
An Approach for Developing and Assessing Sustainable Business Models

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ABSTRACT

With sustainability becoming an increasingly important factor in a globalized world, there is an increasing demand for ways to systematically incorporate sustainable activities into companies. Representing the value creation logic of a company, business models play an important role in this development. In this paper we suggest an approach to support organizations in developing and evaluating sustainability aspects in their business model by helping select appropriate measures as well as considering assessment indicators that help evaluate their successful implementation.

Keywords: Sustainable business model, Business sustainability, Sustainability assessment, Business model innovation

INTRODUCTION

The traditional understanding of successful business models often focuses on creating the highest possible profits, using available resources in the shortest possible time. In times of fully globalized economy and competition, growth from traditional business models is often achieved at the expense of social and environmental factors, such as hazardous working conditions or the exploitation of natural resources (Ahrend, 2016). Sustainable business models (SBM), however, aim to achieve long-term economic growth while at the same time meeting ecological and social requirements, such as consciously using water, energy and finite raw materials as well as humane and dignified working conditions.

Often, the genuine pursuit of sustainable activities in companies is associated with social responsibility or philanthropic considerations. However, current research shows strong links between ESG (Environmental, Social, Governance) Issues performance and long-term resilience, which shows that sustainability is not only a social responsibility, but also a value creation factor (Ahrend, 2016), hence affecting an organization's business model.

A business model represents the core logic of a company that describes which values are created for whom ('value proposition'), how these values are being delivered ('value creation') and how customer relationships can be converted into profit ('value capture') (Neuhüttler et al. 2020). In this paper we suggest an approach to support organisations in developing and evaluating sustainability aspects in their business model by providing a tool to help select appropriate activities.

Based on literature research, we have identified a comprehensive number of measures and assessment indicators that have been structured and assigned to the respective dimensions of a business model, as well as indicating their affiliation to ecological, economical, or social characteristics. In this paper we will also discuss the definition of sustainable business models and suggest requirements that have to be met in order to be considered sustainable.

WHAT MAKES BUSINESS MODELS SUSTAINABLE?

Business models represent the main and relevant activities of the value creation of companies (Paiva & Carvalho, 2020; Wirtz et al., 2016). The division of the business model concept into three core dimensions - value proposition, value creation and value capture - can be used to characterize sustainable business models: For a business model to be considered sustainable, at least two of the three dimensions should be designed in a sustainable way (Bocken et al., 2014; Boons et al., 2013; Cosenz et al., 2020).

In management literature, the concept of sustainability is closely linked to business models and innovation (Boons & Lüdeke-Freund, 2013). Designing sustainable business models are a subtopic of business models literature that aims to contribute to the natural environment and social cohesion in addition to long-term economic value (Ahrend, 2016). For implementation, they follow a triple bottom line approach with economic, social and environmental objectives and take into account a wide range of stakeholder interests (Belz & Binder, 2017; Boons & Lüdeke-Freund, 2013; Dyllick & Muff, 2016). In this respect, they should fulfil economic, environmental and social objectives better than other business models and be a key driver in shaping lasting competitive advantages (Bocken et al., 2014; Boons et al., 2013). Sustainable business models include not only customer benefits, resource transformation and exchange relationships with customers and partners, but also concrete approaches to achieving ecological and social benefits. They aim at economic value contributions as well as ecological and social added values (Cosenz et al., 2020).

This means that sustainability becomes an integral part of the core business as opposed to being implemented in the form of isolated activities (D'heur, 2014). Moreover, the further integration of sustainability aspects into the overall business model takes a broad perspective on strategy design and the related organisational dynamics that determine the success (or failure) of organisations (Cosenz et al., 2020). Figure 1 shows the link between the three business model dimensions, the sustainability goals and the elements to be considered.

The **value proposition** does not only consist of the specific product or service, but it also includes all valuable exchanges and relationships between the company and its customers. According to Boons et al. (2013) a special strength of sustainable business models lies in the balance between economic, social and ecological dimensions of a value proposition. This entails the examination of consumers wants and needs, which could be fulfilled i.e. by the specific function of the product or service offered.

