as explained in the previous paragraph.

Costs of Conversion:
Assumption: Costs of conversion used are only Financial. Environmental and Social costs of conversion are out of the scope of this case.

Financial Costs of Conversion
Assumption: Financial Costs of Conversion is the impact that the conversion will have on the EBITDA of the Meat Company. Therefore, they are measured with the incremental difference in operating costs between Non-Meat and Meat Company.

Since EBITDA is the proxy used for the financial value, to evaluate the conversion costs we should take into consideration the impact that such a conversion will have on EBITDA.

EBITDA is calculated by adding D&A to the Operating Profit. We should therefore estimate how the transition impacts Operating Profit, thus estimate an increment in Operating Expenses to convert part of the production to Non-Meat production.

To evaluate the increment in operating expense and its impact on the EBITDA, the percentage of operating expense to total sales (operating ratio) for the two companies is calculated and compared.

The difference in operating ratio between the two companies is the increase in operating expense which the Meat Company will incur with an immediate and complete conversion (100%) to Non-Meat. To obtain the dollar value, the percentage is multiplied by the Meat Company sales.

Then to estimate the conversion costs for each scenario, the dollar value is multiplied by 8%, to represent the effect that converting 8% of production to Non-Meat will have on EBITDA.

The costs of conversion are estimated better with this method compared to using estimated investments in new production plants, since they will not be correctly reflected as an impact in the EBITDA.

Furthermore, this method is more valuable as it is generalisable to other Meat companies, since the operating ratio (Operating expenses to sales) is similar for companies operating in the same sector with a similar business model .

Assumption: The more the Meat Company converts to Non-Meat, the lower the impact of the costs of conversion. Therefore, the financial costs of conversion for each $ value-added are lower with a higher conversion.

Financial costs of conversion per added value are adjusted by a factor that represents the increased efficiency in creating value by converting a higher percentage to Non-Meat.

Since the low scenario is a conversion of 8% - the lowest conversion predicted - the conversion cost is multiplied by 8%. When the low scenario has been reached, the increase in investment to further increase the Non-Meat percentage of production will be less than exactly proportional, benefitting from economies of scale of the Non-Meat production. Thus, we will multiply the adjusted conversion costs by a factor that represents the lower cost for each dollar of value-added (1 minus the increase in Non-Meat percentage from 8%).

Main Results of Transition Model

As explained in the previous sections, the model proposed a conversion of the current production of the Meat Company into Non-Meat with different percentages of conversion based on three different scenarios (8%, 20%, 32%) applying the Integrated Value Model formula and comparing the results to financial annual value creation.

Integrated Value Model (Equal Weighting: β = γ = 1)

Low Scenario (8%) → Model Output: Do the project
In the low scenario, the company will convert 8% of its sales and production to Non-Meat and the remaining 92% will remain in Meat Production.

The IV improved compared to the value before conversion by 2% which is driven by an improvement in environmental impact. Social Value remains the same and Financial Value decreases due to the costs of conversion.

The result of the model suggests that even by converting only 8%, the company can already start improving its IV even if by a small percentage, incentivising meat companies to start a sustainable transition.

Medium Scenario (20%) → Model Output: Do the project
In the medium scenario, the company will convert 20% of its sales and production to Non-Meat and the remaining 80% will remain Meat Production.

The IV improved by 14% which is driven by an improvement in environmental impact. Social Value slightly deteriorates, and Financial Value improvements offset the costs of conversion.

The model shows the incremental benefit of converting more production to Non-Meat with an improvement of 14% compared to the initial annual value creation of the Meat Company incentivising to further increase the percentage of Non-Meat products once they have reached the low scenario.

High Scenario (32%) → Model Output: Do the project
In the high scenario, the company will convert 32% of its sales and production to Non-Meat and the remaining 68% will remain in Meat Production.

The IV improved by 27% which is driven by an improvement in environmental impact. Social Value remains almost the same and Financial Value continues to improve.

