



THE BUSINESS CASE FOR ECO-INNOVATION



UNITED NATIONS ENVIRONMENT PROGRAMME



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Authors: Tanja Bisgaard, Katie Tuck

Supervision and coordination: Liazzat Rabbiosi, Elisa Tonda at UNEP

Editing: Joni Pegram, Madhuvanthe, Ulla Norup Panild

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FOREWORD

UNEP



Business and industry worldwide are recognizing the sustainability imperative to shift production and consumption patterns to a new economic paradigm. Yet the current approach of incremental improvements has proved to be insufficient to deal with environmental and social pressures from challenges such as dwindling resources and climate change.

Unless a company is looking beyond its gates to assess sustainability risks and opportunities throughout its value chain, and in cooperation with the key partners, it will be incapable of unlocking the transformational potential to deal with these growing external pressures.

Leading CEOs have already identified the need to change their business strategies and point to systemic change as the right approach.

Eco-innovation seeks to implement this approach, embedding sustainability into the core decision making of a company and integrating it throughout all business dimensions, enabling the creation of novel solutions to satisfy market needs.

Research shows that eco-innovative companies of all sizes are growing, on average, at a rate of 15 per cent a year, at a time when their respective markets have remained flat. Small and medium-sized enterprises (SMEs) are particularly responsive to eco-innovation due to their adaptability and flexibility, and as contributors of as much as 70 per cent of GDP and two-thirds of formal employment in developing and emerging economies, they are potentially a key driver of a resource efficient economy.

Realising this systemic transformation is difficult but not impossible. This extremely informative publication provides a clear business case for this approach, building on the examples of successful eco-innovative enterprises from around the world.

In South Africa, an SME provides alternative energy to rural communities in partnership with the local government. In just three years it has tripled in size and is now rolling out its micro grid-kit model of energy supply in more areas in neighboring countries.

In Belgium, a small manufacturer of ecological cleaning products achieved an annual revenue growth of 10-25 per cent between 2002 and 2013, while the rest of the market remained flat. This success came as a result of innovating across all dimensions of its business, from product formulas to packaging, including re-fill options.

This publication represents an important milestone in the collaboration between UNEP and the European Commission to disseminate eco-innovative business practices in developing countries and emerging economies. The Eco-innovation Project, and this publication, will help strengthen private sector engagement in promoting the transition to a more resource efficient economy and Sustainable Consumption and Production practices.

Achim Steiner

Under-Secretary-General United Nations
and UNEP Executive Director

FOREWORD



European Commission

Eco-innovation is one of the key enabling instruments identified by the EU for the transition to a more resource efficient economy. It is embedded in the Europe 2020 strategy for a more sustainable growth and the Commission has developed over the years a policy framework and dedicated funding to encourage uptake of eco-innovative solutions by the market.

Eco-innovation is a concept that aims at matching the interests of industry and businesses with those of sustainability. Many challenges have already been successfully solved by frontrunner cities and regions which have been looking at the world around them in a different light and started innovating. A number of public authorities across the world have had the courage to re-think the approach to managing their jurisdiction and re-design the services they were offering to citizens in order to improve their well-being. Many others will hopefully follow.

Eco-innovation is above all an opportunity for businesses. Our planet needs actors that take transformative action towards new ways of production, new ways of consumption that are mindful of planetary boundaries and ultimately reduce the need for natural resources. Eco-innovation supplies the business community with answers in this respect. Eco-innovation aims at stimulating human creativity at its best. In the recent past we have been able to identify solutions to recover precious metals from high-tech devices doomed to scrap. We have found ways to treat waste waters and re-use them in agriculture. We have been able to extend the life of products or design solutions to reduce the use of raw material. Last but not least, as consumers we have started to modify our behavior and started purchasing services rather than products. However, much more must be done and by more people.

What we need to do now is to upscale and mainstream some of these solutions. We need to encourage internationalization efforts and offer SMEs, the real engines of eco-innovation, a highway to find new markets and contribute to global sustainability.

How do we do this? Partnering with UNEP on the "Promoting Resource Efficiency and Eco-innovation in Developing and Transition Economies" Project was an important step. This publication, *The Business Case for Eco-innovation*, will support the diffusion of eco-innovation. It will also support mainstreaming eco-innovation in the activities of the global network for Resource Efficient and Cleaner Production (RECP) and will strengthen its capacity to provide technical assistance to businesses and contribute to the diffusion of innovative solutions for the benefit of global sustainability.

I am sure that readers of the *The Business Case for Eco-innovation* will find inspiration in these pages. I am convinced that it will be an important tool that will help them to adopt and adapt the wealth of innovative ideas to their own realities and thus contribute to our common goal: to live well, within the limits of our planet.

Karl Falkenberg

Director General for Environment,
European Commission

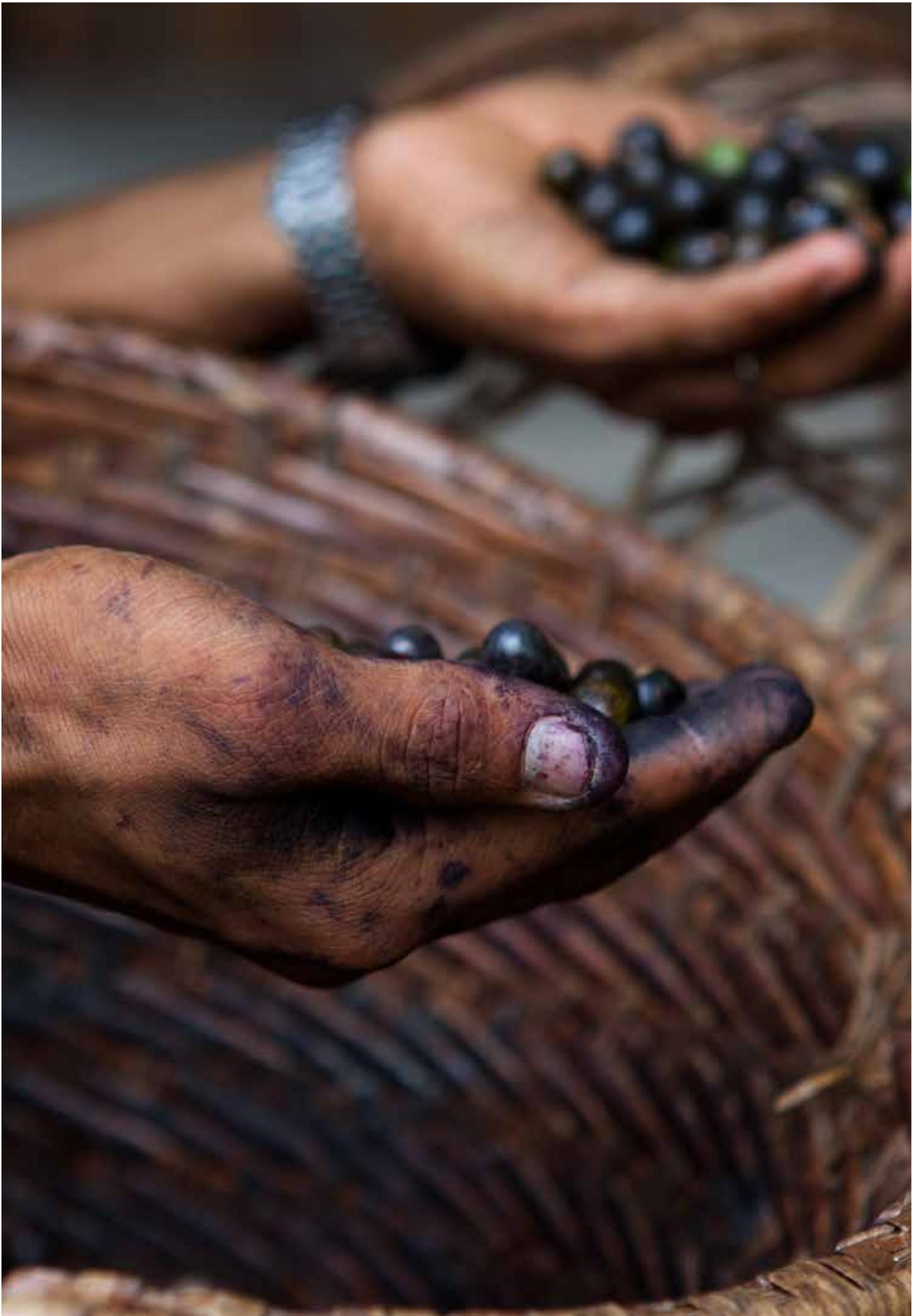


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Introduction

This publication sets out to demonstrate the compelling business case for eco-innovation and how it can enable your company to carve out commercially interesting opportunities. You are presented with examples from companies that have integrated eco-innovation at the core of their business strategy. The findings demonstrate considerable business benefits including: increased market access, value creation and business growth (with an average annual growth of 15 % from eco-innovative companies) along with increased operational resilience. As a result of eco-innovation, these companies are developing new solutions and products¹ which can perform above industry standards.

With global resource scarcity and environmental degradation presenting growing challenges for business, along with related market and regulatory pressures, companies are facing a need to think more strategically about the sustainability of their business. Eco-innovation can help transform these challenges into new market opportunities.

¹ Refers to both goods and services

WHAT IS ECO-INNOVATION, OPERATIONALLY?

Eco-innovation is the development and application of a business model², shaped by a new business strategy, which incorporates sustainability throughout all business operations based on life cycle thinking³ and in cooperation with partners across the value chain.

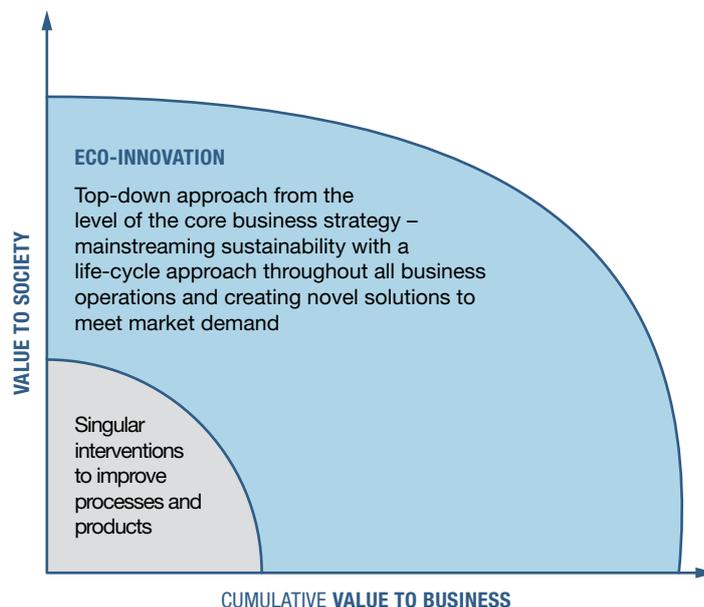
It entails a coordinated set of modifications or novel solutions to products (goods / services), processes, market approach and organizational structure⁴ which leads to a company's enhanced performance and competitiveness.

Thinking from a life cycle perspective means considering all phases of the product life cycle, from extraction of raw materials through material processing, manufacturing, distribution, use, repair and maintenance to disposal

or re-use. This approach allows companies to evaluate where significant progress can be made against the major challenges faced by industry, anticipate and avoid future ones. Adopting this perspective works best in cooperation with suppliers, customers and other partners across the value chain⁵.

Companies evaluate their position in the value chain, analyse the hotspots that affect their business and seek innovative solutions in collaboration with value chain partners to strengthen their market position and competitiveness. Actual transformation is likely to be achieved by implementing the elements of the new strategy on a gradual, progressive and targeted basis, but these steps take place within the framework of the company's long-term strategic drive towards major change.

Figure 1: **Eco-innovation generates significant value to business and society**⁶



² Business model describes how a company does business. It is the translation of strategic issues, such as strategic positioning and strategic goals into a conceptual model that explicitly states how the business functions. The business model serves as a building plan that allows designing and realizing the business structure and systems that constitute the company's operational and physical form (Osterwalder et al., 2005).

