

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

This appendix contains the pattern database related to the article [“The Sustainable Business Model Pattern Taxonomy” by Lüdeke-Freund et al., 2018](#). It is structured according to the 11 groups resulting from a Delphi survey conducted with ten international experts. The patterns are described just briefly. See <http://sustainablebusiness.design/> for further details. Cite as: Lüdeke-Freund, F.; Carroux, S.; Joyce, A.; Massa, L. & Breuer, H. (2018): *The Sustainable Business Model Pattern Taxonomy – 45 Patterns to Support Sustainability-Oriented Business Model Innovation, Sustainable Production and Consumption, Vol. 15, 145-162.*

Business model pattern (source)	Context	Problem	Solution	Example	
G1 Pricing & Revenue Patterns					
Patterns that primarily address the revenue model of a business model, i.e. how offerings are priced and revenues generated.					
P1.1	“Differential Pricing” (Clinton & Whisnant, 2014)	Base of the Pyramid (BoP) and low-income groups in both developed and developing countries are often excluded from consumption due to price barriers.	Customers might need the same product but have different payment thresholds. Hence, some customers are either unwilling or unable to pay as much as others for the same product.	Charging groups with higher payment thresholds higher prices to subsidize those groups who cannot afford to pay as much.	Novo Nordisk sells insulin in developing countries at prices that are up to 20% below the mean prices charged in developed countries.
P1.2	“Freemium” (Clinton & Whisnant, 2014)	Pertains mostly to software or web-based services such as social networks, but also to traditional products and services such as healthcare.	Lacking the critical mass required to achieve economies of scale and to make products and services attractive to a broad range of customers.	Provide a basic service or product free of charge to lower entry barriers for customers, while a fee is charged for additional features and functionality. This allows gaining traction through partly free offerings.	Aravind Eye Care System offers free eye care to more than half of their patients in India. Those who can afford to pay for it receive extra services like air-conditioned waiting rooms.
P1.3	“Innovative Product Financing” (Clinton & Whisnant, 2014)	Forms of leasing and renting are becoming increasingly popular in the renewable energy industry. Also, low-income groups are able to purchase goods they otherwise could not afford.	Customers either cannot afford or do not want to buy the product outright. Reasons might be that the product is very new and uncommon, more expensive than traditional products. This can inhibit the diffusion of radical eco- and socio-innovations.	Offering product leasing or renting for a certain period of time instead of selling it outright. As an option, this can lead to ownership (“progressive purchase”). This allows extending breadth and depth of customer groups for new products.	Simpa Networks provides distributed energy solutions to underserved consumers in emerging markets on a “progressive purchase” basis. Customers first make a small down payment for a solar system and then pre-pay for the energy service they need.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)		Context	Problem	Solution	Example
P1.4	“Subscription Model” (Clinton & Whisnant, 2014)	Green- or social start-ups that enter new markets are often in need of reliable revenue streams and customer relationships.	A lack of recurring and predictable revenues and customer relationships threatens a company’s financial stability.	Charging a customer a rolling fee, typically on a monthly or annual basis for access to a product or service. The customer pays a fee, irrespective of product or service use. This allows creating consistent income streams.	Blissmobox is a membership club that offers monthly subscription boxes filled with a selection of organic, non-toxic and eco products.
G2 Financing Patterns					
Patterns that address the financing model within a business model, i.e. how equity, debt and operating capital are acquired.					
P2.1	“Crowdfunding” (Clinton & Whisnant, 2014)	Typically, traditional financing requires convincing investors and banks based on expected cash flows. This is often impossible when it comes to sustainability innovations.	Solutions to ecological and social problems often require third-party funding, but do not sufficiently attract mainstream investors or banks.	Mobilizing a network, usually online, to tap the financial resources of a mixed group of people and to circumvent traditional financiers such as banks. Forms of crowdfunding are e.g. donation-based, loan-based and equity-based.	Community Sourced Capital is an online marketplace that provides a platform for small businesses to source capital from members of their communities. Members finance part of a loan by buying a \$50 unit of the loan issued to the business.
P2.2	“Microfinance” (Clinton & Whisnant, 2014)	Traditional banks tend to decline loans to “base of the pyramid” and low-income groups because of high transaction costs and a lack of collateral and credit history.	“Base of the pyramid” and low-income groups lack access to financial services and thus financial literacy. They often just need small amounts of money to buy much-needed things or engage in local business.	Providing small loans and financial services to people without access to conventional banks. Microfinance is often provided through group-lending systems where group members act as guarantors for each other.	WaterCredit , an initiative launched by the non-profit Water.org, provides access to safe water and sanitation in developing countries by issuing microfinance loans for clean water and toilets for individual- and communal use.
