

D3.2: Ploutos SCBMI approach - final version

WP3 – Sustainable Collaborative Business Model Innovation

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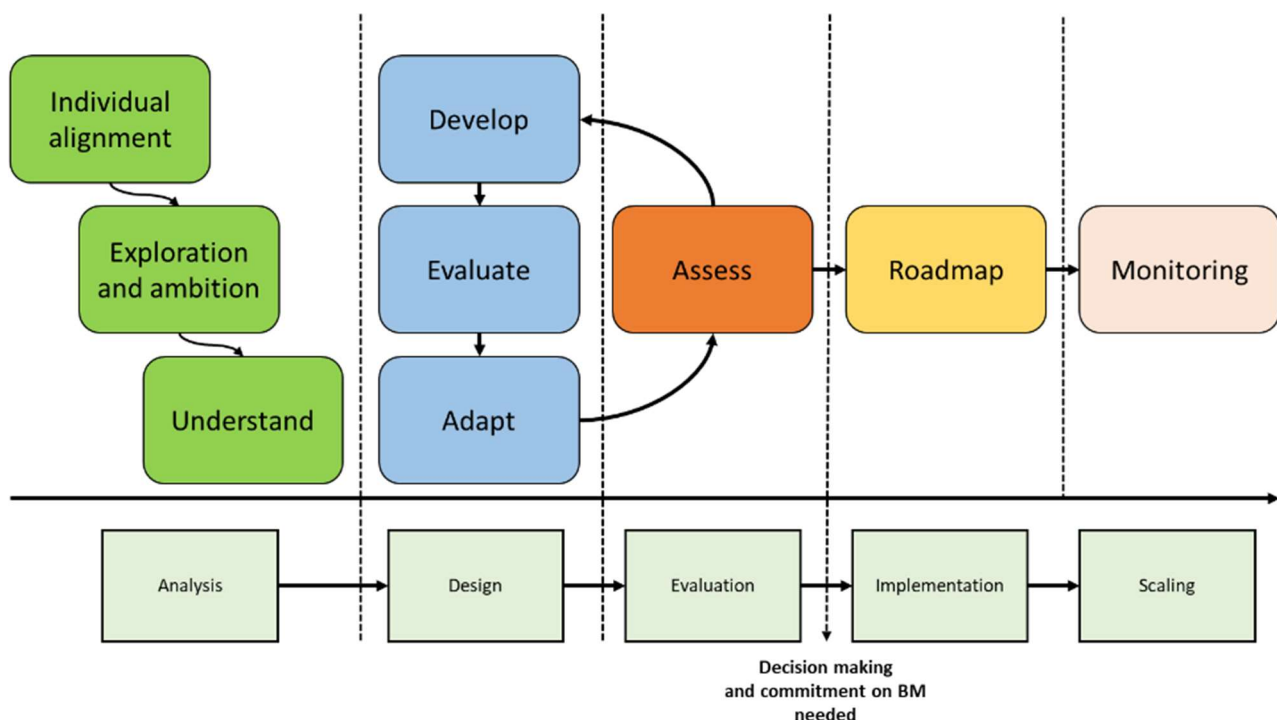
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Executive summary

In this report, we present the *final version* of the *Sustainable Collaborative Business Model Innovation (SCBMI)* approach. Sustainable collaborative business models represent business models which are geared toward creating collective, sustainable (i.e. merging planet, people and profit) value. Often, these business models are the result of collaboration between diverse stakeholders with different motives, drivers and beliefs. Given this multi-stakeholder nature, the innovation of such business models requires careful attention and structure, to which the SCBMI approach is proposed. This report serves as a follow-up of D3.1 – Ploutos SCBMI – initial version, in which the *alpha version* of the SCBMI approach was presented. Following a design science methodology, we have iteratively developed this approach through building on previous literature findings and previous efforts in sustainable collaborative business modelling. Through application of the alpha version of the SCBMI approach, we were able to collect feedback from users and learn from its application, through which we were able to identify several areas for improvement. The final version of the SCBMI approach is illustrated below. The nine steps previously identified for the alpha version of the SCBMI approach have been aggregated as part of 5 phases to be completed: *analysis*, *design*, *evaluation*, *implementation* and *scaling*. We have included this aggregation, in response to feedback received, to improve the clarity of the process and to improve its communication to users of the approach. The phase-like structure also allows us to explicate what outputs are expected after each phase (offering clear goals to end-users when engaging for the approach). The *analysis*, *design* and *evaluation* phases mark the *core part* of the SCBMI approach in Ploutos, in which stakeholders work towards commitment on a new sustainable collaborative business model (see Figure below). Conversely, the *implementation* and *scaling* phases represent the ‘ad-hoc’ part of the SCBMI approach, depending on what additional decision should be made to support the implementation of the sustainable collaborative business model (and whether these decisions can already be pursued given the maturity of the business collaboration).

Each phase of the SCBMI approach is supported through tooling to guide its application in practice. These tools are further detailed in D3.8 – Training material for SCBMI approach – final version. Based on the mapping of tools and phases, we propose a workshop-based setup for operationalizing the SCBMI approach in practice. Accordingly, users can call upon this series of workshops to put the SCBMI approach in action.



Through application of the final SCBBI approach for the Sustainable Innovation Pilots (SIPs), we identified that SIPs may pursue different innovation goals, resulting in different generic ‘innovation structures’ that can be considered (i.e., the business configuration of stakeholders to generate or realize new innovations). These innovation structures are: *marketization of technological innovation*, *orchestrating the innovation landscape*, and *scaling the sustainable collaborative business model* (as illustrated in the Figure below). These innovation structures impact what phases of the SCBBI approach are key to consider. For example, for the innovation structure, *marketization of technological innovation*, SIPs actively pursue a SCBM to realize a concrete technological innovation. For such a structure, the focus of the SCBBI approach should be on the design and evaluation phase, working towards a concrete SCBM to support the needs of the SIP. Conversely, for the innovation structure *orchestrating the innovation landscape*, SIPs focus on establishing a fertile ground in terms of a collaborative business network for ideating and generating value propositions to deal with the needs of end-users (farmers). In this case, the analysis and design phase of the SCBBI approach are key to explore. SIPs (or different end-users) can use these innovation structures to characterize their SIP structure and intentions, and consequently focus their efforts for the SCBBI approach for the key phases to consider.

Innovation structure:
marketization of new technological innovation



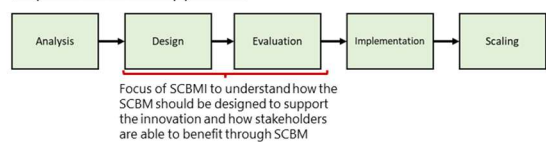
Characteristics of SIP:

- Technological innovation as a starting point
- Goal is to work towards SCBM to create impact through technological innovation

Outputs for SIP:

- SCBM (alternatives) which support realization of technological innovation to create impact

Impact on SCBBI approach:



Innovation structure:
orchestrating the innovation landscape for new value propositions



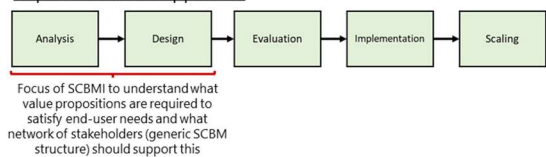
Characteristics of SIP:

- Concrete needs and challenges of end-users as starting point
- Goal is to understand through SCBM what value propositions (and technologies) can be supported to address challenges

Outputs for SIP:

- Generic SCBM structure, identifying stakeholders and roles to be included to support a set of value propositions that can help to solve challenges

Impact on SCBBI approach:



Innovation structure:
Scaling of sustainable business model for increased impact



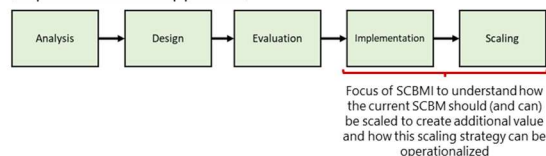
Characteristics of SIP:

