Life Cycle Initiative

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The Business Case For Life Cycle Thinking

United Nations Environment Programme

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Acronyms

ISO	**International Organization for Standardization**
LCA	**Life-cycle assessment**
LCM	**Life-cycle management**
LCM-CMM	**Life Cycle Management Capability Maturity Model**
LCT	**Life-cycle thinking**
NGO	**Non-governmental organization**
O-LCA	**Organizational life-cycle assessment**
SETAC	**Society of Environmental Toxicology and Chemistry**
SME	**Small- and medium-sized enterprises**
UN Environment	**United Nations Environment Programme**

Glossary of Terms

Cradle-to-the grave	A cradle-to-grave assessment considers impacts at each stage of a product's life cycle, from the moment natural resources are extracted from the ground and processed through each subsequent stage of manufacturing, transportation, product use, recycling and, ultimately, disposal. (https://www.lifecycleinitiative.org/resources/life-cycle-terminology-2/)
Eco-innovation	A new business model that promotes sustainability throughout the entire life cycle of a product, while also boosting a company's performance and competitiveness. (http://unep.ecoinnovation.org/about/)
Hotspots	A life-cycle stage, process or elementary flow that accounts for a significant proportion of the impact of the functional unit (UN Environment, SETAC (2017) – Hotspot Analysis).
Life-cycle assessment (LCA)	Compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle (ISO 2006).
Life-cycle inventory (LCI)	The phase of life-cycle assessment in which data are collected, the systems are modeled and the life-cycle inventory results are obtained. (https://www.lifecycleinitiative.org/new-hotspots-analysis-methodological-framework-and-guidance/)
Life Cycle Management Capability Maturity Model (LCM-CMM)	Allows organizations to build on and expand their capabilities in applying life-cycle thinking to ultimately lower their environmental and social impact. It complements top-down efforts to drive sustainability measures across global supply chains with bottom-up organizational development efforts to build the necessary skills within small- and medium-sized enterprises (SMEs), enabling them to provide high-quality data and to adapt life-cycle management (LCM) objectives to meet their specific competitive and stakeholder pressures (Swarr et al., 2015).

Contents

1 Introduction

'The business case for life-cycle thinking' is a compilation of success stories from diverse businesses the world over, illustrating the important role that life-cycle thinking (LCT) has played in improving both companies' environmental credentials and commercial results. The case studies presented are all testament to the myriad situations in which life-cycle approaches can help companies, large and small, overcome the challenges of the 21st Century to create win-win scenarios.

Approaches used

This compilation of cases makes reference to the growing adoption of LCT as a business strategy and to the role of the various approaches used in projects undertaken by UN Environment and the Life Cycle Initiative, notably: the Life Cycle Management Capability Maturity Model (LCM-CMM), organizational life-cycle assessment (O-LCA) and eco-innovation. The booklet shows how LCT can be integrated into evolving business models through these three related approaches. Having a broad range of methodological approaches optimizes the application process as these can cater to the diverse needs and capabilities of different companies.

The **Life Cycle Management Capability Maturity Model (LCM-CMM)** allows companies to build on and expand their capabilities in applying life-cycle thinking (LCT) to ultimately lower their environmental and social impact. It complements top-down efforts to drive sustainability measures across global supply chains with bottom-up organizational development efforts to build the necessary skills within small- and medium-sized enterprises (SMEs), enabling them to provide high-quality data and adapt life-cycle management (LCM) objectives to meet their specific competitive and stakeholder pressures.[1]

Organizational life-cycle assessment (O-LCA) is a compilation and evaluation of the inputs, outputs and potential environmental impacts of the activities associated with the organization adopting a life-cycle perspective.[2] The approach aims to help identify and quantify material environmental aspects within and beyond the gates of the organization. It considers all the supplies and other partners in the value chain associated with the provision of the organization's product portfolio.[3]

Eco-innovation is the development and application of a business model, shaped by a new business strategy, which incorporates sustainability throughout all business operations based on LCT 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 structure that enhances a company's performance and competitiveness.[4]

The diverse cases presented here demonstrate the engagement of UN Environment and the Life Cycle Initiative in driving the integration of such approaches into business strategies with the goal of generating positive transformations.

1 Swarr, T.E., A.-C. Asselin, L. Milà i Canals, A. Datta, A. Fisher, W. Flanagan, K. Grenda, D. Hunkeler, S. Morel, O.A. Vargas Moreno, M. Graça Rasteiro. Chapter 17: Building Organizational Capability for Life Cycle Management. In Life Cycle Management, LCA Compendium –The Complete World of Life Cycle Assessment, G. Sonnemann and M. Margni, eds. Springer, Dordrecht (Germany), 2015. Available at
http://link.springer.com/chapter/10.1007/978-94-017-7221-1_17

2 ISO (2014). ISO/TS 14072: Environmental management — Life cycle assessment — Requirements and guidelines for organizational life cycle assessment, International Organization for Standardization. International Organization for Standardization: Geneva, Switzerland.

3 UN Environment/SETAC (2015). Guidance on Organizational Life Cycle Assessment. Life Cycle Initiative, United Nations Environment Programme and Society for Toxicology and Chemistry: Paris, France. Available at
https://www.lifecycleinitiative.org/wp-content/uploads/2015/04/o-lca_24.4.15-web.pdf

4 UN Environment (2014). The Business Case for Eco-innovation. Available at
http://unep.ecoinnovation.org/wp-content/uploads/2017/07/UN_Environment_Eco%E2%80%94i_Business-case.pdf

Diversity of application

'The business case for life-cycle thinking' presents stories from all over the world, including businesses in Brazil, Cameroon, Colombia, Germany, India, Jordan, Mexico, Malaysia, South Africa and Uganda. The businesses presented vary widely in terms of their size and portfolio, ranging from giants of the industrial world, such as multinational car manufacturer with global reach, Daimler AG, or India's petrochemical pioneer, India Glycols Limited, to family businesses and small- and medium-sized enterprises (SMEs) such as Rural Community in Development (RUCID) in Uganda and Villa Rica coffee company in Peru.

The range of sectors benefiting from applied LCT is also vast, including cosmetics (Natura Cosméticos of Brazil), finance (Banco de México), agri-food (Ugandan agri-food producer RUCID, Colombian coffee company Colcafé or NEHSU Foods of Cameroon), textiles (South Africa's Freudenberg Nonwovens), chemicals (India Glycols Ltd. and Jordan Sipes Paints Co.) and even environmental support services to SMEs (Secretaría Distrital de Ambiente of Bogotá).

