ETC WGME and

Reflections and Lessons Learnt from EEA's Work on Innovative Business Models for Sustainable Lifestyles

Working Paper

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Executive Summary

Rationale

The EU's 2050 vision outlined in the 7th Environmental Action Programme (EAP) of the European Union states:

> *"In 2050, we live well, within the planet's ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed in ways that enhance our society's resilience. Our low carbon growth has long been decoupled from resource use, setting the pace for a global sustainable economy."*

To achieve this vision, radical changes in socio-technological systems are needed to work towards a circular economy. The recent economic crisis, increasing commodity prices and growing awareness of humanity's impact on the environment have recently to a certain extent pushed the debate on innovative and sustainability driven business models into mainstream business and policy agendas.

Traditional business models, that link profit to the volume of sales of products, are continuously refined to reduce input costs, enhance production efficiency and boost demand and consumption levels. However, incrementally developing innovative technology has often proven to be insufficient to reduce environmental pressures that are driven by growth in population, incomes and living standards. In fact, sustainable business models must go beyond mere improvements in resource efficiency and support individuals in making more sustainable choices in their lifestyles. While there are more and more environmentally and socially oriented business models on the ground, where the phenomena and practice of environmentally and socially oriented business models have long been established, the concept of business models that enable sustainable lifestyles is quite novel.

This Report

The overall objective of this report is to draw lessons learnt from four years of EEA's work on innovative business models for sustainable lifestyles and provide a basis for discussion and subsequent decision-making to further advance the values created by business models promoting sustainable lifestyles. The report addresses the following topics:

- Identification of innovative business model typology that supports more sustainable lifestyles, to include its relevance to consumption and production systems as well as examples of good practices. The scope of this report includes business models in new businesses, small- and medium-sized enterprises (SMEs), larger companies and large multinationals. Taking it further, this report identifies value creation models in public and private organisations.
- Common barriers and drivers to business models for sustainable lifestyles, and thereby identifying knowledge gaps as well as opportunity areas for further work.
- Means to enable the scaling up of values created by business models for sustainable lifestyles and their role in meeting the EU 2050 vision and supporting EU's goals and targets.
- Key lessons learnt to scale up the values created by innovative business models to realise sustainable lifestyles in Europe.

It should be noted that the report does not provide a detailed assessment of potential negative environmental impacts and rebound effects linked to innovative business models (e.g. increased transportation and associated energy use and emissions in the case of collaborative consumption). This report provides practical examples of business models for sustainable lifestyles, but does not quantify these environmental impacts.

Innovative Business Models for Sustainable Lifestyles

The ability to think of long-term societal transitions requires knowledge development based on fundamental and applied science at the systemic level. Sustainable lifestyles represent one of the key

elements of the necessary transitions. Different typologies of innovative business models that potentially contribute to sustainable lifestyles have been identified and reviewed in this report (see figure below). The examined business models include not only economic value, but also environmental and social community values created by different kinds of social business practices.

The business models are categorised in the typology according to their value chain focus and to their key driving actor for the value creation towards sustainable consumption, putting people's lifestyles and end-consumers at the centre of the investigations. Their value creation was reviewed for selected production and consumption systems, including food & drink, electrical and electronic goods, mobility, housing, clothing.

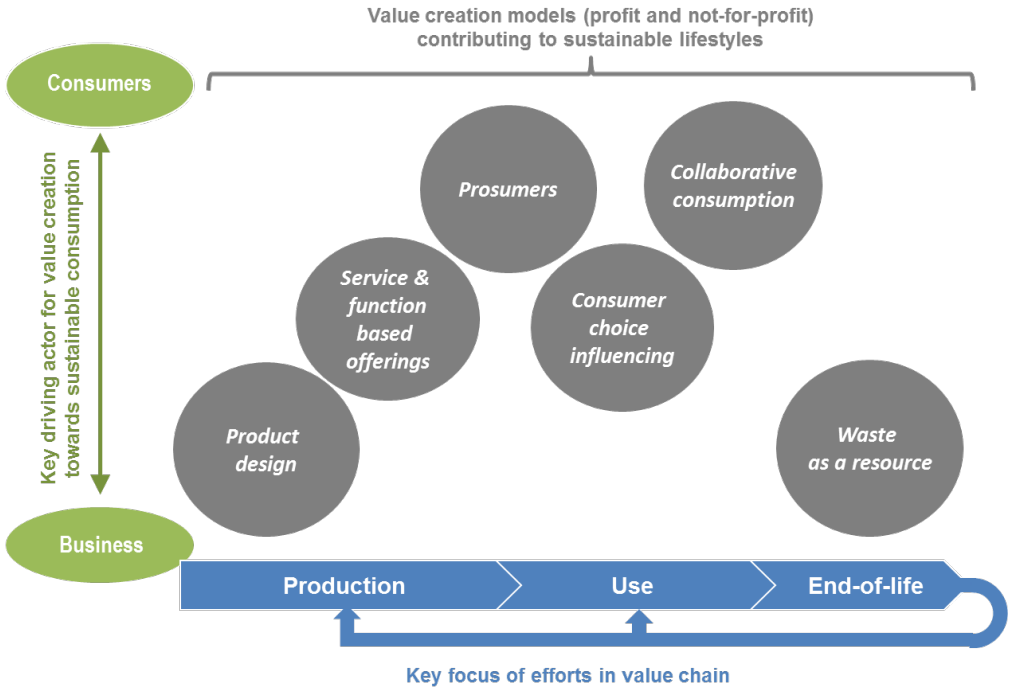

Figure **Typology of Innovative Value Creation Models for Sustainable Lifestyles**

Common Barriers and Opportunity Areas

As part of this study, common barriers and opportunities to scale up the value creation from innovative business models for sustainable lifestyles were assessed from a business, consumer, and a government perspective. The following lessons and conclusions can be drawn from the assessment of common barriers and opportunity areas:

Increased market demand for more sustainable products / services and behavioural changes are essential factors in advancing the up-taking of innovative business models for sustainable lifestyles. Business models are ultimately about the value delivered to customers. To innovate, companies must stay connected to the ever-changing customer needs and market realities. It can be particularly helpful to understand local communities and their real needs and wants. Critical mass and cultural values have been identified as key common barriers to market and behavioural reshaping, as well as the prevailing ways of how products are marketed to consumers. A deeper understanding of how people think and take decisions is essential to transform sustainable products and services into 'ordinary choices' and support behavioural shifts towards more sustainable lifestyles. Increasing market demand for more sustainable products and services is influenced by improved consumer access to sustainable products and services, increased transparency and consumers' ability to identify responsible products and business practices (e.g. through social networks).

Convenient infrastructure and technology are key factors to overcome prohibitively high opportunity costs arising when, for instance, the infrastructures to supply sustainable products and services are not

available. Difficulties in collecting sufficient quantities of good quality end-of-life products may pose a great challenge towards the feasibility of implementing recovery and recycling technologies (e.g. access to repair/recycling facilities and take-back schemes). To innovate within systems, companies need the capability to adapt to shifting market conditions and larger systemic changes through easy access to suitable technologies. Governments and businesses also need to provide consumers with easy and convenient access to infrastructures in order to foster the uptake of more sustainable products and services.

Linking education and training with sustainable lifestyles may prove beneficial to the evolution of sustainable lifestyles by developing the needed innovative expertise among entrepreneurs and academia. So far, effective education and practical training focusing on sustainability within academic curricula are lacking. Nurturing human capital, adjusting educational focus and developing new educational skills and capacities on sustainability topics at schools, high schools and universities are needed to bring forward sustainable lifestyles. To overcome existing barriers, it would be advisable to focus no longer only on knowledge provision but move also towards encouraging creativity, multiculturalism, open intergenerational dialogue, and direct experimentation with future generations to gain ground for new economic principles and business models that combine social and technological sustainable progress.

Suitable financial frameworks can support transformations towards innovative business models. Many new processes or product innovations have fallen short of their potential because of their inability to compete within the financial constraints of existing traditional markets. Governments and financial institutions may play a strategic role in providing the right incentives via environmental taxes and green fiscal reform, helping to internalise environmental costs and establish financial systems enabling innovative products or processes to succeed in the marketplace.

Governance systems incorporating long-term thinking and planning are fundamental for a circular economy and sustainable lifestyles. Institutional options, better accounting for innovative business models for sustainable lifestyles include tailored government regulations that support e.g. green public procurement, extended producer responsibility and social innovation.

Successful and effective information provision to consumers, businesses and governments is often hindered by specific barriers including the lack of knowledge in various areas (e.g. value chains, rebound effects, sustainable products and services and materials) and the lack of benchmarking on sustainable lifestyles and innovative business models. The sharing of good practices, access to reliable information, establishment and refinement of sustainability related standards and labelling alone are no trigger for consumption and production changes. However, access to this information can provide the foundation to turn knowledge into practice and lead to the uptake of sustainable products and services.

Increased multi-stakeholder partnerships and communication channels have the potential to reach out to a vast array of actors and lead to progress towards innovative business models for sustainable lifestyles. In the current age of hyper-connectivity, business innovators can benefit from the opportunity to build new capacities and generate novel ideas through alliances and sharing. Whether it is a public-private partnership or crowd-sourced innovation, companies have realised the benefit of extending their innovation network. However, so far coordination and collective action among stakeholders in the public and private sectors seems too often be insufficient. Communication channels and combined efforts between large and small businesses have to be promoted and further supported both at the company and governmental level.

Overall Lessons Learnt

Sustainable consumption and lifestyles represent a necessity and opportunity area for economic and social development and advancement towards a circular economy.

From the consumers' perspective, one option is for example to shift from traditional ownership attitudes and material-based cultural values towards innovative purchasing and consumption habits to a larger extent based on leasing that consider economic, social and environmental impacts.

From the producers' viewpoint, it is imperative to reduce resources consumption, including through the adoption of a circular economy frame of reference. Businesses can further look for opportunities beyond just the mere manufacturing of a product and its delivery to the marketplace. Sustainable business model innovation efforts could follow a structured approach accounting for the full production and consumption life cycle, from conception and design, use, service, to disposal and end of life. Building up innovative business models for sustainable lifestyles involves much more than merely creating and marketing a new product. These models require convincing consumers by informing and inspiring them about the product or service and how or why it might be of value. Beyond that, companies might also have to arrange for financing to enable consumers to make the purchase, and educate and empower other stakeholders in the system, like distributors, community-based organisations. In some instances, companies create entirely new sales structures to facilitate the distribution of their more sustainable product.

Additionally, innovative business models for sustainable lifestyles – though still representing a niche in the political arena – are becoming increasingly relevant to policy making in Europe. Reasons include their potential to speed up the transition of markets and society towards a green, inclusive and circular economy, and to combat environmental degradation while increasing overall welfare, economic prosperity and life quality in a medium to long-time horizon. Complementing existing policy and social approaches with more integrated and long-term environmental approaches will help provide regulatory stability for businesses and widen the room for behavioural shifts. Additionally, environmental policymaking will have to be shaped or even designed to enable social arrangements and settings empowering citizens to try out innovative forms of business and social innovation.

Dealing with innovative business models for sustainable lifestyles demands a deeper understanding of the interlinkages between society, businesses, and the environment. Since business model innovation appears to be indeed a key ingredient to transforming our economic landscape and improving social and environmental outcomes, it is worth understanding what drives it, what the most promising business models are, and what might compel a company to transform its existing model.

1 Introduction

1.1 Objectives, Target Audience, and Structure of the Report

1.1.1 Objectives

The overall objective of this report is to draw lessons learnt from four years of EEA's work on innovative business models for sustainable lifestyles, and provide a basis for discussion and subsequent decision making to further advance the values created by business models for sustainable lifestyles.

Specific objectives of the report are to:

1. Sort typologically and review innovative business models to support more sustainable lifestyles, including their relevance to consumption and production systems and examples of good practice. The scope of the report includes business models in new businesses, in existing small and medium sized enterprises (SMEs) and large multinationals, as well as forms of social business practices creating environmental and social values.
2. Describe common barriers and drivers of business models for sustainable lifestyles, and thereby identify knowledge gaps and opportunity areas for further work.
3. Highlight the potential for the scaling up of value created by business models for sustainable lifestyles.
4. Summarise the key lessons learnt on scaling up the values created by innovative business models for more sustainable lifestyles in Europe.

It should be noted that the report does not provide a detailed assessment of potential negative environmental impacts and rebound effects linked to innovative business models (e.g. increased transportation and associated energy use and emissions in the case of collaborative consumption). This report provides practical examples of business models for sustainable lifestyles, but does not quantify these environmental impacts.

1.1.2 Structure of this Report

This report is structured as follows:

Introduce	• *Chapter 1* outlines the aims, objectives and rationale of this report and defines key concepts underpinning this report.
Categorise & characterise	• *Chapter* 2 conceptualises and categorises key types of innovative business models contributing to more sustainable lifestyles, including their value creation, barriers and relevance to stakeholder groups. • *Chapter* 3 discusses the value creation and scaling up potential of the business model categories identified in production and consumption systems, including associated barriers.
Analyse & consolidate	• *Chapter* 4 summarises the common barriers for the business models based on discussion in Chapters 2 and 3, and subsequently identifies key opportunity areas for reducing the barriers identified.
Moving forward	• *Chapter* 5 outlines the key lessons learnt and final conclusions on scaling up the value creation of and bridging knowledge gaps for innovative business models for sustainable lifestyles in Europe.

1.2 Rationale

In the 7th Environmental Action Programme (EAP), the European Union (EU) outlines its vision for 2050 as follows: 'In 2050, we live well, within the planet's ecological limits'. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed in ways that enhance our society's resilience. Our low carbon growth has long been decoupled from resource use, setting the pace for a global sustainable economy.' To achieve this

vision, radical changes in socio-technological systems are needed, with a particular focus on a circular economy. Sustainable lifestyles are one of the key elements of the necessary changes.

The issue of resource efficiency and conservation of the environment and its natural resources has become one of the major challenges facing academia, business, society and the policy makers (Leismann et al, 2013). It is clear that we need to look beyond efficiency improvements in the production of the goods and services we use, to reach into the less tangible space of consumer behaviour and social psychology (WEF, 2013b; EC, 2013a).

Business-as-usual patterns of production, consumption and disposal cannot be sustained in the long-term. Resource efficiency and industrial policy in the era of globalisation are two of the seven flagship initiatives of the Europe 2020 strategy for smart, sustainable and inclusive growth. The flagship initiative for a resource-efficient Europe under the Europe 2020 strategy supports the shift towards a resource-efficient, low-carbon economy to achieve sustainable growth. This flagship initiative provides a long-term framework for actions in many policy areas, supporting policy agendas for climate change, energy, transport, industry, raw materials, agriculture, fisheries, biodiversity and regional development. Even though the EU Eco-Innovation Action Plan focuses on technological innovation within business models and the EU SCP/SIP Action Plan mentions green business models, they do not yet clearly link business models to sustainable lifestyles (EC, 2011).

More recently, the report on *"Creating an Innovative Europe" (EC, 2006*) has underlined the main reasons why business innovation potential in Europe has so far not been fully exploited and called for urgent action *"before it is too late."* It identified, as core concern, the need to make the business environment more innovation-friendly.

Traditional business models, that link profit to the volume of sales of products, are being continuously refined to reduce input costs, enhance production efficiency and boost demand and consumption levels. Over the past forty years, the emphasis given on efficient process technologies has resulted in huge increase in labour and energy productivity (EEA, 2010). To some extent, this is the result of the restructuring of economies, with a growing share of services, reflecting the fact that labour has become relatively more costly compared with energy and materials (EEA, 2010).

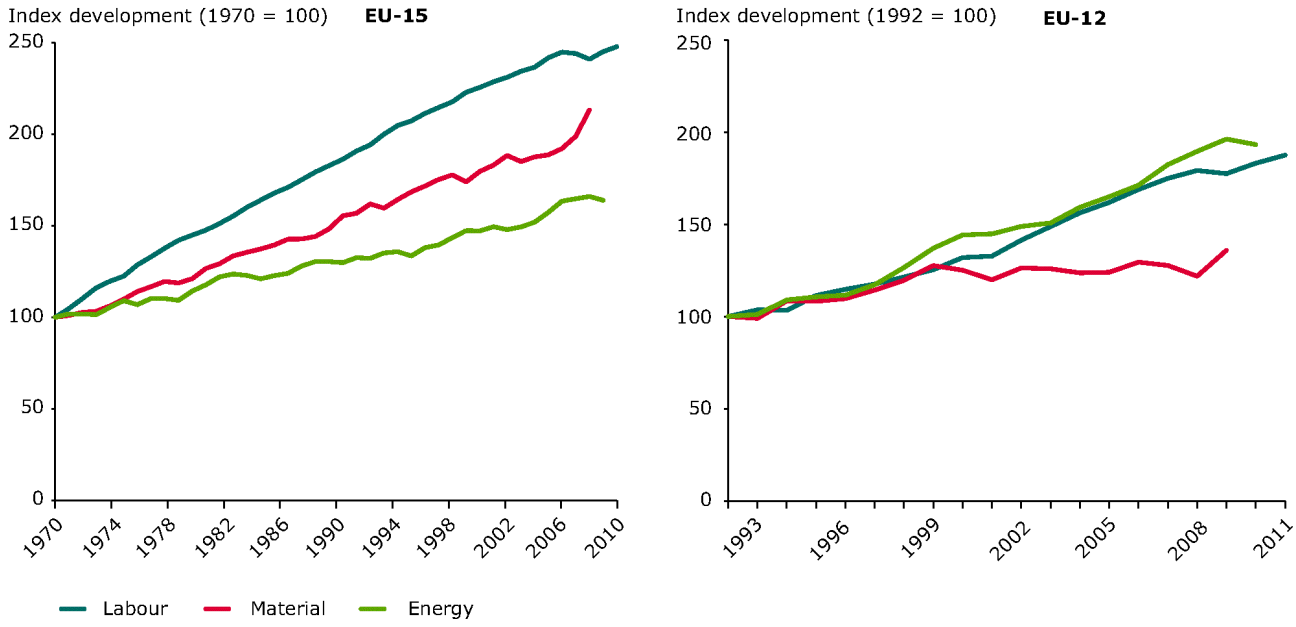

Figure 1-1 Growth in the Productivity of Labour, Energy and Materials, EU-15 and EU-12

From the literature assessed as part of this study (e.g. WEF, 2013b; SPREAD, 2012; Mont & Heiskanen, 2014; WBCSD, 2011), it is clear that both social and technological innovations are important drivers for change. Enabling technologies play a vital role in creating systemic shifts. Innovative technologies generate business opportunities that have a potential to support sustainable lifestyles and consumption. Social innovations motivate and maintain lifestyle changes and, in turn, create market demand for more sustainable products and services (OECD, 2013).

Thus, while the phenomenon and practice of environmentally- and socially oriented business models is no longer new, the concept of business models that enable sustainable lifestyles is quite novel. Consequently, the core focus of this paper is on innovative business models for sustainable lifestyles, including business-to-consumer (B2C), consumer-to-business (C2B), and consumer-to-consumer (C2C) business models. B2B business models are outside the scope of this study as these business models generally have a strong production focus, and are not directly linked to people's lifestyles.

As demonstrated through the typology of business models and supporting good practices in this report (mainly in Chapter 2 and 3), science, business and civil society have come up with new initiatives and interpretations on the future of markets and society. The German Federal Environment Agency (UBA, 2014) argues that the political system seems to lag behind in integrating associated ideas and still seems to be at the periphery of the mainstream discussion on green economy, growth and wealth, etc. The issue of new business models and social innovations for sustainable lifestyles are a kind of synonym for the many ongoing changes on macro- and micro-level within the economy and society towards sustainability.

Business models for sustainable lifestyles can be seen as a bridging concept of innovation between efficiency and sufficiency (UBA, 2014), because they create opportunities to address important structural problems without strong moralisation, and to open up the political space for action. One of the challenges is that existing political rationality of instruments and measurements are becoming less effective, because they are directed to an increasingly out-dated model of society and market economy to which the consumer is a passive political actor.

In summary, business and social innovation models for sustainable consumption and lifestyles are seen as an important contribution towards the ongoing efforts to decouple economic growth from environmental degradation and to address the global challenges of environmental degradation, resource scarcity and social inequality (WBCSD, 2011).