- Ready or implemented sustainable business model as a starting point
- Goal is to scale sustainable business model to increase impact

Outputs for SIP:

- Scaling strategies and roadmap to increase the impact of current sustainable business model

Impact on SCBBI approach:



1 Introduction

1.1. Project Summary

The Ploutos project focuses on rebalancing the value chain for the agri-food system, transforming it into one that works for the benefit of society and the environment. The project will develop a Sustainable Innovation Framework that applies a systemic approach to the agri-food sector, building on three pillars: Behavioural Innovation, Sustainable Collaborative Business Model Innovation and Data-driven Technology Innovation. Exploiting a history of significant agri-food projects and the respective ecosystems around them, the project will deploy 11 innovative systemic Sustainable Innovation Pilots, whereby adopting a multi-actor approach, innovative solutions and methodologies will be implemented, tested, assessed, generating practical learnings. The pilots cover a large range of agri-food ecosystems, across 13 countries, covering arable, horticulture (both open fields and greenhouses), perennials and dairy production among others. In each case, behavior change, collaborative business modelling and data driven innovation will be integrated to deliver the most environmentally, socially, and economically sustainable solution. Moreover, a Ploutos Innovation Academy will be established as a vehicle for integrating the know-how, best practices and assessments developed across the project and derived from the Sustainable Innovation Pilots. Ploutos includes 33 partners, 22 of them being end-users, representing all relevant actors in the food system, including farmers, food industry companies, scientists, advisors, ICT specialists and policy makers.

1.2. Document Scope

Work Package (WP) 3 is centered around Sustainable Collaborative Business Model Innovation (SCBMI). Its objectives are to (i) create a set of reference sustainable business model archetypes, (ii) develop a novel approach for SCBMI with a corresponding toolset in order to (iii) support the Sustainable Innovation Pilots (SIPs) in forming a novel business model that adheres to the Ploutos core principles (i.e. farmer-centricity, mutuality, scalability and multiple values and actors). Additionally, this is all incorporated in the Sustainable Innovation Framework (SIF) that is developed by WP1 as well as the Ploutos Innovation Academy (PIA) of WP5, with the ultimate goal of constructing a knowledge base that can also be used independently after the Ploutos project has ended.

This deliverable (D3.2) in particular is part of *T3.1 – Development of the Ploutos SCBMI approach* in which a general framework for the SCBMI approach is formed. It is a follow-up on D3.1: Ploutos SCBMI approach – initial version in which the alpha version of the SCBMI approach was presented.

TEXT BOX 1: Purpose of T3.1

The purpose of T3.1 is to construct and validate the Ploutos Sustainable Collaborative Business Model Innovation (SBMI) approach. This objective of this approach is to practically support the pilots in their business modelling challenges. The approach will a) be farmer-centric, but extends to the entire value chain and include digitization; b) be based on mutuality, multiple actors (and thus collaboration) and multiple values (people, planet, profit); and c) incorporate experimentation to successfully identify and deal with critical assumptions on desirability, sustainability, scalability etc., We build forward on the Value Case Methodology and append further elements from the SoTA on sustainable business modelling and practical experience of the team and in collaboration with WP1 and WP2 and the pilot-teams. We will follow a design science approach. This means the approach will be validated by application in practice, according to a pre-set plan and updated accordingly. We will also provide training materials to be used in the pilots (and by value chains outside Ploutos). We include the following subtasks:

- Extension of the Value Case Methodology by collection and integration of relevant SBM methodologies and digital business strategy methodologies.
- Preparation of application in practice by the pilots, e.g. by providing instructions and webinars.
- Preparation and execution of evaluation tasks to validate and improve the methodology.
- Finalization of the methodology.

The SCBMI approach is in fact a (WP3) facilitated process aimed to design and evaluate business models for the innovations that are being developed in scope of the SIPs, and which contribute towards sustainable, societal and economic impact. The facilitated process consists of analysis tasks, design tasks and evaluation tasks supported by tools, canvasses and participative workshops. The idea is that relevant actors co-design the business model innovations for their organizations such that the collaborative business model will exploit the innovation of the SIP and moreover achieve ‘substantial levels’ of sustainability when scaled up. We summarize these requirements as the Ploutos core principles (i.e. farmer-centricity, mutuality, scalability and multiple values and actors).

The development of the SCBMI approach is seen as a design task in its own right (following design science rules) and will therefore go through design stages: construction; application; evaluation; improvement. The approach documented in this deliverable represents the *final* version, serving as an update or improvement to the alpha version presented in D3.1. We have achieved this by means of application of the approach for the SIPs as part of T3.4, collecting learnings and feedback through SIP stakeholders involved, iteratively improving upon the alpha version presented previously.

1.3. Document Structure

In this document, we will describe the final version of the SCBMI approach. For the sake of completeness, we once more introduce the concept of sustainable collaborative business models (SCBMs) as well as why these SCBMs are relevant in the context of the Ploutos project (Chapter 2). Chapter 3 reintroduces the design science methodology followed for developing the approach, and explains how we improved the alpha version towards the final version of the approach. This final version of the SCBMI approach is further delineated in Chapter 4, describing its contents, how it can be used in practice and what variations on the SCBMI approach can be considered. In Chapter 5, we conclude the deliverable, listing the main findings and our next steps in communicating the SCBMI approach.

1.4. Link to the Ploutos Sustainable Innovation Framework (SIF)

One of the prominent application areas of the SCBMI are the SIPs. The purpose of applying the SCBMI is to co-create with the SIP participants and potentially additional stakeholders an evaluated collaborative business model that is supported by its stakeholders and is aimed to achieve sustainability. The SCBMI approach is an integral part of the SIF (coordinated in WP1) as one of its three core pillars, in addition to supporting behavioral change (WP2) and technological innovation (WP4). These pillars as well as the SIF follow a staged approach with different phases that should be executed in collaboration with other actors using a set of tools in order to reach a systemic change. Our SCBMI approach provides continuous input for the development of the SIF (i.e. through clarifying the phases relevant for SCBMI or through providing learnings generated for the SIPs through application of the SCBMI approach), while the SIF also provides overarching insights that enable us to streamline the SCBMI approach (i.e. to infuse business thinking with technological and behavioral aspects relevant to consider). The link to the SIF is illustrated in Figure 1.

1.5. Link to the Ploutos Innovation Academy (PIA)

The material covered in this deliverable will also be included as part of the PIA (coordinated in WP1), mostly as part of *Training material for SCBMI* (D3.8). Ultimately, the goal is to provide a stand-alone guide with training material and practical examples to be used in the continuation of the pilots as well as similar external use cases. This allows the introduction of certain (business) concepts, tools and the goal(s), and expected outcomes of a workshop, supporting the application of the SCBMI approach and its replicability in practice.

The application of the SCBMI approach can subsequently also be used to feed the knowledge base of the PIA, for example in terms of common challenges identified (and how these are addressed for the various SIPs) or through communication of innovative solutions or best practices. The link to the PIA is illustrated in Figure 1.

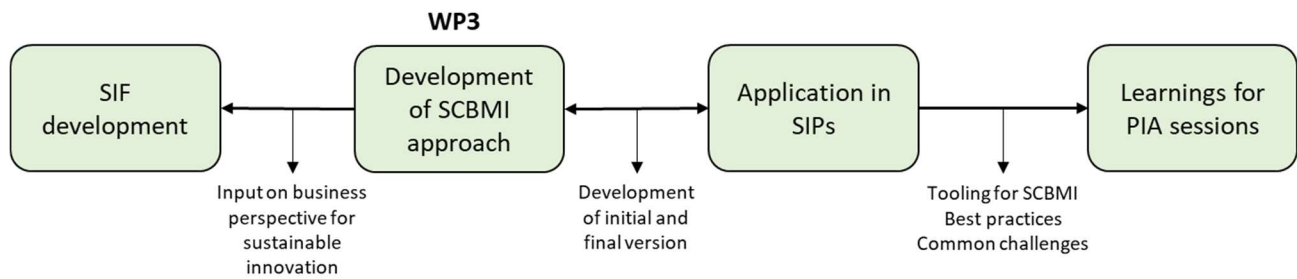


Figure 1 - Link of SCBMI approach to SIF and PIA

2 Setting and Context

In this section, we detail the background for developing the SCBMI approach. Specifically, we discuss the role of business models for coping with agricultural, but also sustainable challenges faced. In doing so, we stress the importance of thinking in collaborative business models and explain what implications the collaborative nature of these models has.