The broad geographical and business scope of these cases illustrates the extent to which LCT can be truly successful. It is testament to the ongoing work by the Life Cycle Initiative and by UN Environment to bring LCT into the mainstream and to foster truly sustainable development through environmentally conscious business around the globe.

Opportunities for businesses and the future of life-cycle approaches

By embracing LCT, the value of the business itself and the entire value chain connected to it benefits immensely through a variety of business strategies. Some cases show how the intelligence provided by LCT led to more collaborative engagement with other value chain actors, resulting in win-win partnerships. Other cases demonstrate how businesses have been able to gain access to new markets or reduce expenses through material and energy savings. Such efficiencies can be multiplied by bringing together actors from the entire system. Essentially, LCT allows an organization to identify high-impact processes (material issues, hotspots) along the value

chain and in doing so, helps prioritize the hotspot areas that need to be addressed to enable effective environmental, economic and social solutions, leading to greater profitability while simultaneously lowering environmental impact. Other advantages for companies adopting LCT include improved reputation through sourcing strategies, reduction of risks and being ahead of the competition. It is evident that LCT has the potential to influence the viewpoints of all internal actors as well as linked stakeholders, aligning them towards the common objective of being more holistic and circular. It is an approach that outreaches formalized management procedures and develops into a new culture.

The case studies show how dedicated and bold business leaders have transformed their business models by applying LCT, thereby triggering positive impacts. They illustrate that through LCT, companies can truly move beyond 'business as usual' and enter a new era of social, economic and environmental gain.

2 Greening the supply chain with life-cycle thinking – India Glycols Limited[5]

At India Glycols Limited (IGL), LCT has been placed front and centre of the company's ambitious strategy to make its supply chain and its operations more environmentally friendly. This is no mean feat for any petrochemicals company, but with the broad application of LCT, IGL aims to become a veritable petrochemicals pioneer.

In the global chemicals sector, companies are increasingly aware of the gradual shift towards cleaner manufacturing. More businesses than ever are poised to meet the industry's need for environmentally responsible products and production techniques. However, for a select few, these techniques are already in place, with the application of LCT a catalyst for eco-friendly business success. IGL is one such company.

An ambitious, diverse portfolio

Based in Kashipur, in the northern state of Uttarakhand, India, IGL has around 800 employees who work towards the company's diverse portfolio of business lines. Founded in 1983, IGL is now one of the country's leading manufacturers of glycols, ethoxylates, polyethylene glycol (PEG) and performance chemicals, as well as glycol ethers and acetates, industrial gases, natural gums and potable alcohol. It is the world's leading producer of bio-MEG (bio-based mono ethylene glycol), which is made of renewable feedstock and used for beverage product packaging.

The company has been structured to reflect its diverse market offering, with production units ranging from the more conventional distillery units to eye-catching guar gum and liquor-bottling units. The result is a wide range of products, including ethanol, industrial gases such as oxygen and medical oxygen, liquid nitrogen, liquid argon, specialty chemicals, industrial solvents and potable liquor. In the 2017/2018 financial year, the company reached a total turnover, including other income, of INR 4,165 Crores[6] (more than US$550 million).

Managing the shift to cleaner manufacturing

By the early 2010s, IGL had already signalled its intent to join a select group of green-minded petrochemicals specialists. In 2012, it participated in a life-cycle management (LCM) pilot project coordinated by the Life Cycle Initiative and since then, the company's flagship chemicals division has gone from strength to strength with its innovations.

It has adopted a new approach to manufacturing ethylene oxide, glycols and ethylene oxide derivatives, developing what it calls a "molasses-ethyl, alcohol-ethylene 'green route'". IGL says that with this green route now a firmly established practice, the company is "the only one of its kind in the world" and consequently, **the** global leader in bio-MEG production.

IGL's credentials have been cemented by its quality management system (ISO 9001:2015) and environmental management system (ISO 14001: 2015) certifications. The company's management also points to various other certifications, such as for its energy management system (ISO 50001:2011) and those in food safety management and social accountability, which are all intended to bring the company in line with the most modern, socially and environmentally friendly business practices.

5 Life Cycle Initiative (2016). Case Study: India Glycols Ltd. believes in green. Available at https://www.lifecycleinitiative.org/case-study-india-glycols-ltd-believes-in-green/

6 Source: Annual Report http://www.indiaglycols.com/investors/downloads/annual-report-2017-18.pdf

IGL has taken its climate responsibilities seriously enough to register a biomass-based cogeneration project under the United Nations Framework Convention on Climate Change (UNFCCC) clean development mechanism. This plant at Gorakhpur is set to earn certified emission-reduction credits until at least 2020 as part of a ten-year project.

Why apply life-cycle thinking?

For IGL, the move to further enhance its LCM techniques is firmly rooted in long-term strategic thinking. This means making the business more sustainable and generally able to seize opportunities in ever-growing environmentally conscious markets. The company's reliance on these innovative technologies is another vital means of introducing cleaner manufacturing and working with an eco-friendlier supply chain.

"We have adopted several green technologies; we are continuously working to evolve new green methods, materials, innovative technologies and systems to meet the specific requirements of global clients," says the company.

On the global trend towards cleaner manufacturing, IGL adds: "We believe that the green movement is on the rise with more and more people joining it each year."

What does the future hold?

Moving forward, IGL has already earmarked or completed research in key potential growth areas. These include specialty chemicals for a wide range of industries—textiles, paint, personal care, detergents, pulp and paper; sustainable products based on renewable raw materials; projects based on energy efficiency, renewable energy and water-conservation deployment; and what the company calls 'green methodologies'. It is also hoped that lessons learned from pilot projects with the Life Cycle Initiative can open up new avenues for research and development as the business expands into new markets, at home and abroad.

According to the company, these projects benefit from the complete support and cooperation of top management, who are eager to boost the organization's momentum towards a truly sustainable business model based on cleaner manufacturing and innovation.

Recent accolades have only served to cement IGL's status as a top brand in India, with the Federation of Indian Chambers of Commerce and Industry (FICCI) (www.ficci.in) awarding the company's Chemicals and Petrochemicals Division the 2016 'Award for Product Innovator of the Year' and the 2018 'Award for Efficiency in Energy Usage'.

If recent innovations are anything to go by, this green-minded company and champion of LCT is on track for more business success.

3 How life-cycle thinking is boosting a Brazilian cosmetics firm[7, 8]

For Brazil's Natura Cosméticos, sustainability has been at the centre of its business strategy for more than four decades—a "guiding principle" since the company was founded in 1969. But this manufacturer of cosmetics, fragrances and toiletries has moved up a gear in recent times, from simply thinking about sustainability to applying LCT across its value chain. This is how Natura's management has taken on the challenge.

