

Identifying the total costs and benefits of products

Should business monetize environmental and social impacts?

IVL Report C75
The Swedish Life Cycle Center Report No 2015:1

Stefan Åström, Haben Tekie

Author: Stefan Åström, Haben Tekie, IVL Swedish Environmental Research Institute

Funded by: VINNOVA

Report number: C 75

Edition: Only available as PDF for individual printing

© IVL Swedish Environmental Research Institute 2015

IVL Swedish Environmental Research Institute Ltd.,

P.O Box 210 60, S-100 31 Stockholm, Sweden

Phone: +46-8-598 563 00 Fax: +46-8-598 563 90

www.ivl.se

This report has been reviewed and approved in accordance with IVL's audited and approved management system.

Foreword

This report is written to give you a short introduction of why it could be of interest for production companies to understand and follow the development of Economic valuation of environmental impacts. The report also gives several perspectives on the pros and cons of using economic values on environmental and social impacts already in the product innovation and product development stages of production.

The report is part of the research project *Integration of Environment and Economy in Product Development Gives Opportunity for Innovation*, financed by VINNOVA - Sweden's innovation agency. Project partners are IVL Swedish Environmental Research Institute, Chalmers University of Technology, AkzoNobel, SCA Hygiene and Volvo Group. The project is hosted by the Swedish Life Cycle Center – a competence center (hosted by Chalmers University of Technology) working in collaboration between industry, academy, research institutes and authorities with applied life cycle thinking in industry and other parts of the society.

We would like to thank the respondents who took the time to answer our questions and thereby helping us to get a perspective on the issues covered in this report. The respondents are left anonymous in this report. We would also like to thank Maria Kardborn at IVL for helping us finalizing the report.

Table of Contents

Foreword	3
Summary	5
Sammanfattning	6
Key Messages	7
Recommendations for further development	7
Purpose of the issue brief	7
Background	8
Current initiatives.....	10
Public sector initiatives	10
Private sector initiatives.....	11
The potential for price premiums	12
Why should companies monetize their impacts? - Corporate perspectives.....	14
Indications from our survey	14
Other important aspects	15
Conclusions and recommendations	16
References.....	17

Summary

This issue brief presents the parts of the Work Package 1 findings from the project *Integration of Environment and Economy in Product Development Gives Opportunity for Innovations*, financed by the Swedish Innovation Agency VINNOVA.

Since the 1980s it has become commonplace for companies to monitor and report environmental impacts of their activities. In parallel, the progress of the research discipline environmental economics has enabled better accessibility to cost estimates of environmental impacts (monetization). These developments lead to opportunities for companies to change product development and innovation patterns. This research programme aims to explore the requirements needed for realizing this specific opportunity.

The purpose of this issue brief is to provide an overview of the current situation for key questions such as whether a corporation should invest time and money, already in the innovation and product development phase, to monetize environmental and social impacts associated with production of products and services. The issue brief doesn't discuss whether data on environmental and social impacts should be produced or not, rather the sole focus is on whether monetization of these data should be performed at a company-level or not. With the help of available knowledge from existing literature and interviews performed by the project group we are, in this issue brief, presenting our view on the rationale for companies to already in their product innovation and development phase integrate environmental and social costs.

All in all it seems that large industrial companies and the financial sector are pushing to more effectively consider the values of environmental and social impacts and to learn and understand their impacts; in order to enabling a use of this knowledge in the decision making processes. On a single firm level though, the rationale for this isn't as clear, although the general interest is high. There is no clear indication that a monetization of environmental and social impacts in the product development phase will automatically lead to good business. And there are good reasons to believe that the way in which companies are run needs to be adjusted, so as to remove existing barriers for long term perspectives and social considerations.

However, there are a number of benefits with regards to monetizing environmental and social impacts of production. First, it can help in the communication with the finance sector; this since monetization allows for common terms to be used, but environmental and social risk impacts needs to be highlighted. Second, it can help communicate reasons for potential price premiums of products to consumers. Third, at some point any decision maker makes a weighting between environmental impacts and other impacts, and monetization allows this weighting to be performed in a relatively transparent and consistent manner. In order to ensure transparency and minimize the burden on companies a standardized and accepted approach and method needs to be developed. Fourth, it can increase the possibilities for companies through changed production to become more sustainable and also be prepared for future risks and government incentives.

Based on this study we make the following recommendations:

- Develop an industry-wide best practice routine for monetizing environmental and social impacts of production of specific goods and services, to be used during the product development phase.
- Complement monetized estimates with risk estimates for the applicable environmental and social impacts.
- Perform research on how monetized external costs are interpreted by consumers, and identify whether eventual high production cost/low external cost products could be more desirable to consumers than conventional products.

Sammanfattning

Denna översiktsrapport presenterar delresultat från arbetspaket 1 i projektet *Integrering av miljö och ekonomi i produktutveckling ger innovationsmöjligheter*, finansierat av VINNOVA.