2.1. Agriculture, sustainability and business models

Our farming and food system is currently under great pressure and in need for change. The farming and food system is expected to secure the world's nutritional needs with safe foods and to adapt to our dietary needs, though currently it is associated with substantial ecological impacts and trends towards decreased biodiversity. In many food chains producing farmers, primarily, are experiencing the pressures of globalized markets and skewed power balances. Digitization developments are linking value chain partners, humans, organizations and technologies in new ways as data is needed to precisely monitor and manage the growth of individual plants or animals by exact amounts of nutrients or control of production equipment, in order to forecast and control production volumes and identify the current and past conditions and whereabouts of the food on the table. The transition towards a more sustainable and digital farming and food system requires value chains to be organized in new collaborative ways, e.g. short local supply chains and community-based farmer's markets (Lawson et al. 2008) or participation in multiple supply chains, referred to as value-nets (Kähkönen, 2012). In other words, the *value creation logic* of the food and farming system is changing: farms create more tangible values than the financial equivalent of the food produced, as production affects, for instance, human health, biodiversity, ecological quality, culture and community's wellbeing. Realigning the business models of multiple actors in the food and farming system in a more synchronized way requires collaboration. This has traditionally had a strong presence in the farming sector, evidenced by the many cooperatives or producer or interbranch organizations that allow farmers to share equipment, share risks, coordinate their production planning, collectively sell their produce to acquire a higher market power et cetera. This also reflected by EU policy making in which aspects such as fairness and sustainability are taken into account in establishing new producer organizations (see [Producer and interbranch organisations \(europa.eu\)](https://ec.europa.eu/agriculture/producer-organisations/)). Yet, the process of designing and implementing new value creation logics across multiple value chain actors, resulting in collaborative business models, is novel.

2.2. Conceptualizing business models

In order to further explain the need for developing sustainable and collaborative business models it is necessary to introduce the notion of the business model. The term has been used increasingly in the new millennium. A business model is said to specify the business logic, or how an organization creates and captures value. In practice, it is used as a description of how a business can make profit. It aims to find an answer to questions such as: which are my biggest expenditures and revenue streams, what is my customer segment and how do I reach them, and which key partners and activities are required? This can be done in free text description, it can be specified by defining activities and resources and it can even be modelled in a more or less formal description language, like E3Value or VDML (H. de Man & van Donge, 2017; Gordijn, 2004). A popular framework to describe and design business models is called the Business Model Canvas (Osterwalder & Pigneur, 2010), which is shown in Figure 2.

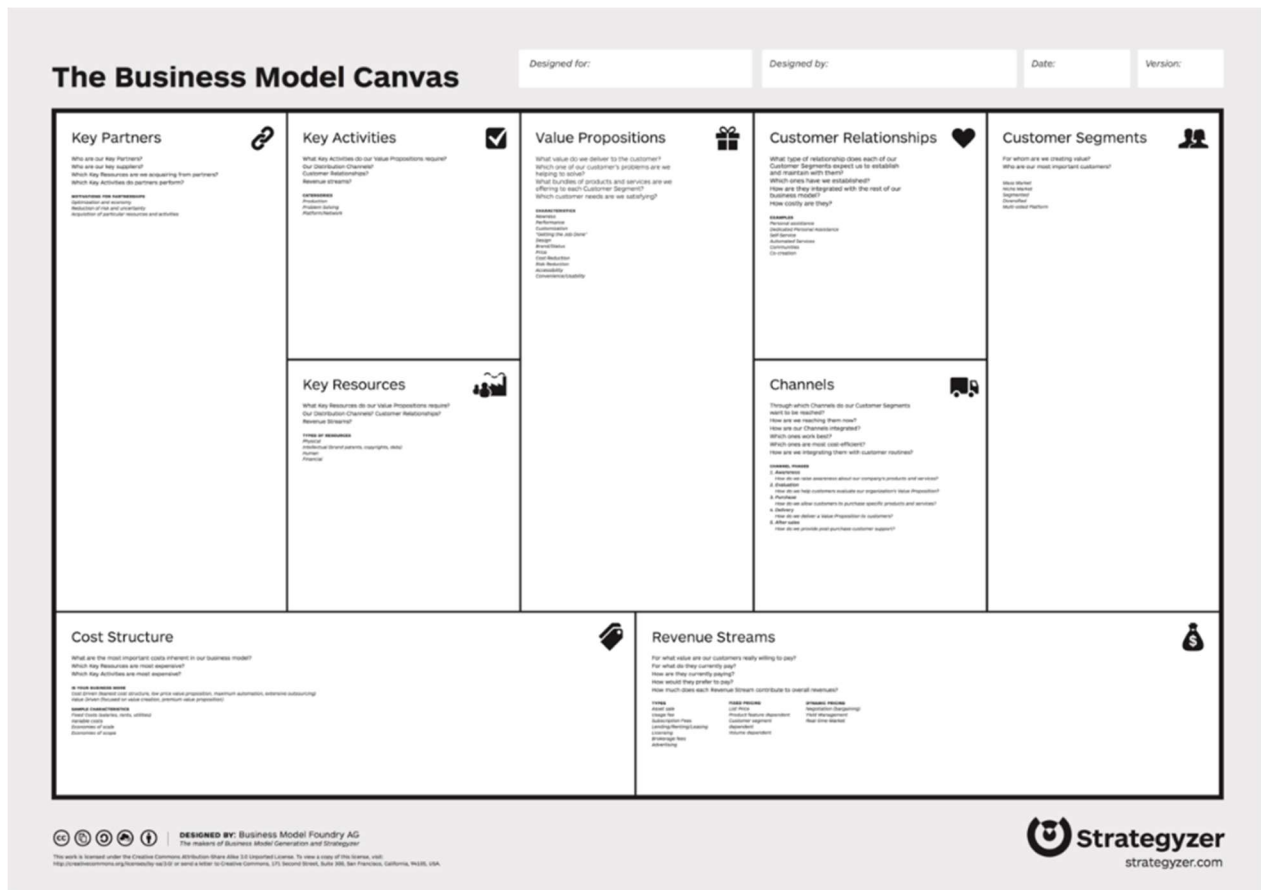


Figure 2 - The Business Model Canvas

A central concept is the so-called *value proposition*, a description of which value is created for the customer and how this is achieved. Business models are mostly firm-centric; they are focused on a single organization and how this organization creates value as well as how it makes money by doing so. The business model canvas is a well-known design-thinking tool that helps organizations specify and analyze their business model using a template. This emphasizes the creative design aspect of business modelling. Massa, Tucci and Afuah (2017) observe two additional ways of using the term 'business model'. The first is a descriptive archetype of how businesses operate in practice, like 'razor & blade' (cheap core product, more expensive additional products), 'freemium' (product or service is offered free of charge, advanced functionalities are priced) or 'pay-per-use' (a fee per moment of use). The second relates to understanding the perceptions of business logic that businesses hold.

2.3. Collaborative business models

In order to supersede simplistic understandings of transactional relationships in business models, it is necessary to evaluate the value chain as a whole (which explicitly includes the customer) and create a business model from this overarching perspective, in which collaboration is key. The main goal of a collaborative business model is therefore to construct a business model in which all the involved actors agree to a distribution of costs and benefits that is fair and acceptable to all partners, which can potentially lead to the creation of (substantial) added value as well. One of many examples of a *failed* innovation is Philips' HDTV (Adner, 2012), which also required recordings to be made using specific cameras. It is said to have failed because actors that needed to innovate their business models too (developers and users of the HD cameras) and actors that needed to adopt the new innovations (broadcasters) had not been taken aboard in the process towards market launch.