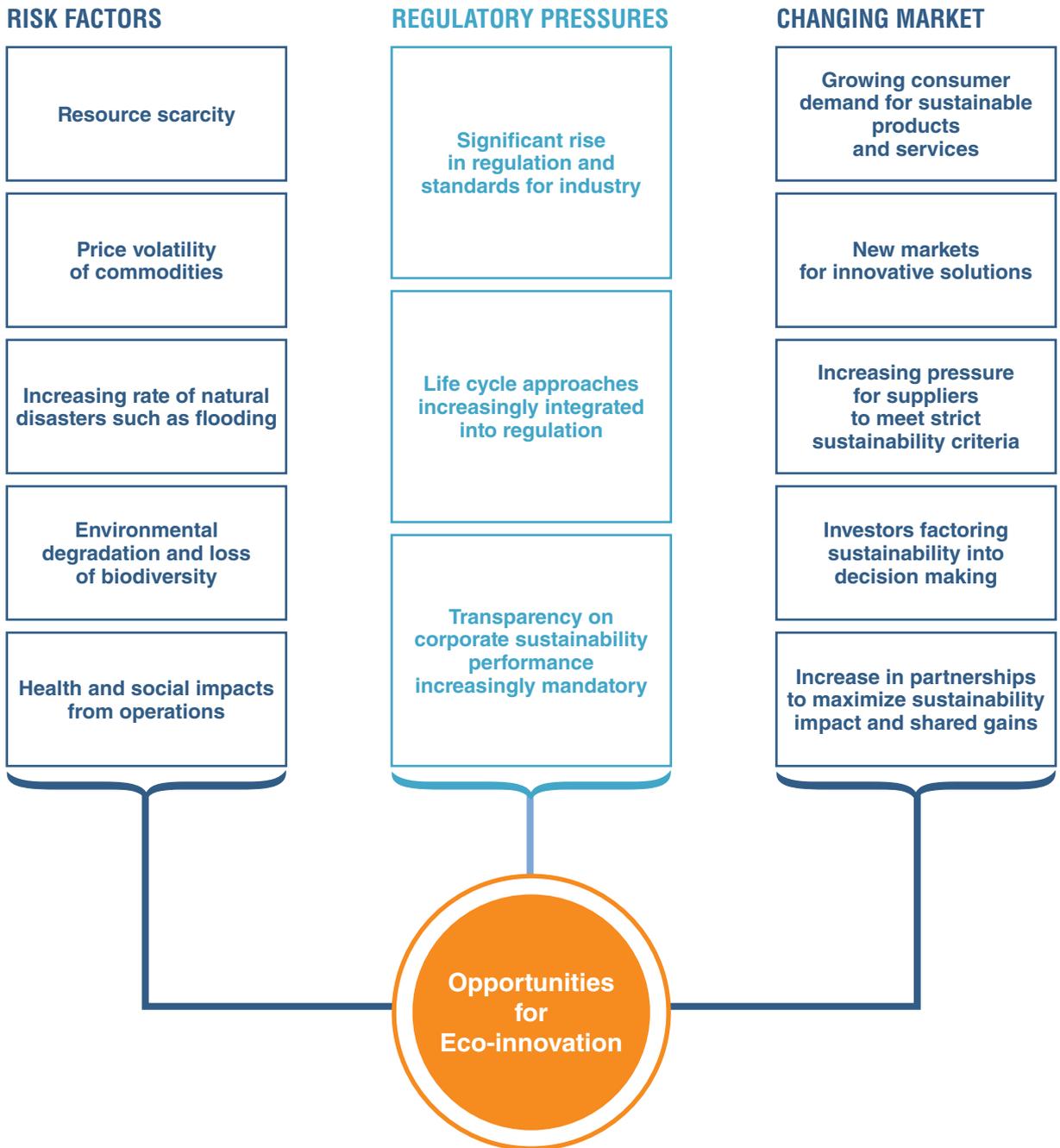
³ Life cycle thinking is a mostly qualitative approach to understand how our choices influence what happens at each of the stages of the life cycle of an industrial activity: from raw material acquisition through manufacture, distribution, product use and disposal. This approach is needed in order to balance trade-offs and positively impact the economy, the environment, and society (UNEP 2004).

⁴ Organization structure refers to the range of activities and key resources (human and financial) within the company, in addition to those relating directly to production, that are dedicated to supporting the business model. These include procurement processes, distribution, key partnerships, customer relationships and interfaces, research and development, internal communication and revenue generation.

⁵ A value chain is the entire sequence of activities or parties that provide or receive value in the form of products or services (e.g. suppliers, outsources, workers, contractors, investors, R&D, customers, consumers, members) (ISO14001 CD2, 2013).

⁶ Graphic adapted from: SustainAbility 2014 Model Behaviour: 20 business model innovations for sustainability

Figure 2: **Increasing pressures on business are creating favourable conditions for eco-innovation**



Through this method, eco-innovative companies create value for the business, the environment and society in general.

The result is a more flexible company, able to respond to changing market trends with novel solutions ahead of competitors. Contrary to a short-term outlook that leads to incremental improvements and results in only limited progress and benefits, eco-innovation represents a long-term strategic drive towards sustainability.

The Business Case for Eco-innovation is intended for a business audience. It provides an overview of growing

trends and indicators and presents real cases and examples that demonstrate the compelling reasons to embark on an eco-innovation process. Primary research was carried out directly with companies ranging from start-ups to larger companies worldwide to evaluate the tangible benefits of eco-innovation and the processes undertaken. Each company has its motivation and reasons for eco-innovating. These motives have been captured, analyzed and organized as the five drivers for eco-innovation, presented in individual chapters.

Figure 3: **Added value from eco-innovation - an overview of the business drivers**



Driver 1: Access new and emerging markets

The market demand for eco-innovative solutions is growing rapidly in many sectors. There are numerous examples of how companies have reached new market segments from low-income to high-end consumers, accessed the supply chains of large companies or catered to untapped demand in areas where no solution previously existed in the market. Eco-innovation also involves collaborating with other partners across the value chain which provides opportunities to access knowledge and networks.

Driver 2: Increase profitability along the value chain

Reaping the full advantages of eco-innovation requires looking at every stage along the company value chain to identify opportunities for improvement and risk factors. Through working on joint solutions to common problems, significant shared gains can be achieved with better commercial, environmental and social value, the sum of which can be significantly higher than the efforts of an individual company. The value comes from greater material or production efficiency, minimized waste to landfill, optimization of distribution channels and reduced lead-time or an altogether novel breakthrough solution. Gains also include a more resilient supply chain and knowledge-related advantages in terms of technologies and expertise.

'Eco-innovation is linked to our core values, strategy and our search for product differentiation'

Fabien Brones, Natura

Driver 3: Stay ahead of standards and regulation

Regulation and standards in the policy domain are becoming increasingly stringent in response to the growing sustainability imperative. Eco-innovative companies are typically significantly ahead of regulatory requirements and therefore reap competitive advantages. When the regulation is implemented, they have already anticipated the change, innovated with the right materials, technologies and processes and tested new solutions. Continuous innovation enables them to react as the requirements get stricter. This approach has a positive impact on the company reputation, providing opportunities to acquire industry leadership and inform future regulation.

Driver 4: Attract investment

Financial opportunities available for eco-innovative companies are increasing. High value acquisitions and mergers with eco-innovative companies are one indicator of this⁷. Banks and long-term investors, such as pension funds, are increasingly investing in companies that demonstrate higher resilience and viability in the long run. In emerging markets, banks are increasingly making investment choices based on sustainability initiatives. For SMEs, there is a rise in funding opportunities from local governments and institutions or regional funding agencies to implement initiatives linking innovation and sustainability. Crowd funding platforms have also become a popular source of investment for the commercialization of new ideas.

⁷ Montalvo, C., Diaz Lopez F. J. & Brandes, F. 2011. Analysis of the Potential for Eco-innovation in Nine Sectors. Task 4 Horizontal Report Delft: Europe Innova Sectoral Innovation Watch. Project on behalf of the European Commission, DG Enterprise and Industry.

⁸ Aija Leiponen, June 2005, *Skills and Innovation* International Journal of Industrial Organization Volume 23, Issues 5–6, Pages 303–323

⁹ International Journal of Business and Management 2010, Vol. 5, No. 12; Solomon Markos and M. Sandhya Sridevi

Driver 5: Increase productivity and technical capacity

The organizational change triggered by eco-innovation increases the technical capacity of the company and drives productivity. Eco-innovation involves information exchange and participation in innovation processes by different units within a company, as well as the acquisition of knowledge through collaboration with value chain partners including technical institutes⁸. The resulting learning and creative process leads to enhanced technical capacity in key competencies, a stronger skills base and increased employee engagement that is interwoven with key business performance indicators such as productivity and profitability⁹.

These drivers have helped companies respond to industry challenges, build more resilient and responsive supply chains while obtaining clear market advantages over their competitors. Clients of these companies enjoy enhanced value through varying factors such as: higher quality and more durable products, novel functionalities and a more attractive price.

It should be noted, however, that the business case varies according to context. Certain enabling conditions including policy environment, market demand and industry pressures are of key importance. This publication demonstrates that the conditions are increasingly favourable in a number of countries, however limitations still exist in certain markets which are not rewarding eco-innovation. In these cases, companies can benefit from export opportunities.

'Our approach ensures that sustainability is integrated into the core business model'

James Vaccaro, Triodos Bank

Access new and emerging markets

DRIVER 1

Across the globe, a growing number of markets are demanding innovative sustainable solutions.

OPPORTUNITIES FOR COMPANIES

Eco-innovation is strategic, and so are your decisions regarding future products, solutions or services. Applying eco-innovation can help to develop tailored solutions to meet growing market demand ahead of your competitors. This will allow you to access new consumer segments, large companies' supply chains and international markets. Furthermore, eco-innovation serves as a good starting point for partnerships with other stakeholders in the value chain. Such collaboration can help your company access partners' networks thereby facilitating market penetration and increased brand visibility.

DEVELOPING COUNTRIES OFFER LARGE CONSUMER MARKETS

Many developing countries have vast numbers of price sensitive consumers looking for affordable and durable products to fulfil their everyday needs. They are active buyers in the market and represent fertile ground for an eco-innovative company to provide innovative solutions and increase the client base. For example, India is known for its distinctive expertise in frugal innovation which is strongly anchored in social sustainability. Businesses are able to improve the lives of the poor by offering low-cost as well as better quality and more sustainable goods and services. Through tapping into the markets of previously overlooked millions, companies can compensate lower prices with higher sales volumes¹⁰.

These types of consumers represent new market opportunities for companies such as *Specialized Solar Systems (SSS)* from South Africa and *Natura* from Brazil¹¹.

Specialized Solar Systems brings electricity to rural communities

The alternative energy company, *SSS*, is a small business start-up that has tripled in size in three years¹² and expanded its business operations to four other countries in the region. Its business strategy is to provide renewable energy solutions to meet the market demand of rural communities in Africa with limited or no energy access. The company also aims to change the norms in consumption patterns of electricity. In rural South Africa, electricity supply is often not connected to Alternating Current (AC) based infrastructure. *SSS* deploys microgrid kits fed by solar power and modifies home appliances to use Direct Current (DC) which consumes two-thirds less energy than conversion to AC systems. The microgrid kit was designed to minimize impacts along its life-cycle. The modular base enables

specific components to be replaced without having to reinstall the entire system. In addition, the panels are effective for 20 years. The kit is sold as a service-system which can be managed remotely through a web-based smart box. *SSS* also provides free training to ensure direct local maintenance. Through a partnership with local government and technical research institutions, *SSS* gained additional funding and technical support which enabled it to roll out this model of energy supply to a critical mass.

Natura reaches a new market with bath and body products

In Brazil, the cosmetics firm *Natura* has a market share of over 20 per cent with an average annual growth of 26 % in 2005-2010. The company has practically doubled in size from 2007 to 2011. Its business strategy is based on innovation for sustainability and market differentiation.

Through its innovations in the body and bath care product line *SOU*, *Natura* proposed a new product to consumers. It was designed with the aim of reducing impacts along its life cycle by innovating the ingredients formula, the packaging along the supply chain. Less material was used, and manufacturing time as well as transportation were improved and optimized. *Natura* was therefore able to expand sales in a new market segment, with a price point lower by 20 - 40% compared to other product lines from *Natura*. The new product line was well received by the consumers, and after a six-month successful trial period, it was launched throughout Brazil¹³.



© Natura

¹⁰ Nesta 2012, Our frugal Future: Lessons from India's Innovation System, K. Bound and I. Thornton

¹¹ Based on interviews with the company representatives

¹² Interview with Mr. Carlos Smith, Specialized Solar Systems, South Africa

¹³ Interview with Fabien Brones, Scientific Manager Eco-design and Environmental Impacts, Natura

'Our expansion from the small shops to supermarkets was thanks to our eco-innovation. This entry in mass retail has given us a big boom in sales'

Tom Domen,

Long-term Innovation Manager at Ecover

DEMAND FOR SUSTAINABLE PRODUCTS IS GROWING WORLDWIDE

The demand for sustainable products and services is predicted to grow significantly¹⁴ worldwide. In some markets, consumers are even experiencing a lack of supply of such products. A recent global survey found that only 6 % of consumers in Germany and 10 % in South Korea felt that enough sustainable products were available. Economies like China and India are also showing a steep rise in the demand for sustainable product offerings¹⁵.

Ecover meets growing demand for ecological cleaning products

The market for ecological cleaning products increased by 21 % between 2007 and 2011. In Belgium, the small manufacturer of ecological cleaning products *Ecover*, seized the opportunity of this growing demand. The company has achieved an annual revenue growth of 10-25 % between 2002 and 2013 while the rest of the market has remained flat. This was helped by expanding from small shops to large supermarkets, significantly increasing its sales.



© Ecover

Ecover started with incremental improvements such as replacing ingredients before adopting a more radical approach through an innovative business model, which involved revisiting supply chains and sourcing strategies. It has a Long-term Innovation Manager who works integrally with all core business operations. Today *Ecover* innovates across all dimensions of its business, from product formulas to packaging, including re-fill options¹⁶. Through an open innovation¹⁷ scheme, *Ecover* has expanded its network with buyers, suppliers and technical and academic communities working with partners in the value chain such as *Solazyme* and *Phillips* and increased its access to knowledge and information in the process. Open innovation represents a potentially cost-effective means of supporting eco-innovation even if the patents are not owned by the company

Some *Ecover* detergents are effective in a cold water wash thereby addressing a key hotspot in the life-cycle of detergents: hot water use. It is not only *Ecover* that sells this type of product; life-cycle thinking is becoming a mainstream business approach in the market of fast moving consumer goods. Enzyme producing companies partnered with large companies to develop and market solutions allowing cold-washing. The enzyme companies were able to demonstrate –through life cycle approach how this offered greater advantages in spite of the initial higher cost of such substitutes. Cold-wash enabling enzymes are used more and more by *Unilever*, *P&G* and other detergent manufacturers.