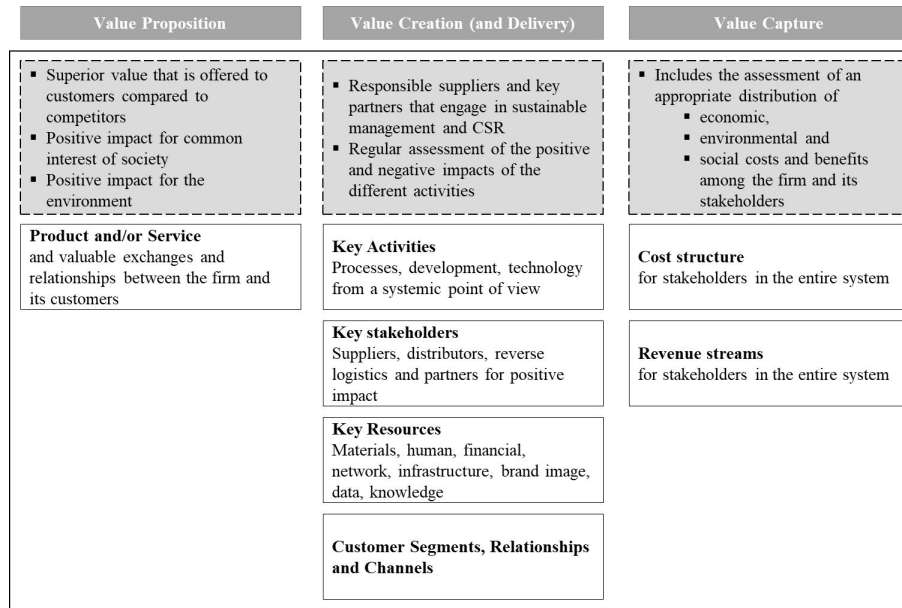


Figure 1: Sustainable business model dimensions (Bocken et al., 2018; Osterwalder & Pigneur, 2010).

The **value creation (and delivery)** comprises all essential activities of the company (Boons et al., 2013). This includes the management of resources, partners, the network, the customer interface, and the supply chain. In order to achieve sustainable business models, it is especially important to regularly assess the positive and negative impacts on society and the environment of the different activities and of the whole supply chain as well as the activities of key partners (D’heur, 2014). The supply chain is according to Boons et al. (2013) one of the essential parts of this larger activity system. Especially in sustainable business models it needs to consist of suppliers and key partners that take responsibility towards their stakeholders and engage in sustainable management, which includes recycling or reuse of materials and paying fair wages. A key principle can be seen in not shifting own socio-ecological burdens to suppliers (Boons & Lüdeke-Freund, 2013, p. 13).

Value capture reflects the distribution of revenues and costs and what reciprocal values a company can achieve from its activities. In sustainable business models this also includes the appropriate distribution of economic, environmental and social costs and benefits among the firm and its stakeholders as well as non-monetary revenues (Bocken et al., 2018; Boons & Lüdeke-Freund, 2013).

APPROACH TO SUPPORT DEVELOPMENT AND EVALUATION OF SBM

In order to not only characterize sustainable business models, but also to be able to systematically develop, evaluate and control them, suitable activities

as well as indicators to measure and evaluate the current state and develop future goals are required to assess sustainability and performance.

In literature there already exists a wide range of sustainability criteria and KPI lists (c.f. Ahrend, 2016). A good starting point for the development of a catalogue of measures for the development and evaluation of sustainable business models are the EFFAS criteria and ESG dimensions collected by Niemöller et al. (2015). Our catalogue of measures builds on these, extends them and structures them for application in the context of business models.

Furthermore, the measures were selected based on two main requirements: they had to explicitly contribute to sustainable dimensions on an ecological, economical, and/or social level and be able to be assigned to either one of the three main dimensions of a business model (Value Proposition, Value Capture, Value Creation and Delivery). In addition, the measures should be precise enough to enable fast definition of steps for implementation, but at the same time broad enough to be used across sectors and industries. Figure 2 shows the resulting catalogue of measures.

The following key questions can help organizations with the selection of appropriate measures for each individual business model development or evaluation process (Deutsches Institut für Normung e.V, 2015):

- Which measures will affect the process of providing the service or product?
- Will internal and external stakeholders (e.g. employees, shareholders, general public) be affected by the measure and relate it to the service or product?

To help track and evaluate the selected measures, assessability must be ensured. Therefore, within the extensive list of categories in which sustainable activities can take place, possible (yet not exhaustive) parameters to help assess the success of the measures have been assigned. Figure 3 shows an exemplary list of indicators for the measure “Ensure reusability and resellability of products”.