As a company, Natura has been aware of its environmental responsibilities for quite some time. Since the 1980s, the has company sought to minimize its environmental impact with a host of initiatives, including the use of

7 UN Environment (2017). Road testing organizational life cycle assessment around the world: Applications, experiences and lessons learned. Life Cycle Initiative, United Nations Environment Programme, Paris, France. Available at https://www.lifecycleinitiative.org/resources/reports/

8 Moreira de Camargo, André, Silvia Forin, Keyvan Macedo, Matthias Finkbeiner, Julia Martínez-Blanco (2019). The implementation of organizational LCA to internally manage the environmental impacts of a broad product portfolio: an example for a cosmetics, fragrances, and toiletry provider. The International Journal of Life Cycle Assessment, vol. 24, No. 1, pp. 104–116.

refill packaging, a self-declared eco-label for all its products and from 2007, a Greenhouse Gas Emissions Corporate Inventory. Now, the company is more aware than ever of the opportunities it can create by applying LCT to its commercial operations.

Cradle to grave

Natura operates in seven countries: its domestic market of Brazil, Argentina, Chile, Colombia, France, Mexico and Peru. Although its international operations account for only a small share of the business, Natura is eager to manage the environmental impacts of all its products, in all its markets.

The company says it "considers the complete life cycle of products, starting from raw materials extraction (cradle), [through the] industrial production stage, distribution, use and disposal (grave)". This cradle-to-grave approach made the company an ideal candidate for road-testing an O-LCA methodology, something that it duly undertook in 2016 within the framework of a Life Cycle Initiative project.

In this pilot project, Natura reported on all 10 cosmetic product types sold in its domestic Brazilian market during the 2013 reference period: beard, hair, body, deodorant, make-up, body oil, perfume, sun protection, face care and soap products.

From hotspots to action

The company modeled its activities and operations on two approaches: a bottom-up approach, taking into account both upstream supply chain activities and downstream activities (such as transport and end-of-life phases), and a top-down approach, taking into account the impacts of corporate activities.

Using these approaches, Natura was able to identify hotspot areas that posed a challenge to a more environmentally friendly business model. These included water and energy use, land use (for the plant ingredients in Natura products) and even fossil-fuel depletion (due to the use of fossil fuels in product transportation).

As a result, Natura outlined specific actions to be taken in future to address these hotspots, such as developing site-specific models for its ingredients, for example, the "agroforestry system cultivation" of palm oil.

The need for regionalized life-cycle inventory data

The move towards LCT was not without its challenges. The O-LCA study, although confirming Natura's ability to gather data from its suppliers, required vast amounts of data. The study highlighted the urgent need in Brazil for regionalized life-cycle inventory data. This is one of the more pressing needs in Latin America if LCT is to become a major catalyst for better business.

However, the experience of Natura Cosméticos shows that, for an ambitious company, embracing LCT across the value chain makes real business sense and can lead to the implementation of rigorous assessment methods within the company.

"The next step for Natura's corporate strategy is to internally manage the environmental impacts of each individual product, in all, about 2,600 different products," says Natura.

Life-cycle science for a life-cycle future

Natura has found that using life-cycle assessment (LCA) science to measure the environmental impacts of its supply chain has greatly improved its practices and has really embedded sustainability in the company's business model.

As an organization with nearly 8,000 employees and an ambitious corporate strategy, the stakes are high for Natura Cosméticos, both in Brazil and abroad. However, the push to incorporate a greater degree of LCT means that this cosmetics innovator is one step ahead of the competition. It is positioned to take advantage of new practices that will allow it to penetrate ever-more demanding markets, based on its green credentials.

For Natura Cosméticos, LCT means more than just business as usual—it means a sensible, balanced approach to business success.

4 Growing Cameroon's agri-food sector with life-cycle thinking[9]

Some 200 km west of Cameroon's capital Yaoundé, the city of Douala is home to a very particular enterprise with a special way of doing business. NEHSU Foods Processing Company, which processes and sells soya bean products, has teamed up with UN Environment to boost its environmental credentials—and its bottom line—through innovative LCM methods.

As a company, NEHSU Foods has been in the soya bean business since its inception in 2000, when modest means meant modest beginnings. Soy-based yoghurt was produced using rudimentary equipment, with output in the range of 80 litres per week. However, this changed in 2003, following the acquisition of a boiler. Production levels rose to 320 litres per week and output has since reached 1,000 litres of soy-based yoghurt every week.

An ecologically conscious company

NEHSU Foods has always been clear about its social and environmental aims. Aside from increasing yoghurt and tofu production and boosting its bottom line, it remains committed to increasing employment opportunities (its workforce currently stands at more than 20 employees) and promoting cultivation of the soybean.

"Soybean yoghurt has smaller carbon and water footprints than the cow-milk yoghurt largely consumed in Cameroon, and far less cholesterol too," argues the company.

The company is firmly engaged in providing nutrition education in local areas, visiting women's groups and giving talks and presentations on how soya beans can be added to household diets and cultivated as a means of generating income.

Getting ready for life-cycle management

For NEHSU Foods, the appeal of participating in a UN Environment pilot project was undeniable. It would be the first time the LCM-CMM approach would be deployed in Cameroon, thus positioning NEHSU Foods at the vanguard of life-cycle methods such as impact quantification, as well as developing principles for product sustainability information. In short, the partnership made sense in terms of being able to reassess production at every stage of the company's value chain, with potential commercial **and** environmental benefits.

NEHSU Foods explained that this process would also entail "sharing this experience with sister food processing companies in Cameroon and for sustainability principles in general".

In the past, the company's life cycle-based approaches were both limited in number and partial in their application. While the business conducted effective stakeholder engagement and material flow analyses, it only partially undertook waste management practices and did not hold any certifications for its eco-labelling scheme.

But with the help of UN Environment, NEHSU Foods raised the bar: key performance indicators were developed along the product value chain; a life cycle-based action plan was created, based on indicators for one year of operations; employees were trained on specific, strategically important LCM tools; and a management information system was developed thanks to IT upgrades, training and staff recruitment.

These experiences were shared with sister organizations through various field visits and workshops supported by UN Environment.

9 Swarr, T.E., A.-C. Asselin, L. Milà i Canals, A. Datta, A. Fisher, W. Flanagan, K. Grenda, D. Hunkeler, S. Morel, O.A. Vargas Moreno, M. Graça Rasteiro. Chapter 17: Building Organizational Capability for Life Cycle Management. In Life Cycle Management, LCA Compendium –The Complete World of Life Cycle Assessment, G. Sonnemann and M. Margni, eds. Springer, Dordrecht (Germany), 2015. Available at http://link.springer.com/chapter/10.1007/978-94-017-7221-1_17

NEHSU Foods is now able to address its challenges head on, from a position of strength.