Sedan 1980-talet har det blivit standard för företag att övervaka och rapportera miljöpåverkan från företagets aktiviteter. Parallellt med detta har utvecklingen av forskningsdisciplinen miljöekonomi möjliggjort bättre tillgång till kostnadsuppskattningar av miljöpåverkan (monetarisering). Dessa utvecklingar öppnar en möjlighet för ändringar i innovationsprocesser och produktutveckling hos företag. Detta forskningsprogram syftar till att undersöka förutsättningarna för att förverkliga denna möjlighet.

Det specifika syftet med denna översiktsrapport är att ge en överblick över nuläget för vissa nyckelfrågor av vikt för huruvida ett företag bör investera tid och pengar i att redan i innovations- och produktutvecklingsfasen monetarisera påverkan på miljö och sociala faktorer som kan knytas till produktion av varor och tjänster. Denna överblick diskuterar inte huruvida data över miljöpåverkan och social påverkan skall tas fram, utan fokus ligger endast på om företag bör monetarisera denna påverkan.

Med hjälp av befintlig kunskap tillgänglig i litteraturen samt egna intervjuer genomförda i projektet presenterar vi vår syn på vilka grunder som finns för företag att integrera miljökostnader redan i innovations- och produktutvecklingsfasen.

Allt som allt verkar det som att större industriella aktörer och finansindustrin trycker på för att börja beakta värdet av påverkan på miljö och sociala faktorer och för att kunna använda denna kunskap i beslutsfattande. För enskilda företag verkar inte nyttan med detta vara lika självklar, även om intresse kring frågan finns. Det finns inga tydliga tecken på att monetarisering av påverkan på miljö och sociala faktorer i produktutvecklingsfasen automatiskt skulle leda till ökad lönsamhet. Det finns också goda skäl att tro att sättet på vilket företag leds behöver justeras för att kunna undanröja existerande barriärer mot långsiktighet och ökat beaktande av sociala faktorer.

Det finns däremot ett antal fördelar för företag med att monetarisera påverkan på miljö och sociala faktorer associerade med produktion. För det första så kan monetarisering hjälpa till i kommunikation med finanssektorn, eftersom värdering möjliggör användande av ett gemensamt språk, men påverkan på risk måste synliggöras. För det andra kan det hjälpa till vid kommunikation av orsaker till eventuella prispåslag på produkter i de fall då detta skulle vara aktuellt. För det tredje, vid något steg måste varje beslutsfattare göra avvägningar mellan påverkan på miljö, sociala faktorer och andra faktorer, och monetarisering möjliggör en relativt transparent och konsistent avvägning. För att säkerställa transparens, och för att minimera bördan för enskilda företag, bör en standardiserad och accepterad metod och praxis utvecklas. En ytterligare fördel är att det kan öka möjligheten för företag att genom ändrad produktion bli mer hållbara och förberedda för eventuella framtida risker och myndighetsinitiativ.

Från denna studie har vi följande rekommendationer:

- Utveckla en industriövergripande praxis för värdering av påverkan på miljö och sociala faktorer från produktion av enskilda varor och tjänster, som kan användas vid produktutveckling.
- Komplettera ekonomisk värdering med skattning av risk för miljö- och sociala faktorer där detta är relevant.
- Studera hur resultat kring ekonomiskt värderade kostnader tas emot av konsumenter, och identifiera ifall produkter med eventuellt hög produktionskostnad och låg kostnad för miljö och sociala faktorer föredras framför konventionella produkter.

Key Messages

- The process of monetizing environmental and social impacts associated with production of goods is gaining international momentum at top corporate management level.
- Governments are to an increasing extent incorporating monetized environmental impacts in the policy making.
- There is currently a search for standard approaches and data that could be accepted by all parties when monetizing product-related environmental and social impacts.
- Of interest for day to day corporate decision making is that monetization in itself would probably need to be complemented by risk assessments if any bank or insurance company would be motivated to change their terms of business with production companies.
- The possibility to share potentially increased production costs with consumers seems to exist in general for products with lower environmental and social impacts, but it is not clear whether monetization in itself would provide the arguments needed to persuade consumers to pay a price premium.
- Today, the direct profit benefits for a producer from a monetization of product-related environmental impacts are unclear, but such efforts will put the producer well prepared to requirements that are more likely than not to occur in the future.
- Monetization of product-related impacts has the potential to increase the internal competence around sustainability and can support internal communication within a company.

Recommendations for further development

- Develop an industry-wide best practice routine for monetizing environmental and social impacts of production of specific goods and services, to be used during the product development phase.
- Complement monetized estimates with risk estimates for the applicable environmental and social impacts.
- Perform research on how monetized external costs are interpreted by consumers, and identify whether eventual high production cost/low external cost products could be more desirable to consumers than conventional products.

Purpose of the issue brief

The purpose of this issue brief is to provide an overview of the current situation for key questions concerning whether a corporation should invest time and money in monetizing environmental and social impacts associated with production of goods and services, and to use these monetized values as input to the innovation and product development phase. The issue brief doesn't discuss whether data on environmental and social impacts should be produced or not, the sole focus is on whether monetization of these data should be performed at a corporate level or not.