P2.3	“Social Business Model: No dividends” (Michellini & Fiorentino, 2012)	“Base of the pyramid” and low-income groups, both in developed and developing countries, are often excluded from consumption possibilities due to price barriers or because offerings	Financially self-sustaining businesses are needed to offer products and services to “base of the pyramid” and low-income groups. These businesses should	Investors are entitled to get their money back. But profits are not distributed to them as these are reinvested to improve the product or service quality or to fund new social	Grameen-Veolia is a social joint venture with the purpose of bringing safe and affordable drinking water to Bangladesh’s rural population. The water supplier is set up as a self-sustaining, no-loss and no-dividends business.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)	Context	Problem	Solution	Example	
	for these groups do not exist.	not be geared towards the interests of investors as this can lead to “mission drift”.	businesses. Social target groups benefit from improved product and service quality and/or lower prices.		
G3 Ecodesign Patterns Patterns that integrate ecological aspects into key activities and value propositions, i.e. how processes and offerings are designed to improve their ecological performance over their entire life cycle.					
P3.1	“Hybrid model / Gap-exploiter model” (Planing, 2015)	There is a growing need of reducing the use of virgin, finite resources and diminishing waste and pollution, in particular when it comes to complex products that use critical resources such as rare earths.	To avoid early obsolescence and related resource wastage products must be built to last. But companies need an incentive to offer products that are sold less frequently.	Employing a hybrid model that combines a durable product and short-lived consumables. That is, selling a long-lasting device, such as a copier, and remanufacturing its short-lived parts, such as toner cartridges, where the company obtains revenues mainly from the consumables.	Epson’s EcoTank printer range is comprised of printers that are equipped with refillable ink tanks with a printing capacity of up to 50 ink cartridge sets, depending on the model. While these printers come with a hefty price tag, their ink tanks are not only more convenient and durable than regular ink cartridges, but also provide higher cost savings in terms of page yield.
P3.2	“Maximise material productivity and energy efficiency” (Bocken et al., 2014)	Because of increasing threats to human health and natural ecosystems there is a growing need of reducing the use of finite resources and diminishing waste and pollution.	Resource efficiency, including physical materials and energy, must be increased to save resources and reduce waste.	Seeking to improve resource efficiency, reduce waste and emissions through product and process redesign, such as lean manufacturing, eco-efficiency (Factor 4 and Natural Capitalism), and cleaner production.	To help achieve their “Mission Zero”, Interface developed “Microtuft”, a new carpet tile that uses 50% less yarn than conventional tiles. The company purchases raw materials that are recycled or bio-based and uses ultrasonic cutting equipment, which reduces excess trimmings and improves resource efficiency.
P3.3	“Product Design” (Kiørboe et al., 2015)	There is growing pressure on most industries to improve eco-efficiency and effectiveness in products; e.g. due to societal and political expectations for products that support a circular economy.	Product design based on a traditional, linear economy model does often not consider the whole product life cycle and can be ecologically harmful and inefficient.	Offering responsible and sustainable products that last, increase users' eco-efficiency, and are reusable, repairable, and/or recyclable. Risks in production and use are reduced, e.g. toxicity. This	Xella Denmark produces innovative Autoclaved Aerated Concrete blocks that are Cradle-to-Cradle certified. Throughout the entire life cycle of Xella’s products sustainability is a guiding principle, i.e. from raw material extraction to waste.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)	Context	Problem	Solution	Example
			allows replacing inefficient and harmful product designs.	
P3.4 “Substitute with renewables and natural processes” (Bocken et al., 2014)	Because of increasing threats to human health and natural ecosystems there is a growing need of reducing the use of finite resources and diminishing waste and pollution.	Industrial production inputs and processes often depend on finite resources, cause environmental harm, and are thus not resilient in the long-term.	Substituting finite and non-recyclable production inputs with renewable resources and designing processes based on nature-inspired principles, e.g. closing material and energy cycles.	Adnams , a British brewery, built a new distribution center using primarily low carbon materials with excellent insulating properties (e.g. lime and hemp) and also installed solar heating and rainwater recovery systems. The new production equipment is of high quality and efficiency – e.g. 90% of the heat produced in one brew is used to in the next brew.
G4 Closing-the-Loop Patterns Patterns that help integrate the idea of circular material and energy flows into partnerships, key activities, and customer channels, i.e. how materials and energy flow into, out of, and return to a company.				