1.3 Definitions

This section explains some key concepts underpinning this paper in order to support the review of innovative business models for sustainable lifestyles and the potential roles of business, governments and civil society organisations.

The present report focuses on innovative business models, which address not only economic value (as is the case with traditional business models) but also deliver new forms of what can be defined as social business practices. These practices can influence environmental and social / community values and catalyse the initiation and stabilisation of sustainable consumption patterns and lifestyles. We take the view that each organisation (e.g. for profit, not-for-profit, large corporations, SMEs, entrepreneurs) creates some sort of (economic, environmental, and societal) value for its clients or 'recipients'. Therefore, each organisational type has a business model. In this paper, value creation is assessed from a sustainable consumption and resource efficiency perspective, putting people's lifestyles and consumption at the centre of the investigations. This approach provides a novel and promising way to tackle resource consumption challenges which has not yet been sufficiently addressed.

1.3.1 Sustainable Lifestyles and Consumption

A lifestyle defines how we live, spend our time or interact with others, who these others are, where we live, where we go on vacation, where we shop, and what we consume. According to Giddens (1990), lifestyles are social routines that help create self-identity. They include not only material possessions,

but also patterns of time use, such as household and rewarding employment, interests and leisure. Lifestyles are a narrative that gives meaning to routines and choices (Lorenzen, 2012) and that serve as "social conversations", in which people affiliate and differentiate themselves from other people. The notion of lifestyle also captures the interconnectedness of consumption practices.

Lifestyles are a product of past and current consumption and production patterns and are intricately related to people's everyday choices and practices (Mont, 2004a). A sustainable lifestyle can be defined as "a collection of social routines pertaining to everyday life, which (a) has a much lower environmental impact than the present average; (b) is significantly more resource-efficient, and (most importantly) c) progressively reduces dependence on a continuous flow of new commodities". The concept of sustainable lifestyles widens the focus from consumption activities to include a wider set of competencies and orientations that people use in their lives (Mont & Heiskanen, 2014).

Private and public consumption dominates nearly all-modern economies, accounting for more than 80% of gross domestic product in many countries. It takes place within a larger system driven by economic forces, technological progress, political and cultural contexts, environmental issues, and many other determinants. Sustainable consumption is related to the purchase, use and disposal of products and services (WEF, 2013). The 1994 Oslo Symposium defined sustainable consumption as "the use of services and related products which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations" (Norwegian Ministry of the Environment, 1994).

In order to enable a focused discussion, this paper focuses on the sustainable consumption aspects of people's lifestyles. As noted in the rationale section, business models for sustainable consumption and lifestyles are seen as an important contribution towards the on-going efforts to decouple economic growth from environmental degradation.

1.3.2 Innovative Business Models for Sustainable Lifestyles

Like "sustainability," the term "business model" is used rather loosely and is often open for (mis)interpretation. Many scientists have attempted to define the term. The early research on business models from 1990s had mainly focused on large-scale companies, while the latest research from the second half of the 2000s changed the focus by investigating, mapping down and exploring innovative elements of *start-ups and companies in emerging sectors*, such as IT and biotechnology.

Innovation researchers, Alexander Osterwalder and Yves Pigneur, offer an inclusive and succinct definition in their work, *Business Model Generation* (2010). They define business models as the "fundamental structures for how organisations create, deliver and capture value''. A more comprehensive definition is provided by Amit and Zott (2012), defining business models as "the bundle of specific activities conducted to satisfy the perceived needs of the market, along with the specification of which parties conduct which activities, and how these activities are linked to each other." This and other definitions clearly point to the fact that a business model encompasses more than just what a company or organisation produces (SustainAbility, 2014).

Overall, business model innovation is about the rationale behind creating, delivering and capturing value that can re-invent or replace the (out-dated) existing models. Traditional innovations through incremental changes in technology have often proven to be insufficient to alleviate environmental pressures that are triggered by growth in population, incomes and living standards. The idea of business model innovation, where an enterprise could introduce a new business model never employed before, or transform an existing business model, has long fascinated business leaders. Sustainable business model innovation seeks to capture economic value as well as environmental and social values from a lifecycle perspective. Many traditional business models survive only because the resource prices do not take into account the external costs of environmental damage, and other market distortions have made such business models more competitive than they would otherwise be (SustainAbility, 2014).

The majority of the business model literature, including on definitions and evaluations, restricts itself to individual companies and focuses on value creation and value offerings of a specific enterprise. In a globalised world with supply chains and resource flows spanning the globe, it has become paramount to investigate business models from the value chain perspective or even in a value network context. It is no longer enough to consider businesses as isolated agents of a closed system, rather it is necessary to consider them as part of a network in which customers, suppliers, competitors, and regulators are interconnected.

Currently there is a shift of focus from tangibles such as skills, information, and knowledge toward intangibles such as interactivity, connectivity and ongoing relationships. The orientation has moved from producer to consumer, from maximising product output to focusing on delivering value to customers (Vargo & Lusch, 2004). This shift is not only about marketing, but what value is created for customer and by whom. It is no longer given that the best value can be provided by conventional / mainstream goods produced by companies. A truly sustainable business model, therefore, should go beyond mere improvement of resource efficiency. Such business model must support individuals in adapting to more sustainable lifestyles that influence their choice of products and services and the volumes of products they consume (ETC/SCP, 2012).

In line with the aforementioned business model definition, each organisation creates some sort of economic, environmental or societal value to its clients or 'recipients'. Each organisation has a business model to justify and ensure its existence. Osterwalder and Pigneur (2010) describe business models through nine basic components ("building blocks"), including *activities, partners, resources, cost structures, customer relationships, customer segments, value proposition, channels* and *revenue streams*. These building blocks are relevant to both for-profit and not-for-profit organisations. Throughout this paper, business model references and good practices are provided for both profit and not-for-profit approaches applied by entrepreneurs, SMEs, large corporations, and consumers where relevant.

1.3.3 Value Creation

Value creation by businesses is most often solely associated with generation of economic benefits (e.g. return on investment, revenues, cost savings). Coulter and Lee (2013) spell out the urgent need for fundamentally different approaches to value creation, moving beyond product and process modifications to business model innovation.

Adopting more sustainable business models and eco-innovations provides a range of other benefits and values for companies that will strengthen their competitiveness (OECD, 2013). However, the concept of sustainable consumption can be controversial for businesses since it may imply less expenditure. While consuming less will surely lower environmental impacts, it may also imply a reduced economic activity, which will deliver less growth, lower incomes and fewer jobs.

Sustainable consumption can be an opportunity rather than a threat when we focus on the value delivered rather than the materials and products we consume. By seeking to reduce the volume rather than the value of consumption, we can consume more sustainably while fostering economic growth. It is crucial to look for opportunities beyond just manufacturing of a product, to the full life cycle, from conception and design through production, use, service, and eventual end of life (WEF, 2013a). Additionally, replacing products with services need to be fostered through the evolution of sustainable business models introducing services that can fulfill the similar functional need and operate as substitutes of actual products (Nordic Innovation, 2012).

The ETC's back ground paper on Sustainable Consumption and Production (as prepared for the WBCSD/EEA workshop on 'The Role of New Business Models for Sustainable Living') has identified five means of value creation towards more sustainable consumption through sustainable lifestyles (ETC/SCP, 2012):

- *Value creation through better products and product substitution:* Value for consumers and business can be created by offering better choices and increasing the availability of eco-efficient

products, or by substituting them directly with services (Breukers et al, 2011). Business models in this area tend to focus on developing products or services that help reduce the consumer's environmental impact by substituting resource- and energy-intensive products with lower-impact products or services that serve an identical or similar purpose.

- *Value creation through efficient use:* For many products, especially those using consumable materials (e.g. water or electricity), up to 80% of their environmental impacts can be associated with their use phase. A more efficient use of a product can, for example, be achieved as company provides additional services to its customers, such as procurement, maintenance, upgrading, and re-use/recycling of products. Leasing is one type of business model which utilises this approach to value creation. The consumer value of this approach is that company provides services related to the product during its consumption phase, thus improving the efficiency of the product use.
- *Value creation through shared use:* This approach enables consumers to get access to, engage with or use products that are available on the market either via other consumers or through businesses who provide access to the products. The common denominator here is that consumers do not necessarily own the products, but products are rather shared among users in different ways. Through sharing, fewer 'physical' products are required to satisfy consumers' demands.
- *Value creation through longer use:* Many products are designed to have unnecessarily short life, requiring consumers to purchase new products leading to increased waste, resource consumption, and pollution from production facilities (Cooper, 2010). Value can indeed be generated by extending a product's lifespan. Longer use of products can also be supported by the exchanging of goods, which are no longer needed by the first owner.
- *Value creation through efficient end-of-life strategies:* The end-of-life phase of a consumer product can offer a vast array of (business) opportunities to create value and close material loops. Upcycling, recycling, and material recovery strategies can be a starting point for innovative business models to generate economic and consumer values and increase resource efficiencies.

1.3.4 Scaling Up

There has been an increasing interest in the subject of "scaling up". The term "scaling up" and its various related terms (e.g. multiplication, replication) are widely used in different sectors and contexts (e.g. health, environmental, commercial, and social studies) at micro (e.g. business case studies), meso (e.g. development strategies), and macro level (e.g. policy formulations). Although literature on the subject is quite extensive, there is not yet an internationally accepted definition and the term 'scaling up' is often not well defined or understood.

Very broadly, scaling up means "doing more" of something, but this "something" varies considerably among sectors. To be more precise, the objective of scaling up is defined as "activities that lead to more quality benefits to more people over a wider geographic area more quickly, more equitably, and more lastingly". Scaling up according to this definition reflects a concern for the impact's degree and quality in terms of sustainability and equity (Menter et al, no date).

Some confusion in understanding "scaling up" comes from the fact that the term is often used as a general term to refer to a combination of different processes that by themselves have a variety of different definitions. The terms "replication", "streamlining", "expansion", and "innovation" are often used in the context of scaling up a sustainable industrial development. These terminologies will be used in the subsequent chapters on scaling up the value created by innovative business models for sustainable lifestyles. The table below provides a brief description of these terms, including their underlying principles, application areas, and thrust (Van Berkel, 2011).

Table 1-1 Scaling Up Disentangled (Van Berkel, 2011)

Terminology		Description	Application Areas	Thrust
Scaling up	Replicating	Large scale application of known solutions and best practices ("widening")	Within the same target group, sector or cluster	Using best practices – business development
	Streamlining	Eliminating steps that may not be necessary to achieve similar result	Within the same target group, sector or cluster	Doing it effectively and efficiently
	Expanding	Seeking new applications and markets for practices proven elsewhere	New sectors, countries, clusters, etc.	Making it applicable in different areas
	Innovating	Finding new solutions that have more substantive benefits ("deepening")	All areas	Continuous development and improvement

1.4 Works to Date by EEA on Innovative Business Models

EEA and its ETC/SCP have undertaken several activities in the last couple of years in the fields of sustainable lifestyles and innovative business models. The table below lists the respective studies, background papers and workshops. Key references, learnings, and good practice examples from this previous work are captured in this report.

The various successions of the EEA events on these topics show a learning and development curve. The 2011 joint EEA / WBCSD stakeholder workshop in Brussels focused on obtaining a clear perspective and understanding of the topics related to the WBCSD business vision 2050 process. The pre-Rio+20 stakeholder meeting in Copenhagen aimed to get an understanding of the green economy (including the role of business, technology, products) and the more lifestyle-oriented business models and opportunities. The Eionet 2013 meeting in Copenhagen and the stakeholder workshop held in Berlin (November 2013) focused on business and social innovations as a multi-dimension phenomena and on different figurations of the transition model of economy and civil society.

Table 1-2 Works to Date by EEA and ETC/SCP with Relevance to Sustainable Business Models

Activity	Reference
Studies, background papers and EEA reports	2009: Social Classes and Consumer Segmentation: State-of-the-Art, Consumption Drivers and Implications for Sustainable Consumption.
	2009: Survey on Consumption Behaviour and its Driving Forces.
	2009: Scoping Study on Consumption Behaviour and Policies for Change.
	2009: Sustainable Consumption in a New Green Economy.
	2010: The Role of Food Retailing in the Move towards Sustainable Consumption and Production.
	2011: The Role of Values and Public Perceptions in Policy Making for Sustainable Consumption.
	2011: Progress in Sustainable Consumption and Production in Europe – Indicator-based Report. ETC/SCP Working Paper No. 1/2011.
	2012: Analysis of Latest Updates on Outcomes of SCP projects and Contributions from Civil Society Organisations (CSOs), including Discourses, Trends and Lessons 2010-2012.
	2012: The Role of New Business Models for Sustainable Living. Background paper for the WBCSD / EEA workshop. 2-3 May 2012, Copenhagen.
	2012: Analysis of Latest Outcomes of Academic Work on Sustainable Consumption 2010-2012.
	2010: The European Environment — State and Outlook 2010 (SOER, 2010).
	2012: Consumption and the Environment — 2012 Update, Update to the European Environment State and Outlook 2010 (SOER, 2010) Thematic Assessment.

Activity	Reference
	2013: Innovative Sustainable Business Models in Europe. Background paper for the EEA-ETC/SCP internal workshop. 16 April 2013, Copenhagen.
	2013: Approaches to Using Waste as a Resource: Lessons Learnt from UK Experiences. ETC/SCP Working Paper No. 5/2013.
	2013: EEA's Role in SCP and Sustainable Business Models in Europe.
	2013: Understanding Factors that Shape Consumption. ETC Working Paper No 1/2013.
	Forthcoming: Environmental Indicator report 2014 – Environmental impacts from Production and Consumption Systems in Europe.
Engagement and workshops	2011: Lifestyles and Consumption 2050. Joint EEA / WBCSD Workshop. March, 2011, Brussels.
	2013: The Role of New Business Models for Sustainable Living. Messages for Rio+20. Report of the WBCSD / EEA workshop. 2-3 May 2012, Copenhagen.
	2013: Collaboration for Sustainable Lifestyles through Business and Social Innovation. Summary Report of the EEA / BMZ Workstudio, 4-5 November 2013, Berlin.
	2014: Summary of the 2013 Eionet Workshop on Sustainable Consumption and Production including Resource Use. 24-25 October 2013, Copenhagen.

2 Typology of Innovative Business Models for Sustainable Lifestyles

2.1 Overview

Most business sustainability strategies have focused on material input, processing, assembly and distribution. Indeed, this has driven a substantial improvement in energy and water efficiency as well as reducing toxics and waste. At the same time it has missed, however, the opportunities of improvements from a reorientation of the entire process towards more sustainable consumption and lifestyles. Transformative processes that brings about innovation requires more attention to parts of the value chain that have gone unnoticed in what can be defined as the "first-generation" of sustainability-driven business models. At that time, business models were more focused on mitigating the social and environmental impacts of material inputs, processing and assembly, and distribution (Kristof & Süßbauer, 2009).

As Figure 2-1 shows, there are several key opportunities to foster sustainable consumption and resource efficiency. That is by focussing on various stages of a value chain: product design, product replacement by service solutions, consumer engagement, consumer use of a product/service, and end-of-use elements (BSR, 2010). Section 1.3 elaborates further on the importance of addressing different stages of the value chain.

Figure 2-1 Opportunity Areas for Addressing Sustainable Consumption in the Value Chain (BSR, 2010)

There are many ways of presenting and categorising business models. The categorisation will depend on the focus and boundaries of the investigation. In this study, we focus on innovative business models which contribute to sustainable lifestyles as outlined in the definitional discussion (Section 1.3).

Figure 2-2 illustrates a typology of innovative business models along the value chain that contribute to sustainable lifestyles. Here the business models are sorted according to their value chain focus (i.e. production, use, end-of-life) and their key-driving actor in creating values towards sustainable consumption (see Section 1.3.3). It is worth mentioning that this typology puts end users and people's lifestyles at the centre of investigations. While traditional business models put more emphasis on creating economic value for companies, value creation models considers generating environmental and social value for providers, customers, and society as a whole. Table 2-1 shows the scope of discussions on the categorisation of business models.

As outlined in Section 1.3.2, business models discussed in this paper are applicable to both profit and non-profit organisations, including peer-to-peer models and social innovations. Admittedly, commercial business models have different drivers and rationale than consumer driven models i.e. economic versus environmental and social drivers. This distinction will be made whenever relevant in this report.

It is important to note that a successful scaling-up of innovative business models for sustainable lifestyles will require a multi-stakeholder approach that includes businesses, consumers, governmental agencies (at local, country, and EU level), and civil society organisations. This will be evident in the discussions in the next chapters. However, it is not claimed that the business model typology presented here is all-inclusive. Other business models encouraging sustainable lifestyles do exist in this emergent field of knowledge and practice which may then require further research.

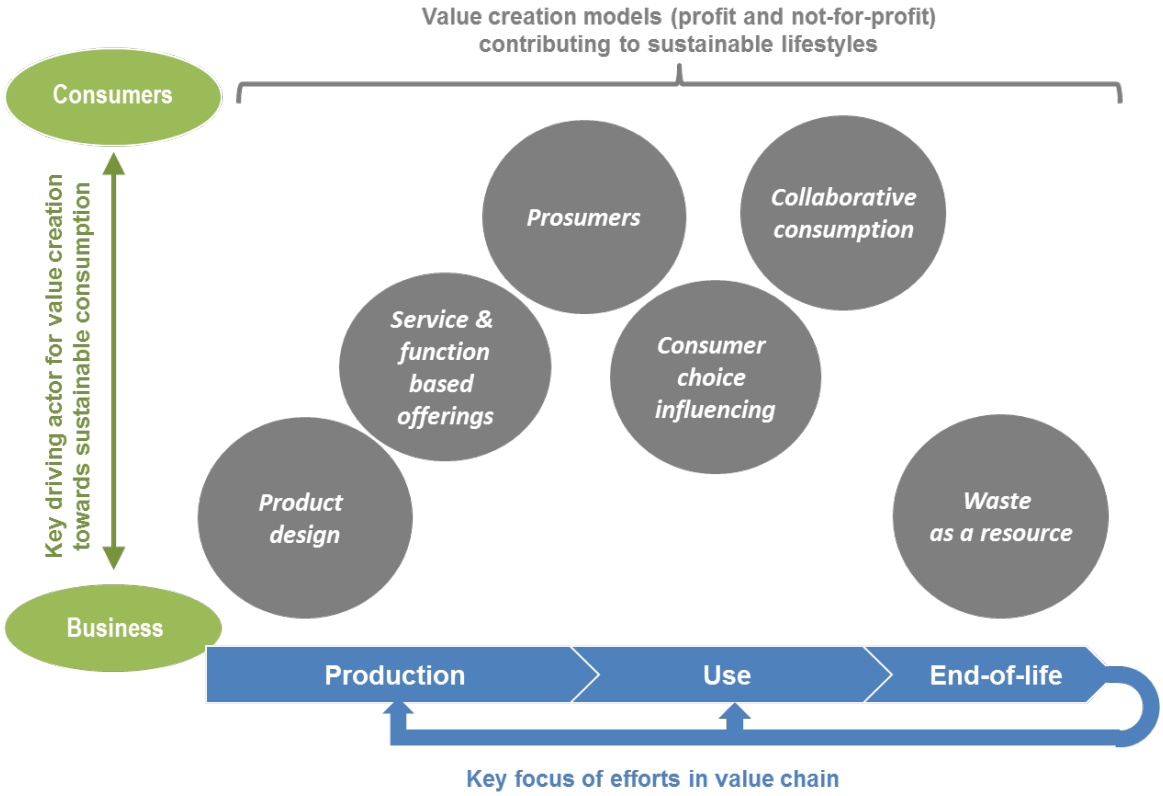

Figure 2-2 Typology of Innovative Value Creation Models for Sustainable Lifestyles (Adapted from ETC/SCP, 2012)

Table 2-1 Key Focuses of Value Creation Models Defined in this Paper

Model	B2C	C2B	C2C	Key Focus of Value Creation (Based on Section 1.3.3)				
				Better products & product substitution	Efficient use of products	Shared use of products	Longer use of products	Efficient end-of-life strategies
Product design	Yes	No	No	X	X		X	X
Service & function based offerings	Yes	No	No	X		X		
Prosumers	No	Yes	Yes	X	X			
Consumer choice influencing	Yes	No	No		X			
Collaborative consumption	No*	No	Yes		X	X	X	
Waste as a resource	Yes	Yes	No	X				X

B2C = business to consumer, C2B = consumer to business, C2C = consumer to consumer.
B2B value creation models are outside the scope of this paper.