Background

[Internalizing an Externality] - *The act of making a change in a company's private costs or benefits in order to make them equal to the company's social costs or benefits.*ⁱ

The conflict between businesses self-interests and the environmental movement has since long decreased, although some issues still spark controversy. However, all industrial and human activities have an environmental impact, large or small. Consideration of environmental impacts are now a natural part of social planning in large parts of the world, and are often considered important aspects for corporations. During recent years, the economic sciences have been more and more involved in environmental management. The economic expenses of taking pro-environmental action have become increasingly important and lately the socio-economic benefits of taking pro-environmental action have also been given more attention. The later development has been enabled by the increased possibility by economists to deliver economic assessments of environmental and social damages, as well as avoided damages. Externality is a term used to describe the environmental impacts associated with production, trade, use and waste of a product. The term is chosen since an environmental impact is typically an impact not considered in the market price of a product; it is a price outside (external) of the market price. The externality can be both positive and negative. The process of assigning monetary values to environmental impacts is usually denoted monetization or valuation, and in this report both terms are used. Development of knowledge about these externalities has been strong since 1989 when the oil spill from the tanker Exxon Valdez shot the discipline of environmental economics into the policy limelight. The US court decided the level of the fine to be paid for the oil spill based on environmental economic studies of the loss in wild life quality affected by the oil spill (the fine has still to be paid though).

In 1997, Costanza et al. presented that the global mean value of ecosystem services was some US\$₂₀₀₇ 46 trillion annually, almost two times the global gross national product. The paper was criticized but nevertheless had a large impact on the debate on how nature and ecosystems should be valued.ⁱ In 2014, Costanza and his team presented an update of the 1997 values and concluded that the loss in annual ecosystem services over the period 1997-2011 had a value of US\$₂₀₀₇ 4.3-20.2 trillion.²

In later years, results from environmental economic studies have been harmonized, categorized, transferred and aggregated so as to enable 'quick-fix' standard economic values of environmental damages caused by human activities. This process has been enabled by projects such as External Costs of Energy (ExternE)ⁱⁱ, New Energy Externalities Developed for Sustainability (NEEDS)ⁱⁱⁱ, The Economics of Ecosystems and Biodiversity (TEEB)^{iv}, which have in turn made possible the use of tools such as EPS^v, Alpha RiskPoll^{vi}, EcoSenseWeb^{vii} etc. Today, there exists a possibility for corporations to incorporate environmental costs (internalize externalities) into the calculation of production costs when considering new innovations and product developments. *The question for our study however is if there is any business rationale for doing so?*

ⁱ <http://www.businessdictionary.com/definition/internalizing-an-externality.html> , accessed 2014-04-29

ⁱⁱ http://www.externe.info/externe_d7/, accessed 2015-03-26

ⁱⁱⁱ <http://www.needs-project.org/>, accessed 2015-03-26 but temporarily unavailable

^{iv} <http://www.teebweb.org/>, accessed 2015-03-26

^v

<http://www.cpm.chalmers.se/document/reports/99/EPS%20Version%202000%20Models%20and%20Data%20of%20the%20Default%20Method%20CPM%20Report%201999-5.pdf>, accessed 2015-03-26

^{vi}

http://www.ec4macs.eu/content/report/EC4MACS_Publications/MR_Final%20in%20pdf/Alpha_Methodologies_Final.pdf, accessed 2015-03-26

^{vii} <http://ecosenseweb.ier.uni-stuttgart.de/>, accessed 2015-03-26

The risk aspect

A well-functioning market allows for an efficient allocation of scarce resources in society. Monetization of environmental impacts makes it possible to consider environmental integrity as a scarce resource just as all the other resources considered in a cost calculation. It is thereby possible that monetized environmental impacts can serve as indicators of future risk for production and investments, both from a physical scarcity perspective and a 'government intervention' perspective. The concept of earth system boundaries is one concept that helps painting the large picture of future environmental risks.³