P4.1 “Co-Product Generation” (Albino & Fraccascia, 2015)	In the current industrial economy, opportunities to leverage wasted and underutilized resources (e.g. materials, energy, capacities, assets) are overlooked as companies tend to focus on their main products only.	Unused surplus material, waste and production costs must be reduced, while new revenue sources are needed, e.g. to support the economics of a new kind of product.	Using the by-products from product generation as input for additional products that can be used by the company itself or sold on the market. This allows reducing waste, optimizing material flows, and increasing revenues.	British Sugar , the largest sugar producer in the UK, uses wastes from sugar production, such as residual resin and pulp, for the production of chemical products and animal feed, which are later sold on the market.
P4.2 “Industrial Symbiosis” (Beltramello et al., 2013)	In the current industrial economy, opportunities to leverage wasted and underutilized resources (e.g. materials, energy, capacities, assets) are often overlooked, partly because their potential cannot be exploited by single organizations.	Companies, industrial clusters and municipalities need to optimize and reduce their material and energy streams and associated costs.	Employing a shared or cascaded use of resources, by-products, and waste materials among different actors on a commercial basis. Establishing inter-firm exchanges and linkages driven by the need to reduce virgin inputs, waste, and costs. This allows reducing waste and optimizing material flows among multiple organizations.	Industrial symbiosis of Kalundborg in Denmark , where several industrial actors exploit each other’s by-products, surplus and waste materials on a commercial basis, including energy and water exchanges.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)		Context	Problem	Solution	Example
P4.3	<p>“Online Waste Exchange Platform”</p> <p>(Albino & Fraccascia, 2015)</p>	In the current industrial economy, opportunities to leverage wasted and underutilized resources (e.g. materials, energy) are often overlooked, partly because their potential cannot be exploited by single organizations. Connecting waste producers and users becomes crucial.	A lot of what is labeled “waste” can still be useful for some producers. But useful waste has to be offered by one partner while it has to be identified by another.	Creating an electronic marketplace for waste that matches supply and demand, enabling the exchange of waste between actors and retaining the value contained in materials. Companies providing such services gain earnings from commissions on transactions.	smileexchange.ie is a free online platform where resource exchanges between members are facilitated through technical assistance, in order to increase cost savings, reduce waste going to landfill and to create new business opportunities.
P4.4	<p>“Product Recycling”</p> <p>(Planing, 2015)</p>	There is a growing need of reducing the use of virgin, finite resources and diminishing waste and pollution. There is also a need to look for new input sources due to increasing resource scarcities.	Much of the value that is still contained in product materials is lost after the use phase.	Recycling used products in such a way that their base materials are recovered and most of their embodied value (energy, labor, financial capital) is retained. This allows gaining access to resources and retaining the value contained in materials.	Bionic Yarn , a New York-based company that makes fibers out of materials such as plastic bottles and recovered ocean plastic that can be used to make clothing, e.g. G-STAR RAW’s “Raw for the Oceans” Fall/Winter 2015 collection.
P4.5	<p>“Remanufacturing / Next Life Sales”</p> <p>(Planing, 2015)</p>	There is a growing need of reducing the use of virgin, finite resources and diminishing waste and pollution. Products that have been used often still have use value for others, but in some cases they need to be completely overhauled or even decomposed and re-manufactured.	Much of the value that is still contained in products after their “first life” is often lost after they have been used.	Used products flow (back) to a manufacturer who repairs or replaces product components, incl. cosmetic updates (refurbishment), or disassembles products to reuse their components in “as new” products (remanufacturing). This allows retaining the value contained in products and creating new revenue sources.	Apple Certified Refurbished Macs are likely to be returned or reconditioned models. The returned unit may have been faulty (and fixed) or may have been returned under the standard sale-and-returns procedure. All refurbished Macs are cleaned, checked, tested and visually indistinguishable from brand new models and come with a one-year warranty.
P4.6	<p>“Repair”</p>	There is a growing need of reducing the use of virgin, finite resources and	Much of the value that is still contained in products is lost after	Products remain the customer’s property, but broken or used products are	Agito Medical offers service contracts on CT and MRI equipment, such as delivering spare parts, engineering and maintenance services.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)		Context	Problem	Solution	Example
	(Kiørboe et al., 2015)	diminishing waste and pollution, in particular when products have the potential to be repaired or maintained.	they have been used when they cannot be repaired or maintained.	repaired and/or maintained by a service provider. The same products are used again and longer, and the value they contain is retained.	Thereby equipment may be repaired and upgraded, rather than replaced. The flexibility of these services secures a maximum possible uptime of the equipment, and prolongs the lifespan of the entire system.