¹⁴ World Economic Forum 2013, Sustainable Consumption, stakeholder preferences

¹⁵ <http://www.greenbiz.com/blog/2013/07/04/should-supply-or-demand-drive-sustainable-products>

¹⁶ Interview with Tom Domen, Long term Innovation Manager, Ecover

¹⁷ Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology. (Oxford University Press 2006 Henry Chesbrough Open Innovation: Researching a New Paradigm)



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AT LEAST 56 COUNTRIES HAVE IMPLEMENTED SUSTAINABLE PUBLIC PROCUREMENT POLICIES

Government spending ranges from 15 - 30 % of gross domestic product (GDP) worldwide¹⁸ and represents an attractive new market segment. Increasingly, governments in many countries and at all levels are using sustainable public procurement to drive innovation

towards environmental and social improvements in their markets. According to a recent survey, at least 56 countries have public institutions that incorporate the principles of green or sustainable procurement into their purchasing policies¹⁹.

¹⁸ <http://www.iisd.org/procurement/>

¹⁹ UNEP 2012, Sustainable Public Procurement: A Global Review

Ecover was selected for use in the public buildings of Ghent

The City of Ghent in Belgium declared that *Ecover* products be used for cleaning 340 public buildings including administrative buildings, museums, libraries, warehouses and community centres. Given the large quantity of products bought, combined with the long-term nature of the contract, the City of Ghent represents an important customer for a relatively small company such as *Ecover*²⁰.

COMPANIES DEMANDING TRANSPARENCY AND INFORMATION FROM SUPPLIERS

Environmental, social and regulatory pressures are forcing companies to change their sourcing strategies. Sustainability criteria in procurement have become a key corporate approach to ensure resilience, continuity and quality of supply²¹. Procurers in large businesses are increasingly demanding more comprehensive and transparent information²² from their suppliers, using this information in their strategic decisions.

Kering uses Environmental Profit and Loss Accounting to collaborate with suppliers in a new way

Kering and its brand *PUMA* developed the innovative Environmental Profit and Loss Account (E P&L), which

measures and monetizes a company's footprint across the entire supply chain. It valued the cost of *PUMA*'s negative environmental impacts at € 145 million for 2010. Only € 8 million of this total derived from its core operations, the remaining € 137 million of impacts were beyond the company gates, from external suppliers, which in the manufacturing tier alone count 195 smaller companies²⁵. *Kering*'s use of the E P&L as a strategic sourcing tool is changing the way the Group works with suppliers and *Kering* is implementing E P&L analysis across all its brands²⁶.

Natura includes social and environmental costs and benefits in supplier selection

Suppliers need to be innovative and adapt quickly in order to live up to sustainability criteria. Large companies often assist their suppliers in this process. Part of the *Natura* strategy involves a new way²⁷ of working with suppliers, selecting them not on the basis of their lowest price offering, but rather on the lowest costs that their products have on the environment and society²⁸. In 2010, *Natura* launched a strategic sourcing programme. As a key element of this programme, suppliers were taught how to use the *Natura* life cycle approach and collect the necessary data. *Natura* is constantly expanding the strategic sourcing programme, which today includes 87 % of its suppliers²⁹. The company estimates that the socio-environmental benefits of selecting suppliers based on high sustainability performance was worth over US\$ 750 000 in 2012³⁰ alone.

²⁰ <http://www.gent.be/eCache/THE/4/125bGizdHZpZxc9cGVyc2JlcmJjaHRib9oZWW0dmFuZGVuYWVsZCZyZW9MTg1OTY4.html>

²¹ Greenbiz 2013, State of Green Business Report, Joel Makower

²² BSR 2013, BSR's Center for Sustainable Procurement: Year 1 Findings and Insights

²⁵ PUMA press kit 2011 PUMA Value Chain http://about.puma.com/wpcontent/themes/aboutPUMA_theme/media/pdf/2011/en/vc1116.pdf

²⁶ Information provided from interview with Michel Beutler, Sustainability Director at Kering

²⁷ Harvard Business Review 2012, The Growth Opportunity That Lies Next Door, How a Brazilian cosmetics giant saw the beauty in neighbouring markets

²⁸ World Resource Institute 2013, Aligning Profit and Environmental Sustainability: Stories from Industry

²⁹ Natura 2012, Annual Report

³⁰ World Resource Institute 2013, Aligning Profit and Environmental Sustainability: Stories from Industry

'It is not just about the quick wins [energy and water use] but real innovations with a view on the entire value chain. Understanding the value of eco-innovation will determine the winners from the losers.'

Michael Beutler,
Sustainability Director at Kering,
parent company of PUMA and other
global brands.

Increase profitability along the value chain

DRIVER 2

Many examples have shown the benefits of working in collaboration with value chain partners to drive down costs, increase profitability and share knowledge and expertise.

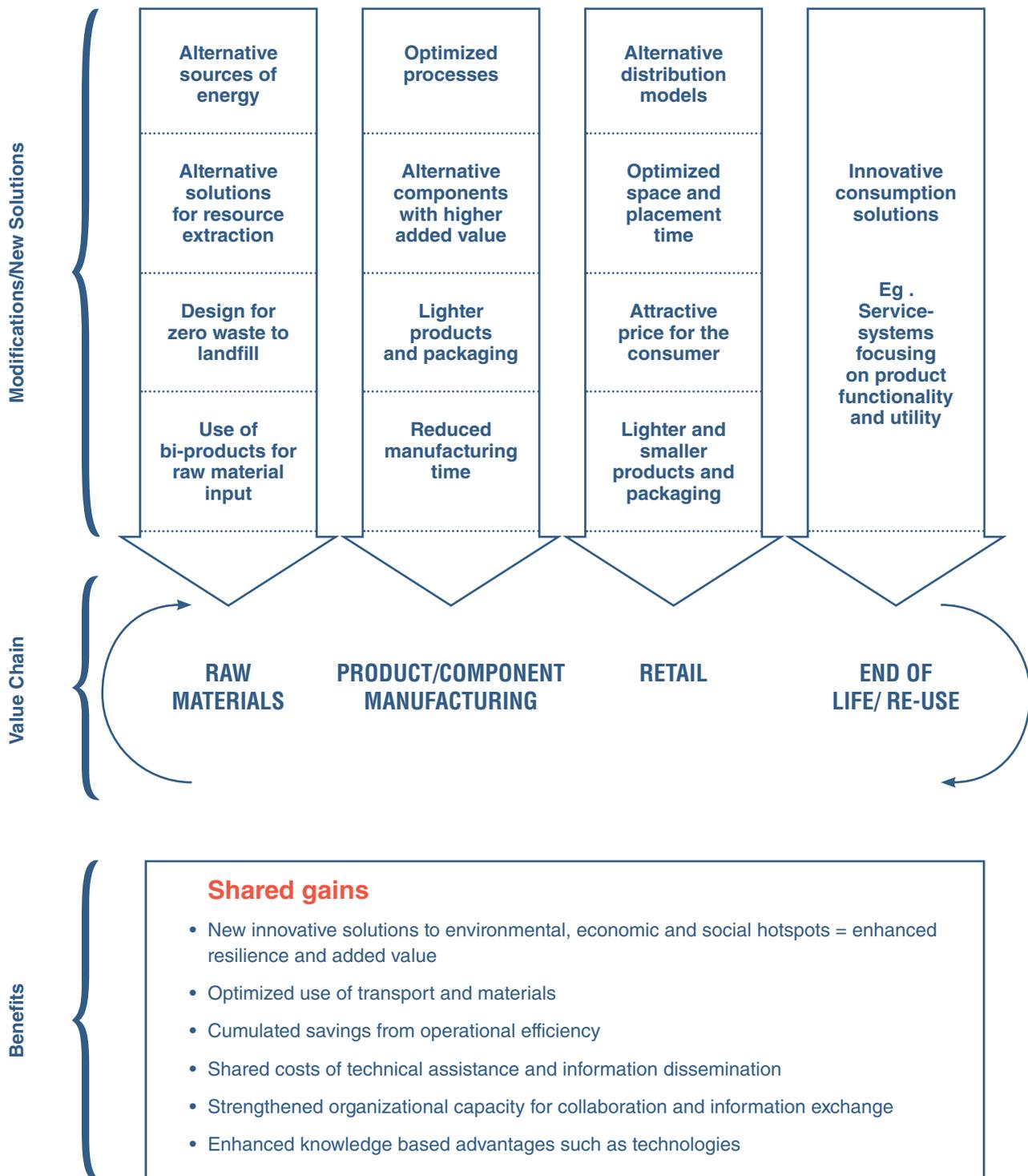
OPPORTUNITIES FOR COMPANIES

Eco-innovation requires looking at every link within the product life cycle to identify critical areas for improvement and potential sources of value. When a product passes from one part of a product chain or life cycle stage to the next, it gains value.³¹ Therefore, to harvest the full potential of eco-innovation it is important to look beyond your company's gate and work in collaboration with the partners in your value chain. Effective and long-term collaboration for innovation and sustainability can result in substantial shared benefits in terms of reduced costs, lower risks, greater efficiency, higher sales and better value proposition.³²

³¹ UNEP, SETAC 2009 Life Cycle Management

³² Journal of Cleaner Production 2014 Ghisetti C, Rennings K, Environmental Innovations and Profitability: How does it pay to be green? An empirical analysis on the German Innovation Survey

Figure 4: **Benefits from eco-innovation along the value chain (non-exhaustive)**



SHARED SAVINGS CREATE A MORE ATTRACTIVE PRICE FOR THE CONSUMER

By applying life cycle thinking and working with partners across the value chain, companies can achieve shared savings from a set of coordinated activities, for example in product and component design and processes, distribution, organizational structure and methods. Savings from these measures can result in prices that are more attractive for clients leading to more attractive retail prices.

Eco2Distrib liquid dispenser creates shared savings up and down the value chain

The French start-up company *Eco2Distrib* benefited from developing innovative solutions to address the negative environmental and economic impacts of packaging. It worked with partners to produce an electronic vending machine³³ that sells liquid products directly through a dispenser. *Eco2Distrib* has an annual sales growth of 15 % and has increased turnover by 200 % in 3 years with significant expansion to large supermarket chains and international markets. Its business strategy is to change patterns of consumption for consumer goods and to respond to market demand from product manufacturers, retailers and end consumers for reduced packaging.

Using the dispenser creates shared savings for the majority of actors in the value chain. Product manufacturers can eliminate the need for individual packaging, saving costs of almost 80 % compared to conventional individual packaging. Transportation can be optimized by filling the liquids into 1,000-liter plastic bags supported by a cardboard box, saving almost 100 kg of plastic compared to individual bottles. In retail stores, consumers purchase liquid products directly from the machine using their own containers. This eliminates the need for a disposable bottle and reduces waste management costs. Retail prices of products can be reduced by up to 25 % as a result of material savings. At the same time, growing consumer concerns about plastic waste means that this mode of purchasing has led to an average 200 % increase in sales for the retailer.

³³ The machine itself was manufactured using a life cycle approach: all parts can be reused and repaired, made of re-usable plastic. There is no waste generated from production, parts come from the closest location possible, the machine is built to use low voltage electricity and switches off automatically when not in use.

³⁴ Ellen MacArthur Foundation 2013, Towards the Circular Economy

³⁵ Ibid.

'Having a sustainable image is a competitive advantage that can win customers. This leads to increased sales and profits'

Xavier Masselin,
Founder of *Eco2Distrib*

INNOVATIVE SOLUTIONS ALONG THE SUPPLY CHAIN ACCUMULATE VALUE

Resource scarcity and the depletion of non-renewable resources are driving up prices. Yet at the same time, 30 % more materials could potentially be recovered than is the case today³⁴. Companies of all sizes are innovating to find alternative solutions and create systems that reduce dependence on certain materials and recover others. Such systems are more easily developed in partnership and collaboration with suppliers and other companies, local organizations or academic institutions. Finding alternative solutions and systems allows companies to build a chain of higher economic, social and environmental value.

In developing and emerging economies, the potential for development and use of such systems is greater as companies are not locked into existing manufacturing or infrastructure systems. Companies in these countries have the possibility of transforming their business models and benefiting from untapped markets. Many companies in these economies are resource-intensive and have the potential to achieve considerable economic and environmental benefits³⁵ from eco-innovation.



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The Mexican Green Supply Programme boasted a positive value creation rate for participating companies

The *Mexican Green Supply Programme*³⁶ was a public-private demonstration project between Mexican federal and local authorities and a group of large companies to develop an innovative and replicable mechanism for engaging SMEs to improve their sustainability performance. Based on the value chain collaboration approach, it has resulted in mutual economic and environmental benefits for all parties involved. The participating companies implemented new procedures, modified technologies, or took on new activities such as on-site recycling or modification of products. The projects that focused on collaboration schemes produced significantly higher economic benefits than those based on singular interventions with an average payback of one year or less. Around 94 % of the projects implemented in the programme led to positive value creation for companies.

This project also demonstrated that supply chain co-operation strengthened the companies' organizational capacity for collaboration and information exchange while creating tangible knowledge-based advantages³⁷. The cost of technical assistance could also be shared and therefore reduced.