* Peer-to-peer collaborative consumption is often facilitated by business services (e.g. sharing and matchmaking platforms like E-Bay).

Each of the six categories of business models (see Figure 2-2) will be elaborated in the following sections, including their key characteristics, value creation, barriers, and relevance to stakeholder groups (e.g. business, consumer, profit and non-profit organisations). Chapter 3 will provide further insights on scaling-up potentials of the six business model categories in production and consumption systems.

2.2 Value Creation through Product Design

Key Characteristics

The shift to a more sustainable consumption starts, apart from the user's behaviour, by improving environmental requirements imposed to products on the design phase. A product management, ranging from production, distribution, use to its end-of-life, is associated with its impacts on the environment, such as waste generation and release of hazardous substances, not yet mentioning the impacts of energy and materials/resources consumption. It is estimated that over 80% of all product-related impacts on environment are determined during a product's design phase (adapted from EC ecodesign website reference). Product eco-design is about finding ways to deliver values where depletion of natural resources can be reduced significantly in the process. In some cases, a radical change in the design of some familiar products may result in a consumption shift in terms of product substitution towards more sustainable alternatives (Baedeker et al, 2012).

Eco-design aims at improving a selected environmental aspect of a product. This may require a producer to reduce its resource consumption, limiting the use of a resource in various stages of a product's life-cycle, as appropriate. As example, the eco-design may specify a limit in water consumption in the use phase of a product, or a quantity of a certain material used in the product, or a minimum quantity of a recycled material (Directive 2009/125/EC). The entire life-cycle of a product encompasses the extraction of raw materials to production, distribution and utilisation, all the way to recycling and disposal.

Alongside issues of energy consumption and the responsible use of resources, the concept of 'value creation through product design' also addresses questions of user behaviour as well as products' durability and reparability (Directive 2009/125/EC). Clearly, eco-design takes end-of-life strategies into account without forgetting the production phase. The ability to translate better designs with more long-lasting components or usage into attractive value propositions is essential for more "circular" or sustainable products to compete successfully against the more-efficient, low-cost, linearly manufactured products. Information on the lifetime costs of a product can be a useful communication tool in this context.

Furthermore, this category of business models looks at means with which organisations can improve the way they manufacture products or how they design the products. Normally organisations (companies) can do that through supply chain management, cleaner production, benchmarking, and adopting relevant international standards. Companies can apply this business model, 'value creation through product design', to improve resource efficiencies, product quality, and reach new market opportunities while improving their environmental performance and social impacts, and taking into account a product's entire life-cycle (UNEP/TU Delft, 2009). For example, *Desso,* a Dutch carpet manufacturer, offers carpets which are easier and more cost-effective to be refurbished and reused at the end of their first use phase. This good practice demonstrates that better product design can deliver savings in raw materials and associated costs (Ellen MacArthur Foundation, 2013).

In short, this category of business models is about delivering products made with fewer resources (e.g. raw materials, water, and energy); products that are more resource-efficient during the use phase; and products that allow effective recovery and recycling at their end-of-life phase. The key actors driving this business model are manufacturers and businesses focusing on product design at their production facilities. This business model, however, excludes the delivery of value through substitution of products with services since this aspect is the characteristic of the 'service and function based' business model (next category).

As part of 'value creation through product design' business models, two approaches can be applied (adapted from UNEP/TU Delft, 2009):

- *Product redesign:* This approach is aimed at increasing the sustainability of an existing product through incremental improvements. Compared to a more radical product innovation, product redesign follows a step-by-step process and requires lower investment at a reduced risk.
- *New product design:* The evolving needs of consumers - towards products that are more suitable for repairing, upgrading, sharing, and recycling - increasingly define the design of sustainable and resource efficient products. While developing new products can be challenging and complex, the benefits can be significant.

Clearly, this type of business models has a core focus on the optimisation of physical product designs from a life-cycle perspective. It is recognised that approaches toward truly sustainable product design (such as described in UNEP/TU Delft, 2009) also look at product substitution and integration with services to meet consumer needs. These aspects will be covered in the 'value creation through service and function based offering' category (see Section 2.3).

Value Creation

Business models dealing with product design can decouple the creation of value from consumption of materials and energy, and thus significantly reduce environmental burdens of the current production systems leading to improvements in eco-efficiency (UNEP/TU Delft, 2009). Products that are designed to be remanufactured may contribute to environmental protection and cost savings as the need for primary resources to manufacture new products is reduced (Fora, 2010). However, it has also been noted that remanufacturing might require more energy than new production. Therefore, respective costs should be reflected in the decision to remanufacture (Gutowski et al, 2011).

Barriers

One of the largest barriers to more sustainable operations is a lack of communication about key initiatives, innovative strategies, effective solutions, and successful technical know-how. According to UNEP/TU Delft (2009), the challenge for 'sustainable product design' business models is to design products that minimise environmental impacts in the entire life-cycle of a product, not just in its production phase. It is thus important to consider streamlining the communication among different actors in the value chain of a product and to link the value chain to the product's life-cycle.

Another barrier to sustainable product design is related to an effect of globalisation. Mass consumer goods are often produced in low-wage countries where sustainable product design may not yet be fully embedded in businesses or a priority. High-wage European repair and maintenance services, therefore, have to compete with the low-wage mass production. Also, with the increasingly hectic lifestyles and "throwing away" habits a significant percentage of consumers do not have the skills, time, or interest anymore to repair their equipment, for example, as was the case 50 years ago.

Further barriers have been identified by Hankinson and Breytenbach (2012) which are a) perceived high investment cost involved in opting for and implementing a more sustainable product design, b) lack of awareness and education, c) lack of availability and information on sustainable raw materials, and d) lack of awareness and interest from consumers. Although customers are now willing to buy more sustainable products and services, there is still a large group of customers who do not have enough knowledge either on sustainability or costs embedded in a products' life-cycle, and who are quite conservative in changing their buying habits, where price is the main purchasing incentive (Nordic Innovation, 2012). In their paper, Hankinson and Breytenbach (2012) also recognise that, the feasibility and subsequent business case for sustainable product design are subject to local availability of and pricing of more sustainable raw materials which can be more expensive than the low-cost and mass-produced ones. The feasibility is also challenged by market distortion due to lack of inclusion of environmental and societal costs in the raw materials prices.

On one hand, policy can be a significant driver for a more sustainable product design (e.g. EU Ecodesign Directive, Energy Label Directive, Green Public Procurement targets etc.) and, on the other hand, it is

noted that regulatory frameworks can become a barrier to a more sustainable product design. This happens when certain environment-friendly aspects are prohibited or inhibited by standards as has been the case with the use of recycled materials in some products (Hilton, 2001).

Relevance to Stakeholder Groups

According to UNEP/TU Delft (2009), a transition toward more sustainable product designs can only take place through collective actions of multiple stakeholders in the supply chain, including SMEs/suppliers, large corporations and the end-consumer. Therefore, it is important to obtain their commitment in the product design process. It is assumed that system innovation can only be successful if it is based on a common vision and ideas and further capacity building within the academic arena.

2.3 Value Creation through Service & Function Based Offerings

Key Characteristics

In this category of business models, the focus is on providing function and benefits of a product instead of the physical product itself (Mont, 2004b). Service and function based models are developed to provide customer with a mix of products and services that meet their needs. Here the ownership of the physical product often stays with the provider, while maintenance, repair, and end-of-life consideration can be included in the offer (Ölundh & Ritzén, 2001).

Business models that fall under this category take into account the physical use of a product and its services necessary to satisfy the evolving market trends and customers' needs. This type of business models can change consumption patterns and deliver material savings not through the production of consumer goods, but by providing a specific service. However, this must be balanced against the materials and energy used in the service infrastructure (ETC/SCP, 2013c).

Various types of service and function based business models (also referred to as 'product service systems') can be distinguished as follows (Tukker, 2004):

- *Product-oriented services:* This type of business models is still focused on product sales but with additional services (e.g. maintenance contracts, supply of consumables and take-back agreements).
- *User-oriented services:* Traditional products play a key role, but this type of business models is not driven by product sales (e.g. product lease, product renting or sharing, and product pooling).
- *Result-oriented services:* Here the client and provider agree on a result, but there is no pre-determined product to achieve the result. The typical examples are companies offering services to create 'a pleasant climate' in offices rather than gas or cooling equipment, or companies that promise farmers with a maximum harvest rather than selling pesticides (Tukker, 2004).

Servicing solutions often differ in terms of business models that target different actors: professional clients or private customers. Therefore, it is useful to distinguish between business-to-consumer (B2C), business-to-business (B2B, in principle, is beyond the scope of this report), and business-to-government (B2G) models (Stahel, 2010). The service and function based business models, as defined in this paper, cover those three markets. An emerging model of service-based solutions is where private individuals provide services to other people – the consumer-to-consumer models (C2C), which is captured by the collaborative business model (Section 2.6) (ETC/SCP, 2013c).

Value Creation

A pervasive shift in consumer behaviour has been detected over the last decade. A new generation of consumers seems prepared to opt for access over ownership (EMF, 2012). One way to achieve a more efficient use of a product is that the producer provides additional services to the customer, such as procurement, maintenance, upgrading, and re-use/recycling of products. So, the ownership of the tangible product is transferred from consumers to producers. The majority of these product-oriented service models does not require any technological changes within an enterprise. This can be seen in the increase of shared cars, machinery, and even articles of daily use. In a related vein, social networks have

increased the levels of transparency and consumers' ability to identify responsible products and business practices (EMF, 2012).

Emerging business models in this area have focused on developing services that help reduce consumer's environmental impact by substituting more resource- and energy-intensive products with less-impact services that serve identical or similar purpose. Servicing is a transaction where value is provided through services or functions and not just through selling products. The concept is based on the notion that "what we want from products is not ownership per se, but the service that the products provide" (Hawken, 1993). The underlying assumption is the idea that a product value lies in its utilisation and benefits to customers. Here the economic value is transformed from value exchange to value utilisation. This means, the provider of service solutions may get paid per unit of function delivered instead of per unit of product sold. In this context, customers become more interested in having a stable fulfilment of their needs rather than in owning a product (e.g. getting transportation rather than owning a car or cold beer rather than a refrigerator).

This type of business models becomes viable where the revenue per more-durable product deployed is higher than the costs of production, asset management, as well as service and maintenance required providing the serviced product, compared to the traditional product sales model. Even when the revenue is not higher, the model can still be successful since the service provider will benefit from customer loyalty. Once a service contract has been made, the customer is bound to the service provider more than she/he is bound to the manufacturer of the replaced product. This increased customer loyalty, in turn, ensures a more predictable and stable future demand, and reduces investment risks for the service provider.

Besides reducing direct environmental impacts, service and function based models also aim to address the potential rebound effects associated with efficiency strategies as described under the first type of business models, 'value creation through product design' (Section 2.2). With those business models, efficiency improvements can lead to a reduced price of products, where it might lead to an increased volume of sales and thereby undermine the efficiency gains. This is less likely to happen with service and function based models, where it is the service provider who benefits from efficiency improvements of products. However, the rebound effect can still occur where consumers pay directly for resources consumed in the use phase, e.g. the fuel consumed by a leased car.

This type of business models only approaches the service provision and consumers' use phase and, thus, helps the consumers to shift toward a more sustainable lifestyle without having to abandon certain habits completely. To what extent a reduced environmental impact alone can drive consumer acceptance and take-up of these models requires further consideration. Consumer demands on price, convenience, value for money and innovation are almost ubiquitous, and emerging business models will be expected to fulfil these needs to achieve further growth.

Barriers

The barriers range from current product design, to cultural resistance, to "subsidized" commodity and energy prices. Some of these barriers may fade on their own, with time. Others will require new frameworks—in terms of corporate governance, cross-industry collaboration, technology, or regulation (EMF, 2012). Particularly, the unfamiliarity of these emerging business models presents numerous barriers to consumer acceptance:

- Judging value for money of a service compared to a unique product purchase.
- Unfamiliar brands and service providers forging new business models compared to well-known and trusted brands providing 'tangible' products.
- Cultural resistance to shift from owning a product to getting a service, due to social status that a product brings
- Instinctive inertia, keeping on buying products and resistance to switching to services.
- In some cases higher transaction costs compared to purchasing a product.

The viability of this business model depends on consumer's use patterns. For many products there is an emotional and social attachment to ownership, missing competencies and flexibility, impressions of dependency which present an obstacle to switching to services, with consumers wanting to own physical products as a source and language of self-expression. Moreover, ownership of certain types of products plays important roles in terms of positioning the owner within society and attributing status to them. Another issue hampering the service and function based business models is the potential misuse and damage caused by the consumer in case the product ownerships stays with the producer (or service provider). Such risks should be taken into account in designing innovative business models.

Financial barrier is known to affect service providers rather than consumers. Financing can pose a great challenge for establishing the necessary service infrastructure, procuring products, and ensuring a stable cash flow while providing service and gaining revenues over extended service duration (compared to the instant revenue from one-off purchase). Emerging business models also lack historical data on companies' financial performance, which is likely to increase the challenge in securing investment from financial institutions.

According to several studies, cultural shift is necessary for a consumer to place value on having a need met as opposed to owning a product (Baines et al, 2007; Goedkoop et al, 1999; Manzini et al, 2001; Mont, 2001 and UNEP, 2001). In their papers, Baines et al (2007) wrote that "the principal barriers to the adoption of service and function based models are positioned at both sides of the dyad: consumers may not be enthusiastic about ownerless consumption, and the manufacturers may be concerned with pricing, absorbing risks, and shifts in the organisation, which require time and money to facilitate. The significant change in the system of gaining profit could deter producers from employing the concept, first through limited experience in pricing such an offering, secondly through fear of absorbing risks that were previously assumed by customers, and thirdly through lack of experience in structuring an organisation to be competent at designing, making, and delivering a service and function based offering. Likewise, an effective product-service system (PSS) is likely to be more complex for a manufacturing organisation than the existing way of delivering functionality through the provision of a product alone." A PPS is a competitive system of products, services, supporting networks and infrastructure. The system includes product maintenance, parts recycling and eventual product replacement which satisfy customer needs competitively and with lower environmental impact over the product's lifecycle (UNEP, 2001).

Relevance to Stakeholder Groups

In Mont (2004b) it is argued that the development of service and function-based systems for end-consumers requires the involvement of a variety of actors (e.g. entrepreneurs, retailing companies, consumer organisations). These actors are situated close to the end-consumer, and thus have a better understanding of local and cultural values and customs, customer's profile, and how value can be delivered in the most efficient and effective manner.

(New) companies seeking to grow their businesses may benefit from the service and function based business models offering new market opportunities. This type of business models provides consumers an access to products and services of a potentially better quality and a wider selection of products compared to private ownership. Also, such business models have potentials to partly counter the global trend of sourcing products from low-cost production countries such as in Southeast Asia, by 'on shoring' service-oriented jobs in Europe. Depending on companies' market location, service-based jobs (maintenance, repair, asset management etc.) most often need to be positioned close to consumers. Therefore, service-oriented business models tend to create more jobs locally and make an economy more resilient to the globalisation risk of job off-shoring.

Consumer protection agencies will play a role in building up consumer confidence in the new service and function based offerings by investigating issues such as insurance and liability, screening the (new) market for best options, providing information and third-party information on such business models.

Shifting consumers' buying habit, from owning a product to buying 'product functions', is crucial in this type of business models. For manufacturers and service providers, their involvement in a particular

phase of a product's lifecycle may change. Value to consumers is created through services that provide functions. For example, a manufacturer may retain the ownership of a product through the product's use phase via leasing agreements with consumers.

Ölundh and Ritzén (2002) note that service- and function-based models can contribute to improve the relationship between producer and customer - customer loyalty increases as the relation becomes closer and more long-term.

2.4 Value Creation by Prosumers

Key Characteristics

As marketplaces transform, it is also changing the definition of consumers. In the past, products and services had one-way relationship with buyers and bill payers. Today the environmental awareness, rising energy costs, increasing interconnectedness and declining costs of micro-generation technology (e.g. solar panels, small-scale wind turbines, energy storage) create a new class of consumers, namely "prosumers" who get more involved in the design and manufacture of products and services.

The term "prosumer" was first coined by Toffler in 1980, signifying a concept where consumers are not just consumers but producers as well (Kotler, 1986). Tapscott and Williams (2006) built further on this concept to include a growing number of consumers who are enabled to become producers by new developments in technology that facilitate information exchange, mass-production of personalised products and services, and immediate contribution in open source projects (e.g. Wikipedia).

In the same way, Ritzer et al (2012) wrote that individuals tend to assume an active role in co-production. A clear example is shown in the case of electricity produced by smart grids and food by urban gardens, where consumers become co-producers. Similar phenomenon is reported by Mont and Heiskanen (2014) that consumers are progressively entering the "maker movement" by fixing, repairing and upcycling products – the activities ranging from upgrading electric and electronic equipment, refurbishing houses, to repairing and restoring cars.

Prosumer is not a new concept in itself. A number of societal changes, however, have contributed to the expansion of "prosumerism" applications, associated value creation and business models. The modern society seems to move away from currently prevailing business models where consumers are put as recipients. One of the reasons for this shift is the general change in perception (particularly in developed economies) about the importance of what we traditionally think of as production (e.g. material and labour in the factory) (Ritzer et al, 2012). Also, technology advancement like internet and portable renewable energy systems has led to the growing uptake of prosumerism (Ritzer & Jurgenson, 2010).

Value Creation

In the prosumer business models, value is created through localised production and delivery of services and products. This can help eliminate or reduce costs of the associated utility infrastructures. As an illustrating example, Mont and Heiskanen (2014) discuss the co-production of value with active involvement of consumers or clients in energy generation and supply. In this model, individuals in addition to being customers start playing an active role in co-production of a utility, e.g. households become co-producers and consumers of district heat or electricity (Votenko & Peck, 2012; Southerton et al, 2004). The service and value are thus produced in a close contact with or by the actual user.

Schleicher-Tappeser (2012) observes that many countries are rapidly reaching the point where it is in the economic self-interest of individual households and businesses to install solar PV technology, even without any subsidy from the government. Solar PV has a unique quality amongst power generation technologies in that it can be effectively installed at very small scales with the energy directly used by the producer. Thus, unlike wind farms or nuclear power stations, the price of electricity produced by rooftop solar panels does not have to compete with the wholesale electricity price that energy suppliers pay, but rather with the much higher retail electricity price that users pay (Friggers, 2013). He also writes that, as solar power achieves grid parity and the uptake increases, large markets are likely to be

created for technologies that give prosumers the autonomy to store self-generated solar energy and manage its use, thereby further improving the economics of solar PV.

The concept of prosumer business models can also be found in community-supported agriculture. For example, in the Slow Food Movement consumers commit to financially support a farmer for a certain period of time. It is also common that members work a few days at the farm, doing their time as shareholders. The value creation, from a sustainable consumption perspective, is achieved through decreased transportation distances compared to traditional food supply chains, shared and efficient use of agriculture land, and often organically produced foods (IIIEE, 2009).

Barriers

Building upon the work of Schleicher-Tappeser (2012), Friggers (2013) identified some key impacts and the associated challenges for prosumer business models. Although his review focused on the renewable energy market, these challenges are also relevant to other systems (e.g. electricity generation):

- With increasing electricity demands met by on-site solar panels, fewer of the larger-scale high-marginal-cost power plants that set the wholesale price will be needed over time. While national grids will still be needed in future energy systems, less electricity will be flowing through the grid itself. The significant grid maintenance and upgrade costs will, therefore, need to be met by the revenues made by decreasing proportion of overall electricity that is provided through the grid.
- On the one hand, it is likely that consumers who become prosumers will obtain benefits that outweigh the initial investment costs. On the other hand, consumers who still get all or most of their electricity from the grid may experience disadvantage as high prices will disproportionately affect them. In this scenario one can imagine the associated negative social impacts.
- Energy produced by household using solar panels is not always a good match for actual electricity demand. If selling unused electricity back to the grid is not possible or allowed, there is a strong incentive to store the energy on site, or change consumer behaviour to use electricity when it is actually produced.
- A variety of disciplines need to come together to enable prosumer systems (e.g. installation, communication and control technologies, financial incentives). Whether service providers can develop the business models to do this in a low risk way and overcome barriers such as high upfront capital costs will be critical to the speed of uptake.