P4.7	“Reuse” (Kiørboe et al., 2015)	There is a growing need of reducing the use of virgin, finite resources and diminishing waste and pollution. Products that have been used often still have use value for others, in particular when they are still working.	Much of the value that is still contained in products after their “first life” is lost after they have been used.	Used products flow (back) to a service provider and/or distributor, either directly or via an intermediary, and are then resold, maybe in slightly enhanced form. This allows retaining the value contained in products and creating new revenue sources.	Godsinlösen redistributes damaged, insured goods. Godsinlösen retrieves damaged goods from policyholders and ensures that they are handled, by being reused or recycled, as effective and transparent as possible in line with environmental standards.
P4.8	“Take Back Management” (Bisgaard et al., 2012)	Because of increasing threats to human health and natural ecosystems there is a growing need of reducing the use of virgin, finite resources and diminishing waste and pollution. Managing take back systems for products, parts or base materials can support circular economy models.	Waste management and waste handling costs need to be optimized to create ecological and economic benefits.	Implementing channels and management systems to recover products or parts from customers and distributors. This allows bringing back products or parts to manufacturers.	Desso , a Dutch manufacturer of carpets, carpet tiles and artificial grass, developed its own “Take Back Programme” to take back and recycle old carpets from customers and non-customers to make new carpets.
P4.9	“Upgrading” (Planing, 2015)	Fast-moving markets and technological developments lead to shorter product life with regard to actuality of version, aesthetics etc.	Despite having past their “first life”, outdated or obsolete products often function properly and contain valuable elements that should not be wasted.	Replacing outdated components that are part of products in use with technologically superior or updated components. This allows using working products as long as possible.	The Fairphone is built to last by combining a modular architecture with the possibility of repair. Affordable spare parts and free tutorials are offered to facilitate phone repair. Plus, its source code is provided to extend the lifetime of the software.

G5 Supply Chain Patterns

Patterns that modify the upstream (partners, resources, capabilities) and/or downstream (customers, relationships, channels) components of a business model, i.e. how inputs are sourced and target groups are reached.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)		Context	Problem	Solution	Example
P5.1	“Green Supply Chain Management” (Bisgaard et al., 2012)	There is growing pressure on companies to be more transparent and efficient, e.g. in terms of using natural resources and avoiding risks and harms to their supply chain partners and customers.	The efficiency and transparency of supply chains needs to be improved, inter alia to mitigate ecological and social risks. Companies must reduce the use of non-sustainable materials and find ways to substitute risky inputs, source and reuse waste and surplus materials.	Sourcing raw inputs and components in the most eco-friendly way possible and reducing or even eliminating toxic inputs. Suppliers are urged to commit to green supply chain management. Partners and networks are crucial for green supply chains.	IKEA has developed the “IKEA Way on Purchasing Products, Materials and Services” (IWAY) as a supplier code of conduct. IKEA has systemized and formalized social and environmental standards, which are to be met in the sourcing of raw materials and core services throughout the entire company. This has resulted e.g. in reduced use of toxic chemicals.
P5.2	“Inclusive Sourcing” (Clinton & Whisnant, 2014)	A lack of attention to the livelihood of local suppliers by large corporations can often result in a decline in both economic and social value.	Disruptions in the supply chain and reputational damage can occur when companies ignore the welfare of local suppliers affected by their business operations.	Integrating local, low-income or less skilled suppliers into the supply chains of existing for-profit companies. This can require providing financial support and training opportunities to develop local suppliers’ capabilities.	Woolworths South Africa sources directly from local farmers, as well as provides credit and training in crop selection and sustainable farming, driven by the goal to be more independent from global supply chains, strengthen local farming and improve local economies.
P5.3	“Micro Distribution and Retail” (Jenkins et al., 2011)	“Base of the pyramid” and low-income consumers tend to make small, but frequent purchases. These customers are often not reached by major suppliers, both in terms of outlets and product or service formats.	Local retail outlets in “base of the pyramid” and low-income areas often underperform because they lack the capacities to accommodate the purchasing habits of their customer base.	Offering products and services that match customers’ cash-flows (e.g., small-sized product units) and employing specialized, independent distributors. This can require strengthening existing retail outlets and delivery channels through training and financing partners as local vendors.	Zain in Madagascar offers shared phone services to those unable to afford their own handsets, through existing retail outlets that are part of the “Village Phone Program”.