WORKING WITH KEY PARTNERS MAXIMIZES INNOVATION AND RESILIENCE

Eco-innovation can be implemented more efficiently when working with key partners across the value chain towards the same goals. This approach requires a clear and long-term company strategy to be developed with interventions that result in increased resilience of supply and capacity for innovation, full-scale resource efficiency and shared gains³⁸. Securing future supply of raw materials is also a key incentive for companies to start engaging with their whole supply chain. In 2012 for instance, over 40 companies issued profit warnings due to raw material pricing impacts.

Kering supply chain approach enables the Group to anticipate resource constraints

According to *Kering*, using the Environmental Profit and Loss (E P&L) accounting tool is helping them understand all impacts and potential risk areas in their brand's supply chains and raw material sourcing. Integrating these factors into the sourcing and innovation strategy has stimulated the development of solutions to these pressures, in collaboration with suppliers. This work entails a number of activities such as supporting suppliers to find alternatives for the cultivation of raw materials, processing and manufacturing phases of specific components. This can help prevent supply instability and resulting impacts on profitability.

³⁶ T.P. Lyon & B. v. Hoof, September 2010, Evaluating Mexico's Green Supply Chain Program

³⁷ Hart 1995

³⁸ Deloitte 2011, The high profit supply chain: A resource-focused approach

'Find out how (eco-innovation) makes strategic sense and gives your company a competitive advantage. Identify where there are material savings that can give cost reductions or where you can add value'

Ramon Arratia,
*Sustainability Director Europe
at Interface*



© Interface

Interface found an innovative solution in collaboration with its partners and enhanced its supply of raw material

The US carpet manufacturer *Interface* has implemented a range of closed-loop systems with a variety of partners. Applying a life cycle analysis, they discovered that 80-90 % of the environmental impacts from their carpets came from the nylon yarn. *Interface* started investigating solutions on how to recycle the yarn, use less yarn and opt for different types of yarn. To recycle the yarn, the company designed a new system in which they reclaim old carpets and separate the yarn from the backing. Through partnerships with yarn suppliers, the old carpets are collected, turned into recycled raw materials and used to make new carpets³⁹.

The company also engaged its value chain partners to find other ways 'outside of the box' to recover raw materials. In June 2012, *Interface* collaborated with the *Zoological Society of London* and *Aquafil*, an Italian yarn supplier, to collect discarded fishing nets from the Philippines. The goal of the partnership was to find an alternative source of recycled materials for the yarn, but it also enabled the development of a community-based supply chain system for discarded nets which otherwise pose an environmental threat to the marine environment. The nets are recycled into new threads which, combined with recycled yarn from reclaimed carpets, allow the production of a carpet made of 100 % recycled yarn⁴⁰. These types of innovations have positioned *Interface* as the leading company in its sector. It currently has a market share of approximately 35 % of the estimated US \$3 billion global carpet tile market⁴¹.

³⁹ The Natural Step 2013, *The Journey of a Lifetime*

⁴⁰ Interview with Ramon Arratia, Sustainability Director Europe, *Interface*

⁴¹ IBID

Stay ahead of standards and regulation

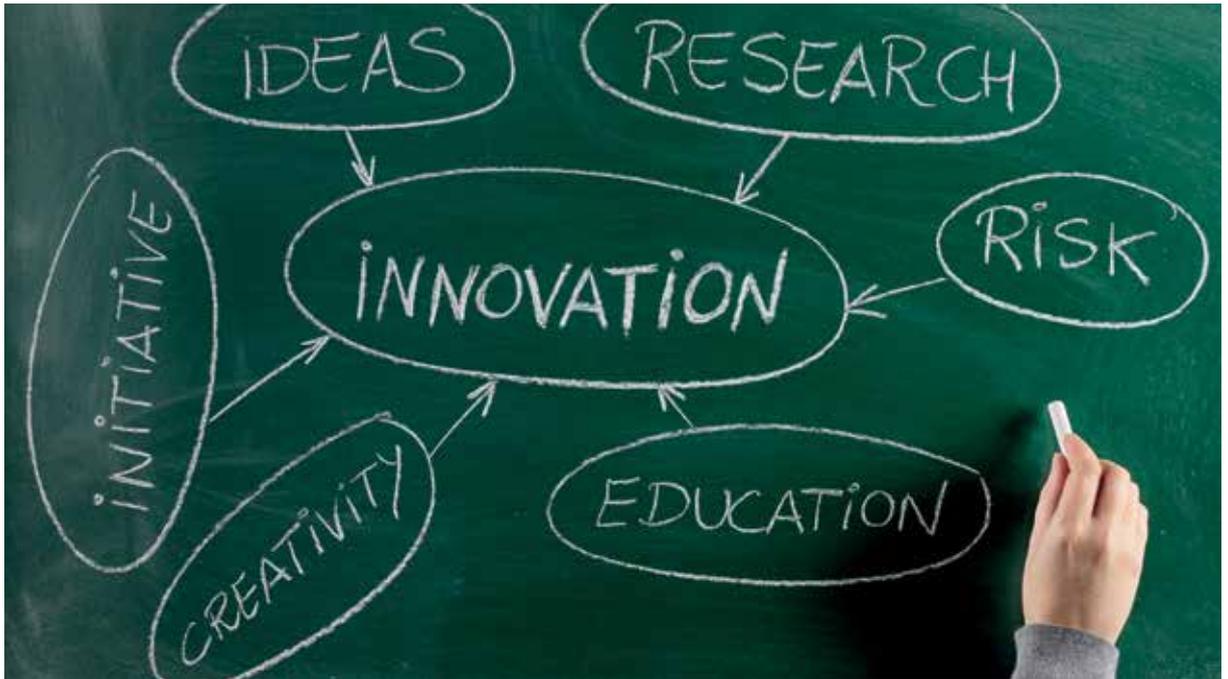
DRIVER 3

Eco-innovative companies are typically ahead in terms of regulatory compliance as they will have already innovated and tested the right materials, technologies and processes to meet requirements ahead of competitors.

OPPORTUNITIES FOR COMPANIES

Regulation and standards are becoming increasingly stringent worldwide. If your company operates in many different markets, eco-innovation will enable you to comply with the toughest requirements. In addition, companies considered as innovative sustainability leaders set the performance bar in the market, inform regulation and influence standards⁴². This can have a positive effect on your company reputation and market position.

⁴² GreenBiz 2014, State of Green Business Report, Joel Makower



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THE POLICY LANDSCAPE IS CHANGING

A range of new policy initiatives are being developed to encourage the mainstreaming of life cycle based approaches that promote environmental and social improvement of products and businesses. For example, France, followed by the European Union (EU), is considering measures related to the assessment and communication of environmental footprint for products and organizations based on a number of life cycle indicators⁴³. Other examples can be seen around the world in Japan, Brazil, Tunisia and Thailand⁴⁴. This will be of extreme importance for businesses and their respective supply chains spread across the globe.

In the EU, directives such as REACH (*Registration, Evaluation, Authorization & Restriction of Chemicals*)⁴⁵ for chemical use, impact a wide range of manufacturers, importers and exporters across many sectors. Its remit

covers a variety of goods, from chemical components for onwards sale to finished products, like clothes, furniture or plastic goods. The WEEE (*Waste Electrical and Electronic Equipment*)⁴⁶ Directive shifts the responsibility of the post-use phase to the producer and the RoHS (*Restriction of the use of Hazardous Substances*)⁴⁷ Directive restricts the use of certain substances in products. These types of regulations have been a strong driver for eco-innovation in a variety of sectors including textiles, agri-foods and electronics. Similar regulation has also been implemented in countries such as South Korea, China and Argentina⁴⁸.

The trend is notable in other regions too, where many governments have promoted a surge in product-focused environmental regulation and technical standards in the last 3-5 years⁴⁹. For example in the area of Environment, Health and Safety, roughly 500 additional regulations were adopted in 2012 compared to 2009⁵⁰.

⁴³ France initiative on Product Environmental Footprint <http://www.developpement-durable.gouv.fr/Product-Environmental-Footprint.html> and EC Single Market for Green Product Initiatives

⁴⁴ UNEP 2014, Life cycle thinking and the use of life cycle assessment in SCP Policies, Pre-print version

⁴⁵ http://ec.europa.eu/enterprise/sectors/chemicals/reach/index_en.htm

⁴⁶ http://ec.europa.eu/environment/waste/weee/index_en.htm

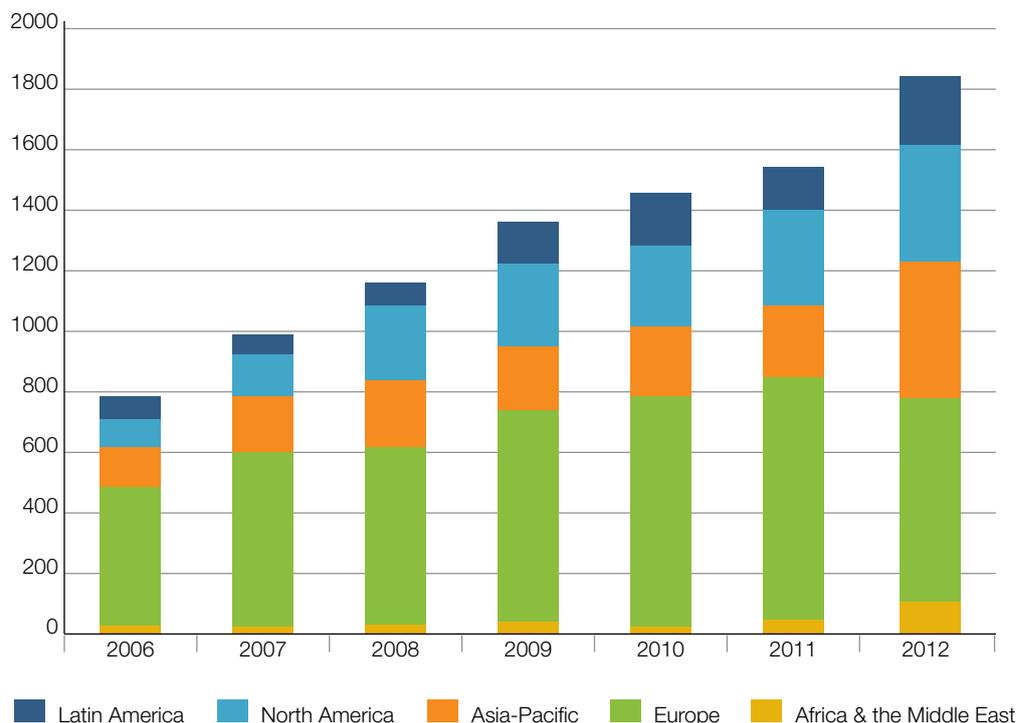
⁴⁷ http://ec.europa.eu/environment/waste/rohs_eee/

⁴⁸ IHS 2010, A Whitepaper Developed for Manufacturers of Electrical and Electronic Equipment *How to Ensure Your Products Meet Environmental Requirements in Asia* and IHS 2010 A Whitepaper Developed for Manufacturers of Electrical and Electronic Equipment *How to Ensure Your Products Meet Environmental Requirements in Latin America*

⁴⁹ IHS 2010, A Whitepaper Developed for Manufacturers of Electrical and Electronic Equipment *How to Ensure Your Products Meet Environmental Requirements in Asia*

⁵⁰ Source: http://ehstoday.com/safety/then-and-now-difference-4-years-can-make-ehs-regulatory-focus-around-world-slideshow#slide-0-field_images-22151

Figure 5: Growth in new environmental, health and safety regulations from 2006 to 2012



Source: ENHESA 2013

In addition, growing calls for increased transparency by governments at national and regional level have led to an increasing number of companies worldwide reporting on their sustainability performance. In Indonesia for example, companies are required to include the implementation of environmental and social responsibility programmes in their annual reports⁵¹.

In April 2014, the European Union adopted legislation relating to the mandatory disclosure of social and environmental information⁵². While its focus is only on large companies, the requirements can potentially affect all companies in the supply chain as large clients reporting on their performance will increasingly demand their suppliers to provide information and live up to specified standards.

‘Being ahead of regulation has given us a competitive advantage. The new solution has opened up access to new types of customers for us.’