Not only has its partnership with UN Environment allowed for the spread of LCT in Cameroon's agri-food sector, but crucially, NEHSU Foods is finding that its efforts have led to real progress in terms of eco-labelling, certification and the product sustainability indicators that the company provides to the Government, businesses and other stakeholders.

The future is looking decidedly brighter for NEHSU Foods, with real potential for growing LCT in Cameroon's promising agri-food sector.

5 Cleaner solutions for a growing adhesives business[10]

Malaysia's Wilron Products is an adhesives manufacturer with a plan. Thanks to a new eco-innovative strategy, the company is providing its customers with the adhesives they want, while aiming for a bigger share of domestic and foreign markets. Here's why going green makes business sense for an ambitious SME.

A small company of 38 employees, Wilron Products has been in the adhesives manufacturing business for nearly 40 years. Throughout its history, the company has made adhesives for clients in the construction, automotive, packaging, bookbinding and paper-conversion industries. But staying with the competition and producing for domestic **and** foreign markets means that Wilron must innovate and make a greener product fit for the 21st Century.

Traditionally a producer of solvent-based adhesives, Wilron acknowledges that "global trends are moving towards green products". Customers are becoming aware of the risks of volatile organic emissions from solvents, but also, more and more regulations require 'eco-label' certification before adhesive products can enter a given market.

"The adhesives market worldwide is being driven by a rising trend in various end-user segments to use eco-friendly or green adhesives, or those with low volatile organic compounds," notes the company. As a result, Wilron and its competitors see the need for a new business model and a better product.

Innovation through ecology

To take the business forward, Wilron has turned to eco-innovation; not just to regain market share, but to improve efficiency and working conditions at its 23-year old manufacturing plant in Selangor. And according to business director Vicki Lim, "this is the right time for expansion at Wilron, as well as profit maximization."

So how is Wilron doing it?

First, the business is focusing on a new product for its customers: eco-friendly, water-based adhesive.

Geared towards eco-label certification, Wilron believes the water-based product will increase the company's market presence—especially with export-based customers who require eco-certified components in their products. In fact, Wilron is particularly interested in the adhesive's eligibility for the Green Building Index, a key entry point into the construction sector.

As for overseas markets, currently only 5 percent of the company's production targets North America, Indonesia, Singapore, the Philippines and Cambodia. Here, the company sees real export potential—especially in the Association of Southeast Asian Nations (ASEAN) region, but also to Europe and the Middle East.

10 Taken from http://unep.ecoinnovation.org/green-solutions-for-a-growing-adhesives-business/

By targeting the water-based adhesive segment, Wilron estimates an annual revenue increase of some 10 percent. And in future, Wilron says that solvent-based adhesives will be phased out, and the business strategy will firmly focus on newer water-based and 'hot-melt' adhesives. But this isn't the only reason Wilron has switched to eco-innovation.

The production of solvent-based adhesive is hazardous to human health, and the company has borne a high price in staff medical costs. By switching to a water-based product, Wilron can provide a safer environment for employees—fewer accidents at work and less medical leave—leading to greater productivity. Indeed, productivity is another big reason for Wilron's eco-innovation strategy.

How to boost quality, productivity and employment

Through eco-innovation, the company has been able to attract support from government agency Standard and Industrial Research Institute of Malaysia (SIRIM) to boost its process efficiency. Attracted by Wilron's innovative and eco-friendly ambitions, the SIRIM Industrial Innovation Model Fund financed a much-needed upgrading of the company's aging plant. This freed up funds for Wilron to invest in a new, automated conveyor at the factory that "eases the work of employees". Now, sub-optimal performance and staff medical leave have given way to increased efficiency and a more attractive working environment. Wilron expects that automation will boost product quality by 10–20 percent, and hopes that new, young employees can be attracted to a more modern factory floor.

As for the company's eco-friendly strategy, it has boosted employment down the supply chain and at Wilron itself. Raw material suppliers have taken on new workers, and Wilron has hired a new marketeer to promote the eco-friendly adhesive, and a consultant and contractor to support initiatives such as the Green Building Index.

The basis for success: 'hotspot analysis'

To achieve all this, Wilron identified priority 'hotspots' where the eco-innovation process would have the most impact.

What could the company do about a small and shrinking local market for adhesives? What could it do about a manufacturing plant with aging machinery and workers? And how could Wilron improve its own chemical product, a product that was hazardous during production and final use?

Using hotspot analysis, Wilron identified the big risk areas across the supply chain, deciding on holistic changes—not only to business operations, but to production itself. This meant addressing its economic, environmental **and** social burdens. And through cooperation and training events with SIRIM and UN Environment, new ideas were developed on customer demand and exports.

In a competitive global chemicals sector, Wilron has a new and ambitious plan. This Malaysian SME recognizes that the global shift towards greener production is a business opportunity, an opportunity that makes business sense.

6 Life-cycle thinking is strategic imperative for automotive giant[11]

A multinational car manufacturer with global reach, Daimler AG is one of the biggest names in the automotive industry. But even this global giant is discovering that LCT is crucial to its strategy for product responsibility and overall business success. As shown in a recent study, a holistic life-cycle approach is key to cementing Daimler's environmental credentials—and its status as a 21st-Century innovator.

As one of the world's biggest producers of premium-end cars—and the biggest manufacturer of commercial vehicles—Daimler is especially well known for its Mercedes-Benz cars and vans, and Daimler trucks and buses. Indeed, there are few countries worldwide where these products have not penetrated the market and consolidated Daimler's reputation as a leading manufacturer.

The road to environmental compatibility

Since 2000, Daimler has been calculating and documenting its CO2 emissions in accordance with the 2004 Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (Scopes 1 to 3) and transparently documents environmental impacts over the whole vehicle life cycle, from development to production and product use, as well as disposal and recycling. "For Daimler AG, product responsibility requires a combination of three things: the greatest possible customer benefit, the highest safety standards, and maximum environmental and climate compatibility," says the company.

Indeed, this application of LCT features heavily across various business divisions, including Mercedes-Benz Cars, Daimler Trucks and Mercedes-Benz Vans. For Mercedes-Benz Cars, this means that, as a first step, Daimler publishes environmental product information in the form of 'environmental certificates', each of which contains a detailed product LCA. This product LCA is externally audited to conform to ISO 14040 and ISO 14044.