P5.4	“Physical to Virtual”	Green and social start-ups need less costly and scalable distribution systems. As	The physical systems needed to distribute products, such as classic	Introducing virtual customer relationships and channels, and only a few or no retail	Sungevity , a residential solar installation and financing company, developed a scalable online sales model where customers get a price quote

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)		Context	Problem	Solution	Example
	(Clinton & Whisnant, 2014)	customers become comfortable with online shopping, switching from brick and mortar to virtual channels becomes an option.	shops, are often expensive, resource-intensive, and hardly scalable.	outposts. Making use of third-party platforms, e.g. “shop-in-shop” models. This allows increasing resource efficiency and scalability of product distribution	within 24 hours. Remote engineers design the solar systems using satellite imagery.
P5.5	“Produce on Demand” (Clinton & Whisnant, 2014)	Aligning supply and demand is particularly challenging for new types of offerings, which can result in excess material in the production cycle and inefficient use of scarce financial resources.	Overproduction that results in inefficient resource use and/or a lack of financial resources to produce stocks of products.	Producing a product only when consumer demand is verified, e.g. via online platforms that allow customers to place pre-orders, to vote on preferred products or even to design their own products. This allows reducing overproduction and inefficient use of resources.	To determine whether there is sufficient customer demand for the Tesla Model 3 to begin production, future Model 3 owners were asked to reserve a vehicle by making a deposit of \$1,000.
P5.6	“Shorter Supply Chains” (The Crowd & Fishburn, 2014)	There is growing pressure on companies to be more transparent and efficient, e.g. in terms of using natural resources and avoiding risks and harms to their supply chain partners and customers.	The efficiency and transparency of supply chains needs to be improved, inter alia to mitigate ecological and social risks. For greater transparency, the traceability of resources and products must be improved.	Reducing the length and complexity of supply chains, e.g. spatially, through less and closer partner and customer relationships. Improving transparency, e.g. by reducing the number of connections or knowledge sharing with suppliers.	McDonalds is committed to “Good Sourcing”, meaning that the company works directly with its suppliers who, in their words, are committed to sustainable supply chain management and compliance, i.e. requirements for ethics, environmental responsibility and economic viability.
G6 Giving Patterns					
Patterns that help donate products or services to target groups in need, i.e. how costs are covered and social target groups are reached.					
P6.1	“Buy One, Give One” (Clinton & Whisnant, 2014)	“Base of the pyramid” and low-income groups, in both developed and developing countries, are often excluded from particular forms of consumption due to price barriers or because markets for these groups do	Some social target groups need a product or service but lack access to it or cannot afford to buy it.	Donating goods or services in a fixed ratio to regular sales. Costs can be covered by regular sales revenues, third-party donations or social investors.	2 Degrees sells nutrition bars directly to consumers and through retail outlets. For every 2 Degrees bar purchased, the company provides a meal to a hungry child. The company does this by forming partnerships with nonprofit organizations that provide food assistance e.g. through health clinics, schools, and community groups.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)	Context	Problem	Solution	Example
	often not exist.			
P6.2 “Commercially Utilized Social Mission” (Dohrmann et al., 2015)	Some social groups are excluded from consumption possibilities due to price barriers or because offerings for these groups do not exist.	A social target group may wish to use a product or service, but is not willing or able to pay for it.	Offering a product or service for free to a social target group while earning revenues from commercial customers, e.g. based on the information generated by the social target group.	co2online offers free online tools to help users track and reduce their energy consumption, costs, and CO ₂ emissions. Based on the generated information about users’ energy consumption, co2online offers commercial services such as customized market studies.
G7 Access Provision Patterns				
Patterns that create markets for otherwise neglected target groups, involving modified value propositions, channels, revenue, pricing and cost models, i.e. how value propositions are designed, delivered, and to whom.				
P7.1 “Building a Marketplace” (Clinton & Whisnant, 2014)	“Base of the pyramid” and low-income groups, in both developed and developing countries, are often excluded from particular forms of consumption due to price barriers or because markets for these groups do often not exist.	Customers need a product or service, but lack access, or cannot afford it. Markets are only insufficiently developed.	Creating a new marketing system for otherwise neglected customer segments, by building new customer relationships, distribution channels, and revenue models. This allows offering products and services that take into account the needs of social target groups and their varying education and income levels.	Novartis’ Arogya Parivar , a multi-national pharma company, combined education and sales efforts to create a for-profit initiative to improve health outcomes for poor, rural communities in India. Arogya Parivar employs health educators to create faith in medicine. Accompanying supervisors educate doctors and pharmacies and assess local needs. Where necessary, Novartis seeks local partners to build up capacity.