Steffen Saecker,
SAFECEM

⁵¹ UNEP 2013, Carrots and Sticks, Sustainability reporting policies worldwide – today’s best practice, tomorrow’s trends

⁵² http://europa.eu/rapid/press-release_STATEMENT-14-29_en.htm?locale=en

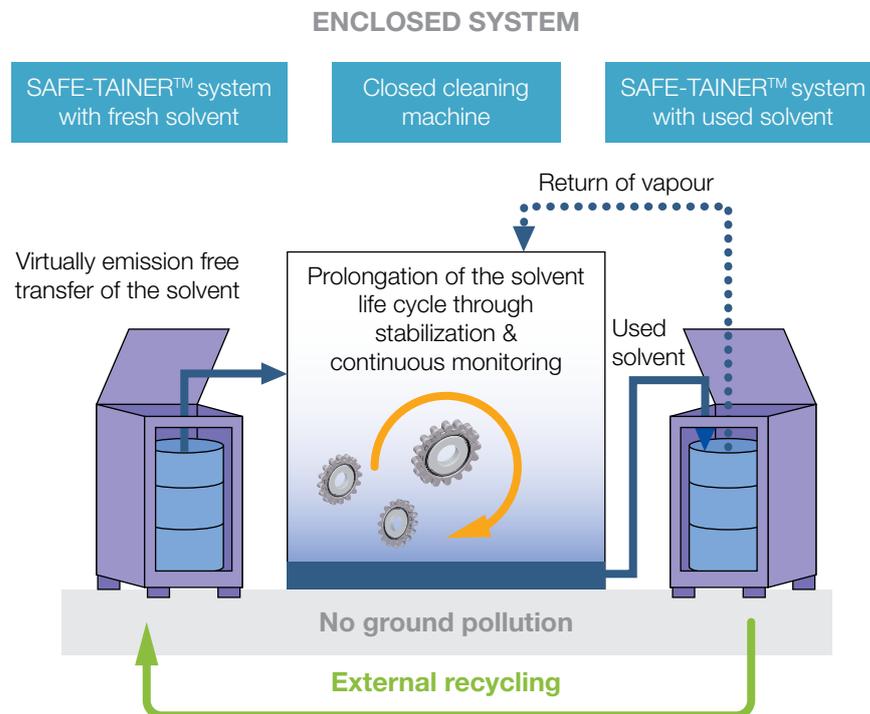
Eco-innovative companies are far ahead of compliance and can anticipate regulation

Given that eco-innovation is based on a life cycle approach, it enables companies to identify potential risk areas in the supply chain and improve on product and business operations holistically without shifting the burden to a different stage of the value chain, geographic area or time. As policy requirements become stricter, these risks could potentially turn into a liability and cost. Through their strategic and insightful approach, eco-innovative companies anticipate possible policy changes and propose solutions to meet future requirements. This gives them a first-mover advantage in the market.

SAFECHEM developed a closed-loop service system in anticipation of the Volatile Organic Compound (VOC) Directive

The German company *SAFECHEM* is a provider of services and solutions related to the optimized use of solvents in industrial surface cleaning and professional textile cleaning. Throughout Europe the company offers chemical product service systems such as chemical leasing where clients pay for the performance of cleaning rather than the volume of chemicals consumed. Through its closed-loop service system, *SAFECHEM* enables its clients to manage the product-specific risks of chlorinated and non-chlorinated solvents. Their product and service offering is well suited to SMEs. With the service-system model, the amount of solvents used for cleaning is reduced by up to 98 %. When the European VOC Solvents Emissions Directive came into force *SAFECHEM* was the only company ready with this offering to clients.

Figure 6. Closed-loop service system



Source: *SAFECHEM*

ECO-INNOVATIVE PRODUCTS ENHANCE ACCESS TO EXPORT MARKETS WITH STRICT REGULATIONS

Environmental and social requirements in international markets are also a key driver for eco-innovation. A number of countries have introduced stricter regulations which affect export opportunities. For instance, countries such as the Netherlands and the United Kingdom are now requesting sustainable sourcing certification for a variety of imported commodities⁵³. Companies that can meet these standards will be able to increase their access to international markets.

Multibax seizes the opportunity of growing demand for biodegradable bags

The Thai company *Multibax* is more than doubling its production capacity for its new line of biodegradable bags due to strong international demand. *Multibax* bio bag has passed several international standards for biodegradability such as ASTM 6400⁵⁴, allowing them to sell their product to Europe, the United States, the Middle East, Australia and South Africa. There are few companies capable of meeting the strict standards for biodegradable packaging⁵⁵ which allowed *Multibax* to tap into this demand and enter international markets. The company developed a bio-based and biodegradable plastic bag together with local universities and government agencies. Drawing on the analysis of available information and technology, *Multibax* formulated the composition for the bags focusing on locally abundant raw material, and then created a network with outside researchers to develop their own bio-based resin for the bags. Since demand in the domestic market is not yet sufficient for these product lines, the company is basing its strategy on increasing exports.

⁵³ http://www.rspo.org/en/national_commitments

⁵⁴ ASTM D6400 is the Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities

⁵⁵ Steve Toloken Plastic News January 2013, Multibax boosting its bio-based plastics production

⁵⁶ OECD 2013, A. Beltramello, L. Haie-Fayle & D. Pilat, Why New Business Models Matter for Green Growth

⁵⁷ Interface 2012, Annual Report

⁵⁸ http://www.sustainablebrands.com/news_and_views/articles/interface-closes-product-transparency-goal

⁵⁹ <http://ethicalperformance.com/reports/view/511>

⁶⁰ <http://www.ghgprotocol.org/>

RESPECTED COMPANIES CAN INFORM FUTURE STANDARDS AND REGULATION

Being an industry leader and innovator serves as a market differentiation, increasing reputation and brand recognition. Policy-makers look to leading sustainability companies to set the benchmark on what is feasible in the market and how they can shape policy to encourage more sustainable enterprises and products. Eco-innovative companies therefore have more opportunity to inspire regulators to develop legislation that is feasible and beneficial for both industry and the environment⁵⁶.

Interface supports the use of environmental product declarations

As part of implementing Mission Zero, a company initiative to eliminate any negative impact on the environment by the year 2020, the US carpet manufacturer *Interface* declared full transparency in the way their carpets are made by using environmental product declarations on 90% of their products⁵⁷. According to them, full disclosure is the only way for a company to gain customer support in the marketplace today⁵⁸. *Interface* is supporting the use of environmental product declarations to become the new standard within the carpet industry⁵⁹.

As policy making usually involves a variety of stakeholders at the agenda-setting stage, this provides opportunities for industry leaders in sustainability to not only participate in the process but to also drive it. For example, the most prominent international standard for carbon foot-printing, such as the Greenhouse Gas Protocol Carbon footprint Standard⁶⁰, was developed with the active engagement of companies and large retailers. This standard has informed the development of related regulation and legislation in many countries.



© Interface

Attract financial resources and investments

DRIVER 4

Eco-innovation is attracting an increasing amount of investment from different sources.

OPPORTUNITIES FOR COMPANIES

As an eco-innovative company, you have an increasing number of possibilities to attract funding. Local governments and institutions across the world provide funding to stimulate environmental and social innovation targeting SMEs in particular. In addition, an increasing number of mainstream banks have established specific credit lines to provide loans to companies with strong sustainability approaches while internet technology has expanded investment options by offering crowd-funding platforms to attract investors to new ideas.

PUBLIC AUTHORITIES AND INSTITUTIONS OFFER FUNDING FOR ECO-INNOVATION

There are many examples of governments, organizations and universities that have set up special funds for companies to obtain grants for innovation and sustainability initiatives. These range from funding for research and development to new technologies and other relevant activities. National and regional level grants can also be obtained for testing products and bringing them to the market. In many cases, priority for these grants is given to SMEs.



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In countries such as Korea⁶¹, Brazil⁶², India⁶³, China⁶⁴ and South Africa⁶⁵, government programmes focus on research and development of knowledge and technology related to eco-innovation. In Malaysia⁶⁶, the Philippines⁶⁷, Mexico⁶⁸, Canada⁶⁹, Denmark⁷⁰, the UK⁷¹, Japan⁷², Australia⁷³, New Zealand⁷⁴, the USA⁷⁵, Israel⁷⁶ and Thailand, governments offer funding programmes to help SMEs embark on sustainability and innovation projects. Typically, these programmes consist of advice and assistance for SMEs, or grants where companies can receive up to 70 % of their costs related to the project. For example in Malaysia, the National SME Development Council (NSDC) recently endorsed, as

part of its SME Masterplan, specific funds to be made available for inclusive innovation for the lower 40 % of the SME income group⁷⁷. The National Innovation Agency in Thailand is providing matchmaking between banks and SMEs in order to provide funding schemes for eco-innovative initiatives⁷⁸ while the European Commission provides a wide number of grants specifically promoting eco-innovation at the SME level. Examples include the Innovation in SMEs scheme under the Horizon 2020 EU Framework Programme for Research and Innovation which aims to build the internal capacity of SMEs to manage innovation processes from idea generation through to its profitability on the market⁷⁹.

⁶¹ OECD 2008, Eco-Innovation policies in the Republic of Korea

⁶² <http://www.finep.gov.br>

⁶³ NESTA 2012, Our Frugal Future, Lessons from India's Innovations System

⁶⁴ OECD 2009, Eco-Innovation policies in the People's Republic of China

⁶⁵ OECD 2011, Eco-Innovation policies in South Africa

⁶⁶ <http://www.smecorp.gov.my/vn2/programmes>

⁶⁷ <http://techcrunch.com/2013/04/06/filipino-social-good-startups-win-at-ideaspace-competition/>

⁶⁸ Ministry of Science and Technology, Mexico *Consejo Nacional de Ciencia y Tecnología* <http://www.economia.gob.mx/comunidad-negocios/industria-y-comercio/innovacion/innovacion-fondos>

⁶⁹ <http://www.idp-ipd.com/ecoconception/expertise-en-ecoconception>

⁷⁰ The Green Business Development Fund; <http://dba.erhvervsstyrelsen.dk/innovation-and-growth>

⁷¹ North West Eco-Innovation programme, <http://www.ctechinnovation.com/#sthash-HydyK77Q.dpbs>

⁷² OECD 2008, Eco-Innovation policies in Japan

⁷³ OECD 2008, Eco-Innovation policies in Australia

⁷⁴ OECD 2008, Eco-Innovation policies in New Zealand

⁷⁵ OECD 2008, Eco-Innovation policies in the United States

⁷⁶ OECD 2011, Policies to support eco-innovation in Israel

⁷⁷ SME Corp, Malaysia www.smecorp.gov.m

⁷⁸ <http://www.nia.or.th/>

⁷⁹ <http://ec.europa.eu/programmes/horizon2020/en/h2020-section/innovation-smes>

Natura, SSS, KUO Industrial Group and Multibax have all benefited from funding and support

The Brazilian company *Natura* received US \$43 million in 2012 specifically for innovation, training, logistics and information technology from national institutions⁸⁰. The company established research partnerships consisting of research institutions, suppliers, local producers and NGOs which helped them to obtain funding^{81, 82}. Similarly, the South African energy supply company *Specialized Solar Systems* developed its solar micro-grid technology with support from local universities and deployed it via the government electrification programme. The Thai company *Multibax* benefited from support provided by the National Innovation Agency of Thailand as well as other local government agencies assisting them on their innovation path. The Mexican *KUO Industrial Group* received funding support from the National Council on Science and Technology (CONACYT).



© *Specialized Solar Systems*

LONG-TERM INVESTORS LOOK FOR RESILIENT COMPANIES

Innovation for sustainability entails building long-term resilience which increases the commercial attractiveness of a company. Long-term investors are finding that investments that address sustainability challenges can offer attractive financial returns as well as reduce future risks. The number of signatories to the UN Principles for Responsible Investment has now reached almost 1,200 institutional investors⁸³. In fact, the sustainability angle adds attractiveness for any investor linking to reputation and brand equity as well as a stronger correlation with the project's resilience particularly in the long run. This is demonstrated by the fact that information on the sustainability performance of companies is now increasingly demanded by stock exchanges all over the world⁸⁴.

In Brazil, the Stock Exchange of Sao Paulo has 58 % of the enlisted companies⁸⁵ disclosing their sustainability performance⁸⁶. In the UK, new regulation adopted in 2013 requests FTSE 100 companies on the London Stock Exchange to report on GHG emissions⁸⁷. In some countries, pension funds and banks are investing in companies and projects with a long-term sustainability focus and goals⁸⁸.

Nigeria was the first country in the world to launch Sustainable Banking Principles in 2012. They require banks to balance the environmental and social risks of their investments, the adoption and implementation of which are compulsory⁸⁹. The launch of the initiative has opened a new market for sustainability services for local and foreign companies⁹⁰.

⁸⁰ Natura Annual Report 2012: Funds were granted by BNDES (Brazilian National Bank for Social and Economic Development) and FINEP (Financial Sponsor of Studies and Projects).

⁸¹ Including organizations such as FINEP, BNDES and CNPQ

⁸² Interview with Fabien Brones, Scientific Manager Eco-design and Environmental Impacts, Natura.

⁸³ UN Principles for Responsible Investment <http://www.unpri.org/about-pri/about-pri/>

⁸⁴ <http://www.ft.com/intl/cms/s/0/7ab8f196-40ab-11e3-ae19-00144feabdc0.html>

⁸⁵ As of October 2012

⁸⁶ UNEP 2013, Carrots and Sticks, Sustainability reporting policies worldwide – today's best practice, tomorrow's trends.

⁸⁷ <http://www.theguardian.com/environment/2012/jun/19/emissions-policy-firms-reveal-co2>

⁸⁸ UN Principles for Responsible Investment 2012. Investing in the Sustainable Economy

⁸⁹ <http://www.cenbank.org/out/2012/ccd/circular-nsbp.pdf>

⁹⁰ <http://www.theguardian.com/sustainable-business/sustainable-banking-nigeria-strategy-mindset>



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Triodos Bank doubled in size due to increase in capital for sustainability initiatives

The investment strategy of the Dutch *Triodos Bank* demonstrates the growing financial interest in eco-innovative companies. It invests in SMEs that are sustainability leaders. During a time when most financial institutions have been undergoing difficulties, the Bank has doubled in size due to the increase in capital available for sustainability initiatives. The investment strategy targets companies that demonstrate an integrated sustainability approach assessed on stringent sustainability criteria evaluated along their entire supply chain⁹¹. *Triodos* currently manages € 9.6 billion euros and testifies that the segment of consumers factoring sustainability into their purchasing decisions is growing⁹². In addition, other banks such as *YES BANK* in India, *CIBanco* in Mexico and *Bancolombia* and *Bancoldex* in Colombia have established green credit lines for companies demonstrating a strong sustainability vision.