Introducing life-cycle science

Daimler has gone as far as to road-test the O-LCA methodology, following the 2015 publication 'Guidance on Organizational Life Cycle Assessment' by the Life Cycle Initiative. That year, the company reported on more than 2 million Mercedes-Benz passenger cars sold.

Daimler says that in contrast to other environmental reporting schemes, this application of LCT allows for a more holistic assessment process:

"The O-LCA methodology helps to identify the organization's environmental impacts within the whole life cycle, for all impact categories, and avoids shifting the environmental burdens from one life-cycle phase into another."

This is particularly true when applying LCT to the analysis of hotspots along the Daimler value chain.

"For a multinational company with a broad product portfolio," says the company, "adopting a comprehensive approach that can identify critical processes or activities is crucial."

In fact, the company's cradle-to-grave approach looked at a range of different activities: from indirect, upstream activities such as the extraction and production of purchased materials, goods and services, to direct activities such as manufacturing, to indirect downstream activities such as the distribution of sold cars and end-of-life treatment of sold cars.

11 UN Environment (2017). Road testing organizational life cycle assessment around the world: Applications, experiences and lessons learned. Life Cycle Initiative, United Nations Environment Programme, Paris, France. Available at https://www.lifecycleinitiative.org/resources/reports/

For this manufacturing giant, which counts more than 280,000 employees, accessing the necessary data was less of a challenge than for other O-LCA testers. The company regularly conducts product LCAs and sustainability reporting, so various data sets were available for the company to use when applying the O-LCA methodology. These were collected from some 23 facilities via Daimler's local experts on environmental management systems.

However, even for a company like Daimler, there are still some pieces missing from the life-cycle jigsaw before the company can implement LCA on a global scale.

Next steps

For one, Daimler's trucks business was not considered in the study due to the absence of a worldwide fleet emission standard for these vehicles.

In addition, during the feedback stage of the O-LCA process, the company raised the ever-present issue of uniformity among nomenclatures and categories:

"The company reports to many institutions [and their] main interest is to have consistent definitions," says Daimler, adding that it would be "desirable to use uniform nomenclatures and categories for the GHG and the O-LCA studies". Both for Daimler AG and the institutions to which it reports, there is still much work to be done to ensure that life-cycle science can be implemented beyond its current applications. However, by engaging with organizations such as the Life Cycle Initiative and continuously stepping up its environmental efforts and LCA practices, Daimler AG has cemented its position as a leader of LCT innovation—and it has the business results to back it up.

7 The fabric of sustainable industry – Freudenberg, South Africa[12]

The pursuit of LCT to boost business has been attracting attention from the four corners of the world, from businesses large and small. At the tip of the African continent, in Cape Town, South Africa, Freudenberg Nonwovens Ltd is yet another company with both the foundations and the backing of its parent company for LCT to take root. This is how Freudenberg began its journey towards more sustainable business.

With more than 20 manufacturing and processing sites in over a dozen countries, Freudenberg Nonwovens Ltd is one of the world's largest producers of nonwoven textiles. The Cape Town-based company manufactures for a raft of important sectors such as the apparel, automotive, construction, shoe, upholstered furniture and hygiene industries. With more than 120 employees, the company is no micro-enterprise, not least when one factors in the size of its parent company—the Freudenberg Group is a multibillion-dollar-generating business, with around 40,000 employees in nearly 60 countries worldwide.

However, where sustainability is concerned, Freudenberg Nonwovens had an environmental policy that was largely limited to legal compliance, with no real focus on the environmental, social or corporate governance aspects of sustainability. In fact, the company was a long way off applying anything close to LCT.

12 Life Cycle Initiative (2016). Case Study: Freudenberg South Africa uses Life Cycle Thinking to adapt to new markets. Available at https://www.lifecycleinitiative.org/case-study-freudenberg-south-africa-textiles/

Getting the ball rolling with UN Environment

In partnership with UN Environment, and as part of an ambitious pilot project, Freudenberg Nonwovens began work on an LCM-CMM approach. The company's objective was to take stock of its activities in a more holistic and systematic manner, with the end goal being a far more sustainable approach to doing business and **running** the business.

With backing from a parent company such as the Freudenberg Group, this might appear a mere formality, but assessing one's capacity for implementing LCM requires introspection, hard work and, of course, solid foundations.

The company's environmental policy meant that Freudenberg Nonwovens South Africa was in a natural position to take its credentials up a notch:

"A certified ISO 14001 management system has been in place for several years now," said the company's management at the time, "however, the focus has been mainly on legal compliance rather than environmental sustainability. With the legal requirements now in place, we feel we are ready to move to the next step."

For Freudenberg Nonwovens, this meant focusing on environmental sustainability, which the company believed would produce several financial and non-financial benefits.

Targeting the supply chain

The company set about planning and executing a highly strategic pilot, one that could be replicated once complete. This involved taking a multipronged approach to supply chain management, and reviewing, reassessing and reimplementing practices that had been in place for years, but hadn't been truly sustainability-oriented.

"We have three specific [business] objectives with this project," explained the company: "establishing long-lasting supplier relations; implementing supplier evaluation processes; and implementing Supply Lead Agreements."

With organizational and financial help at hand from UN Environment, Freudenberg Nonwovens used internal and external trainings, workshops, supplier visits and all-important software to leverage the expertise it already possessed and create new knowledge in the areas where it was most needed—notably within its supply chain management team.

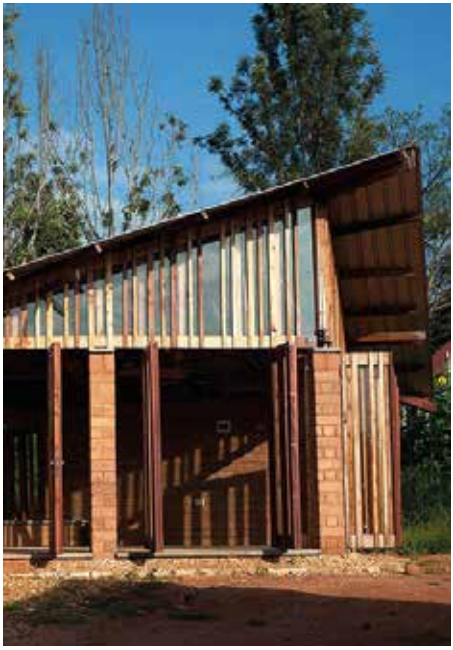
A strategic win-win

When Freudenberg Nonwovens Ltd teamed up with UN Environment to implement the LCM-CMM approach and align its practices with LCT, the company was already in a solid commercial position. Adopting new management approaches was not only intended to gain better environmental credentials, but because LCT and LCM make business sense.