P7.2 “e-Transaction Platforms” (Jenkins et al., 2011)	Approximately 3.5 billion people worldwide lack access to financial services because institutions face high transaction costs and complex logistics to reach the poor, especially in remote areas, due to the cumbersome nature of securely transporting and distributing cash. Providers of other goods and services that require distribution	High transaction costs and complex logistics hinder safe payment and distribution of products and services to “base of the pyramid” and low-income groups, especially in developing countries and remote areas. Often, these groups lack access to basic financial services.	Offering cashless accounts and payment systems to social target groups without bank access. These accounts are used in combination with e-transaction platforms that enable transactions between product and service providers and customers.	FINO offers, among other services, biometric smart card-based electronic wallets for 23 million customers to receive and spend social benefits distributed by the government of India.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)	Context	Problem	Solution	Example
	infrastructure and payment mechanisms share this challenge.			
P7.3 “Experience-Based Customer Credit” (Jenkins et al., 2011)	Traditional banks tend to decline loans to “base of the pyramid” and low-income groups because of high transaction costs and a lack of collateral and credit history.	“Base of the pyramid” and low-income groups lack access to financial services and thus financial literacy. They often just need small amounts of money to buy much-needed things or engage in local business.	Providing access to credit (as a non-bank) based on former experience with the customer, instead of formal bank applications. Lending is not based on a customer’s credit history, but on other transactions in the past.	Promigas , a natural gas utility in Colombia, issues credit for renovations and housing appliances to homeowners, only if those homeowners have paid off their connection fees.
P7.4 “Last-Mile Grid Utilities” (Jenkins et al., 2011)	Some people are not connected to basic supplies because they live in remote areas with a lack of infrastructures, or belong to the “base of the pyramid” and low-income groups.	“Base of the pyramid” and low-income groups often lack access to basic supplies because they live in remote areas, cannot afford the services, and because of high default risks and transaction costs.	Providing basic supplies through extended grid coverage and bundling financing (e.g., tiered pricing), technology (e.g., smart metering), and customer service (e.g., maintenance) to minimize technical and commercial losses and ensure that customers are paying.	Manila Water in the Philippines is experimenting with stand-alone water systems that provide communities outside its network area with clean, affordable water. Partners, usually local governments, operate these systems and customers pay their bills at local shops—with the balances transferred to the company via mobile banking.
P7.5 “Value-for-Money Degrees” (Jenkins et al., 2011)	The costs for higher education, e.g. university degrees, can consume a considerable share of a families’ income. Higher education is essential for professional careers, but “base of the pyramid” and low-income groups often do not have access to higher education.	“Base of the pyramid” and low-income groups often do not have access to higher education, because they are not able to pay for it, have to work full-time, do not believe in the added value of studies, or because universities are far away.	Providing access to higher education to everyone, including those with low income, by making higher education affordable. E.g. through standardized and modular curricula, hiring part-time instructors, on-site and distance learning, offering flexible financing options.	Uniminuto , an educational institution in Colombia, offers professional and technical training to low- and middle income students both on-site and online at affordable rates. Uniminuto, for instance, rents or shares buildings with other educational institutions to keep its tuition prices low.
P7.6 “Value-for-Money Housing”	A home is the biggest investment most people	Lower-income earners face both financial and	Offering affordable home ownership by bundling high	VINTE , a Mexican developer, sells homes in multi-unit buildings starting at \$23,000 for 42

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)	Context	Problem	Solution	Example	
(Jenkins et al., 2011)	ever make and they have to be convinced it is worth the commitment, which can feel risky. Lower-income groups are often not able to invest in own homes and build up capital and financial security.	educational barriers to buying a flat or house. They often do not have the financial means and they often lack the capabilities to navigate the financing process.	value for money homes (e.g., efficient design), facilitating access to financing (e.g., third-party financing), and customer support (e.g., customer training).	square meters, including a kitchen, joint living-dining space, two bedrooms and one bathroom. The homes are designed to reduce gas bills by 75%. Some buildings have rooftop solar cells to lower electricity costs.	
G8 Social Mission Patterns Patterns that integrate social target groups in need, including otherwise neglected groups, either as customers or productive partners, i.e. how customers, partners, and employees are defined and integrated.					