Furthermore, based on Ritzer et al (2012) and Voytenko and Mont (2014), challenges for prosumer models can be summarised as follows:

- *Financial:* e.g. high initial investments in a distribution grid for heating or electricity.
- *Knowledge:* e.g. how to incentivise neighbours to connect to the grid (economic savings, energy security component).
- *Collective action:* Often a joint action by a mix of actors is required. Some cases show how they form cooperatives or associations. Also, a support from local decision-makers, e.g. the municipality, would be required for the business model to work.
- *A frequent need to formalise the business relationships to secure the market*: e.g. written contracts between a new energy or food producer and potential buyers – sometimes a contract needs to be made well in advance before the good or service is delivered.

Relevance to Stakeholder Groups

In this type of business models, prosumers can go (but do not necessarily have to) into partnership with a producer or group of producers, consumer-to-business (C2B) and consumer-to-consumer (C2C) to offer their self-produced electricity, for example.

Consumers are becoming more aware of the environmental impacts of production and consumption, and would like to address these impacts by taking a more proactive stand in production-consumption systems by becoming prosumers. Their power to indirectly and directly influence production and

consumption patterns increases, opening the door for opportunities to innovate and improve current unsustainable practices of mainstream businesses. Possibly the even more significant impact of prosumerism is the change in people's attitudes toward prosumerism. Engaging in own production, repair, upgrading of different kinds of goods can raise general awareness on the real value of goods and create positive visions for low-impact lifestyles (Alexander & Ussher, 2012). Economic reasons, particularly in remote areas where electricity or consumer goods are quite expensive), and self-reliance in regions where quality and quantity of product supply is not secured or stable can also motivate this prosumer business model.

The emergence of "energy prosumers" will fundamentally alter consumer's relationship with energy, whilst driving innovation and demanding new business models. Government and business will need to move fast and flexibly to manage a transition over which they have limited control (Friggers, 2013). For example, RWE, a German utility company, plans to shift its traditional utility model to, instead, manage and integrate renewables into the grid (Lacey, 2013).

Prosumerism offers opportunities for businesses to support consumers in becoming and maintaining their status as prosumer (e.g. energy utility provides connectivity and interactivity for household renewable energy systems). It offers new prospects for the "professional prosumer". For example, hobbyists who have developed from an amateur to the point of commanding skills equal to that of professionals and now are able to offer service for home improvements (e.g. painting), creation of dedicated cable television channels (e.g. The Food Channel), and photography using cameras that are often on a par with professional photography equipment.

2.5 Value Creation through Consumer Choice Influencing

Key Characteristics

Consumers' personal choices have an impact on sustainability-driven business models. However, consumers do not always have complete information to make the most sustainable choices or use the products and services in the most sustainable ways. Companies, therefore, have a strategic position to engage with consumers to cultivate overall awareness with regard to their consumption choices and behaviours (Liedtke et al, 2012).

As shown in Figure 2-3, factors influencing consumers´ choices can be categorised into three (extracted and adapted from Gunn, 2011):

- *Choice provision:* Consumers and their demands are the agents of change. Many sellers of products and services (e.g. bank, retailers, real estate agents) can provide a choice of more sustainable products together with the normal product assortment. Here, consumers are free to act 'ethically'. This is the traditional 'green consumerism' model that depends on a niche consumer market.
- *Choice architecture:* With their substantial market power and extensive knowledge on consumer behaviour, retailers (and also other merchants like banks) can structure, shape, process and filter signals in ways that promote or 'nudge' consumers towards certain products over the others. Some tools available to promote green products have included environmental labelling schemes and social marketing that enable and encourage consumers to choose sustainable products as their default options. In this context, social marketing refers to the activity and processes to understand, create, communicate, and deliver a unique and innovative product offering to overcome certain societal problem (Kubacki & *Rundle-Thiele, 2013*).
- *Choice editing:* Product sellers (particularly retailers) can actively shape consumer choices by limiting the choice to purchase unsustainable items instead of encouraging consumer demand for niche products. From a sustainability perspective, the advantage of choice editing is that active behaviour change of the consumer is not needed. Choice editing is not a new concept. It is a normal practice where retailers make choices on behalf of consumers through the selection and positioning of their product and service offerings.

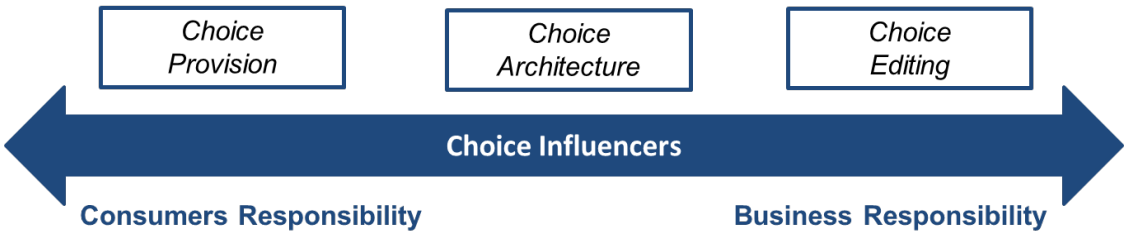

Figure 2-3 Synthesis of Choice Models (Modified from Gunn, 2011)

The type of consumer communication and the entailed engagement can be classified into several areas as outlined in Table 2-2. Here retailers are uniquely positioned to influence sustainable consumption choices. However, there is also a huge opportunity for companies to drive customers' sustainable behaviours by providing sustainable products/services as well as information about the environmental and social impacts of production and consumption phases.

Table 2-2 Types of Information Communicated to Consumers (Adapted from BSR, 2010)

Focus		Description
Consumer choice	Product attribute	Social and environmental attributes and impact of a product/services
	Operational performance	Social and environmental performance of corporate operations
Consumer action	Product use	How to optimise/reduce negative impacts during the use phase of the product/service
	End-of-life	Extending product life cycle and/or end-of-life actions which consumers can undertake

Value Creation

The "choice influencing" business model creates value through offering better choices in the availability of more eco- and socio-efficient products and services, and helping consumers to make the most sustainable choice that fits their lifestyle and budget (Breukers et al, 2011). For some products, the most significant environmental impacts are associated with the use phase. For example, 75% of the energy consumption linked to a pair of trousers arises from washing, drying and ironing (CSCP & UNEP DTIE, 2007). Improving the efficiency of a product's use phase, therefore, is crucial. One option could be to provide the consumer with appropriate information, in the case of the trousers e.g. concerning efficient cleaning procedure and instruction of sustainable maintenance. Choice architecture (e.g. through environmental labelling schemes) can assist consumers in selecting and purchasing consumer goods which are more efficient in their use phase. ClimateWell's CoolStore technology powers solar air-conditioning systems with integrated energy storage to provide heating during winter, cooling during summer, and hot water every day. It exemplifies how air conditioners , which are usually known for their negative environmental impact during usage, could be constructed in a way that enables more efficient usage and transforms the previously negative side effects and integrate for a more efficient use (Sustainia, 2003). For other products (e.g. meat and dairy products, mobile telephone, sofa, or fast fashion clothing), most environmental impacts are associated with the production phase. Here, the choice architecture or choice editing that promotes products with lower production impacts can give environmental gains.

This type of business models can also create value through companies giving advice to consumers during the consumption phases, thus improving the efficiency of product use and end-of-life stage and reducing overconsumption. An example of a non-profit approach is a free training of fuel-efficient driving offered by Naturschutzbund Deutschland in cooperation with Volkswagen.

Supporting the business model, Gunn (2011) states that ''the argument for choice influencing is that in a sustainable society, eco-friendly choices should not be difficult to make, rather the sustainable choice should be the default choice, the path of least resistance." With this business models, consumers

benefit from the assurance that the issues they care about are already dealt upstream (by producers or retailers), rather than facing the demand that they grapple with those complexities themselves (Doran, 2007).

Barriers

The fundamental challenge for "consumer choice influencing" business models is to find a way to drive revenue growth while continuing to encourage a decrease in material consumption. SustainAbility (2014) reports that "the apparel brand Patagonia has experimented with behaviour change marketing in recent years, by encouraging consumers to buy less and repair more. However, since Patagonia is a private company, it is hard to know if the company's bet has resulted in greater revenues or greater loyalty".

Gunn (2011) summarises the barriers on the type of business models as follows:

- *Availability of sustainable products:* If there are concerns about the ability of the supply chain to provide the greener product at scale, retailers and other merchants may refrain themselves from sourcing sustainable products (Almaani et al, 2004). This was confirmed by Gunn (2011) as he reported that the availability of raw material had been a practical barrier to mainstreaming sustainable fish products.
- *Consumer demand and competitive factors:* By providing significant incentives, the current economic system and the associated business role encourage, not discourage, consumption (Tukker et al, 2006). In the traditional 'choice provision' model of 'pile it high, sell it cheap', choice influencing is hard to justify since retailers compete more on price and not quality.
- *Ideological risk:* Retailers and merchants who think that consumers have the 'right to choose' for themselves prefer not to limit consumer sovereignty. Many tend to refuse a limitation on this right for the cause of sustainability. Gunn (2011) observes that choice influencing for sustainability differs from choice influencing for health issues due to a clearer consensus on the 'greater good' with regards to health.
- *Lack of third party verified information for retailers:* Instead of the observed enormous increase in eco-labels on the market, it is still quite difficult for retailers and consumers to effectively use the verified information. This may happen as some products categories are still not identified by certain labels, and the complexity and fragmentation on qualifying criteria hinder their applicability and use by firms and consumers.

Relevance to Stakeholder Groups

The nature of the transaction between consumer and companies becomes nuanced in the consumer choice influencing model: it is more about building brand trust and engagement, and less about selling more goods or services. Companies employing this model seek to increase "stickiness" with consumers, making them less likely to purchase any good or service from another provider (SustainAbility, 2014).

To date, choice influencing is more implemented by actors other than producers, such as retailers, civil society organisations, and media. However, producers will see how this business model can benefit them as well. Since (product) brands are in direct contact with consumers, it is becoming more important to have a reputable sustainable brand.

Retailers in developed countries have become a significant force in shaping the commodity chains and global production-consumption systems (Tukker et al, 2010). Retailers have the potential to assist consumers to make straightforward, affordable and more sustainable choices. Retailers have significant market power and in-depth knowledge on consumer behaviour, and therefore can be seen as key actors in structuring, shaping, processing and filtering signals in stores in ways that promote certain products over others (Gunn, 2011).

Furthermore, government's role is now indispensable as retail sector becomes more concentrated where an effective entry point and the entailed potential grows require policy intervention (Forum for the Future, 2009; Danish Ministry for the Environment, 2011). Gunn (2011) states that "governments have a key role in aiding the practice of choice influencing by introducing outright bans or timescales for

the elimination of a product or service; they edit citizen's choices through laws, taxes and subsidies. The role of civil society is implicit in retailers' practice of choice influencing for sustainability". Gunn further elaborates that media and NGO campaigns can force retailers to remove poorly performing products from their shelves and also foster public awareness and discussions on the issues.

2.6 Value Creation through Collaborative Consumption

Key Characteristics

The term "collaborative consumption" describes a business model based on sharing, swapping, bartering, trading or renting access to products (or other commodities such as land or time) as opposed to ownership. Technology and peer-to-peer communities enable old market behaviours to be reinvented. Collaborative consumption disrupts traditional modes of business and reinvent not only what we consume, but how we consume. A number of innovative models supporting collaborative consumption are emerging, including collaborative workspaces, book swapping, carpool/ride sharing, bike sharing, garden sharing, clothes swapping, peer-to-peer renting, or swapping of accommodation (ETC/SCP, 2013b).

New marketplaces (such as TaskRabbit and Bartercard which offer collaborative consumption services as part of their portfolio) are enabling "peer-to-peer" to become the default way people exchange — whether it is unused space, goods, skills, money, or services. Web sites like these are appearing every day all over the world. Collaborative consumption has been defined as "the reinvention of traditional market behaviours – renting, lending, swapping, bartering, gifting – through technology, taking place in ways and on a scale never before possible" (Botsman & Rogers, 2010). Collaborative consumption thereby extends the *active* functional life of a product (service, space etc.) via many consecutive users and/or owners.

Collaborative consumption models can often function through direct exchanges between citizens. However, these models are often initiated by a third party, often a business that facilitates the exchanges in return for a commission or other form of payment. The most widespread business model deployed by collaborative consumption companies takes form of an online market place through which the demand for certain consumer assets, products or services amongst peers is matched with the ownership of those assets and services by other peers. Strategies employed by companies to differentiate themselves are based on the mechanism that drives matchmaking, which can be either demand-driven, supply-driven or a combination of both (Business Innovation Observatory, 2013).

These sharing models have in common that the consumer does not pay for buying a product but only for using it. The benefits depend on how often the product is used, and if there is a need for changes of the product's function (e.g. car-sharing where the user gets access to a fleet of different cars that can match his/her needs). Yet, the need for products is the determining factor. If a person needs a car on daily basis, car-sharing may not be the best solution to meet the transportation demand (FORA, 2010).

For-profit B2C business models have a different rationale than not-for-profit and consumer-driven models. It is fair to think that commercial car sharing business models will differ from the (social) business model as in neighbourhood and private car sharing. Therefore, the collaborative consumption models described in this section will only cover consumer-to-consumer (C2C) markets (which can be facilitated by businesses as well). The business models of servicing solutions for business-to-consumer (B2C) are discussed in Section 2.3, the service and function based models.

Value Creation

Value generation through 'shared use' enables consumers to get access to, engage with, or use products that are available on the market either through other consumers or entrepreneurs who provide access to products without actually producing them. The common denominator here is that consumers do not necessarily own products, but products are rather shared among users. This can contribute to shifting the habit of owning many rarely used goods – such as repair tools and garden equipment – toward a shared access to them.

According to Mont and Heiskanen (2014), "collaborative consumption takes the ideas of circular economy further by offering innovative ICT-enabled ways of satisfying needs by unlocking the wealth of idle assets (a large pool of products, skills and services that people possess) and matching the 'haves' with the 'have-nots'. Needs are satisfied through secondary resources and products that are up-cycled". Collaborative consumption also offers the seeds of the de-commoditisation of consumption: a shift to 'doing, being or producing' rather than having and consuming (Dietz & O'Neill, 2013).

The collaborative consumption business model has the advantages of products being used more intensively. Instead of owning the product, the users have access to the product when it is needed. Compared to the individual product ownership, the sharing of a product may entail the use of fewer resources as fewer products have to be produced to satisfy consumers' demand. This way, the business model may have environmental benefits as well (FORA, 2010). It is also worth mentioning that some collaborative consumption models, e.g. car sharing, can potentially have net negative environmental impacts by providing access to cars to people who may otherwise have used a more sustainable form of transport. However, if it allows families who otherwise would have purchased a car, to mix car sharing opportunities with more sustainable transport modes for other journeys, this can give net environmental gains.

FORA (2010) notes that collaborative consumption models often constitute a financial advantage, as customers do not have to make initial investments to buy a product. Product sharing might allow consumers to save money compared to private ownership. Furthermore, "the network technologies and social media are dramatically increasing reach and reducing distribution cost for facilitators of sales and remarketing services. These benefits are enabled and scaled by technology platforms. Technology provides the efficiency to match haves and wants seamlessly and economically, and the social glue to build trust between strangers (in both online and offline settings)" (Ellen MacArthur Foundation, 2013).

In short, Rachel Botsman, the co-author of "What's Mine Is Yours: The Rise of Collaborative Consumption" (Botsman & Rogers, 2013) and one of the principal thought leaders of collaborative consumption, outlines the sharing economy as driven by three primary benefits:

- *Economics:* more efficient and resilient use of financial resources.
- *Environment:* more efficient, sustainable and innovative use of natural resources.
- *Community:* deeper social and personal connections among people.

It is important to note that a detailed assessment of potential positive and negative environmental impacts and the rebound effects are not part of this paper (e.g. increased transportation and associated energy use and emissions in the case of collaborative consumption).

Barriers

WEF (2013) identified some key impact areas and associated challenges related to (C2C) collaborative consumption models:

- *Marketplace creation and critical mass:* For collaborative consumption platforms to be possible, it is essential that they have enough persons to participate and sufficient supply and demand to provide convenience and choice. In general, this is easier to achieve in large cities. However, to make collaborative consumption a (new) norm, platforms should be available in smaller cities as well.
- *Legal, regulatory and policy issues*: Public policies and regulations can help or hinder C2C collaborative consumption. Many policies drafted in the past are silent about this new business model – creating a "grey area" in which activities are neither legal nor illegal. Today the most contentious issues focus on taxation, insurance, zoning and licensing, and consumer protection (including personal data) issues.
- *Personal data and identity:* Collaborative consumption and matchmaking platforms must also address personal data identity concerns.
- *Cultural barriers:* Sharing economy business models will only thrive when there is a consumer attitude of accepting sharing and collaboration.

- *Incumbent backlash:* Given that collaborative consumption models have the potential to balance the existing business-as-usual / private ownership models, it is important for companies to assess and understand what their options are and how best to react to this growing consumer trend.

A further barrier to collaborative consumption models is trust; without it there is hardly any transaction among actors. For example, the lender has to have a degree of trust in the borrower that he or she will return the borrowed product intact. By the same token, the borrower needs to be sure that the product is safe to use. Third-party facilitators can overcome this barrier by ensuring accountability, providing insurance and/or reporting on the reliability of individual lenders and borrowers (Maag, 2012).

Relevance to Stakeholder Groups

This type of innovative business models, where product consumption is shared among several users, has been quite promising. So far there are two types of successful C2C collaborative consumption models: monetised (e.g. Airbnb) and non-monetised (e.g. CouchSurfing). WEF (2013a) reports that "both business models tap into the latent sources of value, create new value, build community and spur innovation. Both are highly scalable, though money does not flow in the same ways (if at all). Both are redefining the nature of travel, tourism, community-building and business in a new economy".

Through public campaigns, governments can help promote further acceptance of collaborative consumption, e.g. swapping, hiring and sharing as demonstrated by the "use more, waste less" campaign in Denmark (Mont & Heiskanen, 2014). Interestingly, collaborative consumption has been operating in almost every sector of society and part of the world. According to WEF (2013a), sectors that have experienced growth are accommodation, transportation, tourism and retail products.

2.7 Value Creation through Waste as a Resource

Key Characteristics

Basically conventional business models consist of extraction, production, consumption and disposal. This puts pressure on both primary resource extraction and disposal activities (Ellen MacArthur Foundation, 2012). This in turn increases the environmental impacts of production and consumption activities. Recognising the value of "waste as a resource" will also mean that economic value can be used as a driver for improving environmental performance. The economic value from waste is therefore integral to developing a more circular economy - as required by the EU's 7th Environmental Action Programme.

Retrieving value from waste also plays an important role in addressing future limitations on resources, and in promoting sustainable growth and prosperity by bringing waste materials back into the production cycle and helping to decrease reliance on virgin resources (ETC/SCP, 2013a). The end-of-life[1] phase of a product's lifecycle offers significant commercially, viable opportunities to reduce products' environmental impacts if disposed responsibly. Efficient collection and sorting linked to commercially, viable recycling strategies can form the baseline for innovative business models generating economic and consumer value and increasing resource efficiency.

In the circular economy, different loops can be utilised to reduce the pressure on virgin natural resources. First, product lifetime optimisation can extend the use time of products before they enter the waste stream. Once a product reaches the end of its functional life, strategies for recovering and utilising its components and / or materials can help decrease the amount of energy use and pollution from the production of new products. This contributes to decoupling resource use from economic

[1] End-of-life products are defined here as product which, for whatever reason, cannot be reused for their intended purpose. These can range from single use items like primary packaging to products that have reached the end of their functional life.

growth and can help reduce both post-consumer and production waste that needs to be disposed (UNEP, 2011).