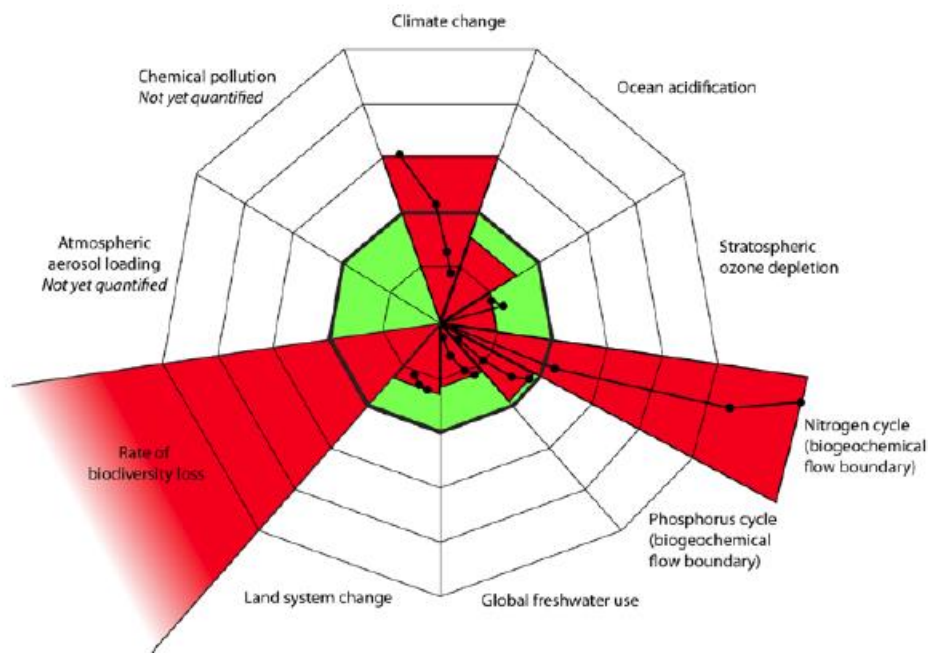


Figure 1 The seven planetary boundaries of global concern and the current human operating space. Figure copied from Rockström et al., (2009)³

As can be seen in Figure 1, any production that increases the pressure on biodiversity, climate change or the nitrogen cycle could be considered as a production activity that is exposed to increased future risk. It is also noticeable that two out of seven boundaries remain to be quantified.

Another interesting indication of environmental risk is that on a global average, the average earning of one US\$ (before interest, taxes, depreciation and amortization) implies 41 US cent of environmental damage, with the agricultural and refinery sectors being the two worst performing sectors.⁴ A new and rising star on the environmental risk management arena is the value of the fossil fuel reserves that are left to be exploited. The IEA World Energy Outlook 2012 recently stated that some 2/3 of the known fossil fuel reserves will need to stay unexploited until at least 2050 if the global average temperature increase is to stay below 2 degrees.⁵ This would correspond to an over-valuation of the known reserves, and thereby oil, gas, and coal companies, by some 40 – 60 percent.⁶ If one were to consider a global climate agreement as a 'government intervention' this intervention would have consequences on corporate profits as well, see Figure 2.

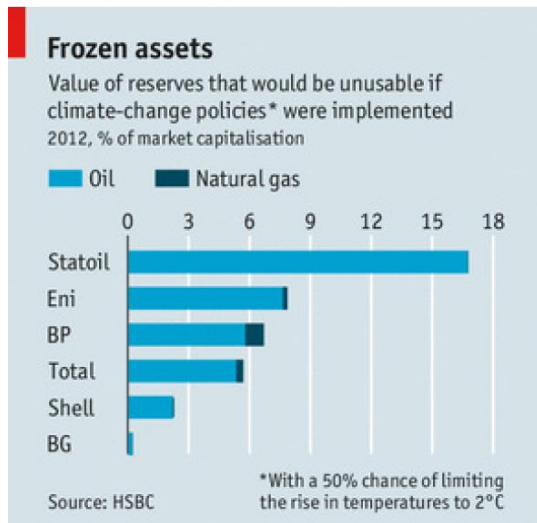


Figure 2 Economic value of unusable fossil carbon. Figure copied from the Economist.⁶

Fossil fuel reserves are not the only values at risk. There are quite a few non-traded ecosystem services and social aspects that affect production. And given the nature of economic risk, where risk is the product of a *probability of an event* multiplied with *the economic impact of the event*, a non-monetization of ecosystem services that are at risk of becoming scarcer in the future can go unnoticed.

In this issue brief we present a brief overview of initiatives related to the issue of internalizing product-related external environmental and social costs during product development processes. Furthermore we explore the current academic knowledge on the challenges involved and present selected stakeholder perspectives. Finally, we provide our own interpretation of the literature and stakeholder perspectives, in order to provide key messages and recommendations.

Current initiatives

Public sector initiatives

As mentioned earlier, the common use of monetized values for considering environmental impacts was basically initiated during the aftermath of the Exxon-Valdez accident. Currently the public sector initiatives are driven by a number of initiatives and activities. One of the most important is the establishment of the UN Convention on biological diversity (CBD), which can be considered as one important milestone and a current arena for the monetization of environmental impacts. Other important initiatives are the Millennium Ecosystem Assessment, the Economics of Ecosystems and Biodiversity (TEEB) and the EU Mapping and assessment of ecosystems and their services.⁷⁻¹⁰ In the UN Convention on Biological Diversity (CBD), biodiversity targets for 2020 have been developed. These targets can be seen as motivators for companies to analyse and clarify their impacts on biodiversity and ecosystems.¹¹

The external costs of environmental damages are already today being used as input to policy making in the field of air pollution. Of concern for the transport sector is the Euro-Vignette directive.^{12, 13} This directive unifies different road charging schemes in Europe, and it has been followed by a later proposal to internalize the external costs of transport when setting the suitable level for the road charging schemes of concern.¹⁴ This later proposal was never made into EU-law, but it has been implemented in a number of