This approach can support companies both in assessing their own business model with regard to sustainability aspects and in introducing meaningful measures that inevitably affect the core business. Also, when thinking about developing new business models, it helps to systematically incorporate sustainability into the core logic of a business. Additionally, this approach can help to assess the total scope of sustainability within an organization. While there do exist gradual distinctions on business sustainability (Dyllick & Muff, 2016), it remains unclear as to when a business model is truly sustainable. With our definition, a sustainable business model must address as a minimum requirement all three sustainability dimensions while at the same time addressing at least two of the three business model dimensions. Following this logic, a business model is most sustainable, when activities from each field of the matrix have been successfully incorporated by an organization.

CONCLUSION AND OUTLOOK

Sustainability is often implemented by companies in the form of isolated activities that do not necessarily affect the core business. With this paper

	Ecological	Economical	Social
Value Proposition	<ul style="list-style-type: none"> Products & Services fulfill certified ecofriendly standards Use of recycled materials in production Ensure reusability & resellability of products Enhance product longevity 	<ul style="list-style-type: none"> Ensure reusability and resellability of products Improvement of product energy efficiency Possibility of disassembly of products Expandability of products Ensure serviceability to enhance product lifecycle Enhance product longevity 	<ul style="list-style-type: none"> Using open source elements Products and services promote collaborative and/or shared consumption Ensure product benefits for society
Value Creation & Delivery	<ul style="list-style-type: none"> Monitoring environmental standards of suppliers & customers Minimization of waste in production Reduction of Greenhouse Gas emissions Reduction of emissions to water Use of renewable energies Avoiding product packaging or making it sustainable Savings in water consumption Environmentally friendly infrastructure & buildings Short delivery & transport routes Use of recycled materials in production 	<ul style="list-style-type: none"> Reduction of Energy Consumption Enhance own electricity production Securing the supply of resources Favour short delivery & transport routes Establish long-term customer and partner relationships Reduction of supply and delivery stages Efficient orchestration of suppliers 	<ul style="list-style-type: none"> Monitoring social standards of suppliers & customers Install long-term incentive systems for employees Promote diversity in the workspace Ensure occupational safety Provide family friendly workspace Commitment against child labour Ensure fair income distribution
Value Capture	<ul style="list-style-type: none"> Support Climate, ecosystem & biodiversity protection Reduce resource input to save costs 	<ul style="list-style-type: none"> Increase research expenditures to enhance sustainability Obtain Additional revenues from residual values Hold financial Instruments in accordance with ESG Criteria Reduced expenditures for mitigation activities Achieve revenues from services 	<ul style="list-style-type: none"> Prevent Corruption & Bribery Donations to charitable causes Free distribution of products and services

Figure 2: Catalogue of measures to develop and evaluate sustainable business models based on Niemöller et al. (2015), EFFAS (2010) and Geissdoerfer et al. (2020).

we intent to provide companies with a systematic approach to think about sustainability as part of the value creation logic. The approach and thoughts presented in this paper are the result of extensive research and integration of various sources. It does not represent a completed state of research and will be subject to further refinement and testing.

In the long term, the work performed in this paper aims to help building a methodology that supports companies in assessing their sustainability at the level of their value creation logic. We suggest that different methodological approaches will have to be applied when developing a new business model from scratch as opposed to refining a business model surrounding existing products or services.

For the development of new sustainable business models, existing patterns and archetypes (Bocken et al., 2014) could help to provide inspiration and

Measure	Assessment indicators
Ensure reusability and resellability of products	Percentage of total product output in terms of revenue eligible for remanufacture or re-conditioning processes
	Percentage of total product output in terms of revenue which is reused in the manufacturing process, sold or donated to third parties
	Degree to which products (on average) can be recycled calculated as a percentage of all materials used
	Number of units of products, containers, packages or parts of products returned to company for recycling in tonnes in relation to total output of units in tonnes p.a.
	Degree to which products (on average) can be recycled calculated as a percentage of all associated material costs

Figure 3: Possible parameters to help measure sustainability based on EFFAS (2010), Deutsches Institut für Normung e.V. (2015) and global sustainability standards board (2021).

drive the process of developing ideas, while balanced scorecards (e. g. Figge et al., 2002) could help keeping record of the current state and the desired outcome of sustainability activities within a company. However, the selection of suitable and goal-oriented activities to support sustainability are vital steps for both objectives and the key outcome of this work.