Freudenberg Nonwovens has been especially keen to propose innovative approaches to reducing resource use and environmental impact along the life cycle of its products, while also making real progress in terms of better governance and revenues.

The key challenge moving forward is replicating LCT among suppliers and other companies in the value chain. This way, the company might yet weave a bigger, better life-cycle fabric in the textile industry.

8 RUCID of Uganda – savouring the taste of life-cycle thinking[13]



When the Life Cycle Initiative teamed up with organic food business RUCID, the small Ugandan company was already a committed champion of various sustainability initiatives. The former NGO runs an agricultural college for young farmers and trains local smallholder farmers on organic methods. But RUCID wanted to see if it could adopt LCM to retain existing customers and develop new business, while tackling waste and energy use. So the company took a step towards LCT—with encouraging results.

Rural Community in Development, known as RUCID to its customers, processes and sells organic fruit juices and sun-dried fruit crisps to the domestic Ugandan market, neighbouring Kenya and even Europe. An SME with few more than 20 employees, the company is now a veritable life-cycle laboratory.

In 2014, the company saw the benefits of a collaboration with UN Environment under a Life Cycle Initiative pilot project aiming to assess the business' capability and maturity to adopt LCM practices. With the support of a dedicated life-cycle coach, RUCID was also able to build staff capacity in methods such as data collection and reporting on energy use and waste generation.

The hotspot strategy—targeting key processes

Energy and waste were identified as two hotspots on which RUCID could focus before taking steps to optimize the company's efforts and its results. As part of the life-cycle approach, studies were conducted on the company's energy balance and its waste inventory for the fruit-processing factory. The maturity level for implementing LCM was also assessed. Tailored training was then organized at all levels of the company: board, management and facility/factory workers.

"A key success factor at RUCID was the management vision, which considers sustainability initiatives as a strategy for retaining existing customers and for developing new business," recognized LCM coach Paul Walakira.

"RUCID's management was also well aware that fruit residue disposal and use—including for energy use—could be improved in order to seize business opportunities in their growing market."

Better-informed decision-making

Overall, financial results for the business improved markedly within a short space of time. Notably, there was a 25-percent increase in annual revenue from cost savings and improvements in the period 2013–2014, compared with 2012–2013.

Other highlights included the uptake of a biogas energy source and the installation of an anaerobic digester to use fruit residues as energy, thus closing the loop to create a more circular process. Fruit residues that are not suitable for the biodigester are being used as raw materials in a vermicomposting process. This creates vermicompost, an organic

13 Life Cycle Initiative (2016). Case Study: RUCID fruit juices and sun-dried fruit crisps. https://www.lifecycleinitiative.org/case-study-rucid-fruit-juices-and-sun-dried-fruit-crisps/

fertilizer that is being sold locally. RUCID also now uses a larger truck to facilitate the bulk transportation of raw materials, which also produces cost savings.

The adoption of LCT by RUCID has also allowed for more informed decision-making and has given the company greater credibility in domestic markets, thus winning over previously sceptical stakeholders with a newly acquired reputation.

The company's decision-making processes have been revitalized, based on the mantra "you can't manage what you don't measure", while promoting a culture of record-keeping and analysis.

RUCID CEO Samuel Nyanzi says, "it has become our culture… life-cycle thinking helps us make informed decisions according to facts and figures provided by staff."

Life-cycle thinking—a solution for every business type

For this small organic food company, the switch to LCT and the various practices it entails has been a boon for business, as well as the company's environmental and social credentials.

RUCID's LCM coach Paul Walakira provides an apt summary of the value of applied LCT for this small but ambitious business:

"Life-cycle management is often perceived as complicated and expensive, accessible only for big companies. But there are solutions adapted for all sizes of business. Big companies and SMEs as well as small business can get significant and tangible benefits from implementing a life-cycle approach."

9 Leading the way in lead-free paints – Jordan Sipes Paints Co.

This company participated in the project 'Applying Eco-innovative Strategies for Chemical Risk Reduction in Jordanian Industry', with financial support from the Strategic Approach to International Chemicals Management (SAICM) Quick Start Programme[14] and technical support from UN Environment and the Cleaner Production Unit of the Royal Scientific Society. Sipes came on board with the project, aiming to reduce risks from hazardous chemicals, particularly from using lead pigments in their products, and to improve its business sustainability performance.

Jordan Sipes Paints Co. is a paint manufacturing company originally established in Beirut, Lebanon, in 1956. The company commenced operations in Jordan in 1976, serving the local market, and is now also exporting automotive paints to the Kingdom of Saudi Arabia. Sipes is distinguished in the Jordanian market for producing automotive and road-marking paints and is also a producer of emulsion, industrial paints, oil paints, pastes, water paints and nitro cellulose paints.

Sipes is one of the first companies in Jordan to have implemented resource efficiency and cleaner production, through its collaboration in 2005 with the Cleaner Production Unit of the Royal Scientific Society. The company's management team is strongly committed to ensuring quality and health and safety standards, which resulted in it achieving the

14 http://www.saicm.org/Implementation/QuickStartProgramme

ISO 9001 and OHSAS 18001 certifications.

Eco-innovation

With the aim of reducing the environmental and health risks posed by lead chromate in paints, Sipes applied LCT across the products' life stages to identify alternative solutions for eliminating lead pigments. This was also motivated by national regulations introduced in Jordan to ban lead chromate in non-decorative paints by 2022, as well as global efforts to eliminate lead in paints.

Through applying the eco-innovation methodology, the company developed a new business model to produce lead-free automotive and road-marking paints for the Jordanian market by 2020. To achieve this, Sipes is liaising with material suppliers in Jordan and outside the country to find tailored substitutes and has started testing new formulations to produce these lead-free paints. Along with these innovations, Sipes has conducted an analysis of the Jordanian market to identify potential customers for the new lead-free paints. Informed by this analysis, the company intends to become one of the leading producers of lead-free paints in Jordan, increasing its share in the local automotive and road-marking paint markets by 5 percent by 2020. In addition, Sipes has committed to improving the work environment and has appointed a Health, Safety and Environmental (HSE) Officer, who will ensure occupational health and safety standards are followed. Moreover, the Royal Scientific Society is conducting an audit of the company to identify procedures needed to improve HSE conditions on site. By improving occupational health and safety, Sipes aims to achieve less than 5 percent HSE violations by 2020, and zero loss time injury in the long term.