EU member states. Furthermore, the European Commission published a proposal for a revised National Emissions Ceilings (NEC) directive in December 2013.¹⁵ The ambition level suggested by the Commission was based on monetized damages to human health and the environment from air pollution.¹⁶

Even if the monetization of environmental damages has become more common in the air pollution research and policy development activities, the largest recent developments are seen in the efforts to monetize ecosystem services. In 2011, the first report from the UK National Ecosystem Assessment was released.¹⁷ And in 2013, both the governments in Sweden and Norway published reports declaring the national strategies on how to better consider and monetize the ecosystem services provided, managed, and used in Sweden and Norway.^{18, 19} In Sweden, the government has decided that the value of Swedish ecosystem services should be publicly known by the year 2018. Another interesting national initiative was the Sarkozy Commission, in which the world renowned economist Joseph Stiglitz and his team presented an alternative way to measure social development by inter alia including the impacts on ecosystem services.²⁰

Furthermore, within the European Union there are initiatives to increase resource efficiency by both phasing out environmentally harmful subsidies and by introducing green taxes that better reflect the environmental and social costs of resource use.²¹

Private sector initiatives

The private sector has been early in developing corporate management strategy documents, often in cooperation with the UN system. In 2004, the Global Compact – a group of 20 big financial institutions invited by the UN – published a report endorsed by their Chief Executive Officers (CEO:s) in which recommendations were made for how financial analysis better could incorporate environmental and social impacts of economic activities.²² Following this, in 2010 another UN-lead group of financing institutions – The UNEP Finance Initiative – focused more specifically on the importance on natural capital for their investments. They identified that impacts on for example biodiversity could have large impacts on investments made, not only due to bad will associated with negative environmental impacts, but also due to operational risks. They presented that many financial institutions had long going schemes for how to identify whether potential investments could have negative impacts on ecosystems services, especially for investments in extraction of minerals, forestry and agricultural business ventures. The first recommendation from the UNEP Finance Initiative was that principles for how to consider impacts on ecosystem services and social factors should be developed.²³ The UNEP Finance Initiative later followed up with a presentation of a roadmap for their Natural Capital Declaration, stating that natural capital [ecosystem services] should be integrated into financial products and services and included in financial accounting and reporting.²⁴

In 2011 it was time for the World Business Council for Sustainable Development to introduce and test concepts for Corporate Ecosystem Valuation. They presented a five stage process and 12 principles that could guide companies desiring to perform a Corporate Ecosystem Valuation. Of interest for our purposes is that they also recognized the possibility that valuation of ecosystem services could potentially raise share prices and enable price premiums on products. Finally they anticipated that public policies and regulations to a larger extent will start including impacts on ecosystem services.¹¹ By 2012, valuing natural capital was presented as a *Business Imperative* by a large group of corporate CEOs. By their account the total value of the global non-market ecosystem services was \$72 trillion annually.²⁵

Apart from large consortiums of CEO initiatives, PUMA deserves a special mentioning. Since a couple of years in their Business and Sustainability Report, PUMA includes monetized environmental impacts in

their annual report. In 2012 they presented environmental profit and loss accounts for two examples from their products.²⁶ By using the same approach, a recent study has been able to identify that environmental impacts associated with industrial activities in the Danish textile industry correspond to environmental costs of 4 billion Swedish Crowns each year, including 25 Crowns for each T-shirt sold.²⁷

All in all, there is a substantial motivation to increase the consideration of environmental and social impacts in corporate decision making, and there exists a rationale to include monetized estimates. Today most companies keep good records on their environmental and social impacts, but there might be a need to complement these records with monetized estimates of the same parameters. However, for the individual company/firm there are a number of other conditions that would need to be satisfied. The issues we focused on in this study were the following:

- Could a company that monetizes the environmental impacts of products be given lower interest rates when borrowing money from banks?
- Could monetization of environmental impacts of products motivate more expensive investments? Will companies be able to motivate bank support to higher investment costs following more environmentally friendly processes?
- Could monetization of environmental impacts of products provide lower insurance premiums for a company?
- Could monetization of environmental and social impacts of products provide higher rating of a company (buy recommendations) from the financial sector?
- Could monetization of environmental impacts of products help motivate 'price premiums'?

As can be seen from the list of issues above, this study didn't focus on internal company processes during product development. The question of whether monetization practices should be used as a company-internal strategy to promote sustainability of business has been left outside this study.

Some of the questions asked by us have been previously studied, others have not. We therefore performed a literature review to see if there was any established level of knowledge for some of the questions, while other questions were covered by interviewing stake holders. It was mainly the question about price premiums that we could find knowledge about from the literature.