‘There are indicators of strong market growth in companies producing sustainable products and services’

James Vaccaro, Triodos Bank

Three Wheels United links cleaner auto-rickshaws with financial and social services

Three Wheels United (TWU) is a start-up company in India with an innovative financing scheme which has triple bottom line benefits. An auto-rickshaw is a common transport means in India that provides a livelihood for at least 5 million people⁹³. The business-as-usual model is that the drivers rent high-polluting vehicles to work up to 12 hours a day earning around US \$3 under poor working conditions. The TWU business model is based on three principles: access to financial and social services (through negotiating with local banks), provision of alternative sources of revenue and cleaner-technology for the vehicle. Under the scheme, both the banks and the drivers benefit. The drivers’ revenue increases by approximately 70 %, they can become the owner of their vehicle, and engine replacements reduce fuel costs while the bank recovers 100 % of loans.

Crowd funding channels funding directly from individuals to companies

An increasingly popular method of attracting investments for eco-innovation ideas and projects is through crowd funding organizations. These connect individual investors with companies and have gained significant momentum in recent years. New organizations and platforms such as *Green Fundraising* and *Green VC* also focus on environmentally conscious ideas and projects that are looking for investments^{94, 95}.

⁹¹ Montalvo, C., Diaz Lopez F. J. & Brandes, F. 2011. Analysis of the Potential for Eco-innovation in Nine Sectors. Task 4 Horizontal Report Deltt: Europe Innova Sectoral Innovation Watch. Project on behalf of the European Commission, DG Enterprise and Industry.

⁹² Interview with James Vaccaro, International Head of Corporate Development, Triodos Bank

⁹³ Interview with Ramesh Prabhu, Three Wheels United. Information can also be found here: <http://enviu.org/our-work/three-wheels-united/>

⁹⁴ <http://greenfundraising.org>

⁹⁵ <http://www.greenvc.org/crowdfunding.html>



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ECO-INNOVATIVE COMPANIES ARE ATTRACTIVE TO ACQUISITIONS, MERGERS AND PARTNERSHIPS

In recent years, a range of SMEs have built strong brands as a result of eco-innovation. This leads to an increase in value for the company making them attractive candidates for potential acquisitions, mergers and partnerships⁹⁶. In addition, small companies working in partnership with large companies gain access to knowledge and resources and can tap into larger funds than might otherwise be possible⁹⁷.

A number of highly valued small innovative companies have been bought by large companies. Some examples include the beverage company *Innocent* that was acquired by the US multinational *Coca Cola*, the US company *Burt's Bees* that started out as a small company with revenues of US \$23 million in 2000 and was acquired

by *Clorox* in 2007 for US\$1 billion⁹⁸, and finally the car rental company *Avis* that acquired car sharing platform *Zipcar* in 2013 for US\$500 million. There has also been a significant rise in interest from corporations to create or fund subsidiary companies specializing in innovation and clean technology^{99, 100}. These acquisitions are an indication of the potential growth for companies with innovative business models.

Ecover acquires *Method* and gains access to knowledge as well as markets

The small manufacturer of ecological cleaning products, *Ecover* bought *Method*, a San Francisco-based manufacturer of green cleaning products, in 2012 to assist with their entry into the North American market. *Ecover* doubled in size to a company with 300 employees and sales exceeding US \$200 million. Through the acquisition, the companies gained access to innovative solutions: e.g. *Ecover* on *Method's* green solvents and design capabilities, and *Method* on *Ecover's* R&D capabilities to develop novel plant based ingredients such as biosynthetic surfactants¹⁰¹. Together, they will have access to a larger market and growth opportunities.

⁹⁶ Montalvo, C., Diaz Lopez F. J. & Brandes, F. 2011. Analysis of the Potential for Eco-innovation in Nine Sectors. Task 4 Horizontal Report Delft: Europe Innova Sectoral Innovation Watch. Project on behalf of the European Commission, DG Enterprise and Industry.

⁹⁷ OECD Publishing, Paris, 2013 A. Beltramello, L. Haie-Fayle & D. Pilat, Why New Business Models Matter for Green Growth, OECD Green Growth Papers

⁹⁸ <http://www.greenbiz.com/blog/2013/09/11/lean-startup-movement-lessons-coca-cola>

⁹⁹ Clean Tech Group 2009, The rise of the corporation in cleantech

¹⁰⁰ Clean Tech Group 2013, Global Cleantech 100,

¹⁰¹ Interview with Tom Domen, Long-term Innovation Manager, Ecover.

Increase productivity and technical capacity

DRIVER 5

Eco-innovation entails a process of organizational change enhancing human and social capital, which are key assets of a company.

OPPORTUNITIES FOR COMPANIES

As an eco-innovative company, you can benefit from this virtuous circle: the more you innovate, the better you get at innovating. Eco-innovation typically involves a drive for information exchange and participation in innovation processes by different units within your company as well as the acquisition of knowledge through collaboration with value chain partners and technical institutes¹⁰². The resulting learning and creative process leads to stronger employee engagement, technical capacity in key competencies and overall skills base which correlate positively with the productivity of the company^{103, 104}.



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¹⁰² Aija Leiponen *Skills and Innovation* International Journal of Industrial Organization Volume 23, Issues 5-6, June 2005, Pages 303-323

¹⁰³ Ibid.

¹⁰⁴ Solomon Markos and M. Sandhya Sridevi, December 2010 International Journal of Business and Management Vol. 5, No. 12



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ECO-INNOVATIVE COMPANIES INCREASE TECHNICAL CAPACITY AND PRODUCTIVITY

Embarking on eco-innovation is a process of change that will lead to the enhancement of technical capabilities. As eco-innovation typically involves collaboration with value chain partners such as larger companies and technical institutes, knowledge can be acquired by companies in the process. For example, the small manufacturer of ecological cleaning products *Ecover*

noted that through the eco-innovation process, their partners brought different expertise and perspectives into the company that increased its capacity to develop innovative solutions for the market¹⁰⁵. In the process, an eco-innovative company benefits from the creation of a stronger skill base and better performance which positively correlate with productivity rate¹⁰⁶.

'Without innovation, growth wouldn't be possible. It has helped us to become a sustainable producer which is a requisite to develop new projects in our markets.'

Margarita Ferat,

Environmental and Energy Corporate Manager at KUO Industrial Group

¹⁰⁵ Interview with Tom Domen, Long-term Innovation Manager, Ecover.

¹⁰⁶ 2013, D. Antonioli, S. Mancinelli, M. Mazzanti: Is environmental innovation embedded within high-performance organisational changes? The role of human resource management and complementarity in green business strategies, *Research Policy*, Volume 42, Issue 4, Pages 975-988

KUO moved from low value-added products to high value chemical components

Through a large number of process and organizational innovations, the Mexican industrial group *KUO* managed to increase productivity, reduce costs and increase the overall efficiency of operations in parallel to developing its research and development (R&D) capacity¹⁰⁷. *KUO* now commercializes specialized components based on proprietary technology such as composite materials for tyres with more sustainable features sold on international markets such as the United States and Europe. *KUO* implemented a new business strategy in the 1990s implementing design for environment and combining eco-efficiency with innovation to produce higher value specialized chemical components. The company used an approach of joint ventures, an extensive eco-efficiency programme and R&D to increase its overall technical capacity¹⁰⁸. This improved the ability to develop high-value chemical components such as Biorene, an ingredient of bio-based plastics that is compliant with the ASTM¹⁰⁹ bio-degradability standard.



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ECO-INNOVATIVE COMPANIES INCREASE EMPLOYEE ENGAGEMENT

The working culture of a company determines the strength of social capital which can directly affect the success of the company. An increasing number of companies now realize that by focusing on employee engagement, they can create more efficient and productive workforces¹¹⁰. Given the collaborative nature of eco-innovation, such companies tend to involve their workforce in a more participative process of knowledge sharing, training and encouraging two-way communication.

Employees' sense of engagement and satisfaction leads to better retention of skills and reduced attrition rate which corresponds in turn to higher productivity, profitability and growth of a company¹¹¹. This is supported by research which indicates that the more engaged employees are, the more likely their employer is to exceed the industry average in terms of revenue growth¹¹². Such correlation is stronger if employees feel engaged in a positive cause. For example, a 2010 global survey in China, India, US, UK and Germany indicated that over 96 % of 18-45 year olds want their employer and workplace to be environmentally friendly or at least environmentally aware¹¹³.

***Natura's* staff attrition rate is only 9 %**

The Brazilian cosmetics company *Natura* believes that it is important to educate and train its employees to achieve the company's vision. On average, its employees in Brazil received 95 hours of training in 2012 amounting to a total investment of US\$ 8 million. The results of this high focus on training can be seen with 72 % of employees satisfied with working at *Natura* and an internal promotion rate of 71 % at the management level in Brazil in 2012. In addition, the retention rate is high with an annual attrition rate of just 9 %¹¹⁴.

***Ecover's* Long-term Innovation Manager helps develop internal capacities**

In the case of *Ecover*, the company has a dedicated Long-term Innovation Manager who collaborates with all company departments. This is helping to drive change within the company but also to develop internal capacities at its core. The company has a culture of information exchange which encourages employees to express their ideas to drive sustainability and innovation forwards.

¹⁰⁷ Diaz Lopez, F. J. 2009, Environment, Technological Change and Innovation. Faculty of Social Sciences. School of Development Studies. Norwich, University of East Anglia. Doctor in Philosophy: 302.

¹⁰⁸ Journal Industry and the Environment, 2004 Volume 27 No.2-3 Article Margarita Ferat

¹⁰⁹ ASTM, is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems and services.

¹¹⁰ Solomon Markos and M. Sandhya Sridevi, December 2010 International Journal of Business and Management Vol. 5, No. 12;

¹¹¹ Ibid.

¹¹² Ibid.

¹¹³ Johnson Controls 2010 Global WorkPlace Innovation: Generation Y and the Workplace Annual Report

¹¹⁴ Natura 2012, Annual Report

How do I start an eco-innovation process?

This publication can serve your company as inspiration for embarking on eco-innovation. To go further, we can recommend a number of publications and websites.

UNEP ECO-INNOVATION PROJECT www.unep.org/ecoinnovationproject

- The *Eco-Innovation Manual* provides step-by-step guidance to Resource Efficient and Cleaner Production (RECP) service providers and other business intermediaries to identify opportunities and assist SMEs to implement eco-innovation programmes. The *Manual* contains specific sector supplements for agri-food, metals and chemicals. It is being used in pilot projects engaging over 35 companies in 6 countries from Africa, Asia Pacific as well as Latin America and the Caribbean regions.
- *Technology for Eco-innovation* provides practical advice to RECP service providers and policy makers on the key enablers, processes and methods of transferring, adapting and developing technologies for eco-innovation. Some key policy actions in this context are highlighted.
- The *SCP Policy Guideline* informs RECP service providers and policy-makers about appropriate policy mixes that can address the barriers and enabling conditions for eco-innovation in order to provide a conducive policy framework. The *Guideline* informs RECP service providers about proactive ways to use their expertise for interacting in the policy-making cycle. National level action planning will be carried out in 6 countries based on in-country policy assessment studies.
- A final *Compendium of Eco-innovation Cases* showing best practices and lessons from the pilot demonstration projects will be compiled. The Project's experience will be widely shared and disseminated.

LIST OF SERVICE PROVIDERS AND EXPERTS

To assist you with eco-innovation, RECP Service Providers and other relevant experts can provide advice on what needs to be considered and how to implement the different phases of the process. A non-exhaustive list of service providers is available on the UNEP Eco-innovation Project website.

LIST OF TOOLS AND REFERENCES FOR MORE INFORMATION

- UNEP Design for Sustainability:
<http://www.unep.org/resourceefficiency/Business/CleanerSaferProduction/Eco-InnovationTheUNEPAapproach/DesignforSustainability/tabid/78845/Default.aspx>
- UNEP Life Cycle Management; a business guide to sustainability:
<http://www.unep.org/pdf/dtie/DTI0889PA.pdf>
- Life Cycle Innovation and Management for small and medium sized companies (LiMas)
<http://limas.simplle.com/>
- European Commission: Eco-Innovation – A guide to SMEs and Business Coaches
<http://www.eco-innovation.eu/index.php?option=comcontent&view=article&id=638:smeguide2&catid=79:thematic-reports&Itemid=212>
- OECD: Sustainable Manufacturing Toolkit:
www.oecd.org/innovation/green/toolkit

Full Case Studies

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Case Study Specialized Solar Systems

Location	Size	Established
South Africa	60 employees (SME)	2005
Annual Sales	Sector	
2012/13 \$US 872 040	Alternative energy supply, service and Support	
2013/14 \$US 2 083 687		

Business Growth	<ul style="list-style-type: none"> ✓ In 3 years, the company has tripled in size. ✓ SSS has become one of the main suppliers to local government. Initial support from local government and institutions, and rollout to the critical mass, have enabled 'enormous business growth'¹¹⁵.
Business Strategy	<ul style="list-style-type: none"> ✓ Meet market demand from low-income consumers with high levels of energy poverty in rural South Africa through the provision of a Direct Current (DC) micro grid service-system fed by solar power. ✓ To modify home appliances to function on DC which uses 2/3 less energy compared to Alternate Current (AC) when converted. ✓ To change the 'norms' in consumption patterns of electricity from AC to DC from solar power by working in partnership with local government and institutions. ✓ To establish support networks for the technology throughout the region of Africa. <p>Many areas in South Africa are not covered by traditional AC-based energy supply infrastructure. SSS has therefore demonstrated technological leapfrogging through an innovative approach that avoids being locked into less efficient systems requiring highly skilled maintenance.</p>
Business model	<ul style="list-style-type: none"> ✓ The DC microgrid kit is sold as a service system, as opposed to a one-off product purchase, at a price that is considered affordable locally by the target market. ✓ The kit can be managed remotely from a 'smart box'. ✓ SSS provides free trainings for installation, use and maintenance. Through fostering new skills in local communities, which function within service to service exchanges, SSS states that it is creating social and economic value.
Product Innovation	<ul style="list-style-type: none"> ✓ Designed using a life-cycle approach, the product, has a modular base which means that specific components can be replaced without having to reinstall the entire system. ✓ The panels are effective for 20 years and a smart box serves as the functioning mechanism, which enables the system's management and maintenance.
Process and Distribution	<ul style="list-style-type: none"> ✓ The smart box has a web-based system which allows remote system management and payment reducing transport needs and costs for monitoring. ✓ Training and manufacturing plants are moved to the proximity of the respective markets.