P8.1	“Expertise Broker” (Zeyen et al., 2014)	Some social groups are denied help or sidelined because of a lack of understanding for their particular situation.	Some social target groups lack information that is needed to improve their situation, e.g. in terms of self-help or acceptance.	Accumulating problem-specific know-how as a resource. This know-how is derived from affected persons’ experiences and is used to educate, train, and help social target groups.	Väter (German for fathers) aims at improving the acceptance of fathers staying at home to care for their children. Väter provides services based on knowledge acquired by collaborating with fathers. Services include corporate training courses on work-life balance and online networking for fathers.
P8.2	“Market-Oriented Social Mission” (Dohrmann et al., 2015)	Some social groups are not able to engage as productive workforce, although they wish to, e.g. because of a lack of skills or labor markets for these groups do not exist.	A social target group may wish to engage in production processes, i.e., engage in a productive way, but does not have access to suitable jobs.	Offering opportunities to excluded social target groups to engage as productive and paid workforce. They can help in generating market revenues. Training and capability development might be required.	Fifteen , a social enterprise started by British celebrity chef Jamie Oliver, involves several top class restaurants that provide training and full-time positions (upon completion) to disadvantaged young people. Part of the restaurants’ profits is used to fund the training.
P8.3	“One-Sided Social Mission” (Dohrmann et al., 2015)	“Base of the pyramid” and low-income groups are often excluded from particular forms of consumption due to price barriers or because markets for these groups do not exist.	A social target group is interested in a product or service, but is not able to pay for it.* *The problem can also be found on the production side. In this case, this pattern would be about a social target	Launching a dedicated project/organization aimed at satisfying the consumption need of a target group that does not have sufficient funds to pay for a product or service. The social mission is largely funded by social investors and supported by	Arbeiterkind (‘Working-class Child’) is a mentoring network and information platform that helps young adults with working class background to overcome barriers such as financial concerns to pursue a university degree. This venture to fight social segregation in the German academic system is supported by volunteers, donations and governmental funds.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)	Context	Problem	Solution	Example
		group on the production side.	volunteers.	
P8.4 “Social Business Model: Empowerment” (Michellini & Fiorentino, 2012)	“Base of the pyramid” and low-income groups, both in developed and developing countries, are often excluded from business and income opportunities due to a lack of skills and business organizations dedicated to these groups.	Income opportunities and business skills must be improved among “base of the pyramid” and low-income groups to alleviate poverty and improve their socio-economic situation.	Launching an enterprise owned and run by the social target group to generate market-based revenues and even make profits. The social target group benefits from income and business opportunities.	Grameen Bank is a formal bank that is owned to 94 percent by the poor, mostly female borrowers of the bank, and it serves them exclusively. The remaining six percent is owned by the government.
P8.5 “Two-Sided Social Mission” (Dohrmann et al., 2015)	Two-sided platforms are an effective means to match suppliers and users of products and services. This approach is not only applicable to traditional online platforms such as search engines, but also to social businesses.	A social target group is interested in a product or service, but is not able to pay for it, while a second group is looking for possibilities to engage in a productive and meaningful way.	Offering a platform, maybe third party-funded, to match two social target groups, one on the production and one on the consumption side. The group on the production side offers free production support for the consuming social target group.	Was hab’ ich? (‘What do I have?’) is an online interactive platform, where medical students translate diagnostic findings for patients in laymen’s terms and exchange knowledge and learning opportunities with fellow medical students and doctors.
G9 Service & Performance Patterns Patterns that emphasize the functional and service value of products and that offer performance management, i.e. how value propositions are defined and delivered.				
P9.1 “Pay for Success” (Clinton & Whisnant, 2014)	The development of new products or services to solve fundamental ecological or social problems, such as investing in a new drug, can be too risky for clients to do it based on their own resources.	Clients face the risk of insufficient or adverse outcomes of a product, service or process, which could lead to an inefficient use of their own limited resources.	Employing success-based contracting, usually between providers of a new product or service and the client, in which payments depend on meeting a pre-defined success level.	The NYC ABLE Project for Incarcerated Youth: Adolescent Behavioral Learning Experience (ABLE) Program launched by the New York City Department of Correction aims to reduce the re-incarceration rate by at least 10 percent among youths at Rikers Island through an evidence-based intervention program targeted at improving personal responsibility and decision-making. If the program fails to meet its goal, New York City government is not required to provide funding to MDRC, the non-profit overseeing the project.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)		Context	Problem	Solution	Example
P9.2	<p>“Product-oriented Services”</p> <p>(Planing, 2015)</p>	Replacing established and/or complex products, or technologies in a broader sense, is challenging due to several barriers to their diffusion. In particular providers of eco-friendly technologies have to find ways to make their offerings attractive.	New or complex products often come with additional services, such as maintenance or updates. In some cases, these additional services can be crucial to convince users to switch from old and inefficient products to new, more eco-friendly versions.	The business model is still mainly geared towards sales of products, but some extra services are added. The product is usually owned by the customer. Customers pay for the product and product-related services offered by the provider.	Tesla sells e-mobiles as products owned by individual customers. The company also offers the charging infrastructure, where the revenue model is currently changing from free to paid charging. Further services include “over-the-air software” updates that add new features and functionality to the cars.