In contrast, establishing *value-adding supply chains* relies heavily on collaborative business model thinking, and demonstrates that through a holistic consideration and incorporation of partners economic, social and environmental on a large scale can be achieved ([Values-based Supply Chains | Sustainable Agriculture Research & Education Program \(ucdavis.edu\)](https://ucdavis.edu/Values-based%20Supply%20Chains%20Research%20&%20Education%20Program)). Such supply chains focus on ensuring that small and medium farmers are able to capture premiums for their (selling) their products as a result of the environmental and social benefits that are embedded for their produce. Such benefits in return are appreciated by customers which are willing to pay for or stimulate the generation of these benefits. To enable such value-adding supply chains, collaboration between value chain actors as well as fair agreements on how value is distributed is essential.

Concretely, the added value of collaborative business models in comparison to regular, firm-level business models are:

- The ability to unlock novel value that a single actor could not pursue on its own (Adner, 2012);
- Benefitting from increased specialization and interdependence between organizations, and driven by digitalization (Bankvall et al., 2017)
- The business models in which multiple actors are aligned and their risks are shared, allowing for more effectiveness and efficiency compared to the situation in which each actor optimizes its own means of doing business. Accordingly, investments towards new innovations or solutions can be shared or distributed fairly (de Man & Luvison, 2019; Rohrbeck et al., 2013)
- Managing collective provisions, like data sharing facilities, on which multiple organizations' new business depends.

In collaborative innovation settings, much like the SIPs in Ploutos, it makes sense to expand the scope of business modelling to include multiple organizations that are deliberately working on interaction, interoperability and other relations. Such collaborations can then form the basis for the generation of collaborative benefits which go beyond the benefits that an organization or stakeholder is able to achieve on its own (Renga et al., 2023). Understanding how these benefits are generated, shared and captured for collaborations, and thus how collaborations are shaped and how decision making rights are distributed, is essential to support these type of business models. Expanding the scope to multiple actors then turns the design activity from a single organization to a participative approach in which participants from multiple organizations need to evolve their mutually dependent perspectives to develop new business models, that generate sustainability effects.

3 From business models to value networks to sustainability and collaboration

We follow the definition that **a business model describes how an organization is structured and how value is created and captured**. In conventional business model theory, the central focus is on a single organization and the way in which this organization creates value. The way in which the specific business model can be set up is influenced by economic and institutional factors. The definition of value often revolves around a financial interpretation; sustainability is hardly included, if at all (Osterwalder et al., 2005). Although conventional theory takes a rather organization-centric perspective, interactions and transactions between different actors in the supply chain are often necessary in order to create value for end-users/customers. To make these interactions explicit, Stabell and Fjeldstad came up with the concept of the value network (Stabell & Fjeldstad, 1998). The value network illustrates the *links* between actors and shows tangible and intangible value transactions (e.g. the money flows, contractual information or other types of exchanges). It shows how companies and organizations are involved in the value creation process (Allee, 2000; Leavy, 2012). The business ecosystem concept naturally evolves from the value network concept (Leviäkangas & Öörni, 2020). The business ecosystem is a system comprising a community (or communities) of organizations and their physical, market and regulatory environment, at a specified scale, in which there are continuous fluxes of knowledge, finance and value taking place in an interactive open manner (Ågerfalk & Fitzgerald, 2008; Moore, 2006). The business ecosystem takes a more holistic approach than value networks and includes all relevant stakeholders such as governmental actors, non-governmental actors, regulators, competitors and often comprises several, potentially competing, value networks.

An innovation ecosystem is a business ecosystem wherein organizations interact with an explicit focus on developing, adopting, and implementing new products, services or processes (Adner, 2016; Barnett, 2011). In these definitions, the innovation ecosystem is indeed a subset of organizations in the wider ecosystem and also one that changes its superseding business ecosystem. Note that there are many different definitions of these three key concepts, and it is beyond the scope of this document to align these. However, it is generally accepted that an individual organization and its direct network can be considered as the value network, and that such networks are also part of a wider network, which we refer to as the business ecosystem, consisting of value networks.

3.1. Collaborative sustainable business modelling

Value network and business ecosystem approaches become especially useful when considering innovation for sustainability (Evans et al., 2017). A subfield within business modelling literature that explicitly focusses on both sustainability and takes a holistic ecosystem approach is ‘sustainable collaborative business modelling (SCBM)’. SCBM is fundamentally different from regular business modelling in two key aspects; (i) SCBM focusses on creating multiple types of value (e.g. social, environmental, financial) and (ii) SCBM actively involves stakeholders to strengthen the whole value network. Although the fields of collaborative business modelling and sustainable business modelling come closest to SCBM, there are some key differences regarding the elements of multiple value creation and the way in which stakeholders are involved. Note that the distinction between these concepts is rarely made in existing literature and these terms are often used interchangeably. Furthermore, the distinction between a collaborative sustainable business model and the process of modelling is worth highlighting. The business model is then considered as a description or a design, whereas the process is a participative sequence of activities including context analysis, design, evaluation and implementation of a collaborative sustainable business model.

In the remainder of this section, we zoom in on the different types of business modelling concepts. positions the output of these concepts, based on the two parameters of collaboration and multiple value creation.

Sustainable Business Modelling (SBM) requires companies to proactively create value for society by finding profitable solutions to social and ecological challenges (Masud et al., 2019). The aim is to incorporate sustainability objectives integrally into the business model by using a broader concept of value, which is also referred to as 'triple bottom line' (people, planet, profit) and 'multiple value creation' (Nosratabadi et al., 2019). The difference in time lag in the realization of different values, or effects, of a business model or innovation has been rarely mentioned, however, it should be considered for there might be important differences in the timing according to which sustainability effects materialize. Sales effects typically take place more or less directly, although innovation diffusion and scaling can take years. For individual users, effects or benefits of a value proposition may be direct or delayed: e.g. a smart farming solution may produce benefits on a cattle herd or on soil conditions only over seasons, and potentially only after substantial business process and behavioral changes on the farmer's end. Thus, value creation or benefits realization as a result of an innovation follows different pathways and has different preconditions for each value, and consequently for each actor. Building theories of change (Connell & Kubisch, 1998) or modelling benefits realization mapping (Bradley, 2006) may be a way to deal with these.

Collaborative Business Modelling (CBM) has an inter-organizational design approach with the aim of creating value not just for the individual company, but for the whole value network (Mäkinen & Dedehayir, 2012). As a result, the design process becomes community-centric, with value creation taking place through collaborations in hubs, networks and chains (Jonker & Faber, 2019). CBM is a participatory process, in which ideally all actors of the value network participate leading to intertwined, aligned business models and long-term contracts on how to do business within the value network (Rohrbeck et al., 2013). Such an approach is valuable in contexts where multiple organizations are subject to change as is the case of purposive sustainability transitions.