¹¹⁵ Source: Interviews with Carlos Smith and Jonathan Hodgson, Specialized Solar Systems

Case Study Ecover

'Our expansion from the small shops into supermarkets was thanks to our eco-innovation. This entry in mass retail has given us a big boom in sales.'

Tom Domen,
Ecover

Location	Size	Established
Belgium	300 employees	1980
Annual Sales		Sector
\$200 million		Ecological cleaning products

Business Growth	<ul style="list-style-type: none"> ✓ Shift from niche markets to supermarkets Europe-wide. ✓ Annual growth rates of 10-25 % between 2002 and 2010. ✓ Acquisition of the company Method in 2012, a US manufacturer of ecological cleaning products, bringing Ecover sales to over US \$200 million.
Business Strategy	<ul style="list-style-type: none"> ✓ Innovations mostly through open innovation involving partners and scientific institutions. ✓ Shift from incremental innovations such as replacing ingredients to a more radical eco-innovative path now looking at new business models, supply chains and sourcing strategies. ✓ Respond to market demand: annual growth of the ecological cleaning products market by 21 % between 2007 and 2011¹¹⁶. ✓ Business expansion to supermarkets all over Europe with a view to expand to other global regions.
Business model	<ul style="list-style-type: none"> ✓ Innovation in all dimensions of the company considering the entire value chain of its products in order to respond to market demand ahead of competitors. ✓ Certification of its products with eco-labels, if needed, to reach key market segments.
Product Innovation	<ul style="list-style-type: none"> ✓ Development and use of formulas with bio-based solutions using certified ingredients¹¹⁷. According to Ecover, it is continuously innovating to develop new technologies that can provide the most sustainable alternatives in the long term. ✓ Re-fill packages and use of 100 % bio-based plastics such as Green PE made from certified sugar cane¹¹⁸ which can be fully recycled along with conventional plastics. According to Ecover, there is a system in place to audit the sugar cane plantations. ✓ Cleaning products that are effective with a cold water wash (hot water use is a key environmental hotspot in the life cycle of most cleaning products).
Process innovation	<ul style="list-style-type: none"> ✓ Innovating in all processes including manufacturing and distribution channels by promoting dispensing machines with retailers and online purchases.
Organizational structure	<ul style="list-style-type: none"> ✓ Collaboration with actors in the product value chain. ✓ Establishment of a specific position for <i>Long-term Innovation Manager</i>. ✓ A company culture of encouraging and inviting employees to propose ideas.

Source: Tom Domen, Long term Innovation Manager, Ecover

¹¹⁶ Sales globally of green cleaning products accounted for US\$640 million in 2011 representing three percent of the global household and laundry cleaner retail market.

¹¹⁷ LCA studies have been carried out on the specific issue of land and water use for bio based ingredients with universities.

¹¹⁸ idem.

Case Study Eco2Distrib

Location	Size	Established
France	10 employees	2008
Sector		
Retail of consumer products		

Business Growth	<ul style="list-style-type: none"> ✓ Sales growth of approximately 15 % annually ✓ Increased income by almost 200 % in 3 years ✓ Increased number of orders beyond what the company can currently supply
Business Strategy	<ul style="list-style-type: none"> ✓ Change patterns of consumption for consumer goods and respond to the market demand of end consumers desiring to purchase their goods in a more sustainable way (50 % according to a market study¹¹⁹). ✓ Expand to retail stores that are market leaders such as Carrefour, E. Leclerc, organic stores and product manufacturers who are interested in finding out how to reduce the amount of plastic used, transport costs and cater to end consumers that are more aware of environmental issues. ✓ Expansion to other countries such as Germany, Italy, Spain and the United States of America.
Business model	<ul style="list-style-type: none"> ✓ Manufacture machines with an electronic system that dispenses fluid consumer products such as detergents in retail stores. ✓ Connect to product suppliers and retail stores so that they can sell products without the cost of packaging and handling individual products while end consumers can buy the exact quantity required and reduce their waste. ✓ Work closely with other actors in the supply chain to provide an effective solution to reduce the environmental and economic cost of individual packaging.
Product Innovation	<ul style="list-style-type: none"> ✓ Development of a machine in which all parts can be reused and repaired, made of re-usable plastic. ✓ No waste is generated from production, parts come from the closest location possible, and the machine uses low voltage electricity and switches off automatically when not in use. ✓ Use of the machine substitutes the need for individual packaging, preventing waste in landfills. ✓ Retail prices can be reduced by up to 25 % as a result of the material savings (12 % on average). ✓ Sales in retail stores increased by 300 % on average from using the vending machine as a sales channel (up to 500 % for the best store).
Process innovation	<ul style="list-style-type: none"> ✓ Transportation of products in bulk 1,000-liter containers increases efficiency and saves costs. ✓ Production savings of almost 80 % on plastic and transportation costs compared to conventional packaging. ✓ The use of material resources is reduced by 87 % and CO2 emission reduced by 65 %.

Source: Interview with Founder of Eco2Distrib, Xavier Masselin

¹¹⁹ Ethicity 2011 Annual market survey, The French and the sustainable consumption'
<http://www2.ademe.fr/servlet/getDoc?cid=96&m=3&id=76320&ref=24691&p1=B>

Case Study SAFECHEM

'Being ahead of regulation has given us a competitive advantage. The new solution has given us access to new types of customers.'

Steffen Saecker,
SAFECHEM

Location	Size	Established
Germany	35 employees	1992
Sector		
Chemical product services and chemical leasing		

Business Growth	SAFECHEM continues to grow in a declining market and serves 7,500 clients across Europe and North America.
Business Strategy	<ul style="list-style-type: none"> ✓ SAFECHEM is a provider of services and solutions related to the use of solvents in industrial surface cleaning and professional textile cleaning. ✓ Driven by customer demand and guided by Product Stewardship principles, SAFECHEM has developed an innovative closed-loop service system to help its clients meet their needs of: <ul style="list-style-type: none"> ◆ Cleaning performance through the use of recyclable solvents ◆ Workplace safety ◆ Regulatory compliance ◆ Environmental protection ◆ Reduced solvent consumption and therefore, waste ✓ Through its closed-loop service system, SAFECHEM enables its clients to manage the product-specific risks of chlorinated and non-chlorinated solvents. Their product and service offering is suited for SMEs. ✓ By being 15 years ahead of European regulation the company benefitted from untapped market demand for the safe and sustainable use of solvents in cleaning applications.
Business model	<ul style="list-style-type: none"> ✓ SAFECHEM offers chemical product service systems like chemical leasing where clients pay for the performance of cleaning rather than the volume of chemicals consumed. ✓ Chemical leasing and the closed loop system which reduces the use of chemicals and increases the financial benefits for both parties. SAFECHEM helps optimize the cleaning process as well as the amount of solvent consumption. ✓ In 2007 the VOC directive was implemented throughout Europe. At that point, the company had a product that was tested and proven, and that no one else could offer. By developing a new solution, the company had a product that was ahead of regulation and could gain a competitive advantage in the market of solvent cleaning. ✓ The company works with relevant stakeholders along the value chain such as recycling companies and machine manufacturers. They also offer their services via distribution partners and have expanded their network and market coverage.
Product Innovation	<ul style="list-style-type: none"> ✓ The closed loop system is a double-walled safety steel container system for the safe handling of fresh solvents and the take-back of used solvents for recycling. It was designed together with clients and the machine manufacturer. ✓ Up to 98 % reduction of solvent consumption for clients in combination with closed cleaning equipment technology. ✓ Using the closed-loop system, virtually no chemicals are spilled or emitted.
Process innovation	<ul style="list-style-type: none"> ✓ Solvents are recycled within a closed cleaning machine and can be used for up to 4 years if continuously monitored and stabilized applying SAFECHEM Service Elements. This service portfolio includes test kits for on-site monitoring, stabilizer concentrates for re-stabilization of the solvent during use, specialized laboratory services, solvent training, and consultancy. After that the solvents are returned and recycled. ✓ Workforce training on the safe and proper handling of solvents provided by SAFECHEM enables optimized processes and environmental compliance.

Source: Steffen Saecker, SAFECHEM
Nordic Innovation Report 2012 Green Business Model Innovation: Business case study compendium

Case Study Natura

Location	Size	Established
Brazil	Over 7000 employees and 1.657 million independent sales consultants	1969
Annual Sales	Sector	
US\$ 3.2 billion	Cosmetics, fragrances and personal care	

Business Growth	Natura currently has a market share of over 20 % in Brazil and has had a compounded annual growth of 26 % from 2005-2010 leading to revenues of US\$ 3.2 billion in 2013. It is ranked among the world's top 20 beauty companies ¹²⁰ .
Business Strategy	Innovation for market differentiation and sustainability.
Business model	<ul style="list-style-type: none"> ✓ Continuous research into new technologies, market trends and advances in the area of cosmetics with a focus on technologies for sustainability and 'well-being' as key innovation drivers. ✓ Uses an open innovation model and R&D platform involving partners such as researchers and other institutions as part of a scientific community as well as suppliers. Received investment from national financial institutions such as FINEP, BNDES, CNPQ. ✓ Selects suppliers on a 'shadow price' that reflect the socio-environmental costs and benefits. ✓ Focuses supplier relationships on the creation of partnerships to build a chain with higher-added value. The estimated socio-environmental benefits of selecting suppliers who are high sustainability performers were worth over US\$750,000 in 2012.
Product Innovation	<ul style="list-style-type: none"> ✓ Natura develop products using an eco-design approach applying life-cycle thinking to the product formulas, packaging and distribution channels. ✓ For example, for the SOU body and bath care product line: <ul style="list-style-type: none"> ◆ The product line was developed using ecodesign and a life cycle thinking approach, with a dedicated multifunctional team. Formulas were created using only essential ingredients, giving priority to plant-based components with up to 75 % 'vegetalization' and no colour pigments. ◆ Stand up pouches with a cap are used as primary packaging. The pouch requires 70 % less plastic compared to conventional packaging and CO2 emissions are reduced by 60 %. The packaging results in 3 times less waste and can be recycled with other plastics. ◆ Within the innovative manufacturing process, the pouch is formed using a plastic film roll just before the filling stage thus optimizing transportation and packaging storage and resulting in cost savings and less pollution. ◆ With the reduction of material consumption and reduction of waste along the entire supply chain, Natura was able to position SOU in a new market segment, with a more accessible price than its current lines. SOU was successfully tested for six months and launched nationally in June 2013.

Process innovation

- ✓ A carbon calculator is used to minimize emissions to support the Corporate Carbon Reduction Programme (with a target of 33 % reduction achieved in 2013); it also calculates all the indicators of an environmental table and simplified packaging LCA for all sold products.
- ✓ The environmental table (displayed on all products) shows the value for 6 key indicators: the percentage of plant based product content, percentage of certified raw materials, packaging with percentage of recycled and recyclable material as well as a number of recommended re-fills.
- ✓ Waste and water programs have been implemented at product and corporate level, including all factories.
- ✓ According to Natura, local ingredients are prioritized when developing products.

Organizational structure

- ✓ Cross-disciplinary teams established at the beginning of every new project.
- ✓ Offer 90.3 hours of training (considering all employees and all types of training) per employee in topics such as sustainability, brand, product and commercial model. Employee satisfaction rate of 78 % and attrition rate of 9 %.