The following three types of "closed loop" approaches (adapted from Mont & Heiskanen, 2014) provide the basic principles of "waste as a resource" business model:

1. At the end of its 'first life', a product can be repaired or refurbished to extend its functional life, or if part of resource efficient product service models can be remanufactured including upgraded functionality in some cases.
2. Where end-of-life products are separable from a mixed waste stream, they often can be dismantled. The products' components or parts can be re-used or refurbished, for example, as input in a remanufacturing system.
3. Where it is not technically or economically viable to utilise waste products or their components, they can still enter the recycling system where the value of materials may be recovered, for example food packaging.

Value Creation

In this type of business models, the optimal value is obtained through closed-loop recycling, i.e. recycling products back into the same format as the original, e.g. textile waste back into textile products. This will displace virgin equivalent in higher grade applications and not only realises higher value, but generally increases environmental benefits as well (ETC/SCP, 2013b). It also helps to draw lower-value waste materials (e.g. cardboard packaging) into the recycling system as they can meet demand for lower specification products. Thereby, more material (glass, plastic, etc.) can be diverted from landfill and, therefore, replace more primary materials – with the associated environmental benefits.

In the "waste as a resource" business model, the material used to create a product is recycled through the production system in an optimal way. Every effort is made to reduce waste in the production system, and where waste does arise, it is collected and re-used or recycled. This model substitutes the more conventional, linear take-make-waste production pattern that most manufacturing industries now depend on. Furthermore, not only it cuts material and energy-related costs, the business model can also provide further opportunities such as increasing consumer loyalty. For example, through better interaction with consumers who re-engage themselves with the company supporting a product take-back (SustainAbility, 2014).

Barriers

Market failures can prevent producers, consumers and governments from making optimal choices. It means market forces alone typically lead to an overproduction of waste. Also, structural barriers such as missing infrastructure and lack of suitable technology and finance may prevent economically viable collection, sorting, and recycling. For example, when appropriate system to collect the used-up electronics is absent, then no sorting out but recycling is needed. Likewise a closed-loop recycling can be difficult when current collection systems allow contamination to spoil the waste, making it harder to recycle and for the recycled materials to meet strict quality requirements that manufacturers set for their production (Kral et al, 2013).

Even if structural barriers can be overcome, informational barriers often preclude consumers and businesses from recognising the economic value of waste and making informed choices about purchase and disposal, and this leads to another type of barrier, i.e. behavioural barriers. These barriers can influence the quality of waste materials and inhibit both supply and demand. Environmental externalities also contribute to waste overproduction, i.e. where economic decisions to produce and consume do not take into account the impacts that wastes generate to the environment. If the environmental cost is not reflected in product prices, economically inefficient production and consumption patterns will flourish, leading to an ever-increasing waste production. An integrated approach is therefore required to address this type of barriers (ETC/SCP, 2013a).

According to Mont and Heiskanen (2014), closing material loop is not without weak points. Concerns have been raised about the potential increase of transportation as the used-up products need to be

returned to their original producers, which are often situated on the other side of the world. The economic viability of this "reverse logistics" is therefore a critical component in balancing economic viability with environmental benefit. Many times technological solutions do contain possibility for remanufacturing of some products or for recycling of some waste materials. Subsequently, costs can be prohibitively high when the infrastructures for reverse logistics and remanufacturing are not well established. A stable supply of waste materials can also be an issue due to the unpredictable flow of post-industrial or post-consumer use in terms of volume, products, and composition (the quality of feedstock). Volume and composition of waste materials tend to change over time, following consumption trends in the society.

Relevance to Stakeholder Groups

A circular economy depends on and benefits the market and market actors who work with their supply chains. Standards and specifications define and communicate the quality of materials required in production. It means, when a recyclate can meet the required specifications, it can realise similar value as the virgin materials. For example, food grade PET plastic polymers or recycled office papers.

In the production phase, encouraging eco-design for product's lifetime optimisation and recyclability will help reduce environmental impacts and increase the volume of materials that can be recovered from different waste streams. To ensure this, expertise and insights from different stages of a product lifecycle have to come together in a process of multi-stakeholder co-innovation toward a circular economy (Mont & Heiskanen, 2014).

Governments can take a more active role, for example, by setting reuse targets. This can strengthen existing reuse facilities and encourage the establishment of new facilities. This approach has been applied to good effect in Belgium, where 117 reuse and repair shops have been set up in Flanders with the support from municipalities to meet the region's target of five kilograms of resold used goods per capita per year[2].

Waste collection and reverse logistics are an integral part of any recycling system aiming to increase material productivity by ensuring that end-of-life products can be reintroduced into business systems. Collection system guidelines need to inform operators and local authorities of the options and requirements for an optimum recyclability. The options and requirements can vary according to local geography and population densities, and need to consider the local infrastructure availability. For example, costs benefit analyses showed that separate weekly collections for food waste processed at anaerobic digestion facilities, were the most cost effective option in England (WRAP, 2009). In the Netherlands, separate collection of plastics packaging ('Plastic Heroes') and textiles and electrical appliances ('WeCycle') also prove to be effective (MIE, 2014).

Logistic service providers increasingly see reverse logistics not only as an opportunity to fill backhaul loads, but as attractive standalone distribution platforms that include distribution, resupply, repair and collection, for example in UK beverage vending machines (Ellen MacArthur Foundation, 2013).

Raising consumer awareness of recycling and its positive benefits using national and local campaigns can be effective to support recycling as it deals with information and knowledge barriers about local recycling services. Information helps improve the quality of material collections and so enhance the value of recycled materials. A good example can be taken from the London Borough of Southwark that in 2010 tested a weekly combined food and garden waste collection alongside its existing mixed dry recycling collection service. The number of households taking part in dry waste and food/garden waste collection schemes has increased by 10.3 % and 11.1 % respectively. The average yield of food waste per household was 2.08 kg per week, comfortably exceeding the target which the council had set. In

[2] See http://toep.ovam.be/jahia/Jahia/pid/2412?lang=en

addition, on average each household within the test area set out 1.5 kg more dry waste per week than households outside the test area (WRAP, 2010).

Furthermore, government via public procurement while private sector with its CSR policies can encourage waste recycling by procuring recycled materials or products, creating a stable market and wider acceptance from other producers. Sectoral approaches to meet certain targets for recycled content can also act as market drivers. For example, the retail and grocery sectors in the UK have established targets to have certain amount of recycled content in their food packaging such as HDPE milk cartons WRAP, 2009). Similar voluntary agreements in construction and other sectors seek to encourage the use of recycled content as long as it can meet the functional specifications. All this can help attract new investments in collection, sorting and recycling infrastructure, which in turn helps address structural barriers to recapturing value from waste (WRAP, 2014).

2.8 Conclusions

The typology of innovative business models for sustainable lifestyles is highly relevant in the following ways:

- *Categorisation and key characteristics:* The typology helps identify business models with knowledge gaps at the EU and individual country level. It supports a more systematic dialogue among stakeholders and improves common understanding on the topic and its related phenomenon.
- *Value creation:* The discussion in this chapter shows that each category of business models has particular "value profile" with regards to sustainable consumption and resource efficiency perspectives, besides addressing economic value as in conventional business models). The topic of business models for sustainable lifestyles seems, therefore, relevant to be addressed as part of the current and future initiatives of the EU, member states, and the EEA to support a green and inclusive economy and a sustainable society in Europe.
- *Barriers:* As discussed in this chapter, it is clear that the uptake of various innovative business models is challenged by multiple barriers, ranging from governance, to technology, consumer behaviour, economics, and knowledge. The barriers need to be tackled to foster the value creation generated by the business models. It is anticipated that policy-makers at the European level will facilitate and contribute to reducing or eliminating some of these barriers at the EU and member states level. It is crucial to create awareness on the barriers and to create evidence and recognition of such barriers in various political arenas.
- *Relevance to stakeholder groups:* This chapter shows that the topic and uptake of innovative business models for sustainable lifestyles are not only relevant to large for-profit businesses, but also entrepreneurs, SMEs, not-for-profit organisations, governments, and consumers. Evidently multi-stakeholder approach is required to scale up the value creations.

The points above will be further addressed and consolidated in Chapter 4 and 5 of this report.

3 Innovative Business Models for Sustainable Lifestyles in Production and Consumption Systems

3.1 Overview

The purpose of this chapter is to categorise and characterise examples of different initiatives and business models within five different production and consumption systems. The discussion is based on the previously presented framework on the value creation and scaling up potential of various lifestyle initiatives and business models. A few associated barriers are also identified. The analysis is performed by examining examples of sustainable lifestyle initiatives and business models. The examples used for illustrative purposes in this report (without any EEA judgement or promotion) are only several of many promising examples of initiatives and models around Europe.

The production and consumption systems as identified here have been the focus of the EEA´s work in recent years (EEA, 2012; EEA, forthcoming). Food & drink, mobility and housing are selected since they trigger most of key environmental pressures by total national consumption. Electric and electronic goods as well as clothing are chosen since imported goods and resources play an important role in meeting the European demand in these areas.

3.2 Food & Drink

Relevant Business Models

Business models and more sustainable lifestyles within the food & drink sector are somewhat different from other production and consumption systems (e.g. electronic goods or clothing), since food & drink are generally not suitable for re-use. However, food & drink still offer many interesting opportunities for innovative business models and sustainable lifestyles, such as:

- *Product design: COOP Italy* offers refill instead of packaging (Retail Forum for Sustainability, 2011). *Beyond Meat* produces a plant protein that mimics real chicken's texture, bite, and succulence (Sustainia, 2013). It is free of gluten, GMOs, cholesterol, trans-fats, hormones, and preservatives, and is made from a soy and pea protein blend. *Unilever's 3R's* addressed food packaging (Unilever, no date).
- *Prosumers: Brooklyn Grange*, the world's largest rooftop soil farms, grows and distributes local organic vegetables and herbs (Brooklyn Grange, 2014). *Slow Food Movement*, a global, grassroots organisation with supporters in 160 countries, links the pleasure of good food with a commitment to their community and the environment. As a result, consumers are well informed and some even become co-producers (Slow Food, 2014). *Local Harvest* is a community-supported agriculture where customers buy "a share" of the farm (usually like a weekly box on subscription) (Local Harvest, 2014). The *Copenhagen Food Cooperative (KBHFF)* buys organic vegetables, fruit and grains from local farmers which then via the member's manpower are distributed weekly amongst members at close to the price paid to the farmers. KBHFF has over 5,000 members and more than 10 distribution outlets across Copenhagen, Denmark (Københavns Fødevarefællesskab, 2014).
- *Consumer choice influencing: British Waitrose, Tesco* and *Danish Netto* improve their environment and sustainability profile by offering large shares and/or permanent assortments of organic and *Fairtrade* products in their stores; while retailers promote more sustainable lifestyles and healthier diets (Norden et al, no date). *SPUD* is a "sustainable produce urban delivery" that brings locally and sustainably produced food in boxes (called "boxing scheme") to the customer, managed via a web-solution (SPUD, 2014). Additionally, various types of food labels like the *EU Organic* or *Fairtrade International* certification have been implemented over the years.
- *Collaborative consumption: Shareyourmeal* – a website which makes it possible to share your cooking with people in your neighbourhood, find out what meals your neighbors are sharing, reduce food waste and foster people interactions via the website (EC, 2013d).

- *Waste as a resource:* "Food waste to fuel" is practiced in Malmö, Sweden, with the ultimate goal to transform all organic waste into biogas. Today Malmö's city buses run on a mix of biogas and natural gas (Swedish EPA, 2008). Food banks are usually non-profit, charitable organisations that distribute food to those who have difficulty in purchasing it. *FEBA (European Federation of Food Banks)* brings together 253 food banks across Europe (FEBA, no date). *Dumpster diving / skipping* is an act of finding items in rubbish bins or containers which have been discarded (e.g. by retailers), but that may still prove useful to the dumpster diver (and is claimed to be safe, useable, clean, and in perfect or near-perfect condition). Groups like *Food Not Bombs* recover foods that would otherwise go to waste and use it to prepare meals to share in public places. Similarly, *Rubies in the Rubble* receives surplus fruits and vegetables and makes them into chutneys. Some retailers have also started to sell vegetables, which deviate from the standard shape (SustainAbility, 2014).
- *Short food supply chain:* It means the production of agricultural products and foodstuffs with the aim of selling them in an area reasonably close to the farm of production with a reduced number of intermediaries (EC, 2013b). Those activities meet the growing demand for local products and can strengthen and develop the competitiveness of rural areas. Supplying local food systems is not only an opportunity for agricultural producers. It also affects post-primary production activities such as processing, distribution and retail and thus has a multiplication effect on the local community by generating employment opportunities and positive environmental practices (EC, 2013b).

Value Creation

Value can be generated in several ways via innovative business models and sustainable lifestyles, which focus on food & drink. Referring to the terminology used in Chapter 2, a shortlist can be presented:

- Changes in product design have been exemplified by packaging in particular. Better packaging design – like reducing volume and/or weight, making packaging reusable, recyclable or biodegradable or using certified materials – can contribute to more sustainable business model and lifestyles. Value will be created mainly via efficient end-of-life strategies. This is due to the nature of the improved product eco-design, which makes the packaging reusable, recyclable or bio-degradable.
- The prosumer examples mentioned in the food & drinks production and consumption systems will mainly create value via product substitution from conventional to more sustainable products.
- Similarly, consumer choice architecture in the food & drinks production and consumption systems can create value via product substitution that is labelled/supplied in a way that makes them more environmentally friendly and labelled accordingly.
- Collaborative consumption models can generate value through shared use. Sharing here is not to be understood literally since each "piece" of food or drink cannot be shared between people, but rather in the sense that people come together and share the experience of eating and drinking together.
- The "waste as resource" business models such as food banks will generate value by ensuring that food products that are left unconsumed by their purchaser (retailer, caterer, consumer or other agents), can be consumed by a subsequent consumer rather than wasted.
- The short food supply chain models support close relations between producers and consumers, increase consumer knowledge and understanding of food, possibly leading to behavioral changes, for example in eating habits and purchasing decisions, and have a positive effect on farming activities and environmental issues. Additionally, by combining local and seasonal characteristic storage the needs are reduced, while ecologically sound production methods contribute to reduced use of pesticides as well as soil and water pollution and soil degradation, and enhance biodiversity and sustainable water usage (EC, 2013b).

Potential for Scaling Up

In the following section a few short examples of potential for scaling up will be presented.

There is already a lot of thing happening within the consumption and production system of food & drink. Choice influencing, for instance, has already been used across Europe for some time and the number of prosumers of various kinds constantly increases. Streamlining and replication are needed for both new and well-established models, while some of the less widespread models need expansion and innovation. In a special way, food & drink are incorporated in daily lifestyles and closely connected to cultural norms and values as well as human behaviour. This can make both lifestyles and business models difficult to replicate and/or to expand.

Replication of waste as a resource models can prove to be profitable. For example, the Ellen McArthur Foundation (2013) estimated the conversion of food resources from household, retail, and hospitality landfill streams to represent an income stream of USD 1.5 billion in the U.K., based on a total collected stream of 9 million tonnes.

Terminology		Description
Scaling up	Replicating	A lot of the *waste as a resource* models are easy to be *replicated*, but can be hindered by national regulation and/or perceptions on food quality, i.e. when food waste is waste and when it is still suitable for consumption.
	Streamlining	*Streamlining* better product design for packaging would be relevant in order to promote and improve on more sustainable materials and solutions for packaging.
	Expanding	Business models for retailers offering refill rather than packaging are more common in southern European countries than in central and northern Europe. These business models might therefore be relevant to *expansion* to respective countries.
	Innovating	Some models like e.g. vertical farms or pig city-like solutions (*waste as a resource* model) are still in their early stage and will need further *innovation* to become scalable.

Barriers

Some key barriers to innovative business models and sustainable lifestyles for food & drinks have been identified based on the examples mentioned above.

For the prosumer and waste as a resource business models, it is in many cases crucial that there is a committed and visible leader who is highly motivated and able to dedicate a substantial amount of time to start and make things work (IIIEE, 2009). Where a production phase is in particular focused, farming knowledge and land suitable for farming are essential. Thirdly, in the cases where projects rely on small-scale local networks, there is also a need for a committed community, which is motivated and willing to dedicate time and effort to the projects. Prosumers must also be willing and able to cooperate with their leaders and/or peers.

The so-called "boxing scheme" requires less or no involvement from the consumer and is, therefore, more convenient and easily applicable for most consumers. However, this convenience has its toll where the values of connecting with community as well as a sense of belonging that might attribute to the collaborative consumption.

Short food supply chains and local food systems face numerous challenges: lack of knowledge and expertise required to engage in creating a new activity of selling directly to the consumer; lack of adequate facilities or even space to sell directly on the farm which requires investment in buildings and selling facilities; and administrative burden in the forms of the required the documentation and costs incurred to comply with food hygiene legislation in particular are sometimes considered as one of the main difficulties faced by farmers who wish to develop short supply chains and sell to consumers directly (EC, 2013b).

3.3 Electric and Electronic Goods

Relevant Business Models

Business models and more sustainable lifestyles for electronic goods are, amongst other things, closely linked to product life-spans. This is because many electric and electronic goods are known to be discarded before the end of their service life due to innovation in technology (causing the consumer to want newer and more updated products) or small faults/planned obsolescence. A short exemplifying list of opportunities for innovative business models and sustainable lifestyles is presented below:

- *Product design:* *Ricoh* provides printing and photocopying services, using both new and remanufactured equipment. The *Comet Circle* centres on the belief that all product parts should be designed and manufactured in a way that they can live long, be reused or recycled. Copiers and printers returning from Ricoh's leasing programme are inspected, dismantled, and go through an extensive renewal process — including key components replacement and software update — before re-entering the market under the company´s *GreenLine* label with the same warranty scheme that is applied to new devices.
- *Service & function based offerings:* *Bosch Siemens Hausgeräte* provides a "full service" leasing scheme to its customers. *Xerox* leases printers and copiers including full service arrangements.
- *Choice influencing:* EU energy labels can help consumers choose products which save energy and thus also money. The labels are also intended to provide incentives for the industry to develop and invest in energy efficient product design.
- *Collaborative consumption:* *Tool Library* is a community service co-operative that lends out tools similarly to how ordinary libraries lend out books. *Repair Cafés* are free meeting places where there are tools and materials to repair electrical appliances, clothes, furniture etc. Repair Cafés are voluntarily staffed by repair specialists such as electricians, seamstresses, carpenters or the like (Sustainia, 2013). *RecycleIT* which has been set up in Danish shops owned by video rental chain Blockbuster - has created a business model where it buys second-hand IT appliances from businesses and consumers, repairs, tests and then resells it with a warranty of two years.
- *Waste as a resource:* Many NGOs repair and redistribute used electronic goods like PCs and mobile phones to third world countries. The UK based company, *Mazuma Mobile,* for instance has prevented over 4 million mobile phones from reaching landfills by giving consumers cash for their used handsets (Ellen MacArthur Foundation, 2012).

Value Creation

- Changes in product design are fundamental for the products' suitability for new types of business models and more sustainable lifestyles. Modified product design for longer usage can thus lead to value creation via both product substitution and more efficient end-of-life strategies.
- Service & function based offerings can create value through better and more efficient products usage due to the leasing model and end-of-life strategy of products.
- Consumer choice architecture in electronic goods will create value by switching consumers' preferences to less environmentally harmful products and thus lead to a more efficient use and/or longer use. Furthermore, proper labelling combined with a suitable business model for a take-back mechanism can lead to better end-of-life strategies. This will encourage consumers to bring used-up products back for reuse or recycling.
- Collaborative consumption models can generate value by enabling customers to access a product, rather than owning it, and use it only as needed. The value creation of this model lies in the fact that product is shared. The model enables efficient, productive use of a resource that might otherwise sit idle.
- Waste as a resource models for electronic goods generates value through a more efficient or longer usage since the models will increase the number of life-cycles per product.

Potential for Scaling Up

In the following table a few examples of potential for scaling up are presented.