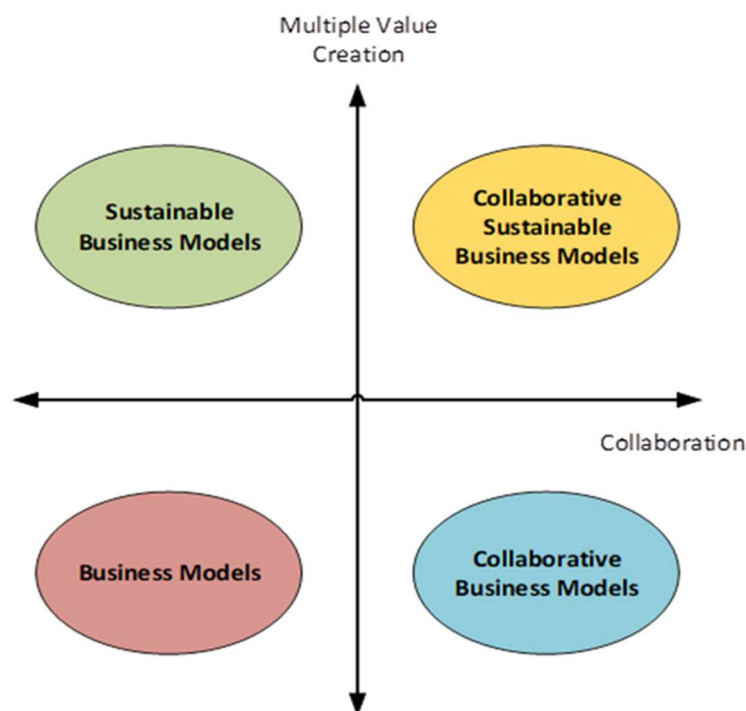


Figure 3 - Business model classification based on the parameters 'collaboration' and 'multiple value creation'

SCBM focusses on creating and capturing value for the whole value network, just as CBM. The main difference is that SCBM aims to 'create multiple value' focusing on the 'triple bottom line' (Ordonez-Ponce et al., 2020).

The focus on multiple value creation might mean that the participating organizations take greater responsibility towards society and nature. Companies proactively design the collaborative sustainable business model to create ecological, economic and social value for the community and network partners. The aim of the organizations is to contribute to problem solving within the domains of sustainability, circularity and inclusiveness; and therefore can play a key role in facilitating a sustainability transition (Evans et al., 2017; Schaltegger et al., 2016).

The perspective taken with regard to value creation makes a fundamental difference in designing a business model. Conventional business models are designed from the perspective of single, financial value creation within a company's production chains (Osterwalder et al., 2005). Collaborative sustainable business models, on the other hand, focus on creating multiple values in close collaboration with partners in the value network (Jonker & Faber, 2019). Stakeholders together can identify complex problems rather than limiting their scope to individual internal economic business challenges. By looking at problems from a collective perspective, stakeholders can take coordinated action, allocate the necessary resources while ensuring equitable sharing of costs and benefits (Kais & Islam, 2016).

3.2. SCBM approaches

Various approaches focus on developing a SCBM (Abhari et al., 2016; Brehmer et al., 2018; Bullinger et al., 2017; Costa & Da Cunha, 2015; Geissdoerfer et al., 2016; Karlsson et al., 2019; Mlecnik et al., 2019; Oskam et al., 2018; Pereira & Caetano, 2015; Rohrbeck et al., 2013). Although these approaches vary in maturity, each approach describes a learning process consisting of steps to come to mutual value creation, capture and delivery in order to build mutual beneficial value propositions and prevent contradictory incentives in the value network (Oukes et al., 2020). Several studies have been conducted in which such approaches were successfully applied to practical cases (Brehmer et al., 2018; Dembek et al., 2018; Gorissen et al., 2016; Mlecnik et al., 2019; Solaimani et al., 2015). Based on structured literature review focused on collaborative business model approaches for inclusive innovation (Oukes et al., 2020), the sources and steps as presented in Table 1 were synthesized. Here, the four business model innovation phases proposed by Frankenberger et al. (2013) were used as the foundation for conducting collaborative business modelling. Identifying sub-steps to be completed per task, tools and methods were selected which helped in addressing the steps or objectives posed per (sub)task. This offered structure to workshop participants on how the process of collaborative business modelling would be executed.

Earlier practical experience in collaboratively developing business models was gained through a project in the Dutch Dairy Farming industry in which three major cooperatives collaborated in a precision farming based business model (Berkers et al., 2019). A practical workshop approach was also developed and reported in (Derks et al., 2021).

			Collaborative business model development
Step	Sub-step	Tools and methods	(1) Service development phase to ideate and conceptualize functional product (2) Startup phase to introduce and test a value concept (3) Market phase to grow as solution provider and scale commercial use Oskam <i>et al.</i> 2018; Palo and Tähtinen 2013
Initiation	Identify and characterize the participating stakeholders ^{2,3,5,6}	Value Mapping Tool ^{2,5} ; BIZ2BIS ⁶	
	Conduct market review to identify external change drivers ^{3,5}	PESTEL ³	
Ideation	Generation of collaborative business model ideas ¹⁻⁸	Business Model Canvas ^{1,3,8} ; Value Mapping Tool ^{2,5} ; BIZ2BIS ⁶ ; Flourishing Business Model Canvas ⁷	
Integration	Prioritization of collaborative business models ideas ^{1,2,5,8}	Attractiveness-Effort matrix ^{1,5} ; Impact-feasibility matrix ² ; Possible-desirable matrix ⁸	
	Validation of selected business models ¹⁻⁶	Business Model Canvas ¹ ; Canvas; Prototyping ² ; Business wargaming ⁵ ; BIZ2BIS ⁶	
Implementation	Planning joint development and commercialization activities ^{1,2,4}		

Table 1 - Overview of the collaborative business modeling steps and the collaborative business model development phases (adapted from Oukes *et al.*, 2021)

3.3. Business models in agriculture

The agri-food value chain produces, processes, distributes and consumes products in a complex value creation system with interrelated actors – see Figure 4.

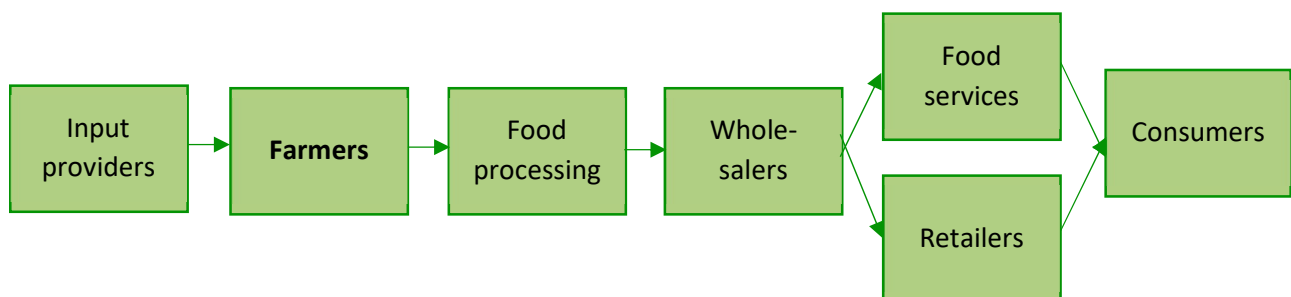


Figure 4 - Typical value creation and delivery system in the agri-food value chain

Farmers face pressures such as

- **Economic:** demand volatility, profit, sales, capital structure, liquidity, competitive position (Franceschelli *et al.*, 2018);
- **Environmental:** biodiversity management, gentle soil cultivation, sustainable fertilizer usage, avoidance of artificial substances, waste minimization, sustainable packaging, careful water usage, energy savings and provisioning of ecosystem services (Dressler & Paunović, 2019);
- **Social:** positive work atmosphere, employee retention, reliable partner relationships, social engagement, food security (Dressler & Paunović, 2019).

- Within this value creation system, two factors create unfavorable situations which limit farmers to adopt sustainable business models (Cagliano et al., 2016; Fritz & Matopoulos, 2008; Tell et al., 2016):
- *Power imbalance*: an increasing power imbalance in favor of retailers (e.g. large supermarket chains) reduces economic benefits and the economic flexibility to adopt sustainable business models.
- *Market access*: most food products are now routed through large trading companies or (regional) distribution centers and several processing stages which increases the distance between the farmer and the market and reduces farmers in monetizing sustainable models.
- *Farmer size and composition*: Farmers tend to be small businesses with few employees. Consequently, farmers are often “generalists” or “all-rounders” who have to run all aspects of their business and, therefore, lack the specialist’s view on innovation and innovative business models (Tell et al., 2016).

Economic value capture of sustainable business models often takes place through premium pricing, increased brand value and additional income streams. To enable farmers to benefit from these value capturing mechanisms, existing value creation and delivery systems need to be innovated and sustainable business models can provide a response to all of these challenges.