The potential for price premiums

Certain characteristics of a market make it easier to transfer surplus production costs to the final consumer. The most notable market is the electricity market, where societal environmental ambitions enforced by governments can be claimed to have caused price increases that are pushed on to final consumers. This is feasible since there are very limited options for the final consumer. In Sweden it is very difficult for a private consumer to buy electricity from a non-Swedish utility. All companies selling electricity in Sweden have to comply with Swedish law and pay Swedish environmental taxes, pay for electricity certificates, and pay for CO₂ emission permits. But Swedish consumers cannot opt out of the Swedish electricity grid by any other means than producing electricity of their own (for which they would have to pay the same taxes). We can classify this characteristic of the Nordic energy market as being a consequence of a local market with physical barriers with respect to entering or leaving the market.

In contrast, on a global market for goods, the setting is different. Companies that take responsibility for environmental and social improvements early on might find it very difficult to charge a price premium corresponding to the pro-environmental production costs if not all companies producing the same type of goods are following suit. In this text we intertwine social and environmental responsibility into the term responsibility. In the literature we present, there is a variation in what type of responsibility that has been analysed.

It appears to be a consensus in the academia that large firms that work actively with responsibility issues in general are more profitable than those who don't.²⁸ Analysis has shown that firms that are becoming judged as responsible by the inclusion into responsibility indices don't necessarily experience increased confidence from the stock market (higher share prices) after being included, while firms that are excluded from responsibility indices are punished. Similarly, firms that are being included in responsibility indices show better overall performance (income) than the ones excluded from the indices for the period; probably an effect of co-variation. A firm that cares about social responsibility issues is also likely to care about overall performance indicators.²⁸ Basically, a firm should not expect to be rewarded by price premiums for environmentally and socially responsible products, but they risk being punished if they stop being responsible.^{viii}

Additionally, it appears as if many consumers report a willingness to spend more on products produced by responsible companies, while a smaller proportion of consumers actually spend more on responsibly produced products. However, this smaller proportion is still 4 out of 10 consumers globally. How far this can be translated to the willingness to pay a price premium is less certain, it might be the case that the consumer will benefit the responsible producer via quantity instead of price.^{29, 30}

There are, however, indications that a price premium can be paid, although maybe not as high as would be needed for maintained profitability. A recently published paper by Tully & Winer from New York University presented results from a large meta-analysis of willingness-to-pay studies. In this study they found that on average a price premium of 16 percent could be paid for responsible products and that 60 percent of the consumers would be willing to pay a premium. What is interesting is that these premiums would be paid for altruistic goods without any positive impacts on the purchasing consumer (organic food etc. was excluded). Also, these results are from self-estimations rather than from revealed consumer behaviour, so caution is recommended when using these results as guidelines.³¹ However, as anyone who has been to a grocery store can verify, the real life price premium of responsible products is often far higher than the conventional alternatives. And not very surprisingly, only 4 percent of all food sold in stores in Sweden was organic in 2012.³² In addition, 10 percent of all newly sold cars were environmentally labelled in 2013.^{ix} Buying organic food is of course only one of many options for a responsible consumer, there are a large number of responsibility labels for a large range of products. Unfortunately we're currently missing data on the share of responsible products (all labelled items) of total purchased products.

The final question of importance to our literature study remains unanswered, since we have not found any papers or reports explicitly studying whether the communication of avoided monetized environmental and social impacts of a product can motivate a corresponding price increase to the final consumers. Conversely, there are no studies clarifying whether consumers would be willing to pay more for a product causing large environmental and social impacts.

^{viii} <http://www.forbes.com/sites/csr/2011/07/28/no-consumers-will-not-pay-more-for-green/>, accessed 2014-11-28

^{ix} <http://www.dn.se/motor/hetaste-bilarna-i-sverige-2013>, accessed 2014-11-28

Why should companies monetize their impacts? - Corporate perspectives

In order to get a hands on perspective on the questions of importance in this study we performed interviews with selected stake holders from production companies, the banking sector, the finance sector, the insurance sector, and also the environmental labelling groups. Interviews were performed by first sending out background information and then interviewing via telephone or communicating via email. When delays in responses occurred, we re-contacted the respondents via telephone or email.

More specifically, what we asked for was whether a company's decision to:

- *Monetize environmental impacts in the product development phase could provide lower interest rates?*
- *Monetize environmental impacts could provide lower insurance premiums?*
- *Monetize environmental impacts could provide higher company rating (buy recommendations) from the financial sector?*
- *Monetize environmental impacts could motivate more expensive investments in production costs?*

Indications from our survey

We received answers to our questions from 9 out of 11 contacted companies, including representation from all stakeholders but the environmental labelling groups. Nine responses from a non-random selection of companies are in no way enough to derive conclusions, and the results presented here should be interpreted as selected perspectives of use primarily for further discussions. But in general, there was a common sense of curiosity of the aspects raised in the questionnaire, whether the interest was academic or motivated by business interest remains unclear.