The Ellen McArthur foundation has amongst other systems advocated for the scaling up of sustainable lifestyles and innovative business models in the electronic goods production and consumption system (Ellen MacArthur Foundation, 2012; 2013; 2014). Products like washing machines and mobile phones have served as primary examples of how "circular economy" business models function – and thus the sustainable business models and lifestyles. It has been suggested that the application of "circular" business practices to mobile phones (in this case mainly remanufacturing activities) alone would have a positive effect of USD 1 to 2 billion on Europe's trade balance surplus due to the overall reduced imports of new phones, components and material inputs (Ellen McArthur Foundation, 2012).

Terminology		Description
Scaling up	Replicating	Leasing models for e.g. white goods, computers, TV sets and DVDs are strategic for replication. These are models that can be much more mainstreamed than they currently are, despite the fact that they are already operating in small scales in many countries.
	Streamlining	*Waste as a resource* models can be further improved and *streamlined* since the models are increasingly applied in many countries despite the barriers.
	Expanding	Tool libraries have a potential to *expand.* This business model is particularly known in US and can be applied widely in Europe. This way, the business model and lifestyle behind this scheme can make borrowing a "normal" choice rather than owning a product.
	Innovating	*Innovation* in product design for electronic goods is required to make electronics more suitable for longer life, upgrading, repair, reuse and recycling.

Barriers

Some barriers facing business models and/or organisations that aim at re-using electronic goods have been identified. These include difficulties in collecting sufficient quantities of used equipment of an appropriate quality as well as a lack of legislation that encourages or enforces reuse (Kissling et al, 2013). Business models for reusing electronic goods are challenged by difficulties in obtaining spare parts or repair manuals, often because producers perceive it as trade secrets.

Larger and perhaps more formal take-back schemes for the reuse and recycling, in particular for electronic goods, still encounter barriers in developing countries, such as: insufficient knowledge of (hazardous) contents, poor recycling efficiencies (mechanical pre-processing), low collection rates, and high costs of reverse logistics (UN, 2009; UN, 2012). In Europe, with the expansion of the EU to 27 Member States, the amount of electronic goods put on the market arose to 10.3 tons per year. Certain factors like availability of collection points, geographical location, culture, waste collection procedure and financing mechanisms influence higher collection rates (Sawhney, 2008).

3.4 Mobility

Relevant Business Models

Mobility is one of the consumption and production systems, which in many forms has been taking up a most collaborative form. To some extend many consumers/users are already used to use public transportation and, partially, also to rental and/or leased cars, this consumption and production system still holds many possibilities to be discovered:

- *Product design:* Improving vehicle design and focusing on exchanging the "weakest link" components, that wear out or tend to break first, allows for a second usage period at "full performance" (Ellen McArthur Foundation, 2012).
- *Service & function based offerings: Volkswagen* has established partnerships with apartment complexes in Germany to offer a mobility service to the tenants. Under the two programmes, *Mietermobil* and *Wohn mobil* in Hamburg, signing a tenancy agreement automatically provides

access to a fleet of vehicles. The cars are maintained by a Volkswagen dealer, washed by local fuel stations, and used exclusively by residents of the buildings (UNEP, 2001). *Zipcar* and *Car2Go a*re similar business models where users get access to cars based on hour or day of use, including the gas and insurance.

- *Consumer choice influencing:* EU requirements to labelling of fuel economy and CO_2 emissions for a fuel-efficient driving.
- *Collaborative consumption: RelayRide* is a platform where private car-owners can rent out their cars via online platform. *GoMore* and *SideCar* are "apps" that match drivers with free spaces and people in need of a ride. *Lejetlig* ("hire a corpse") hires out cars and vans bought on the used car market. The company advertise as the "ugliest" rental cars in the business, but ensure the lowest price and 100% safety. Public cars can be considered a way of re-thinking the public transportation system, where personal cars are included as an option on a par with trains, buses and metros. *Cleardrive* introduces this option in Copenhagen, Denmark (Clear Drive, 2014). *Just Park* enables those with an available parking space, garage or driveway to rent it out to others in the community (Just Park, 2014). *Zilok* provides a platform for owners of things like cameras, cars, or drills to rent them to others.
- *Waste as a resource:* In the EU, vehicles generate 8-9 million tonnes of valuable waste every year, and around 80-95% have been reused, recycled and recovered (Eurostat, 2014). According to a study by the Ellen McArthur Foundation (2012), improving vehicle design and replacing the "weakest link" components may allow a second usage period at full performance. *re.source* offers a monthly membership fee for waste collection services and processing of waste into useful products such as organic fertilizers and energy.

Value Creation

- Service & function based offerings create values through the possibility of longer use and significantly more efficient use. Cars are regularly taken care of by professional service providers and can be used more frequently than cars with just a single owner.
- Consumer choice influencing with respect to mobility, here is exemplified by cars, creates values by encouraging consumers to shift consumption to cars with better fuel economy and/or lower CO_2 emissions. The practice of fuel-efficient driving consequently leads to a better use of cars.
- The key value from collaborative consumption for consumers that they do not need to own a car but still can have full mobility. Having access to a car via collaborative consumption means usually a reduced car use compared to owning the car, and more use of public transport, bikes and walking.

Potential for Scaling Up

Mobility can be considered as one of the production and consumption systems where consumers/users are already to some extent used to various types of collaborative business models leading to more sustainable lifestyles. However, there is still room for improvement in the product design to promote more long-lasting and more sustainable products. For example, once electrical and hydrogen cars are ready for mass markets, such business models and lifestyles can be *streamlined* and *expanded*.

The following table presents several examples of scaling-up potentials:

Terminology		Description
Scaling up	Replicating	*Service and function based* as well as *collaborative consumption* models for mobility are already well known across Europe. Existing innovative business models can still be *replicated* further.
	Streamlining	*Streamlining* mobility embedded in collaborative consumption and service & function based offerings business models (e.g. car sharing) is not a focus anymore since it is already advancing at a fast pace in the up-taking of innovative business models largely recognised and used by consumers in several European countries. Nonetheless, scaling up potential still exist in Southern and Eastern European Member States.

Terminology		Description
	Expanding	*Expanding* innovative business models, such as service and function based offerings, as well as collaborative consumption models in the mobility area is important by targeting European countries and consumers groups. This is especially true where such business models have not substantially reached "critical mass" in terms of implementation and use.
	Innovating	Product design still needs further *innovation* to make vehicles last longer and increase the usability and recyclability. New technologies such as electrical and hydrogen cars may require further innovation to be scaled up.

Barriers

Despite the well-developed market sustaining new business models and sustainable lifestyles for mobility, it is still a challenge for consumers to be enthusiastic about ownerless consumption. The aspiration to own a new car and show it off to friends and family might become a significant barrier to car-sharing and public transportation (Baines et al, 2007; WEF, 2013a). High investments costs for such business models represent a significant barrier hindering a successful up scaling. Additionally, any mobility platform or business model is dependent on reaching a critical mass, at which point users can easily find the goods, or skills they seek. The challenge lies in a better integration of different mobility systems, especially in urban areas. In rural areas the innovative business models in mobility could form a baseline for new customized, self-organised not-for profit mobility services as alternative to car mobility and/or missing public transportation.

3.5 Housing

Relevant Business Models

To some extent the production and consumption system for housing is different since it covers not only the actual building, but also electricity, heating, water usage, carpets, furniture etc. Several relevant business models and sustainable lifestyles have been identified as the following:

- *Product design*: *LifeEdited* shows that we can live in small spaces, by applying smart concepts and technology, thus reducing the need for land, energy and materials (LifeEdited, 2014). *Reihnzink* and *Mosa Tiles* produce building materials ready for a closed loop cycle (C-2-C Centre, 2014).. *Parans* is a solar lighting system employing fibre optic cables to transport sunlight into buildings, and even into rooms where there are no windows. The cables can be installed in new buildings or retrofitted into existing ones. This reduces the electricity used for illumination and cooling, and also brings about the benefits which natural light provides compared to artificial light (Sustainaina, 2013) . *LifeCycle Tower* is a hybrid timber construction system for large buildings, which guarantees a minimised use of resources and energy over the full lifecycle. The building can be converted throughout its lifecycle and the materials installed hold their value significantly from a deconstruction standpoint, even throughout several decades (Cree, no date).
- *Service & function based offerings*: Energy service/saving companies (ESCOs) – in addition to the "ordinary" ones – can finance or arrange financing for the operation with service fees directly tied to the energy savings achieved. *Interface* makes and leases carpet tiles from reclaimed and recycled carpet, and it aims at zero waste, zero emissions and zero use of oil by 2020. *Simpa Networks* sells energy solutions by encouraging customers to make a small initial down payment for solar photovoltaic (PV) system and pre-pay the energy service via mobile phones. Once the solar installation is fully paid, the system unlocks and produces free energy for the customer (SustainAbility, 2014).
- *Prosumers: ODE*, a Dutch association for wind energy producers and consumers, represents an example of a community wind cooperative, where public or private entities invest in local wind power generation. *Schüco E3* houses incorporate energy saving, energy production and energy storing in houses. The houses are based on smart grids enabling the owners to sell excess energy back to the network (Norden, 2012).

- *Choice influencing:* *Gebäudepass* is a certification system providing information on all properties of a building, like transportation, sound insulation, energy demand, wastewater, and storm water treatment.
- *Collaborative consumption:* *Airbnb* is a global community marketplace for people to list, discover, and book accommodation across the globe for days, weeks or even months (Ellen MacArthur Foundation, 2013). *ShareDesk* is an online platform for flexible workspaces, which makes it easy for mobile professionals to discover and book spaces under flexible terms. There are also various types of co-housing schemes such as collectives/communes, house shares, cohabitations etc (Sharedesk, no date) .
- *Waste as a resource:* *Gamle Mursten* (old bricks) reuses bricks in new construction projects (Gamle Mursten, no date).

Value Creation

- Changes in product design can lead to value creation via product substitution, like smaller and thus more sustainable living spaces, longer use and more efficient end-of-life strategies for building materials.
- Service and function based offerings can create values through better product design and longer use in e.g. carpets. Such offerings should also incorporate products' suitability for recycling. With respect to services of solar-generated electricity, values are created via product substitution from, for example, coal-generated electricity to solar-generated electricity.
- In the case of prosumers, values are generated from the efficient use of energy. Instead of being wasted, E3 houses bring energy back to the grid.
- Consumer choice architecture creates values by encouraging consumers to shift consumption to less environmentally harmful housing options, such as environmentally friendly or energy saving-labelled housing. Real estate agents could play a much bigger role in this area. Proper reuse and recycling infrastructures may lead to better end-of-life strategies by encouraging consumers to bring back used products, such as carpets and furniture.
- Collaborative consumption models generate values through longer and shared use, since the models optimise the use of housing space which otherwise goes unused. With better product design, new housing options can be created to fit more people in smaller spaces (which is considered to be more sustainable), without compromising the functionality.
- The *waste as a resource* models for housing create values by promoting better product design. By taking into account the end of life, it is possible to use building materials that are suitable for reuse (by using more long lasting materials that are free of hazardous substances), and to disassembly or recycle (this is true since building materials can be difficult to be disassembled and separated from each other).

In housing, various collaborative consumption as well as service and function based models and lifestyles are already well known and will thus be suitable for replication. Yet, there is still plenty room for improvement, to make buildings more sustainable. Due to a building's long life, the process of implementing more sustainable solutions will only take place in the long-term. In the following table, a few short examples of potential for scaling up are presented.

Terminology		Description
Scaling up	Replicating	Many of the collaborative consumption models as well as the service & function based models discussed above provide opportunity for *replication* to ensure a wider implementation.
	Streamlining	Some product design opportunities, e.g. offering smaller living spaces, are already fit for *streamlining*. To scale up, a change in consumer mindset is required. Prosumer models can be used to *streamline* and *expand*.
	Expanding	Some of product design models are mature enough to *expand* to new markets.
	Innovating	More innovation in product design, like building materials and architectural opportunities, will be essential for greening the housing sector. Many good examples indeed exist, but new and better solutions are still needed.

Barriers

Barriers to new innovative business models and sustainable lifestyles in the area of housing may vary: living in smaller spaces and co-housing schemes strongly affects every-day life and will thus demand a significant shift in habits and norms; whereas business models that provide services, such as flooring or electricity, rather than selling it will meet the challenge of convincing consumers to let go of ownership. Alternative lifestyles such as co-housing schemes might be quite common to some, yet perceived as odd by others.

Demolition for reuse and recycling is challenged by the fact that building materials used in the past are often not easily taken apart and/or might contain hazardous substances. Even if only reusable building material were utilised in all construction works, it would take time before this actually becomes beneficial for re-users due to the long lifespan of buildings.

3.6 Clothing

Relevant Business Models

Textile products, especially clothing, offer a big opportunity to create values repeatedly during its full lifetime, since the (short) lifetime of textile products is more often determined by fashion than by technical limitations. When the first user no longer has use for a garment, it can potentially be reused by one or more consecutive users. The reuse market for apparel in good condition gives a far higher price than recycling markets and also offers far larger environmental gains than even closed-loop recycling. The second-hand model has existed for decades but new types of business models are rapidly emerging at many different levels (Watson et al, 2014; Norden, 2012; Ellen MacArthur Foundation 2012 , 2013).

For textile products and clothing in particular, all business models described in Chapter 2 are proven to be relevant. Some examples are provided below:

- *Product design:* *PUMA*'s design for disassembly and use of single fibre types to allow closed-loop recycling as part of Japanese Teijin's *EcoCircle* system. 150 different brands and retailers are part of the EcoCircle system worldwide (Teijin, no date).
- *Service & function based offerings:* *MUD Jeans* is leasing denim wear and fleeces. *Dutch aWEARness* leases fully recyclable uniforms to companies and the public sector. Swedish *Filippa K* collects its used own brand clothing from customers in return for a rebate coupon of next purchases and resells them in a specialised resell shop (Green Strategy, 2014).
- *Prosumers:* *NIKEid* customises shoes and accessories based on individual preferences (Nike, 2014).
- *Choice influencing:* Various types of labelling, e.g. the EU flower, certified organic cotton, or care labelling that provides washing and drying guidelines and which can recommend low temperature washes combined with the right kind of low temperature detergent etc.
- *Collaborative consumption:* *Kleiderkreisel* resells used clothing; *Share Your Closet* is an online C2C clothing library where members borrow each other's clothes*; Lånegarderoben* serves as a physical clothing library for members (Prewaste, 2012).
- *Waste as a resource:* *KICI* and *Red Cross* collect textiles from private households and NGOs, while *Omar Munie* re-designs KLM's old uniforms (OmM, no date).

In addition to being able to exemplify many business models, clothing can be viewed as an important change area that reaches far beyond its own domain, especially due to its ability to constantly affect consumer behaviour and attitudes (Deloitte, 2013).

Value Creation

In the business models described above, value can be generated in several ways. Using the terminology introduced in Chapter 2, a short exemplifying list is presented:

- Changes in product design and service & function are fundamental for the products' suitability to new business models and sustainable lifestyles. In particular, design for durability is a critical

element of all business models which depend on extending the active lifetime of textile products e.g. leasing, clothing libraries, resell of used own brand and traditional second-hand models. Modified product design can also aid in closed-loop recycling and therefore value creation at the end of the usable lifetime of products. This can include use of single fibres; design for disassembly (e.g. easy removal of buttons, zippers and seams); and avoidance of fibres which are not easily recycled such as cotton. All these will enable product substitution for more efficient use, shared use, longer use, and better end-of-life strategies.

- In prosumer models, people are actively involved in the design phase and value is created as the resulting design satisfies the individual prosumer. This approach may safeguard the value created as prosumers tend to stick to the products they help creating, and are less willing to dispose of the products or switch to new models or collection offered in the market.
- Consumer choice architecture in the area of clothing creates value by encouraging consumers to shift to less environmentally harmful products (e.g. via eco-labelled products) or by helping consumers to take better care of their clothes (e.g. via care labelling) – all this favours a more efficient or longer use. This proper labelling will contribute to better end-of-life strategies, if it can encourage consumers to bring back used clothing for reuse and recycling.
- Collaborative consumption models will generate value through a longer and/or shared use. This model extends the active lifetime for each garment. Tapping into the potential of clothing library business models for example, producers may enjoy additional value allowed by better product design.
- By providing incentives all the way back in the value chain, the *waste as a resource* business models will generate value by inspiring a better product design. For example, making it easy to reuse clothes by using durable materials; to disassemble by removing buttons, zippers and seams; or to recycle by producing clothes in one single fibre type.

Potential for Scaling Up

The challenges for scaling up collaborative consumption models in the area of textiles are relatively similar to the service and function based business models. Up to now, little experience has been made in this field. Thus, there is a need for further innovation. For example, testing new types of collaborative consumption models with or without different types of membership options, new legal solutions (i.e. determining ownership of waste and liabilities), and new logistic options. Built upon the innovations introduced, streamlining and replicating successful models are a prerequisite for further innovation.

The Ellen McArthur Foundation (2013) reports that, for instance, an online rental archive for clothing could result in a material savings of USD 3.8 billion for the U.K. alone. Projected to North America and Europe, the savings would be worth USD 44 billion. This is based on a scenario that includes rental and archives with 75% collection of all end-of-use clothing.

Terminology		Description
Scaling up	Replicating	Prosumer models in clothing are relevant for *replication* since the models are already introduced in various forms. The models can be further improved and more widespread.
	Streamlining	*Streamlining* of the existing good product design is relevant to promote and improve the use of more sustainable materials and solutions.
	Expanding	Collaborative business models and lifestyles, e.g. clothing libraries and re-selling used clothing, are at the moment mainly targeted towards women's (and in some cases children's) wear. Expanding the business models to men's and sportswear will provide more room for business to innovate.
	Innovating	In the B2C textile market, there still seems to be few well-known examples of service & function based business models (Watson et al, 2014). Thus, it is crucial to acquire more empirical knowledge to identify best practices and common barriers. With respect to scaling up of service & function business based models, there is still plenty room for *innovation*. For example, by testing different materials and designs most suitable for leasing, testing customers' different needs for variety in brands and styles, and testing various logistics models.

Barriers

More traditional ways of how textile products are marketed and offered to consumers can be viewed as a common barrier to new business models. This concerns both how producers view their role in the market place and how consumers view their options for obtaining and disposing products (Watson et al, 2014).

As for other areas, new business models in textiles often rely more on local employment close to the consumer than existing business models i.e. for servicing leasing systems, manning repair shops and clothing libraries etc. Thus, these models are challenged by high relative wages of employment in Europe compared to the low costs of production of new textiles in Asia. Here, measures which would raise the quality and thus price of new products are critical in allowing these new models to prosper, i.e. more value can be gained from high quality products via leasing, sharing, repair etc. (Watson et al, 2014). Eventual increases in raw resource prices are also likely to have a strong supporting effect for many of these business models, be it via resource taxation or increasing global demand for scarce resources.

Furthermore, on considering of starting a business model from scratch, there are often significant challenges related to raising and maintaining finances to cover start up, marketing and even running costs. There is also a lack of knowledge amongst entrepreneurs on best practice and pitfalls to avoid when starting up such a business (Watson et al, 2014).

The way consumers perceive textile products is also crucial as the reuse and collaborative use is central to the innovative business models and sustainable lifestyles.

The creation of a critical mass, the difficulties of setting-up business in remote regions, and little room for competition within country borders can be barriers that specifically hinder replication and expansion (EC 2013b). In addition, a lack of clarity or regulation tends to have substantial negative consequences in developing collaborative consumption business models in general.

Business models and lifestyles, which are facilitated by online platforms and/or activities, might also face challenges in relation to the public's general trust in online activities and transactions (EC 2013b).

3.7 Conclusions

It has become clear that there is a vast amount of sustainable business initiatives and models, and that this paper might only touch it on the surface. Several barriers to the implementation and scaling up have been identified mainly in terms of lack of knowledge and skills throughout the entire value chain. Another critical barrier is the high costs of establishing infrastructural systems to get sufficient input materials that are necessary for the reuse and recycling (Norden, 2012). These new business and social actions are however highly relevant to be watched closely, since the spread of the business models are expected to create a momentous foundation for future sustainable development (Ellen McArthur Foundation, 2012 & 2013).