These results are a confirmation of the previous conclusions. A higher conversion will result in a higher improvement. Therefore, just as before, the company's decision-makers will be inclined to convert a higher portion of Meat to Non-Meat.

Financial Value only (β = γ = 0)

Low Scenario (8%) → Model Output: Do not do the project
In the low scenario, the annual value creation of the Meat Company after conversion is positive since it takes into consideration Financial Value only. On the other hand, the value is decreased by 16% due to the costs of conversion.

The model therefore suggests that converting only 8% of the production to Non-Meat is value-destructive for the Meat company. Thus it induces managers to not start a sustainable transition.

Medium Scenario (20%) → Model Output: Do the project
In the Medium scenario, the annual value creation of the Meat Company after conversion is positive since it takes into consideration Financial Value only. On the other hand, there is no improvement (0%).

A conversion of 20% is therefore the break-even point. Thus, taking into consideration financial values only, managers will decide to convert only if their objective is to reach a Non-Meat percentage greater than 20%.

High Scenario (32%) → Model Output: Do the project
In the High scenario, the annual value creation of the Meat company after conversion is still positive. The value improved by 16% since by converting a higher percentage, the costs of conversion will have a lower impact.

Therefore, the financial model suggests that if the company manages to convert 32% of the production to Non-Meat it will create value. Thus, if managers are going to make the decision about whether or not to do this project based on Financial Values only, they will decide to do the project.

Monetised Data and Calculations

» Financial Value per Value-Added

FV		
	Meat	Non-Meat
Direct & Upstream	$ 0.38	$ 0.78
TOTAL	**$ 0.38**	**$ 0.78**

EBITDA is used as a measure of annual financial value creation divided by the dollar Value-added generated by the company to make the number comparable with the Environmental and Social impacts provided by Impact Institute.

» Environmental Impact per Value-Added

EV		
	Meat	Non-Meat
Direct	$ -0.02	$ -0.03
Upstream	$ -1.16	$ -0.44
TOTAL	**$ -1.18**	**$ -0.47**

Environmental Impacts include: Contribution to Climate change, Air pollution, Water pollution, Use of Scarce water, Fossil fuel depletion, Material depletion, Land occupation.

As can be seen from the table the main driver of the impact difference between Meat and Non-Meat is the Upstream impact, mainly driven by differences in Climate change, Air pollution, Land occupation and Water pollution.

» Social Impact per Value-Added

SV		
	Meat	Non-Meat
Direct	$ -0.01	$ -0.02
Upstream	$ -0.03	$ -0.05
TOTAL	**$ -0.04**	**$ -0.07**

Social Impacts include: Child labour, Gender wage gap, Underpayment, Workplace health and safety incidents.

The main drivers of the social impact are the Gender wage gap and Underpayment. In this case, the impact is higher for the Non-meat company, but this could be due to the difference in the country of the two companies (Meat: Canada; Non-Meat: United States).

» Integrated Value per Value-Added (Formula Application)

Value Dimensions & Parameters	Company 1: Meat	Company 2: Non-Meat
SV	$ -0.04	$ -0.07
EV	$ -1.18	$ -0.47
FV	$ -0.38	$ -0.78
β	1	1
γ	1	1
δ	1.5	1.5
$\beta*SV^{+}$	-	-
$\gamma*EV^{+}$	-	-
FV^{+}	$ -0.38	$ -0.78
$\delta*\beta*SV^{-}$	$ -0.06	$ -0.11
$\delta*\gamma*EV^{-}$	$ -1.77	$ -0.70
$\delta*FV^{-}$	-	-
Annual Value creation (Simple Summing)	**$ -0.84**	**$ 0.24**
Annual Value creation (Integrated Value)	**$ -1.45**	**$ -0.03**

The table above represents the Integrated Value formula (Part A of this Appendix) and the Integrated Value of the Meat and Non-Meat company. It can be seen that the main difference between the two is the lower environmental impact for the Non-meat company.

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