Digitalization of the farm and the food chain has not only led to a development of many new farming technologies, but also to the creation of new data flows. Their valorization, in turn, led both to the creation of new businesses, e.g. the data driven business models from John Deere and platforms like 360 Farmnet add to a new position and new pressures to the farmer (Elijah et al., 2018; Kamilaris et al., 2017; Kenney et al., 2020). The transition towards a more sustainable and digital farming and food system thus requires value chains to be organized in new collaborative ways, e.g. short local supply chains and community based farmer’s markets (Lawson et al. 2008) or participation in multiple supply chains, referred to as value-nets (Kähkönen, 2012), sharing of data across a supply chain requires additional activities, resources and alignment on top of traditional transactional relationships. Digitalization also allows to organize things in different ways, e.g. using platforms and third-party services. Transformative innovation is often said to disrupt existing linkages (Kemp, 2011). Collaboration has traditionally had strong presence in the farming sector, witnessed by the many cooperatives (Chaddad & Cook, 2004) that allow farmers to share equipment, share risks, coordinate their production planning, collectively sell their produce to acquire a higher market power, et cetera.

Yet, the above illustrates that business model innovation is typically not driven by the farmer, but by external parties such as food processors, cooperatives, tech providers, SMEs, etc. Consequently, we cannot expect that bringing technological innovation to market, despite its intended benefits for farming, will naturally lead to a better position of the farmer. Therefore, a key focus in the design principle in SCBMI is an improvement of the position of the farmer.

4 Development methodology for the SCBMI Approach

In this section, we recap the development methodology followed to develop both the initial version and final version of the SCBMI approach. First, we present an overview of the entire development methodology, explaining how we move from initial need for a SCBMI approach towards the final version of the approach. Next, we explain the efforts that have been conducted to move from the alpha version towards the final version, and what intermediate versions of the SCBMI approach have been produced. We refer to D3.1 – Initial Ploutos SCBMI approach for a description of how the alpha version of the approach has been developed.

4.1. Development methodology based on Design Science

The Ploutos Sustainable Collaborative Business Model Innovation approach (SCBMI approach) can be considered as a process and collection of tools that transforms information about an innovation (as further elaborated in a Sustainable Innovation Pilot), provided by SIP participants, into a design for collaborative sustainable business models. This business model design, the output of that process, describes how the value is (could be) created and captured by the innovation. As there is no process description and toolset readily available, we approach this as a *design* task.

To support this design task, we followed the philosophy of a design science approach (Hevner, 2004; Peffers, 2006; Sein, 2011), which is to combine practical relevance with scientific rigour. Practical relevance means that something is created for use in a practical setting and that it is also evaluated as such. In our case the practical setting is the value creation by means of the innovations furthered in the SIP. The scientific rigor refers to the 'rules' and guidelines used for designing and evaluating the created information system. This applies to the theory on which the design is built (there should be something not yet described in scientific literature) and it also applies to how the developed approach is evaluated, e.g. an experiment, and which criteria are used (Peffers, 2012; Prat, 2014).

Figure 5 illustrates the phases in Action Design Research (ADR) (Sein., 2011), which can be seen as an action oriented version of the design science approach. The ‘action’ part to design science generally refers to the emphasis on the participation of practitioners and users in the design process.

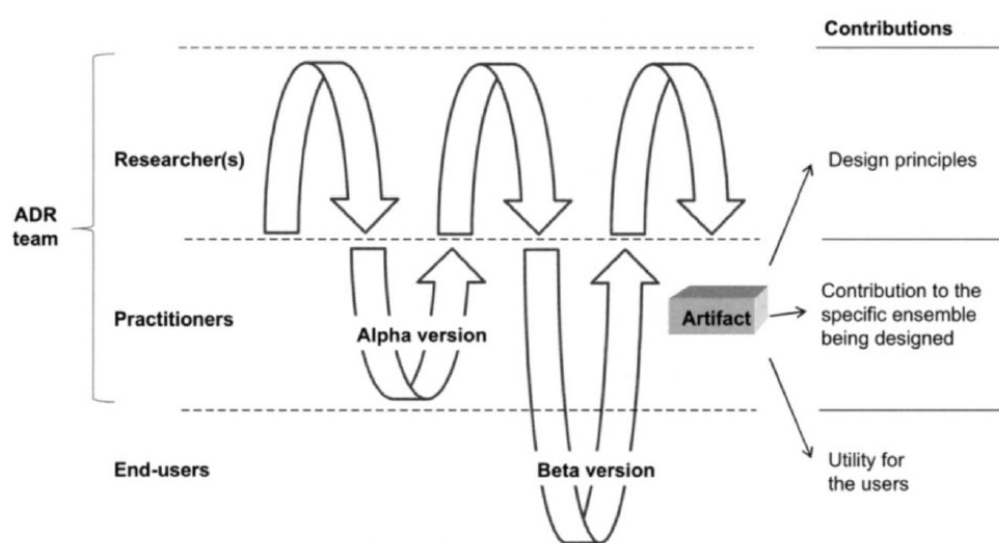


Figure 5 - Action Design Research (ADR) iterations over time (Sein et al., 2011)

4.2. Steps followed to develop SCBMI approach

In the following, we recap in brief the steps we have taken to operationalize the design science approach. As also explained in D3.1 – initial version of the SCBMI approach, we have built on the steps proposed by Peffers et al. (2007) as guidance. Accordingly, the steps *problem identification and motivation*, *objectives of a solution*, *design and development*, *demonstration and evaluation*, and *communication* have been followed. We refer to D3.1 for a detailed elaboration on the literature background used for the identification of the problem at hand and the objectives posed for the solution. In this deliverable, for brevity, we list these as given here.

4.2.1. Problem identification & motivation

The practical problem we address through the development and application of the SCBMI approach is to support innovation pilots in furthering their innovations, helping pilots to realize and implement these innovations in practice. To do so, business model innovation is required, meaning that stakeholders involved for the pilot should investigate how such innovations can be enabled in practice, foster value creation and capture, and how these innovations will be supported through business operations. Often, this is the product of collaboration and the exchange of resources and capabilities between stakeholders involved. These stakeholders can operate in diverse domains (technology, agriculture, academia), each with different individual motivations and objectives to be achieved through pilots. In the context of European projects, we observe that pilots are set up not only with the reason of generating economic value, but rather should also contribute towards sustainability and societal objectives. Accordingly, we are tasked with supporting business model innovation which yields business models which contribute to sustainable and societal value, but also create incentives for individual stakeholders to provide long-term support for these business models (in light of the individual objectives they intend to achieve). Such business models should also explain how stakeholders will collaborate with practice, how investments are divided or shared and how each stakeholder will capture value. Such an approach for *supporting sustainable collaborative business modelling* currently is not available: as part of Ploutos, the goal has been to develop such an approach.

4.2.2. Objectives of a solution

Based on the problem identified and the goal addressed for the SCBMI approach, the following objectives for designing the solution were posed. For a detailed description on how these objectives have been derived, we refer the reader to D3.1 – initial version of the SCBMI approach.

The SCBMI approach should:

1. Produce business model designs that (when implemented)
 - a. exploit the innovations furthered in a (collaborative) pilot
 - b. are acceptable to the stakeholder organizations of the innovations (i.e. fit with their strategic objectives). This is referred to by the Ploutos Principle of “mutuality”.
 - c. will generate the desired sustainability effects (i.e. improve societal conditions, ecological conditions and economic conditions of the stakeholders involved). This is referred to by the Ploutos Principle of “sustainability”.
 - d. improve the farmer’s control of how s/he runs the farm, including for example which products are grown and how the production is done (e.g. organic or not), as well as for which price the products are sold. This is referred to by the Ploutos Principle of “farmer centricity”.
 - e. achieve value creation at substantial scale, either by growth or replicability. In order to not only be sustainable in nature, but to achieve substantial impact, e.g. on a European level, the

innovation must be diffused, taken up and used in practice. This is referred to by the Ploutos Principle of “scale”.