The innovative business models and lifestyles discussed in this chapter are in very different contexts and stages of development. Some business models and social practices are still new and only tested one or few time(s), whereas others are already well known and widely spread across countries. Consequently, different strategies are required to scale up those business models and lifestyles, if this is the desired objective. A lot still needs to be done in terms of scaling up and removal of barriers; and business, consumer and policy measures are needed through stabilisation and enhanced institutionalisation in market and social structures (ETC/SCP, 2013b). There are indications that many sustainable business models and social practices are created from bottom-up with only few initiators. The role of pioneers is thus crucial in the conceptualisation and implementation of innovative business models for sustainable lifestyles. Larger corporations with higher availability of capital and resources can have difficulties in changing their existing business model (SustainAbility, 2014).

In more general terms however, it is clear that social, cultural and behavioural issues are key challenges to the scaling up of sustainable business models and lifestyles in the majority of production and

consumption systems. Changes in the way consumers eat, live, transport, and dress as well as general consumption patterns of, for example, electronic goods are closely interlinked with habits, norms and values operating in the society, and are therefore not easily changed (UN, 2010). However, the emergence of business models offering different ways of behaviours has the potential to change such norms and practices over time.

4 Common Barriers and Opportunities

4.1 Overview

This chapter summarises key common barriers to scale up further development and value creation from innovative business models for sustainable lifestyles, also opportunities from tackling those barriers. Realising its importance, this chapter takes into account the perspectives and needs of various stakeholders. The analysis is structured in such a way to present barriers and opportunities relevant for business (e.g. investment risk), consumer (e.g. behaviours), and government (e.g. policy making decisions), addressing both business as well as social innovation aspects. Figure 4-1 shows the categories of barriers and opportunities, as extracted from a study by CSCP (2014) on success factors for scaling up business impacts on sustainable living.

The opportunities and barriers examined here are mostly based on discussions in Chapter 2 and 3, and grounded in the EEA/ETC's prior work in the area (e.g. research report, workstudio outcomes etc.), as listed in Section 1.4.

Figure 4-1 Seven Areas of Common Barriers and Opportunities for Scaling Up Value Creation from Business Models for Sustainable Lifestyles (Adapted from CSCP, 2014)

4.2 Market Demand and Behaviour Change

Common Barriers

Key common barriers to market demand and behavioural change are the *critical mass* and *cultural values*. For business models to be feasible, it is essential to have a critical mass of customers demanding specific sustainable products and services or participating in the sharing platforms and waste collection. Often there is an emotional and cultural attachment to ownership, which presents a barrier to switching to services, with consumers desiring to own physical products in order to achieve status, register themselves as being part of a group or a host of other reasons. Therefore, a cultural shift is required for consumers to place more value on fulfilling a need rather than owning a product or to recognise that participating in sharing platforms or becoming prosumers can also provide equally strong social positioning markers as owning products does. This requires a shift in thinking paradigm.

In addition, the *prevailing ways of how products are marketed to consumers* can also be viewed as common barrier. This concerns both how producers view their role in the market place and how consumers view their options in obtaining and disposing products (Watson et al, 2014).

Opportunities

Looking at consumers, there are opportunities to *enable behaviour shifts and engagement, and increase consumer awareness*. A deeper understanding of how people think and take decisions is essential to make a new "ordinary" out of sustainable lifestyle options. Individual behaviour changes need to be supported, and sustainable choices need to be easy and desirable (SPREAD, 2012). For most consumers, initial capital cost is still the main factor that influences purchasing decisions. Potential efficiencies during the use phase, product longevity and opportunities for repair and maintenance are generally not taken into consideration in purchasing decisions, and information on such aspects is often not available.

Opportunities arise through this pervasive shift in consumer behaviour. A new generation of customers seems prepared to play the role of active participants through enhanced knowledge and sharing services and networks. *Social networks increase the levels of transparency and consumers' ability to identify and highlight responsible products and business practices*, enabling them to become active player in fostering sustainable lifestyles.

Businesses can benefit from *analysing sustainable lifestyle markets and consumer trends, changing corporate behaviour*, and *improving consumer access to sustainable products and services*. To thrive, businesses need to assess and anticipate their market and customer demands for sustainable products and services. In other words, environmental as well as social performances are to be fully integrated into everyday business practices.

Governments play a vital role in instigating consumer behaviour changes through their capacities to intervene in production processes and "corporate behaviour". Existing policy instruments focusing on consumers can be further enhanced to include a mix of "soft" communication-based approaches, such as labels, and "hard" measures such as regulatory and economic instruments (Schönherr, 2010; Tukker, 2006).

Civil society organisations have a role in *supporting a deeper understanding of the diversity of individual lifestyle and helping to create market demand* for a broad range of sustainable options, which favour consumption and production behavioural changes (SPREAD, 2012).

4.3 Technology and Infrastructure

Common Barriers

Structural barriers in infrastructure and technology can prevent economically viable supply of sustainable products and services, and the subsequent collection, sorting and recycling of waste. Opportunity costs can be prohibitively high when the infrastructure is not available. One way of looking at this is, existing infrastructure can create a level of environmental footprint that it is difficult for an environmentally aware producer or consumer to reduce – a so-called "glass floor" of impacts. Moreover, since much of

the infrastructure such as transport networks, power plants, buildings and machinery are capital-intensive, this can lock in unsustainable consumption and production activities for a long time before the infrastructure is replaced by a more sustainable one.

Providing easy and convenient access to infrastructure that encourages sustainable lifestyles is important, e.g. easy access to repair/recycling facilities and take-back schemes. The potential increase of transportation in product sharing, reuse, and recycling also needs to be considered. Difficulties in collecting sufficient quantities of used products with appropriate quality may pose a great challenge to business or any organisations working towards re-use and recycling.

Opportunities

In technology and infrastructure, the key opportunities will include *scaling up innovations, increasing access to technologies and recognising the important role of ICT, and better coupling of technological and social innovations*.

Innovation may arise from sharing visions and modelling local solutions that start on a small scale. As technological and social innovations develop, it is possible to seize the momentum to scale up and translate the innovations into successful practice. Crowd-sourcing platforms and technological enablers such as social media outlets can be examples of factors supporting the processes. ICT has the potential to enable sustainable living in many areas (e.g. housing, mobility, e-health) by providing interconnectivity and smart-grid solutions. To encourage the uptake of ICT that supports sustainable lifestyles, showcases or test-beds can be created, allowing people to experience positive changes in their lifestyles. Efficient, sustainable and affordable transportation infrastructures will increase the up-taking of more sustainable lifestyles, by starting with how people commute on day-to-day basis to the adoption of more sustainable travelling habits.

From discussions in the paper, it is clear that both social and technological innovations are important drivers for change. Enabling technologies play a vital role in creating systemic shifts and can generate business opportunities that support sustainable lifestyles. These technologies need to be supported and integrated with social innovations to motivate and maintain lifestyle changes and, in turn, create market demand for more sustainable products / services and their supporting technologies (OECD, 2013).

4.4 Education and Training

Common Barriers

There is still a lack in *effective sustainability education programmes for consumers on the one hand and professionals (e.g. entrepreneurs, designers) on the other hand.* This calls for an action to incorporate sustainability issues into curricula in high schools and universities setting up an innovative educational programme, as well as into professional training, to raise awareness particularly among younger generations of entrepreneurs and students. The issues can also be inserted as a cross-cutting subject in bachelor and master's programmes to enhance the experience-based education on the possibilities of sustainable business models, sustainable design, sustainable lifestyles etc.

Lack of practical trainings for instance among entrepreneurs and young graduates has further posed a challenge for businesses or any organisations seeking to incorporate new opportunities, brought by sustainable lifestyles, into their business models and to see the benefits.

Opportunities

Education and training programmes may prove beneficial by *developing (new) expertise, nurturing human capital, and adjusting educational focus and curricula.*

It is apparent that drastic change in peoples' mind-sets will be indispensable in devising new economic principles and business models that combine social and technological. This can be addressed by transforming current educational systems to take into account societies' realities and needs. Also, some lifelong learning programmes for adults can help motivating personal development, entrepreneurship and intrapreneurship. Currently, education is mainly focused on knowledge provision. To move towards

sustainable lifestyles, it is critical that education systems encourage creativity, multiculturalism, open intergenerational dialogue, and experimentation as tools for developing individual's potential to apply the knowledge and innovate in day-to-day life. So, there is an opportunity for educational institutions, including business schools, design schools etc. to leverage their curricula, by provide sustainable living skills and demonstrating how sustainable consumption and production are relevant to everyday life and business situations.

4.5 Financial Frameworks

Common Barriers

By and large studies and researches have pointed to high initial investment costs, management of cash flows, lack of internalisation of environmental and social externalities, pricing of sustainable products and services, high cost of labour for services, lack of financial performance data as common barriers. Through a survey conducted by GlobeScan and SustainAbility, in collaboration with UNEP (2011), querying about 650 sustainability experts and practitioners from around the world, *financial short-termism, inappropriate regulation and low awareness of business imperative among business leaders have also* emerged as first three greatest barriers to transition of businesses to sustainability.

For organisations willing to transform their business models, the key barrier is often the large initial investment costs required for new technologies, new materials, and adjustments required for new product development and design (Nordic Innovation, 2012). In the case of product/service systems, there are financial barriers to establish the infrastructure, procuring products, and managing the cash flow. The cash flow management is necessary to provide a service with revenues being recovered over an extended duration of the service provision, as compared to the more instant revenue from one-off purchase.

Economic decisions to produce and consume do not take full account of resulting environmental impacts where environmental externalities are not internalised and thus prices, for example of materials, do not reflect the "true costs". For example, failing to take into account the environmental cost of generating waste can cause economically inefficient production and consumption patterns, as well as the production of excess waste. An integrated approach is required to address these barriers.

Finally, some emerging business models based on sharing, leasing, repair etc. necessarily rely on local employment. The strong wage differential between European service workers and production workers in Asia producing new products is a strong barrier to many of these business models (Watson et al, 2014). A further challenge for emerging business models is a lack of historical financial performance data, which is likely to increase the challenge in securing investment from financial institutions.

Opportunities

Governments have a strategic position to create opportunities for businesses. For example, by creating *supportive financial frameworks, internalising externalities, creating right incentives via environmental taxes and green fiscal reform (as well as removing environmental harmful subsidies), establishing financial rating schemes, and establishing financial frameworks that allow small social ventures to develop.*

The internalisation of environmental costs can make sustainable driven business models, products, and services more competitive in the market. This will not only stimulate the production and supply of green products and services, but also create market demands. Policy-makers can contribute by adjusting the regulatory systems, and develop legal and financial frameworks favouring the development of business and social innovations for sustainable living. Through regulatory adjustments, governments may provide sustainable business and social ventures with financial incentives, such as earning extra pension points and reward schemes. Additionally, governments may adjust the tax systems to favour green business models and sustainable lifestyle practices.

For financial institutions there are opportunities for *impact investment*. Investments that have a positive social and environmental impact rather than merely a financial value can potentially play an important

role in supporting sustainable lifestyles. As this is still a relatively new area as there are some questions that remain to be answered. Among these are: how to directly measure the impact on e.g. more sustainable ways of living; which indicators and standards to use for this purpose; and what the success factors are and how they may be enhanced.

Civil society and support organisations can assist with gaining a better understanding of the different types of investments that support business and social innovations for sustainable living.

4.6 Governance Systems

Common Barriers

In terms of governance systems, the common barriers identified include *the often short time horizon for policy and decision making, and unclear role of government in facilitating sustainable lifestyles.*

Undoubtedly, governments play an important role in facilitating the development of business and social innovations. Governments are increasingly paying attention to social and business innovation, and how they can further support it. There seems to be a need for developing methodologies that help policy-makers in identifying business and social innovations that progress society towards sustainable living. Transforming our current consumption patterns requires a significantly longer time horizon than most business and policy makers currently consider. A critical barrier is the "short-termism" that has been observed in regulations, business management, and investment decisions (Mont & Heiskanen, 2014). A key challenge for policy is to support innovative business models developing, according to rapidly changing economic and social conditions (e.g. circular economy, increasing roles of consumers, changing purchasing choices and preferences). Lack of or inappropriate regulations – standards that inhibit, or insufficient rules to encourage, more sustainable practices and behaviours – constitute a significant barrier to sustainable lifestyles. Examples may include perverse subsidies, or externalising the costs of pollution and other environmental impacts.

Opportunities

Options for enhancing governance systems to better take into account innovative business models for sustainable lifestyles include: *increasing the time horizons for policy making, government leadership, enhancing the effectiveness of government regulations, promoting green public procurement, and supporting extended producer responsibility and social innovation*.

A move to long-term thinking and planning in policy is a fundamental prerequisite for a circular economy and sustainable lifestyles (Mont & Heiskanen, 2014). Proactive businesses will need political leadership and governmental support through long-term policies as well as instruments to enable the transition to more sustainable lifestyles.

For a long time, the focus of environmental legislation has been on "end-of-pipe" abatement measures. Significant progress has been made over the past decade in widening the focus towards policy encouraging the production and demand for more sustainable products. However, there is potential to further enhance regulatory frameworks and guidance particularly in the area of sustainable lifestyles.

One option to support business models that create value and generate profit from satisfying consumer needs through access to and use of products is to introduce extended producer responsibility, covering the entire product life cycle, from the purchasing of the product, the use-phase and the end-of-life phase. Well designed, this will reposition consumers as users, where products are hired/leased/rented rather than purchased for as long as the product is needed (EC, 2011).

4.7 Information Provision

Common Barriers

Barriers facing consumers, businesses and also governments are *lack of knowledge in various areas, including value chains, rebound effects, sustainable products and services and materials. A further*

barrier is the lack of benchmarking of some on-going initiatives in the field of sustainable lifestyles and innovative business models.

Nordic Innovation (2012) notes, that there is a lack of knowledge and skills throughout the entire value chains. Alternative business models may be more complex and rely on a larger network of actors than traditional ones. Thus, understanding their economic and environmental implications requires more knowledge and time. Information on the potential negative environmental impacts and the rebound effects of innovative business models for sustainable lifestyles is often not well addressed and, consequently, not understood.

Some consumers are increasingly willing to buy more sustainable products and services, but there still is a large group of consumers that do not have enough knowledge about sustainable products and services (Nordic Innovation, 2012).

Many businesses have realised the merits of modifying their products and processes to become more sustainable. Acknowledging the business benefits of improved product performance, some have revamped their offerings to be more effective, more efficient and produced with safer, "greener" materials. Other companies have rethought their processes—for example, by utilising renewable energy sources in production or enhancing performance and trust through various certifications (SustainAbility, 2014). But, still information barriers exist on e.g. greener material costs and availability of innovative technologies often undermining investment in sustainability-driven technologies as well as in recyclables and recycling capacities.

Re-use and repair can be challenged by a lack of repair manuals, and recycling can be challenged by lack of information on the composition of products and presence of hazardous substances.

There is evidence that providing more information to consumers and putting the main responsibility for sustainable consumption on consumers alone ("consumer scapegoatism") will not deliver substantial reductions of environmental impacts from consumption (Norden, 2013). Raising awareness is important, but other tools can be expected to be more effective, such as administrative or economic instruments that directly address unsustainable consumption patterns (Norden, 2013).

In addition, collaborative consumption and matchmaking platforms still need to address personal data identity concerns and are challenged by lack of trust between peers i.e. between the borrower and the lender.

Opportunities

Opportunities to improve the information provision include *the sharing of good practices, increased access to reliable information, establishment and refinement of sustainability related standards and labelling, and conducting data inventories*. Consumer protection organisations may play a significant role here, for example by testing and comparing products and services not only based on purchase price, but also life-cycle costs etc.

Case studies and life stories will help businesses and governments identify success and failure factors that are specific to various cultural, business and geographical contexts, and hence support the replicability of such practices. Enhancing access to reliable information on such factors is a crucial step to successfully implement sustainability driven business models and lifestyles.

It is important that relevant sustainability standards for products, materials and processes are in place in industries, where standards have been developed, and to expand this approach to cover more products and sectors. The Product Environmental Footprint (PEF) method, established by the EU's Single Market for Green Products initiative, is a recent example of such activities (EC, 2013c). It is acknowledged that access to technical information alone is no trigger for operational change in business. However, it can provide the foundation to turn knowledge into practice (Nordic Innovation, 2012).

4.8 Partnerships and Communications

Common Barriers

The common barriers for building up partnerships and communications are *lack of coordination and collective action among stakeholders in the public and private sectors.*

Making significant progress towards innovative business models for sustainable lifestyles requires multi-stakeholder collaboration, including between business, government and civil society organisations, service providers, financial institutions, and consumers. Many case studies exist with individual businesses making substantive progress. However, each organisation has the opportunity to rely on other actors in its value chain in order to effectively address unsustainable production patterns.

Cooperation among regional, national and European institutions on the topic of innovative and sustainability driven business models seems to be insufficient (ETC/SCP, 2013c). There is a need for better coordination across governmental levels, but also between private and public sectors.

Opportunities

Key areas to enhance partnerships and communications towards innovative business models for sustainable lifestyles include *enhanced stakeholder collaboration, better communications, cooperation between large and small businesses, and the role of media and advertising*.

It is important to facilitate a common understanding on sustainable value propositions among relevant stakeholders in private and public sectors, which requires trust building, information sharing along value chains, and collaboration to find best available solutions for the environment, business and consumers without spilling over impacts from one life cycle stage to the other. Better communications and new collaborations are necessary to create a competitive economic environment that will enable businesses to capitalise on the full potential of innovative sustainable strategies and models.

Large and small businesses have complementary roles in creating sustainable business models. As businesses are in a constant state of transformation, supporting the emergence of intrapreneurship in large businesses and entrepreneurship in small ones may encourage companies to find common frameworks to understand sustainability, where actors create innovative networks and constellations for sustainable value proposition for their clients and customers. Also, social innovation can be regarded as an important element in mainstreaming sustainable living practices.

In general, media and governments can foster sustainable lifestyles through disseminating simple and engaging messages, and further promoting tailored policy measures with a focus on enhancing and promoting sustainable consumption and production choices.

5 Lessons Learnt and Conclusions

Building upon findings of previous chapters and activities coordinated by the EEA over the past years (see Section 1.4), this chapter outlines the key lessons learnt and final conclusions on scaling up the value creation of and bridging knowledge gaps for innovative business models for sustainable lifestyles in Europe.

5.1 Overall Learnings and Conclusions

The discussion in this report shows that the issue of "innovative business models for sustainable lifestyles" is becoming more and more relevant for policy making in the European Union. Reasons include the potential of such initiatives to become central elements in the transition of markets and society towards a green, inclusive economy and – additionally – to strengthening the role of environmental policy as powerful engine for change towards sustainability in a medium to long-term perspective.

The business and social innovations described in this report demonstrate that business and civil society have become more engaged in the arena of transformative policies towards sustainability, although they still have a marginal impact compared to mainstream practices. In more practical terms, the business and value creation models represent a social and business capital for change which could form a complementary approach to widen the room for solutions to combat environmental degradation while increasing overall welfare, economic prosperity and life quality.

Dealing with innovative business models for sustainable lifestyles needs accordingly a different understanding of the role of environmental policy-making, to look deeper into the ongoing dynamics and relation of society, business, and environment. Environment-motivated policy may need to branch out into shaping or even designing social fora where citizens and entrepreneurs can experiment with new forms of business and social practices. There is a strong need to organise more basic analysis on the various innovations and business models and to deliver it to political institutions and/or to transform the issue into a political language.

5.2 Business Models Characterisation

The key lessons learnt and conclusions from the business model characterisation in Chapter 2 are provided below.

Sustainable Product Design

Sustainable product design models have the potential to reduce the life-cycle environmental load of current products leading to improvements in eco-efficiency. The concept of sustainable product design has been well established. It is recognised that a number of public and private stakeholders are even already involved in scaling up the value creation from product design models. However, in general the uptake of respective business models by producers and their mainstreaming in consumer markets is still lacking due to organisational, technical, economic, and institutional barriers. This is particularly true for the scaling up of product design models, which requires detailed technical and managerial expertise and often involves directly engaging and working with producers.

Service & Function Based Offerings

These models are expected to contribute in reducing the consumer's environmental impact by substituting products with services that serve identical or similar purpose. The application of these models currently happens on a relatively small scale, but there seems potential for scaling up their application and contribution to more sustainable lifestyles. The scaling up requires further work, including encouragement, enabling, engagement, and exemplifying access to services.