From the responses we could derive a couple of general themes:

- 1. There doesn't seem to be an existing established agenda motivating the direct need for a company to monetize environmental impacts associated with their products or services.**

Currently, there is a general interest in monetization of environmental and social impacts from products although the interest might not have any direct connection to corporate profits or business strategies. For the respondents, the interest in including monetized environmental impacts appears to be motivated primarily by two factors:

- a) Communication with the finance sector and the general public (monetization as marketing).
 - b) For development of internal product development strategies and comparison of planned production options.
- 2. Monetization of environmental impacts will not in itself be enough for reduced bank interest rates, insurance premiums, or investment decisions. Information about risk is needed.**

The responses indicated that the exposure to risk will always be the key factor for banks and insurance companies, and a monetization of environmental impacts isn't necessary the best way to estimate risk. However monetization is recognized as one way in which companies could ensure transparency regarding communication of environmental impacts. This in turn might be useful information for investors when reviewing which companies to invest in.

3. If monetization of environmental impacts is to be performed in the product development phase, some sort of consensus on methods and data is required.

A couple of the respondents stressed that if a company would make the effort to monetize the environmental impacts of products already in the product development phase, there will be a need for some sort of acknowledged standard or international consensus on which methods and data to use. This will give higher credibility for companies when monetizing environmental impacts.

Other important aspects

Monetization of environmental impacts isn't in itself seen as something that would lower interest rates on bank loans or insurance premiums. In order to achieve an insight on the environmental and social risks that a company or product are exposed to, some sort of estimate on the costs would be required, which means that monetization at some stage would be needed. But it is understandable that it isn't enough to identify these risks in order to get lower interest rates or insurance premiums, a risk management plan is also needed.

In this brief study we have not been able to cover all aspects that should be discussed when one contemplate whether a company should bother to monetize environmental and social impacts of their production. However, other research have identified that the current ways in which companies are run constitutes an obstacle in itself. In Sweden, companies registered as a joint-stock company are subject to a specific part of the Swedish legislation. In this legislation they are mandated to provide profit to their shareholders, unless other purposes are specifically presented in the articles of association for the company.^x We assume that this type of legislation is commonplace. The Norwegian researcher Beate Sjøfæll proposes three main redefinitions of a company that would be necessary prior to a full consideration of environmental impacts of production:

1. The company's role in society must change; the purpose of the company must be redefined so that the company explicitly contributes to society's goal of sustainable development.
2. The role of the company board and the position of the board within the company need to change.
3. The company interest guidelines needs to be complemented with a sustainability interest guideline, which would help the company to select the most environmentally beneficial path forward (enlightened shareholder approach).³³

Beate Sjøfælls research applies to conditions specified by Norwegian law, but considering cultural and regional proximities between Sweden and Norway it doesn't seem implausible that similar challenges will be found in Swedish corporate law.

^x <http://www.notisum.se/rnp/sls/lag/20050551.htm>, Aktiebolagslagen chapt. 3, §3, accessed 2014-11-27

Conclusions and recommendations

All in all it seems to be a push by large industrial companies and the financial sector to more effectively consider environmental and social impacts and to learn and understand their specific part of the impacts, in order to use this knowledge in decision making processes. On a single firm level though, the rationale isn't just as clear although the general interest and curiosity is high. There is no clear indication that a monetization of environmental and social impacts in the product development phase will automatically mean good business.

There are also good reasons to believe that the way in which companies are run needs to be adjusted so as to remove existing barriers for a long term perspective and social considerations.

However, there are a number of benefits of monetizing environmental and social impacts of production. First, it can help in communication with the finance sector since monetization allows for a common metric to be used in communication. Second, it can help communicate reasons for eventual price premiums of products to consumers. Third, at some point any decision maker makes a weighting between environmental impacts and other impacts, and monetization allows this weighting to be performed in a transparent and consistent manner. In order to ensure transparency and minimize the burden on companies, a standardized and accepted approach and method needs to be developed. Fourth, it increases the possibilities for companies to become more sustainable and also be prepared for future risks and government incentives.