Lead chromate is classified by the European Chemicals Agency (ECHA) as a substance of very high concern, which may cause cancer, damage human organs and affect fertility through prolonged or repeated exposure. Additionally, lead chromate is very toxic to aquatic life and has long-lasting effects on soil, water and air. Despite a 60-percent increase in costs from producing lead-free paints, Sipes decided to pursue the goal of eliminating lead, acknowledging the significant improvement in health conditions of employees involved in paint production, consumers using the paints and actors further down the value chain (e.g. recyclers of painted products). By eliminating lead chromate from automotive and road-marking paints, Sipes is committed to preserving the freshwater ecosystems in Jordan, which are the most vulnerable ecosystems in the country.

To successfully implement the innovations for lead-free paints, Sipes worked in collaboration with the Royal Scientific Society Cleaner Production Unit to identify the Higher Council for Science and Technology (HCST) in Jordan as a funding partner. The HCST acknowledges that lead elimination is a breakthrough innovation that could revolutionize the industry in Jordan. Sipes is therefore applying to access financial resources from the HCST National Fund for Enterprise Support. In addition, to successfully introduce the lead-free road-marking and automotive paints, Sipes is targeting the international car dealership companies in Jordan as entry customers, given their existing high environmental standards and interest in purchasing products that comply with them. At the domestic level, Sipes will engage with its local clients to communicate the benefits and innovations of the lead-free paints, in the hope of attracting their interest and shifting their preferences towards purchasing the new paint products.

The future of sustainability

"Our company is committed to applying the best environmental standards in performing its operations. The eco-innovation project was a chance to foster our capability to develop products while incorporating sustainability pillars in the whole life cycle of our operations. We, at Sipes, hope to lead the local market in the production of lead-free automotive and road-marking paints." **Engineer Maher Joma, Sipes Plant Manager, 2018**

10 A currency for life-cycle thinking – the success story of Banco de México[15]

Among the many applications of LCT across the globe, few are as surprising as that of Mexico's central bank, Banco de México. While banks are rarely mentioned in the same breath as the ecologically minded manufacturers and cooperatives of the world, Banco de México has taken some pioneering steps to bring LCT into the business of currency and the distribution of hard cash. So what exactly does the Mexican peso have to do with LCT in the 21st Century?

As Mexico's central bank, Banco de México occupies a crucial space in the daily lives of Mexico's 130 million inhabitants. Through the regulation of monetary policy, this operationally autonomous entity strives to maintain the purchasing power of the national currency and, just as crucially, provides the Mexican peso "in the quantity, quality, denomination and geographical distribution demanded by the public".

It is in the production and distribution of its more than 1 billion banknotes per year that Banco de México has introduced LCT to the world of banking in Latin America.

Calculating the life cycle

In 2014, Banco de México took the decision to perform the first-ever LCA of banknotes conducted by any organization in Latin America, with a firm focus on the environmental impact of polymer substrate banknotes compared with that of high-durability cotton substrate.

The subsequent study reported on no less than 1.2 million kg of polymer- or cotton-based banknotes, which were produced in 2013. Specifically, this involved a rigorous examination of a range of processes carried out by Complejo Legaria (the Banco de México-owned reporting organization where these processes are performed): namely, the design, production and distribution of banknotes and the shredding of banknotes withdrawn from circulation. According to the bank, the rationale was simple: "it reinforces Banco de México's commitment to environmental protection and cements its position as the only national central bank that has applied this methodology."

But there was more to the story than a progressive campaign to boost the bank's environmental credentials. This was an opportunity for Banco de México to conduct a comprehensive assessment that could finally provide it with detailed information on the environmental impacts of its operations, thereby making future social or economic impact assessments more straightforward, by means of a similar methodology.

Crunching the numbers, getting results

The assessment undertaken by Banco de México considered, in the first instance, the complete life cycle of all the denominations of Mexican banknotes, in addition to the materials, energy and emissions required for Complejo Legaria's activities.

A cradle-to-grave assessment of both direct and indirect activities was conducted, leading to the quantification of 11 impact categories. The results were clear: most of the banknotes' environmental impacts were derived from activities related to the production and transportation of raw materials. In addition, the assessment showed that "the distribution

15 UN Environment (2017). Road testing organizational life cycle assessment around the world: Applications, experiences and lessons learned. Life Cycle Initiative, United Nations Environment Programme, Paris, France. Available at https://www.lifecycleinitiative.org/resources/reports/

and final disposal stages produce significant atmospheric emissions, primarily due to distribution of the banknotes throughout the Mexican territory".

Where the production and transportation of raw materials was concerned, water resources, earth eco-toxicity and agricultural land occupation were particularly significant, signalling the need for immediate discussions on bold new strategies.

According to the bank, this is precisely what happened. "The O-LCA methodology enabled the organization to create environmental management strategies that could make a significant difference to the high-impact processes," recalls Banco de México.

Finding bankable solutions

Specific proposals included the deployment of renewable energy to power some of Complejo Legaria's operations and, for the nationwide distribution of banknotes, the switch from diesel-powered vehicles to gas-powered vehicles—two important steps towards reducing emissions.

The adoption of LCT by Banco de México appears to have led to broader questions about how organizations can bring about better environmental performance.

The bank's management have already recommended that further O-LCAs be performed for the organization's administrative units and regional cashiers (which form part of the bank's Currency Issuance arm—the same directorate as Complejo Legaria).

This implementation of applied life-cycle science would surely take Banco de México's use of LCT to the next level, by assessing the impacts of different investment portfolios and possibly endorsing the Principles for Responsible Banking.[16] In doing so, it would consolidate the organization's green credentials in what is currently a rather cautious banking sector, as far as LCA is concerned.

With the support of Banco de México's top management, there is almost certainly more good news to come from this Latin American life-cycle pioneer.

11 Life-cycle analysis in Bogotá – green on paper as in life[17]

For nearly two decades, the Life Cycle Initiative has been collaborating with companies and authorities in dozens of industrialized and emerging economies. In some countries, the key adopters of LCT are SMEs within a regional cluster or local network. This is the case in Bogotá, Colombia, where the city's environmental authority, Secretaría Distrital de Ambiente (SDA), has led a series of projects that help SMEs use LCA, with the aim of boosting environmental and business performance. Here's what happened when the Life Cycle Initiative teamed up with Bogotá's SDA.

As the environmental authority for the city of Bogotá, SDA has a special role in designing, developing and deploying environmental programmes. It also facilitates a network of companies that have implemented environmental management systems with the aim of becoming greener and boosting business. A key sustainability actor in Bogotá, it has supported a cluster of eco-friendly businesses across a variety of sectors—from food to packaging, textiles to transport.