2. Be guided by an overall vision and process.
3. Be supported by easy-to-understand and easy-to-use tools.
4. Be able to be facilitated by persons who have some experience in guiding participative design processes (workshops) and some experience with business modelling in context of innovation projects.
5. Be reusable over SIPs and similar situations beyond the project.
6. Be configurable to specific situations, i.e. SIPs.
7. Be open to benefit from the Sustainable Collaborative Business Model Archetypes as developed in *D3.3 - Initial version of reference sustainable collaborative business model archetypes* and its successors.
8. Be open to integration of *D3.5 - Valorization model for data and digital services*.
9. Be open to be integrated in the Ploutos Sustainable Innovation Framework.

4.2.3. Design and development

Figure 6 presents the development cycle of the SCBMI approach throughout the Ploutos project. We can see that M8 marks the finalization of the alpha version of the SCBMI approach (see D3.1). after which application of the SCBMI approach has taken place to support business modelling activities for the SIPs (as part of T3.4 in Ploutos). Through application of the alpha version of the Ploutos SCBMI approach for the 11 pilots in Ploutos, we have further refined the SCBMI approach based on the learnings generated, resulting in the final version of the SCBMI approach (documented as part of this deliverable).

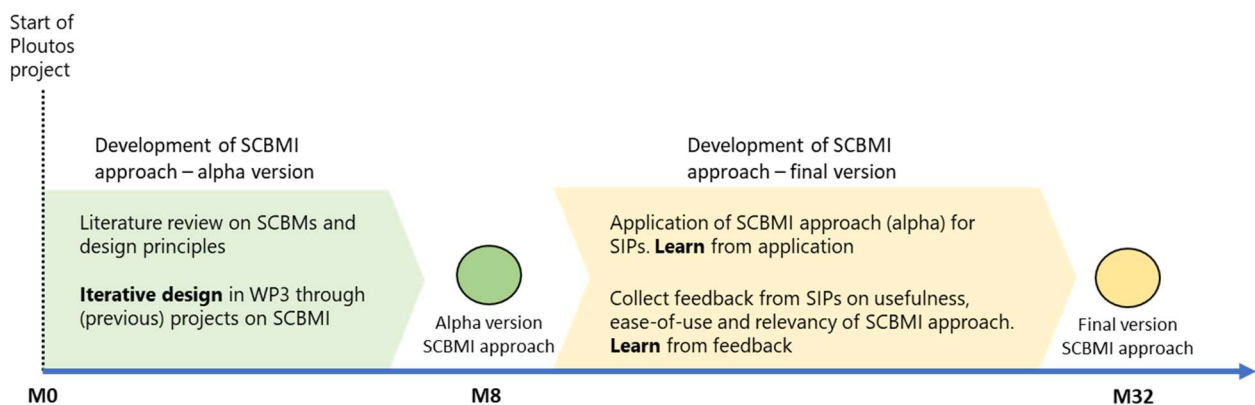


Figure 6 - development process of SCBMI approach

Alpha version

The alpha version was developed by a sequence of work sessions between WP3 members. It was initiated by discussions on mutual experiences. Specific inspiration was taken from the following projects:

- [Smart Dairy Farming](#): focused on the development of a data sharing facility for the dairy sector in the Netherlands and collaborative precision farming applications. Specifically referring to the methodology developed and documented (Berkers et al., 2019).
- [Collaborative Business Models for Base-of-the-Pyramid](#): a practical approach to design collaborative business models in context of base-of-the-pyramid, (Derks et al., 2021; Oukes et al., 2020) and its underlying database of collaborative business model articles and its readily applied workshop designs and tooling.

Based on the insights derived, a generic structure for the application of SBCMI approach was created, as well as a list of tools and techniques was established to be used to support the SBCMI approach. Indications for the amount of workshops to be conducted, their duration and timing were also included. A detailed description of the alpha version is presented in D3.1 – initial version of the SCBMI approach.

Final version

Through application of the SCBMI approach (and the tools embedded for the approach), stakeholders can reflect on the positive and negative aspects of the approach and can provide valuable insights on how the approach can be further improved. For example, some tools may cover similar topics previously discussed for the process or can be perceived as too abstract or too concrete depending on the characteristics of the SIPs. Accordingly, this provided us insights on which tools were possibly not as useful or should rather be considered as an exercise to *deepen* certain design decisions. Additionally, stakeholders can express to what extent they understand *why* certain activities were conducted and *how* they contribute towards the overall goal of the SBCMI approach. In doing so, we are able to accommodate activities conducted by means of short descriptions to clarify what is asked from pilot stakeholders and why an activity is undertaken. Moreover, stakeholders can indicate under what conditions or for what characteristics of their pilot, parts or phases of the SCBMI require additional attention. As a result, it allowed us to cater the SBCMI approach to these specific needs or conditions to increase its relevancy or usefulness in practice, and to build upon these learnings for presenting the SBCMI approach to other SIPs.

In addition to the feedback of users of the SBCMI approach, application of the approach for the pilots also helped the WP3 team to better understand how the approach can be streamlined, both in terms of the time effort needed to complete the SBCMI process as well as to ‘standardize’ steps or phases to improve the replicability of the approach. Through internal discussions for the WP3 team and communication of (intermediate versions of) the approach as part of consortium and work package meetings within Ploutos, we were able to identify several opportunities for further improvement. These opportunities for improvement entailed, amongst others:

- merging steps taken for the SCBMI approach into a single phase to discuss topics regarding business modelling which are similar or have strong synergies, improving the efficiency of application
- repositioning tools for the various SCBMI steps to offer a more natural flow in terms of discussions (i.e., the application of *benefits realization mapping* after a *business model design* session such that the insights on what the business model will look like can be taken into account)
- providing indications to what parts of the process are considered *core* and which parts are considered as *deepening* or *ad-hoc* depending on the characteristics of the SIPs. This allowed for reducing the SCBMI approach in case certain steps were already more or less ‘taken’ for the SIP.

Both streams of learning (*learning through user feedback* and *learning through application*) were used to develop the final version of the SCBMI approach. Section 5 will further detail the final version of the SBCMI approach.

4.2.3. Demonstration and evaluation

To support the collection of feedback of users to improve the approach, we orchestrated semi-structured interviews with pilot stakeholders. Typically, these interviews took place at the end of the SCBMI approach. Accordingly, pilot stakeholders were able to generate a comprehensive view on the positives and negatives for the approach, and could reflect on how different aspects of the approach are integrated as part of subsequent steps for the approach. To structure the elicitation of feedback, we build upon the Technology Acceptance Model (TAM) (Davis, 1986). This model is typically used to support the evaluation of design artefacts in practice. Using this model, we identify the following dimensions for evaluating our approach:

- Perceived usefulness: the degree to which pilot stakeholders deemed the approach (and the outputs generated) to be useful or relevant
- Perceived ease of use: the degree to which pilot stakeholders deemed the approach to be easy to interpret and the extent to which each step conducted was deemed clear
- Intention to use: the degree to which pilot stakeholders would intend to follow-up on the approach or would appreciate to apply the approach in different context.

We used these dimensions as part of the interviews held with stakeholders. Each interview was recorded, for which at least two members of the WP3 were present. The outcomes of these interviews are documented in the Appendix of this deliverable.

4.2.4. Communication

The following deliverables are used to communicate on the final version of the SBCMI approach in Ploutos.

D3.2 – Ploutos SCBMI approach – final version serves as the core deliverable for communication on the beta version of the SBCMI approach. However, within Ploutos, the final version of the SBCMI approach will also be communicated as part of:

D3.8 – Training material for SCBMI – final version: This deliverable will document the tools used to support the final version of the SBCMI approach. It will clarify how the tools can be used and at what phases of the SCBMI applied the tools are best applied.

D3.11 – Final Ploutos SCBMIs and data service valorization for pilot: This deliverable will document how the application of the final version of the SBCMI approach has resulted into SCBMIs for the various pilots, as well as what ad-hoc or *deepening* exercises have been considered for the SIPs to further address their needs.