References

1. Costanza, R.; D'Arge, R.; de Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O'Neill, R. V.; Paruelo, J.; Raskin, R. G.; Sutton, P.; van den Belt, M., The value of the world's ecosystem services and natural capital. *Nature* **1997**, *387*.
2. Costanza, R.; de Groot, R.; Sutton, P.; van der Ploeg, S.; Anderson, S. J.; Kubiszewski, I.; Farber, S.; Turner, R. K., Changes in the global value of ecosystem services. *Global Environmental Change* **2014**, *26*, 152-158.
3. Rockström, J.; Steffen, W.; Noone, K.; Persson, Å.; Chapin, F. S. I.; Lambin, E.; Lenton, T. M.; Scheffer, M.; Folke, C.; Schellnhuber, H. J.; Nykvist, B.; de Wit, C. A.; Hughes, T.; van der Leeuw, S.; Rodhe, H.; Sörlin, S.; Snyder, P. K.; Costanza, R.; Svedin, U.; Falkenmark, M.; Karlberg, L.; Corell, R. W.; Fabry, V. J.; Hansen, J.; Walker, B.; Liverman, D.; Richardson, K.; Crutzen, P.; Foley, J., Planetary Boundaries: Exploring the Safe Operating Space for Humanity. *Ecology and Society* **2009**, *14*.
4. KPMG International *Expect the unexpected: Building business value in a changing world*; 2012.
5. International Energy Agency, *World Energy Outlook 2012*. 2012.
6. The Economist, Unburnable fuel. *The Economist* 2013, pp 12-14.
7. Millennium Ecosystem Assessment *Ecosystems and Human Well-being: Synthesis*; 1597260401; 2005.
8. Sukhdev, P.; Wittmer, H.; Schröter-Schlack, C.; Nesshöver, C.; Bishop, J.; ten Brink, P.; Gundimeda, H.; Kumar, P.; Simmons, B. *The economics of ecosystems and biodiversity - Mainstreaming the economics of nature, a synthesis of the approach, conclusions and recommendations of TEEB*; 2010.
9. European Commission *Mapping and assessment of ecosystems and their services - indicators for ecosystem assessments under Action 5 of the EU biodiversity strategy to 2020*; 2014.
10. Maes, J.; Egoh, B.; Willemen, L.; Liqueste, C.; Vihervaara, P.; Schägner, J. P.; Grizzetti, B.; Drakou, E. G.; Notte, A. L.; Zulian, G.; Bouraoui, F.; Luisa Paracchini, M.; Braat, L.; Bidoglio, G., Mapping ecosystem services for policy support and decision making in the European Union. *Ecosystem Services* **2012**, *1*, (1), 31-39.
11. World Business Council for Sustainable Development *Guide to corporate ecosystem valuation - A framework for improving corporate decision making*; 2011.
12. Official Journal of the European Union, Directive 2006/38/EC of the European Parliament and of the Council of 17 May 2006 amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures. In 2006.
13. Official Journal of the European Union, Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures. In 1999; pp 42-50.
14. Commission of the European Communities, Proposal for a Directive of the European Parliament and of the Council amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures. In *COM(2008) 436 final*, 2008.
15. European Commission, Proposal for a Directive of the European Parliament and of the Council on the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC, *COM(2013)920 final*. In 2013; Vol. 0443.
16. Holland, M. *Cost-Benefit Analysis of Final Policy Scenarios for the EU Clean Air Package - version 2*; 2014.
17. UK National Ecosystem Assessment *The UK National Ecosystem Assessment: Synthesis of the key findings*; 2011.
18. Statens Offentliga Utredningar *Synliggöra värdet av ekosystemtjänster - Åtgärder för välfärd genom biologisk mångfald och ekosystemtjänster*, *SOU* 2013:68; 9789138240175; 2013.
19. Norges Offentlige Utredninger *Naturens goder – om verdier av økosystemtjenester*, *NOU* 2013:10; 9788258311819; 2013.
20. Stiglitz, J. E.; Sen, A.; Fitoussi, J.-P. *Report by the Commission on the Measurement of Economic Performance and Social Progress*; 2009.
21. European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions - Roadmap to a Resource Efficient Europe. In *COM(2011) 571 final*, 2011.
22. The Global Compact *Who Cares Wins - Connecting Financial Markets to a Changing World*; 2004.
23. UNEP Finance Initiative *Demystifying Materiality - Hardwiring biodiversity and ecosystem services into finance*; 2010.
24. Mulder, I.; Mitchell, A. W.; Peirao, P.; Habtegabber, K.; Cruickshank, P.; G., S.; Meneses, L. *The NCD Roadmap: implementing the four commitments of the Natural Capital Declaration*; 2013.

25. Corporate eco forum & the Nature Conservancy *The new BUSINESS IMPERATIVE: VALUING NATURAL CAPITAL*; 2012.
26. PUMA *PUMA Business and Sustainability Report*; 2012.
27. Danish Environmental Protection Agency *Danish apparel sector natural capital account*; 2014.
28. Doh, J. P.; Howton, S. D.; Howton, S. W.; Siegel, D. S., Does the Market Respond to an Endorsement of Social Responsibility? The Role of Institutions, Information, and Legitimacy. *Journal of Management* **2009**, 36, (6), 1461-1485.
29. Nielsen *Consumers Who Care - And say they'll reward companies with their wallets*; 2013.
30. Ipsos, Half (52%) Globally Care About Brands' Environmental Efforts but Only Four in Ten (38%) Willing to Pay More. In 2013.
31. Tully, S. M.; Winer, R. S., The Role of the Beneficiary in Willingness to Pay for Socially Responsible Products: A Meta-analysis. *Journal of Retailing* **2014**, 90, (2), 255-274.
32. Statistics Sweden *Livsmedelsförsäljningsstatistik 2012, livsmedelsförsäljning inom detaljhandeln*; 2013.
33. Sjøfæll, B. *Towards a Sustainable Development: Internalising Externalities in Norwegian Company Law*; 2010.



IVL Swedish Environmental Research Institute Ltd., P.O. Box 210 60,
S-100 31 Stockholm, Sweden
Phone: +46-8-598 563 00 Fax: +46-8-598 563 90
www.ivl.se