16 https://www.unepfi.org/banking/bankingprinciples/

17 Life Cycle Initiative (2016). Case Study: City of Bogotá, Colombia – More sustainable industry, healthier urban environment. Available at https://www.lifecycleinitiative.org/case-study-bogota-colombia/

Putting life-cycle analysis on the city map

In 2014, SDA decided to take its environmental efforts up a notch by coordinating, in partnership with the Life Cycle Initiative, a pilot project to introduce LCA practices to a raft of companies. This would also involve introducing an LCM-CMM to participating enterprises. The idea was essentially to develop corporate capabilities in applying LCA to enable these companies to ultimately become greener, more bankable businesses.

Under the guidance of SDA as cluster coordinator, some 22 companies stepped forward for the project. About 90 percent of these companies were Colombian and more than two thirds were SMEs—the majority manufacturers of some kind.

The Life Cycle Initiative and SDA set out to cover as many bases as possible for the companies, with a series of training workshops, coaching sessions and video conferences to fully immerse participants in the life-cycle methods, practices and tools at their disposal. These events revealed both challenges and opportunities (not least the challenges of applying LCA to diverse business realities), but by and large, companies were enthusiastic about strengthening their commitments to ISO 14001 on environmental management.

Of course, for each business, the approach had to be somewhat different. As Professor Paulo Romero of the Universidad Nacional de Colombia noted: "Each company needs to develop tools and methods specific to their situation."

For SDA, the project would not only impact each company in specific ways, but their respective value chains would also stand to gain. "The project is a great opportunity for these companies to improve their ability to transmit this knowledge to other companies in the value chain," confirmed the SDA during the project.

Life-cycle thinking in action—one business at a time

For some companies, implementing LCM practices and converting LCA results to effective action was challenging, but it reaped positive results. Businesses such as cleaning product manufacturer Azul K, coffee company Colcafé, acrylic sheet producer Cristacryl de Colombia, food packaging company Multidimensionales SA and transport operators Somos K all witnessed boosts to their businesses in one way or another.

In the case of Azul K, all its business lines—home, personal care and laundry products—stood to gain from the application of LCM principles. A thorough assessment of design, materials, manufacturing, marketing, waste generation and disposal revealed that among the company's products, liquid washing detergent had the potential for improvements. In this instance, packaging was identified as a key issue. By means of holistic LCAs, the company was able to reduce the weight of plastic containers by around 40 percent, with no negative impacts for the end consumer. Now, new automated lines have been installed to handle the growing demand for the product.

Transport operator Somos K also put its LCA results to good use. Its assessment yielded improvements on two fronts: maintenance operations and fuel consumption. First, the company noticed that to enhance the maintenance procedures of its fleet of buses, it would have to start collaborating with the fuel injector suppliers, since its previous in-house procedures were insufficient. Second, the average fuel efficiency of the fleet was also enhanced, from 6.7 to 6.9 km/g, through efficient driving training. In addition, LCA results pointed to the need for improvements in the fleet's efficiency while idling at the company's depot. As such, Somos K partnered with its supplier to install electronic systems that would automatically shut off an idling bus after a set period of time.

Companies such as these translated LCT into action and saw tangible improvements to their businesses, while boosting their environmental credentials. What's more, the case of SDA in Bogotá shows that applying LCA and LCM in a cluster of local companies can have a multiplying effect, building a strong business case for LCT where it is needed.

12 Conclusions

The business case studies presented in this document show how LCT can represent an enormous opportunity for a variety of businesses. These businesses have recognized their responsibility for initiating positive change and have, in return, received various environmental, social and economic benefits. LCT has led to an increase in market stability and has enabled these businesses to be ahead of their competitors and to access new markets. It has also resulted in cost reductions and increased revenues through the valorization of waste and the decrease in material and energy costs. LCT prioritizes the uptake and enhancement of innovative technologies with positive occupational and environmental benefits. In short, it reduces companies' environmental footprint and risks and increases resource efficiency. The increasing interest in LCT is due to the fact that companies are becoming more aware of these benefits.

At the same time, these business cases highlight some of the challenges in applying LCT. Often the internal business climate acts as a barrier or linked supply chain actors show resistance towards the desired change. Yet it is important for business leaders to remain consistent in their actions and provide leadership in their roles. Furthermore, one business alone cannot always deliver the scale of change that is required. Limited access to life-cycle data and limited capacity are often what slow or impede the uptake of LCT.

Effective capacity to apply LCT is most likely when all levels of the business engage with the life-cycle vision, from the board to the facility workers. It is also important to establish conditions for enhanced collaboration along the value chain, such as an enabling policy framework, capacity to apply life-cycle approaches and access to life-cycle data. The entire value chain can benefit from this through an increase in overall stability, ensuring the longevity of value chain actors.

Ultimately, it becomes evident that sharing knowledge and visions within a collaborative environment can lead to many positive developments. The Life Cycle Initiative and UN Environment aim to enhance the feasibility of life-cycle approaches on a global scale and in all sectors by setting the stage for partnerships and collaboration. Some of the multi-stakeholder partnership projects presented in this document demonstrate precisely how the Life Cycle Initiative's engagement has led to positive business performances and thus, how it is inducing advances in the global Agenda for Sustainable Development. Significant efforts are also being made to enhance access to life-cycle data and capacity, as these are two enabling conditions that were highlighted in most of the case studies as particularly challenging.

The diversity in the business case studies shows that application of LCT is becoming more mainstream in all sectors, in both industrialized and emerging economies, large companies and SMEs. Adopting LCT is a forward-thinking strategy as it enhances an organization's overall sustainability and makes it more resilient to external changes. Leading businesses are moving beyond business as usual to create a more sustainable and regenerative economy—a new 'business unusual'. This development is inevitable. Now it is up to all other businesses to make similar changes

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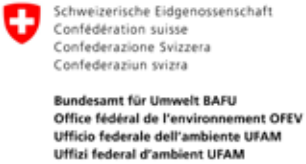

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About the Life Cycle Initiative

The Life Cycle Initiative is a public-private, multi-stakeholder partnership enabling the global use of credible life cycle knowledge by private and public decision makers.

Hosted by UN Environment, the Life Cycle Initiative is at the interface between users and experts of life cycle approaches. It provides a global forum to ensure a science-based, consensus-building process to support decisions and policies towards the shared vision of sustainability as a public good. It delivers authoritative opinion on sound tools and approaches by engaging its multi-stakeholder partnership (including governments, businesses, scientific and civil society organizations and individuals).

The Initiative facilitates the application of life-cycle knowledge in the global sustainable development agenda in order to achieve global goals faster and more efficiently.

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