Sources: Interview with Fabien Brones, Scientific Manager Eco-design and Environmental Impacts; Harvard Business Review July-August 2012; Redefining the Future of Growth: The New Sustainability Champions, WEF & BCG; Aligning profit and environmental sustainability: Stories from Industry, WRI; Natura Annual report 2012. UNEP, Greening the Economy through Life Cycle Thinking – Ten Years of the UNEP/SETAC Life Cycle Initiative, 2012

¹²⁰ Harvard Business Review 2012 Geoffrey Jones, *The Growth Opportunity That Lies Next Door*

Case Study Interface

Location	Size	Established
USA	3,500 employees	1973
Annual Sales	Sector	
US\$ 1 billion	Textiles - Carpet production and sales	

Business Growth	<p>Sales increased by 7-10 % in the different markets in 2011 despite less construction taking place due to the financial crisis. Interface is the leading company in its sector with a share of approximately 35 % of the estimated US\$3 billion global carpet tile market.</p>
Business Strategy	<ul style="list-style-type: none"> ✓ To use its position and capabilities in the modular carpet segment market as a platform from which to drive acceptance of modular products across several industry segments¹²¹. ✓ Eliminate any negative impact Interface has on the environment by 2020 (Mission Zero) as a brand enhancing, competitive strength, as well as a strategic initiative. ✓ Seek to increase revenues and profitability by capitalizing on the company strengths. ✓ Penetrate expanding geographic markets for modular products. ✓ Build principal competitive factors of brand recognition, quality, design, service, broad product lines, product performance, sustainability, marketing strategy and pricing.
Business model	<ul style="list-style-type: none"> ✓ Offer carpets that are customized and made to order. ✓ Use the company capabilities to drive change in consumer behaviour ✓ Work with suppliers to affect the sustainability of the value chain - A Life Cycle Assessment (LCA) in 2000 showed that 80-90 % of product and process footprint comes from the value chain beyond company gates (mainly from yarn). Suppliers are involved in how to achieve better product design or how to make recycled nylon.
Product Innovation	<ul style="list-style-type: none"> ✓ 49 % of all raw materials are now either recycled or bio-based including 36 % of yarn and 51 % of carpet backing. ✓ Biosfera™ carpet made of 100 % recycled yarn including discarded fishnets. ✓ Yarn thickness reduced using 50 % less yarn with corresponding effect on weight and transportation costs and reduced CO2 impacts. ✓ The Entropy™ carpet tile leads to 1.5 % waste compared to 14 % previously. ✓ Fotosfera™ carpet tiles with 63 % of yarn made from oil from castor-bean plant. According to Interface, the plants are fast-growing, rapidly renewable, grow in dry climates and require almost no water. ✓ TacTiles™, adhesive stickers fix carpet tiles to the floor without synthetic glues.

Case Study Interface

Process innovation

- ✓ The ReEntry™ program makes it possible to reclaim any old carpet by separating yarn from backing and recycling 100 % of yarn.
- ✓ Introduction of precision cutting machinery that reduces waste by 80 %.
- ✓ Since 1996 manufacturing waste to landfill reduced by 84 % amounting to savings of US\$ 450 million.
- ✓ Total energy use at the global factories reduced by 39 % per unit.
- ✓ Since 2008, reduction in carbon footprint of 28 % and since January 2014, a 90 % reduction compared to 1996 in European factories.

Organizational structure

- ✓ Transport and distribution: Currently 99 % of the products manufactured in Europe are delivered in Europe. By grouping deliveries and reducing the number of empty trucks on the road, Interface saves close to € 290 000 every year.

Source: Interview with Ramon Arratia, European Sustainability Director; Natural Step Case Study: Interface – The Journey of a Lifetime; Annual Report 2012

¹²¹ Modular carpets create less waste when installing and make it easier to repair parts without taking up the entire carpet.

Case Study Triodos Bank

Location	Size	Established
The Netherlands, Belgium, Spain, Germany, United Kingdom	911 employees	1980
Sector		
Financial services: retail deposit taker and lender. Specifically working on impact investment, emerging markets, SMEs and small listed funds.		

Business Growth	The Bank has more than doubled in size from 2008 to 2013. During this period, Triodos increased the amount of equity and funds entrusted to the bank by over 200 %. It currently manages €9.6 billion.
Business Strategy	The Bank bases its selection for investment on sustainability leadership for 100% of the companies they lend to. It lends specifically to renewable energy projects and organic farms and specifically seeks companies with sustainability integrated into their core business model with a transformative potential for their markets.
Business model	Through convening direct relationships with customers in their respective sectors and having sector-specialist relationship management teams, market insights are used to drive innovation. Investing in maintaining a high level of dialogue with other stakeholders within sectors (governmental bodies, NGOs, trade bodies, foundations, researchers etc) Triodos Bank is able to gather insights and data to help further innovation – for example through setting up guarantee funds for cultural projects with foundations
Investment Criteria	<ul style="list-style-type: none"> ✓ Triodos Bank considers a broad range of factors at the level of processes, relationships and motivation in investment decisions. ✓ It takes perspective of the entire network of relationships (supply chains and stakeholders) in order to assess the company's resilience and sustainability.
Process Innovation	<ul style="list-style-type: none"> ✓ Specialist services and impact investment funds to complement its core banking business in order to respond to the needs of leading clients. ✓ Discounts on loan interest rates to incentivize sustainability (Eg. Green tourism schemes that achieve higher sustainability certification standards or private mortgage customers that improve the energy rating of their houses).

Source: James Vaccaro, International Head of Corporate Development at Triodos Bank; Annual Reports on the Triodos Bank website: <http://www.triodos.co.uk/en/about-triodos/corporate-information/annual-reports/>

Case Study KUO Industrial Group

(DESC Holding Company)

Location	Size	Established
Mexico City	12,665 employees	1973
Sector/Industry		
Chemical components (business to business)		

Business Growth	Over time, the company expanded and restructured to become KUO Industrial Group which is now the parent company of many subsidiaries and joint ventures.
Business strategy	KUO corporate strategy was to shift from low value-added commodities (black carbon, rubbers) to high value-added specialized chemical components (SBR composites, bio based components for plastics), as a result of the company's drive towards innovation for sustainability.
Business model	A combined approach of eco-efficiency and innovation that allowed them to go from business-as-usual to eco-innovation. The company focused on products and processes, but also the organizational structure to increase their technical capacity for innovation. KUO worked in collaboration with research institutes and universities both in Mexico and in Canada. Most of their specialty components are developed with proprietary technologies or through joint ventures and are sold to international markets such as the United States, Japan and Europe.
Product Innovation	<ul style="list-style-type: none"> ✓ Innovative products launched to the market based on proprietary technology incorporate the methodology of <i>design for the environment</i>. ✓ Develop high value-added products such as the component for bio-based plastics Biorene which complies with bio-degradability standard ASTM D-5338. ✓ Since the year 2010 KUO has commercialized bio-based plastics and composite materials for green tyres.
Process innovation	The company carried out a large number of process and organizational innovations to increase productivity, to reduce costs and to increase the overall efficiency of operations in parallel to carrying out Research and Development (R&D).
Organizational structure	<ul style="list-style-type: none"> ✓ Creation of an R&D group together with an incentive system for researchers (technical upgrade plan). ✓ Set up a formal liaison programme with universities, providing scholarships for postgraduate education. ✓ The company implemented a number of international standards, namely: ISO9001, ISO14001, a number of ASTM standards and the development of their own environmental management systems.

'The premise is that a company that is sustainable will generate long-term value, and will be better prepared to deal with economic, social and environmental challenges that arise'

Margarita Ferat,
KUO Industrial Group

Sources: Margarita Ferat, KUO Industrial Group; Fernando Javier Diaz Lopez, TNO: Industry and the Environment Journal Volume 27 No.2-3 2004 Article Ms. Margarita Ferat

eco-innovation **opportunities**
customers optimization
sustainability
processes **productivity**
business **model**
value companies
operations
efficiency strategy
networks quality
collaboration
product
durability segments market solutions **life-cycle**
suppliers **service** reputation
profit product collaboration
access
innovation **resilience** capacity
competitiveness

Glossary of Terms

Business strategy describes the long term goals of the company and the markets in which the company will operate (i.e. vision and mission)¹.

Business model describes how a company does business. It is the translation of strategic issues, such as strategic positioning and strategic goals into a conceptual model that explicitly states how the business functions. The business model serves as a building plan that allows designing and realizing the business structure and systems that constitute the company's operational and physical form².

Life cycle - refers to the consecutive and interlinked stages of a product (good or service), from the extraction of natural resources to the final disposal³.

Life cycle thinking is a mostly qualitative approach to understand how our choices influence what happens at each of the stages of the life cycle of an industrial activity: from raw material acquisition through manufacture, distribution, product use and disposal. This approach is needed in order to balance trade-offs and positively impact the economy, the environment, and society⁴.

Market analysis is the activity of gathering information about the size, growth, profitability, target groups and existing products of a market, which is used to inform decision making at a strategic level. This specific activity would fall under the broader umbrella of **marketing** activities.

¹ Adapted from Andrews, K R, 1997

² Osterwalder et al, 2005

³ Adapted from ISO 14040:2006

⁴ UNEP 2004

⁵ ISO 26000:2010

⁶ Stakeholder Research Associates Canada Inc., United Nations Environment Programme, AccountAbility: Stakeholder Engagement, 2005

⁷ Michael Porter 1985

⁸ Adapted from Porter & Kramer, 2011

⁹ ISO, 14001 CD2, 2013

Organization structure refers to the range of activities and key resources (human and financial) within the company, in addition to those relating directly to production, that are dedicated to supporting the **business model**. These include procurement processes, distribution, key partnerships, customer relationships and interfaces, research and development, internal communication, and revenue generation.

Partners refer to parties in the **value chain** that provide or receive value including suppliers, outsourced workers, contractors, customers, consumers, clients, members, and others⁵.

Stakeholder is any group or individual who can affect, or is affected by, an organization or its activities. Also, any individual or group that can help define value propositions for the organization⁶.

The **supply chain** is a system of organizations, technology, activities, information and resources involved in moving a product or service from supplier to customer⁷.

Value is understood to involve creating economic value (the revenue that a firm gets in return for its goods or services) in a way that also creates positive outcomes for society by addressing its needs and challenges, taking into account economic, environmental and social considerations⁸.

A **value chain** is the entire sequence of activities or parties that provide or receive value in the form of products or services (e.g. *suppliers, outsourced workers, contractors, investors, R&D, customers, consumers, members*⁹). See also **Partners** definition above.

Value proposition refers to the products or services that an organization offers to a specific market segment that the organization believes will create value for that specific market segment.

About the UNEP Division of Technology, Industry and Economics

Set up in 1975, three years after UNEP was created, the Division of Technology, Industry and Economics (DTIE) provides solutions to policy-makers and helps change the business environment by offering platforms for dialogue and co-operation, innovative policy options, pilot projects and creative market mechanisms.

DTIE plays a leading role in three of the six UNEP strategic priorities: **climate change, harmful substances and hazardous waste, resource efficiency.**

DTIE is also actively contributing to the **Green Economy Initiative** launched by UNEP in 2008. This aims to shift national and world economies on to a new path, in which jobs and output growth are driven by increased investment in green sectors, and by a switch of consumers' preferences towards environmentally friendly goods and services.

Moreover, DTIE is responsible for **fulfilling UNEP's mandate as an implementing agency for the Montreal Protocol Multilateral Fund** and plays an executing role for a number of UNEP projects financed by the Global Environment Facility.

The Office of the Director, located in Paris, coordinates activities through:

- > **The International Environmental Technology Centre** - IETC (Osaka), promotes the collection and dissemination of knowledge on Environmentally Sound Technologies with a focus on waste management. The broad objective is to enhance the understanding of converting waste into a resource and thus reduce impacts on human health and the environment (land, water and air).
- > **Sustainable Consumption and Production** (Paris), which promotes sustainable consumption and production patterns as a contribution to human development through global markets.
- > **Chemicals** (Geneva), which catalyses global actions to bring about the sound management of chemicals and the improvement of chemical safety worldwide.
- > **Energy** (Paris and Nairobi), which fosters energy and transport policies for sustainable development and encourages investment in renewable energy and energy efficiency.
- > **OzonAction** (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition to ensure implementation of the Montreal Protocol.
- > **Economics and Trade** (Geneva), which helps countries to integrate environmental considerations into economic and trade policies, and works with the finance sector to incorporate sustainable development policies. This branch is also charged with producing green economy reports.

DTIE works with many partners (other UN agencies and programmes, international organizations, governments, non-governmental organizations, business, industry, the media and the public) to raise awareness, improve the transfer of knowledge and information, foster technological cooperation and implement international conventions and agreements.

**For more information,
www.unep.org/dtie**

The UNEP approach to eco-innovation means embedding sustainability into the core decision making of a company and integrating it throughout all business dimensions, enabling the creation of novel solutions to satisfy market needs. As part of this process, a company should be looking beyond its gates to assess sustainability risks and opportunities throughout its value chain, and in cooperation with the key partners.

The Business Case for Eco-innovation is for a business audience. It provides an overview of growing market trends and indicators, presenting real examples that demonstrate a compelling business case. Primary research was carried out directly with companies ranging from start-ups to larger companies worldwide to evaluate the tangible benefits from eco-innovation and the processes undertaken. This information was complemented with research from annual reports, academic journals and business reports. The findings demonstrate considerable business benefits including: increased market access, value creation and business growth along with increased technical capacity and productivity. These have been presented as the five drivers of eco-innovation.

With global resource scarcity and environmental degradation presenting growing challenges for business along with related market and regulatory pressures, companies need to think strategically about their business sustainability. Eco-innovation can help to turn these challenges into new market opportunities.

www.unep.org

United Nations Environment Programme
P.O. Box 30552 Nairobi, Kenya
Tel: ++254-(0)20-762 1234
Fax: ++254-(0)20-762 3927
E-mail: unep@unep.org



For more information, contact:

UNEP DTIE

Sustainable Consumption
and Production Branch

15 rue de Milan

75441 Paris CEDEX 09

France

Tel: +33 1 4437 1450

Fax: +33 1 4437 1474

E-mail: unep.tie@unep.org

<http://www.unep.org/resourceefficiency/>

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