REFERENCES

- Ahrend, K.-M. (2016). *Geschäftsmodell Nachhaltigkeit*. Springer Berlin Heidelberg. <https://doi.org/10.1007/978-3-662-52880-8>
- Belz, F. M., & Binder, J. K. (2017). Sustainable Entrepreneurship: A Convergent Process Model. *Business Strategy and the Environment*, 26(1), 1–17. <https://doi.org/10.1002/bse.1887>
- Bocken, N., Schuit, C., & Kraaijenhagen, C. (2018). Experimenting with a circular business model: Lessons from eight cases. *Environmental Innovation and Societal Transitions*, 28, 79–95. <https://doi.org/10.1016/j.eist.2018.02.001>
- Bocken, N., Short, S. W., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, 65, 42–56. <https://doi.org/10.1016/j.jclepro.2013.11.039>
- Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 45, 9–19. <https://doi.org/10.1016/j.jclepro.2012.07.007>
- Boons, F., Montalvo, C., Quist, J., & Wagner, M. (2013). Sustainable innovation, business models and economic performance: an overview. *Journal of Cleaner Production*, 45, 1–8. <https://doi.org/10.1016/j.jclepro.2012.08.013>
- Cosenz, F., Rodrigues, V. P., & Rosati, F. (2020). Dynamic business modeling for sustainability: Exploring a system dynamics perspective to develop sustainable business models. *Business Strategy and the Environment*, 29(2), 651–664. <https://doi.org/10.1002/bse.2395>

- D'heur, M. (2014). shared.value.chain: Profitables Wachstum durch nachhaltig gemeinsame Wertschöpfung. In M. D'heur (Ed.), *CSR und Value Chain Management* (pp. 1–122). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-39889-6_1
- Deutsches Institut für Normung e.V. (2015). Referenzmodell für die Entwicklung nachhaltiger Dienstleistungen, Gesellschaft und Wirtschaft (DIN SPEC 35201:2015-04). Berlin. Beuth Verlag GmbH.
- Dyllick, T., & Muff, K. (2016). Clarifying the Meaning of Sustainable Business. *Organization & Environment*, 29(2), 156–174. <https://doi.org/10.1177/1086026615575176>
- EFFAS. (2010). KPI for ESG - Key Performance Indicators for Environmental, Social & Governance Issues: A Guideline for the Integration of ESG into Financial Analysis and Corporate Valuation.
- Figge, F., Hahn, T., Schaltegger, S., & Wagner, M. (2002). The Sustainability Balanced Scorecard - linking sustainability management to business strategy. *Business Strategy and the Environment*, 11(5), 269–284. <https://doi.org/10.1002/bse.339>
- Geissdoerfer, M., Pieroni, M. P., Pigosso, D. C., & Soufani, K. (2020). Circular business models: A review. *Journal of Cleaner Production*, 277, 123741. <https://doi.org/10.1016/j.jclepro.2020.123741>
- Global Sustainability Standards Board (2021). GRI Standards Glossary 2021.
- Neuhüttler, J., Kett, H., Frings, S., Falkner, J., Ganz, W. & Urmetzer, F. (2020). Artificial Intelligence as Driver for Business Model Innovation in Smart Service Systems. In J. Spohrer and C. Leitner (Eds.), *Proceedings of AHFE 2020, AISC 1208*, pp. 212–219. https://doi.org/10.1007/978-3-030-51057-2_30
- Niemöller, C., Bärtling, N., & Thomas, O. (2015). Nachhaltigkeit durch Hybride Wertschöpfung - Entwicklung eines Reifegradmodells. In D. W. Cunningham, P. Hofstedt, K. Meer, & I. Schmitt (Eds.), *GI-Edition Lecture Notes in Informatics Proceedings: Vol. 246. Informatik 2015: Tagung vom 28. September – 02. Oktober 2015 in Cottbus* (pp. 427–442). Ges. für Informatik. <https://dl.gi.de/handle/20.500.12116/2207>
- Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Wiley&Sons.
- Paiva, T., & Carvalho, L. (2020). Sustainable Business Model. In S. Idowu, R. Schmidpeter, N. Capaldi, L. Zu, M. Del Baldo, & R. Abreu (Eds.), *Encyclopedia of Sustainable Management* (pp. 1–6). Springer International Publishing. https://doi.org/10.1007/978-3-030-02006-4_543-1
- Wirtz, B. W., Pistoia, A., Ullrich, S., & Göttel, V. (2016). Business Models: Origin, Development and Future Research Perspectives. *Long Range Planning*, 49(1), 36–54. <https://doi.org/10.1016/j.lrp.2015.04.001>