P9.3	<p>“Result-oriented Services”</p> <p>(Planing, 2015)</p>	Replacing established and/or complex products, or technologies in a broader sense, is challenging due to several barriers to their diffusion. In particular providers of eco-friendly technologies have to find ways to make their offerings attractive.	Switching from old, often inefficient products can be complicated and expensive for users. They are thus not willing or able to invest in new, more efficient products, or technologies in a broader sense. In some cases, this can inhibit switching from old and inefficient products to new, more eco-friendly versions.	The client and provider in principle agree on a result, and there is no pre-determined product involved. The service provider owns the product and is responsible for its use. This creates more accountability within the broader system for product disposal, and higher likelihood of product repair, reuse and recycling. The customer pays for an outcome and not for buying or using a particular product.	Xerox introduced “pay per print” solutions that have been followed by most copier producers. Pay per print means that the customer pays per print, while the copier producer takes over all activities needed to perform the copying or printing functions, including paper, toner, maintenance, repair and replacement of parts or whole copiers if necessary.
P9.4	<p>“Use-oriented Services”</p> <p>(Tukker, 2004)</p>	Replacing established and/or complex products, or technologies in a broader sense, is challenging due to several barriers to their diffusion. In particular providers of eco-friendly technologies have to find ways to make their offerings	Using a new or complex product, or technology in a broader sense, can be challenging for users and they might need support to use and maintain it properly. In some cases, this can inhibit switching from	The traditional product still plays a central role, but the business model is not geared towards selling products. The product usually stays in ownership with the provider and can be shared by a number of users. Customers pay e.g. a	Rolls Royce plc offers maintenance and other services around the aircraft turbines they provide to airlines (“Power by the hour”). Instead of charging per turbine sold, Rolls Royce uses a total care model focused on achieving outcomes for customers. Customers pay a service fee that includes the turbines, maintenance, and further services.

Appendix to [Lüdeke-Freund et al., 2018](#) – Detailed description of SBM patterns and groups

Business model pattern (source)	Context	Problem	Solution	Example
	attractive.	old and inefficient products to new, more eco-friendly versions.	leasing, renting or service fee for the use and performance of a particular product.	
G10 Cooperative Patterns Patterns that integrate a broad range of stakeholders as co-owners and co-managers, how partners are defined and how the organization is governed.				
P10.1 (Clinton & Whisnant, 2014)	“Cooperative Ownership” In today’s business world, the shareholder model is still the norm and managers’ main responsibility is to meet the expectations of shareholders without giving equal weight to other stakeholders’ interests.	As most businesses focus on meeting shareholder expectations, they do not feel accountable for the effects of their activities on other stakeholders. Stakeholders other than shareholders do not benefit equally from businesses’ value creation.	The cooperative model follows a multi-stakeholder approach and is therefore owned and managed by cooperative members. Members can be retail consumers, users of services, employees, suppliers, or the local community, for example.	Ocean Spray is an American agricultural cooperative that is owned and operated by 750 cranberry and grapefruit growers. Ocean has annual revenues of \$2 billion; the cooperative’s members are the only shareholders.
G11 Community Platform Patterns Patterns that substitute resource or product ownership with community-based access to resources and products, how value propositions are defined and delivered.				
P11.1 (FORA, 2010)	“Sharing Business” When a product or other asset is not used very often, when it is expensive or not fully proven (e.g., e-mobiles), many consumers are not willing to purchase it. Individual and exclusive ownership also means that more resources must be used to satisfy consumers’ needs.	Private ownership of products results in direct risks, liabilities, and high costs for product users, as well as high levels of resource consumption. Private ownership can also inhibit efficient use of products and other assets.	Sharing, or collaborative consumption, is about matching the supplier side of a platform with the demand side of that platform. The product is shared among a number of users, whenever the individual user needs access to the product. Sharing models have in common that the consumer does not pay for buying a product but only for using it.	Turo (formerly RelayRides) operates a peer-to-peer car sharing marketplace. Private car owners can rent out their vehicles via Turo’s online platform and thus increase the usage of their vehicles while earning money.