Prosumers

Prosumer models are being applied by a growing number of consumers who are enabled to become producers by technologies that facilitate the exchange of information, mass and co-production of

personalised products and services, and contributions to open source projects. Prosumerism is currently mostly relevant to utility supply (e.g. household photovoltaic systems), food supply (e.g. community-supported agriculture gardens), and knowledge (e.g. Wikipedia). This model offers increasing opportunities for both business and consumers, and is driven by technology advancements, increasing consumer awareness of environmental issues, and willingness to become more autonomous and taking a leading role in those sustainable market developments (Kotler et al, 1986).

Consumer Choice Influencing

These models create value through guiding consumers towards more eco- and socio-efficient products, services, and lifestyles. It offers companies many opportunities to engage with consumers more intensively and to develop more tailor-made information and communication approaches in the realm of new communicative settings (like social media, E-Commerce). Retailers represent a key stakeholder group for this value creation model due to their influence on and their position in commodity supply chains.

Collaborative Consumption

Collaborative consumption models have experienced a significant growth in interest and uptake over recent years, and this trend of "commoning" is likely to continue or even more dynamic in the near future. These models offer opportunities for both consumers and (profit and not-for-profit) businesses. There seems significant potential to further develop new (commercialised and non-commercialised) collaborative consumption models, and also to scale up existing business models for consumer-to-consumers sharing, swapping, bartering, trading or renting access to products and services.

Waste as a Resource

These models are already making significant contributions to deriving economic value from waste and a more circular economy. It is anticipated that these models will gain further momentum in the future driven by increasing scarcity and costs of raw materials and government policies in conjunction with the search for new employment opportunities, especially in SMEs and/or social business organisations.

5.3 Production and Consumption Systems

Key lessons learnt and conclusions from the application of the characterised business models in the production and consumption systems in Chapter 3 are presented below.

Food & Drink

The consumption and production system of food & drink offers many interesting opportunities for innovative business models for sustainable lifestyles. For some time, a number of business models are already applied within food & drink (e.g. choice influencing, prosumers), and this trend is likely to continue or might even become stronger in the context of changing public risk perceptions on current agro-industrial practices in food production and processing. However, the scaling-up of these business models is hindered by various organisational, social, geographical, technical and regulatory barriers. For example, small suppliers not involved in producer organisations or other forms of co-operation face barriers in terms of standards, lack of investments and distribution capacity. Due in part to under-investment, they are least able to resist the power of large retailers and are likely to be the most vulnerable to imposed changes in contract terms (EC, 2013b).

Electric and Electronic Goods

Business models for more sustainable lifestyles with regards to electric and electronic goods are often linked to dealing with product life-spans and their design, since many of these goods are discarded before the end of their service life due to technological innovations, societal trends (e.g. current societal patterns promote a recurrent purchasing of the most updated products as a means to show social status) or small faults/planned obsolescence, as well as monopolisation of spare parts. On the other hand, ICT and supporting electronic goods (e.g. smart phones) have the potential to enable more

sustainable lifestyles in many areas by providing interconnectivity (e.g. facilitate collaborative consumption solutions), new consumer choice models, and smart-grid solutions.

Mobility

Collaborating and sharing are already key elements of business models for sustainable lifestyles in mobility. Many consumers are using public transportation and also rental/leasing of cars is meanwhile a common practice in many cities and countries. However, from this study it is clear that there are still many untapped opportunities for the development and scaling up of business models to enable more sustainable mobility and lifestyles (e.g. car and bicycle sharing schemes, electric cars). It is acknowledged that a significant number of public and private stakeholders are already working on the sustainable mobility and associated business models in Europe to move from niche solutions towards mainstream. The challenge lies in a better integration and inter-connectivity of different systems of mobility, especially in urban areas. In rural areas the innovative business models in mobility could form a baseline for new customised, self-organised not-for-profit mobility services as alternative to car mobility and/or missing public transportation.

Housing

Business models for enabling more sustainable lifestyles in the area of housing are of a different nature - due to its extensive stretching over different sectors - than other production and consumption systems. Housing covers not only actual buildings, but also electricity, heating, water usage, carpets, furniture etc. There are several interesting business models relevant to housing and sustainable lifestyles (e.g. businesses supplying construction materials made from wastes, house sharing schemes). The scaling up process of innovative business models in this system should take into account the long lifetime of buildings, offering opportunities for long-lasting contributions and building renovations.

Clothing

Clothing can offer a significant opportunity for creating value repeatedly during their full lifetime, since the lifetime is more often determined by fashion than by technical lifetime limitations. Various innovative and sustainability driven business models are already present in the clothing system, but are currently applied on a relative small scale or in niche markets. One of the key barriers to innovative business models for textiles are trends towards fast fashion and decreasing quality of clothing, the more traditional ways of how textile products are marketed to consumers, and associated cultural and consumer values towards clothing. But there are growing signs that parts of consumers want to re-organise their common preferences and practices in that area.

5.4 Common Barriers and Opportunity Areas

The key lessons learnt regarding common barriers and associated opportunity areas to scale up further development and value creation from innovative business models for sustainable lifestyles as discussed in Chapter 4 are summarised below.

Category	Common Barriers and Opportunity Areas
Market demand & behaviour change 	Increased market demand for more sustainable products / services and behavioural changes are essential factors in advancing the up-taking of innovative business models for sustainable lifestyles. Business models are ultimately about the value delivered to customers. To innovate, companies must stay connected to ever-changing customer needs and market realities. It can be particularly helpful to understand local communities and their real needs and wants. Critical mass and cultural values have been identified as key common barriers to markets and behavioural reshaping, as well as the prevailing ways of how products are marketed to consumers. A deeper understanding of how people think and take decisions is essential to transform sustainable products and services into 'ordinary choices' and support behavioural shifts towards more sustainable lifestyles. Increasing market demand for more sustainable products and services is influenced by improved consumer access to sustainable products and services, increased transparency and consumers' ability to identify responsible products and business practices (e.g. through social networks).

Category	Common Barriers and Opportunity Areas
Technology & infrastructure 	Convenient infrastructure and technology are key factors to overcome prohibitively high opportunity costs arising when for instance the infrastructures to supply sustainable products and services are not available. Difficulties in collecting sufficient quantities of good quality end-of-life products may pose a great challenge towards the feasibility of implementing recovery and recycling technologies (e.g. access to repair/recycling facilities and take-back schemes). To innovate within systems, companies need the capability to adapt to shifting market conditions and larger systemic changes through easy access to suitable technologies. Governments and businesses also need to provide consumers with easy and convenient access to infrastructures in order to foster the uptake of more sustainable products and services.
Education & training 	Linking education and training with sustainable lifestyles may prove beneficial to the evolution of sustainable lifestyles by developing the needed innovative expertise among entrepreneurs and academia. So far, effective education and practical training focusing on sustainability within academic curricula are lacking. Nurturing human capital, adjusting educational focus and developing new educational skills and capacities on sustainability topics at schools, high schools and universities is needed to bring forward sustainable lifestyles. To overcome existing barriers, it would be advisable to focus no longer only on knowledge provision but move also towards encouraging creativity, multiculturalism, open intergenerational dialogue, and direct experimentation with future generations to gain ground for new economic principles and business models that combine social and technological sustainable progress.
Financial frameworks 	Suitable financial frameworks can support transformations towards innovative business models. Many new process or product innovations have fallen short of their potential because of being unable to compete within the financial constraints of existing traditional markets. Governments and financial institutions may play a strategic role in providing the right incentives via environmental taxes and green fiscal reform, helping to internalising environmental costs and establishing financial systems enabling innovative products or processes to succeed in the marketplace.
Governance systems 	Governance systems incorporating long-term thinking and planning are fundamental for a circular economy and sustainable lifestyles. Institutional options better accounting for innovative business models for sustainable lifestyles include tailored government regulations that support e.g. green public procurement, extended producer responsibility and social innovation.
Information provision 	Successful and effective information provision to consumers, businesses and governments is often hindered by specific barriers including the lack of knowledge in various areas (e.g. value chains, rebound effects, sustainable products and services and materials) and the lack of benchmarking on sustainable lifestyles and innovative business models. The sharing of good practices, access to reliable information, establishment and refinement of sustainability related standards and labelling alone are no trigger for consumption and production changes. However access to this information can provide the foundation to turn knowledge into practice and lead to the uptake of sustainable products and services.
Partnerships & communication 	Increased multi-stakeholder partnerships and communication channels have the potential to reach out to a vast array of actors and lead to progress towards innovative business models for sustainable lifestyles. In the current age of hyper-connectivity, business innovators can benefit from the opportunity to build new capacities and generate novel ideas through alliances and sharing. Whether it is a public-private partnership or crowd-sourced innovation, companies have realised the benefit of extending their innovation network. However, so far coordination and collective action among stakeholders in the public and private sectors seems too often be insufficient. Communication channels and combined efforts between large and small businesses have to be promoted and further supported both at the company and governmental level.

5.5 Outlook

This report can be considered as a short primer covering a typology of value creation models that hold promise for future sustainable lifestyles. The discussion in this report sheds light on innovative and sustainability driven business models, associated challenges and opportunity areas, emerging social innovations as well as key elements of conducive regulatory and policy frameworks.

It is important to gain a deeper understanding beyond what has been covered in this report. Fundamental features shaping the further development and subsequent implementation of innovative business models include social and inclusion aspects, legal issues, rebound effects, and defining what can be considered as truly sustainable business models. All relevant economic, environmental, and

social elements need to be understood and assessed as interconnected components of a complex business, societal, and governance systems.

This report does not provide a detailed assessment of potential negative environmental impacts and rebound effects linked to innovative business models (e.g. increased transportation and associated energy use and emissions in the case of collaborative consumption). This report provides practical and real-life examples of business models for sustainable lifestyles, but does not quantify these environmental impacts. This exercise could be undertaken as a follow-up study if desired.

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Annex 1: Examples of Good Practices

Food & Drink

Good Practice in Food and Drink
ECF Efficiency City Farming (UK)

Overview: ECF is a German company that designs urban farms to produce healthy vegetables and fish within the city environment. This idea is for small and middle consumers that can become potential city farmers for clients such as supermarkets, restaurateurs, hoteliers, architects, schools and universities. One of the strengths of this model is the nearly CO_2-neutral production with no pesticides, zero transportation miles, and with a reduced water footprint. The ECF Farms seek to revolutionise food production in cities and provide a significant contribution to climate protection in urban environments.

Business model category: Prosumer model.

Scaling up value creation: This good practice presents a sustainable solution for macro food consumers that want to adopt a more sustainable supply chain and want to promote a healthy, regional, and sustainable diet. The company assists with the planning, development and construction of urban farms in specific locations. Services include developing feasibility studies and forecasting crop yields. An urban farm can be delivered in a period of three to four months. The urban farm operators can choose the desired operational model (e.g. owned and operated by EFC or by themselves). Furthermore the farms achieve significant water saving of up to 50% compared to conventional farms. By producing in central in urban areas, transport routes and the accompanying environmental impacts are reduced to a minimum. ECF is seeking further opportunities for urban production sites, such as production in containers and on rooftops.

Source: ECF City Farms (2013).

Good Practice in Food & Drink
Rubies in the Rubble

Overview: Rubies in the Rubble uses only surplus fruits and vegetables from fruit and vegetables markets to produce chutney. Before the fruits and vegetables are discarded, they are collected to produce into chutneys and jams. The social business wants to tackle the issue of food waste in the UK by demonstrating that there are solutions for the further use of food waste. Rubies in the Rubble further uses its business as an opportunity to provide employment to disadvantaged individuals in the labour market. The hand-made products are successfully sold in UK markets.

Business model category: Waste as a resource model.

Scaling up value creation: Preserves are an option for consumers to make use of seasonal gluts in a creative and healthy manner and therefore contributes to awareness on food waste and seasonal local food production. In addition, the business provides training and opportunities for individuals needing support to get back on the labour market. It has a scaling-up potential, by expanding into further markets and by identifying further products, apart from chutneys and jams, which can be produced from food waste.

Source: SustainAbility (2014). Model Behaviour. 20 Business Model Innovations for Sustainability.
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Electric and Electronic Goods

Good Practice in Electric and Electronic Goods
Royal Philips Electronics

Overview: Royal Philips Electronics from the Netherlands offers to its customers complete lighting system services, including production, installation, maintenance and taking back of used materials from lighting systems. The business model focuses thus on selling the service of having light rather than the lighting system itself. This approach is based on a cradle to cradle philosophy and strives towards improving living conditions for people, reducing energy consumption and closing material loops. It has been developed as one of the key innovation areas within the Philip EcoVision programme. The service offer is constantly monitored and metered in order to adapt it further to customers´ needs.

Business model category: Service and function based model.

Scaling up value creation: The change in the company´s business model aims at contributing towards a resilient society in the context of scarcity of resources and climate change. In contrast to the traditional approach of value proposition based on product sales, the customers benefit now insofar as they only receive what they need at a steady price. Through the use of an energy-efficient LED system the energy consumption is lowered and the cradle-to-cradle approach reduces resource use.

Source: Norden (2012). Green Business Model Innovation. Business case study compendium. p.62

Good Practice in Electric and Electronic Goods
Netcycler

Overview: Netcycler is a company from Finland, active in the sharing economy. It offers its customers to swap items among each other. In order raise the probability of people swapping items, Netcycler match-making creates swap-circles, in which wants and offers of various people are matched to facilitate the swap. Netcyclers target group are private consumers and as it is internet based it can arrange swaps internationally between users. Netcycler's business model has three income pillars: They have contracts with postage companies, customers pay transaction fees, and Netcycler generates income by customers having premium accounts.

Business model category: Service and function based model.

Scaling up value creation: By incentivizing people to swap their used items, but also to acquire used items instead of buying new products, Netcycler facilitates items to be reused and their lifespan to be prolonged. By this resources for new products and also resources for the production of new items are saved. Furthermore the amount of waste is reduced and people with lower incomes are granted access to products they maybe couldn't afford to buy otherwise.

Source: Netcycler; Norden (2012). Green Business Model Innovation. Business case study compendium.

Mobility

Good Practice in Mobility

Vélib' Bicycle Sharing Scheme (France)

Overview: Vélib' is a public bike sharing system in Paris. A bike can be hired either at one of the Vélib' stations or online, and then returned to any Vélib' station. A one day ticket costs about 1.70 euros while long-term annual subscriptions cost 30 to 40 euros. The first 30 minutes of each trip are free of charge. To keep the bicycles in an appropriate condition, service teams regularly check them at the stations and repair the broken ones.

Business model category: Service and function based business model.

Scaling up value creation: The Vélib' model to reduces car use and encourages healthy lifestyles by promoting physical exercise through biking. The system is funded by the JCDecaux advertising company in return to that the city of Paris places advertising boards on its streets. It creates social values by giving access to quality bicycles to the citizens, lowers traffic and urban congestion and reduces the negative environmental impacts caused by motorised transport.

Source: Vélib' (2013); Voytenko & Mont (2013).

Good Practice in Mobility

Move About

Overview: The Norwegian car-sharing organisation Move About offers its members access to a fleet of electric cars since 2008. Move About operates both public car sharing services and closed systems to corporate customers and currently has about 100 Electric vehicles in operation in Sweden, Germany, Norway and Denmark. They offer their customers a comprehensive service package including the electric vehicles, an insurance, a reservation portal, and washing and cleaning. For the corporate customers the business model is attractive from an economic perspective as one car alone covers the mobility requirements of 20-30 employees.

Business model category: Service and function based model, product design, consumer choice influencing.

Scaling up value creation: The business model is interesting as it entails three business model innovations. In terms of product design it offers an innovative sustainable product, the electric car, to its customers. Furthermore it offers the service of mobility rather than selling the cars itself. And finally, it gives the customers and incentive to use sustainable mobility concepts and thus influences their sustainable choices. By offering corporate and private customers electric mobility, it has positive environmental effects as it reduces CO_2 emission caused by conventional cars. Furthermore it reduces the number of cars on the streets and by this urban congestion. It has a high scaling up potential, for example, in Norway electric cars are allowed to use the bus lane, are exempted from parking fees and are free of congestion charges, which are being introduced in many cities in Europe.

Source: FORA (2010).

Housing

Good Practice in Housing
Schüco International KG

Overview: Schüco International KG is a construction company that has been initially concerned with producing aluminum-housing solutions. After having developed various approaches to lower energy consumption, the company focused on offering solutions for energy producing houses, turning the consumer into a producer of energy by installing solar panels on the roof and into all shadings and parapets of the houses. Furthermore the company´s strategy focuses on energy saving and energy storing by smart grids and options for the house owners to sell back additional energy to the network.

Business model category: Prosumer model.

Value creation and scaling up: Schüco's value proposition is to offer housing solutions that save, produce and store energy, enabling in the long term self-sufficient energy production for the house owners. Thereby the company hassled to an increase in sales and access towards markets shares. By supporting consumers in producing renewable energy, Schüco provides an ecological benefit by reducing CO_2 emission caused by conventional energy production and a social benefit by reducing consumers' dependence on external energy-providers. Schüco has consistently scaled-up the value it provides, by developing from a provider of sustainable housing to a provider of solar panels and finally into a service provider for the domestic production, storage and selling of renewable energy.

Source: Norden (2012). Green Business Model Innovation. Business case study compendium. p.12

Good Practice in Housing
Power Up

Overview: The company Opower partners up with utility providers to promote energy efficiency through Home Energy Reports for utility customers developed with Opower's software. This software analyses the energy consumption and offers recommendations on energy saving by making small changes in how energy is used.

Business model category: Consumer choice influencing model.

Scaling up value creation: Through this service, Opower helps protect the environment, boosts energy security, saves money for utility customers and influences energy consumption behaviour. As of 2012, Opower managed energy data from over 15 million homes around the world. It delivered more than $75 million in savings for utility customers, saved 750 gigawatt hours of energy and abated 1 billion pounds of CO_2.

Source: Opower (2011).

Clothing

Good Practice in Clothing

Puma: Clever Little Bag

Overview: To ensure that PUMA's new way of packaging shoes is not only creative but also environmentally sustainable, a life cycle assessment (LCA) was initiated as an integral part of the re-design process. Puma´s new "Clever Little Bag" consists of a non-woven polypropylene bag and corrugated "bone" providing stability to the design and ensuring, at the same time, that there is no contact between the shoes. This innovative design choice will reduce cardboard use by 65% and save 8.500 tons of paper, 20 million mega-joules of electricity and 1 million litres of water. Due to its light weight 0.02kg this new packing system will also reduce the amount of fuel used to transport the shoes.

Business model category: Product design model.

Scaling up value creation: This innovative design choice will reduce cardboard use by 65% and save 8.500 tons of paper, 20 million mega-joules of electricity and 1 million litres of water. Due to its light weight 0.02 kg this new packing system will also reduce the amount of fuel used to transport the shoes. Regarding the scale of shoes sold by Puma worldwide and the number of shoe-boxes which are used for this, the extension of the use of the "Clever Little Bag" can create significant resource savings and serve as a good example to other businesses and packaging concepts.

Source: Puma (no date).

Good Practice in Clothing

Tecmacal - Reuse of Leather

Overview: Tecmacal is a producer of machines for the footwear industry as well as across other industrial sectors. In a project cooperation with another company and an engineering institute, Tecmacal has developed a machine which reuses leather which resulted as a waste-by-product from the footwear, leather goods and textile industries. The machine combines the recuperated leather pieces and produces leather blankets that can be used as raw material for the manufacture of new products such as wallets, accessories, and bags. The machine can not only be used for leather, but also for the manufacture of other similar materials which are used for, e.g. shows, textiles, wallets etc.

Business model category: Waste as a resource model.

Scaling up value creation: By cooperating with the Technological Center of Footwear (CTC) and the Instituto de Engenharia Mecânica e Gestão Industrial (INEGI) in the project CARRE, Tecmacal has developed a process to use leather-waste which originate in the footwear, leather goods and textile industries. This waste, which in many parts is toxic, is saved from going to landfills and contaminating the environment. Furthermore a reduction in resource use can be achieved due to a more efficient use of by-products, thus saving use in the primary resource leather, but also in resources which are used in the process of the leather production, such as water and chemicals.

Source: OECD Green Growth Papers (2013). Why New Business Models Matter for Green Growth; p.92