D3.12 – Ploutos Consolidated SCBMI: This deliverable will include practical graphics on how the SCBMI approach has been used in Ploutos, what results it has been generated and how it can be (re)used in different related projects. This deliverable serves to facilitate the transfer of knowledge generated through Ploutos to different settings and projects.

In addition to communication within Ploutos, the final version of the SBCMI approach is also applied in different projects.

H2020 ZeroW – in this project, the SCMI approach is used to support sustainable collaborative business modelling in the context of reducing food loss waste. Here, application of the approach is intended to help the pilots involved in identifying collaborative business models to realize solutions aimed at food loss waste.

H2020 COMMECT – in this project, the SCBMI approach is used to support the implementation of ICT-based solutions in rural settings with the aim to create societal, environmental and economic value. Using the SCBMI approach, pilots involved investigate what collaborative business models can be built upon access to ICT-based solutions (such as wireless networks, 5G, edge solutions) and how these ICT solutions can enable new value propositions to be realized through collaboration between stakeholders involved.

Finally, the SCBMI approach is also communicated as part of a chapter on sustainable collaborative business modelling in the *Handbook on Sustainable Entrepreneurship Research*, de Gruyter (forthcoming). In this book chapter, we illustrate how the SBCMI approach has contributed to the development of sustainable collaborative business models (building upon cases drawn from Ploutos), and illustrate how such models can help to foster long-term collaborations for sustainable impact. The practical nature of the approach (i.e. through workshops) helps entrepreneurs support collaborative business modelling towards the realization and exploitation of sustainable innovations.

5. Final Version of the Ploutos SCBMI Approach

In this section, we detail the final version of the Ploutos SCBMI approach. First, we explain how the initial version of the SCBMI approach has been adapted, introducing generalized phases (analysis, design, evaluation, implementation and scaling) to support its use and communication. Next, we describe how each of the phases is supported through dedicated tooling. Lastly, we describe how the Ploutos SCBMI can be operationalized by means of a workshop-based setup.

5.1. Overview of the SCBMI approach – final version

An overview of the final version of the Ploutos SCBMI approach is depicted in Figure 7. One can see that the steps proposed for the initial version of the Ploutos SCBMI have been aggregated into 5 distinct phases, namely *analysis*, *design*, *evaluation*, *implementation* and *scaling*, with the resulting allocation of steps to the respective phases:

- Analysis: individual alignment; exploration and ambition; understand
- Design: develop; evaluate; adapt
- Evaluation: assess
- Implementation: roadmap
- Scaling: monitoring

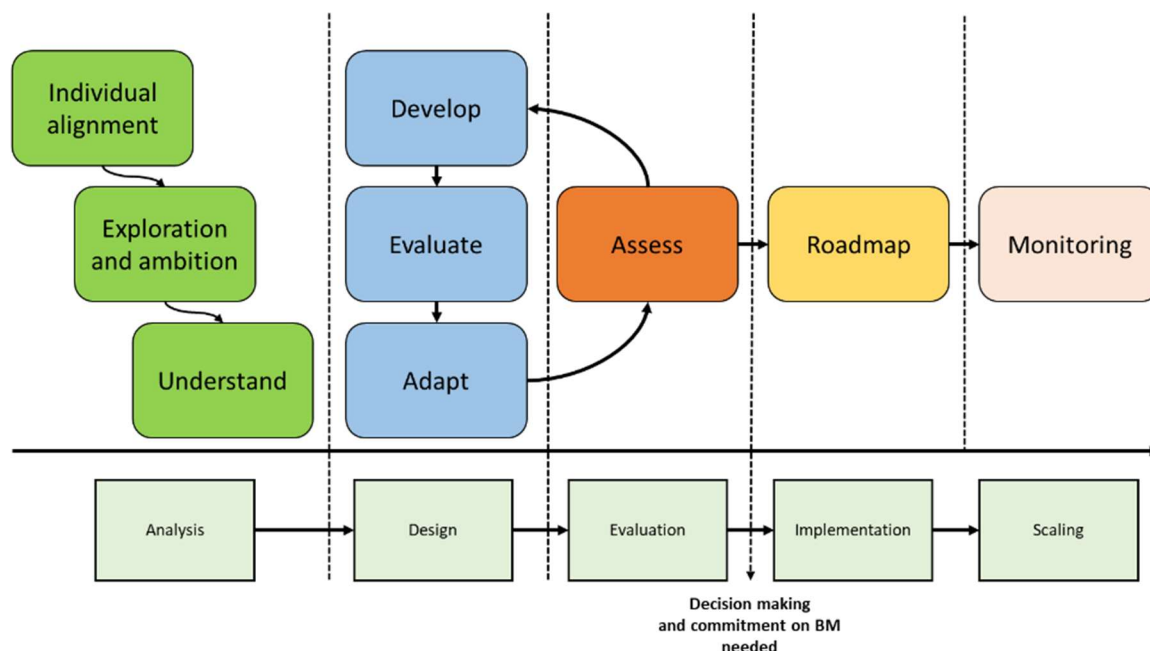


Figure 7 - SCBMI approach - final version

In the following, we elaborate on each of the phases included for the SCBMI approach. As explained (and illustrated in Figure 8, phases are accommodated by a set of techniques and tools to support their execution.

5.1.1. Analysis phase

The first phase, the analysis phase, is focused on laying a mutual foundation and to understand the value of the innovations at hand. Three steps (*individual alignment*, *exploration and ambition*, *understand*) are considered here in order to gather inputs on:

- the ecosystem in which the SIP operates, including parties to consider or involve
- the current business model in place for the SIP as well as the ambitions and objectives of stakeholders involved
- the innovation or (service) solution under consideration, its value and intended users.

Of these phases, we consider the *analysis*, *design* and *evaluation* phase as the *core part* of the SCBMI approach, leading up to a concrete commitment of stakeholders to participate for a novel business model. In contrast, As listed for Figure 8, we see that this phase is supported through tools such as the *value proposition statement* (to understand the value of the innovation), *the customer journey* (to understand how the innovation will be used and the stakeholders to involve to support the innovation) and the *DAMIAN tool* (to investigate how the innovation or solution technically will work). To support the elicitation of motivations and ambitions, this step 1-to-1 sessions to capture the true motivations of stakeholders are leveraged.

5.1.2. Design phase

In the second phase, the design phase (involving the steps *develop*, *evaluate* and *adapt*), a novel business model or business model alternatives are generated in an iterative process in which the initial design is created and evaluated, adapted and assessed in close collaboration with the SIP stakeholders until a satisfactory result is reached. The overview of reference SCBM archetypes (see D3.4: *final version of reference sustainable collaborative business model archetypes*) serves as a valuable basis here, providing generic business model structures which can inspire or be applied by stakeholders. In addition, the Ploutos Principles (mutuality, farmer-centricity, multiple values and scalability) are core considerations in designing the collaborative business model. Any business challenges identified (be it technical, social, or financial) should be captured and, if possible, addressed, whereas also critical assumptions for the business model should be identified. As part of the *develop step*, business model design tools such as the SDBM/R are used to help SIPs in mapping the business model design. As business models generally offer a ‘static’ representation of how new innovations will be realized or implemented, this step also applies *benefits realization mapping* to understand how the business model design is implemented over time and how it will be scaled to generate (sustainable) long-term impact. The *evaluate* step consequently forces stakeholders to reflect on any challenges faced or critical assumptions identified: to what extent are the identified business model alternatives feasible? Can certain business model alternatives already be deemed as infeasible? How should we alter the business model design to improve this? This should generate insights on how business models identified should be adapted or altered (or discarded) to better cater these models to the needs and objectives of the SIP. Logically, the insights generated through the *evaluate* step feed into the *adapt* step, in which stakeholders make changes to the business model alternatives to better cater them to the needs of the SIP. Generally, these steps are conducted in an iterative fashion until a concrete set of business model alternatives is obtained.

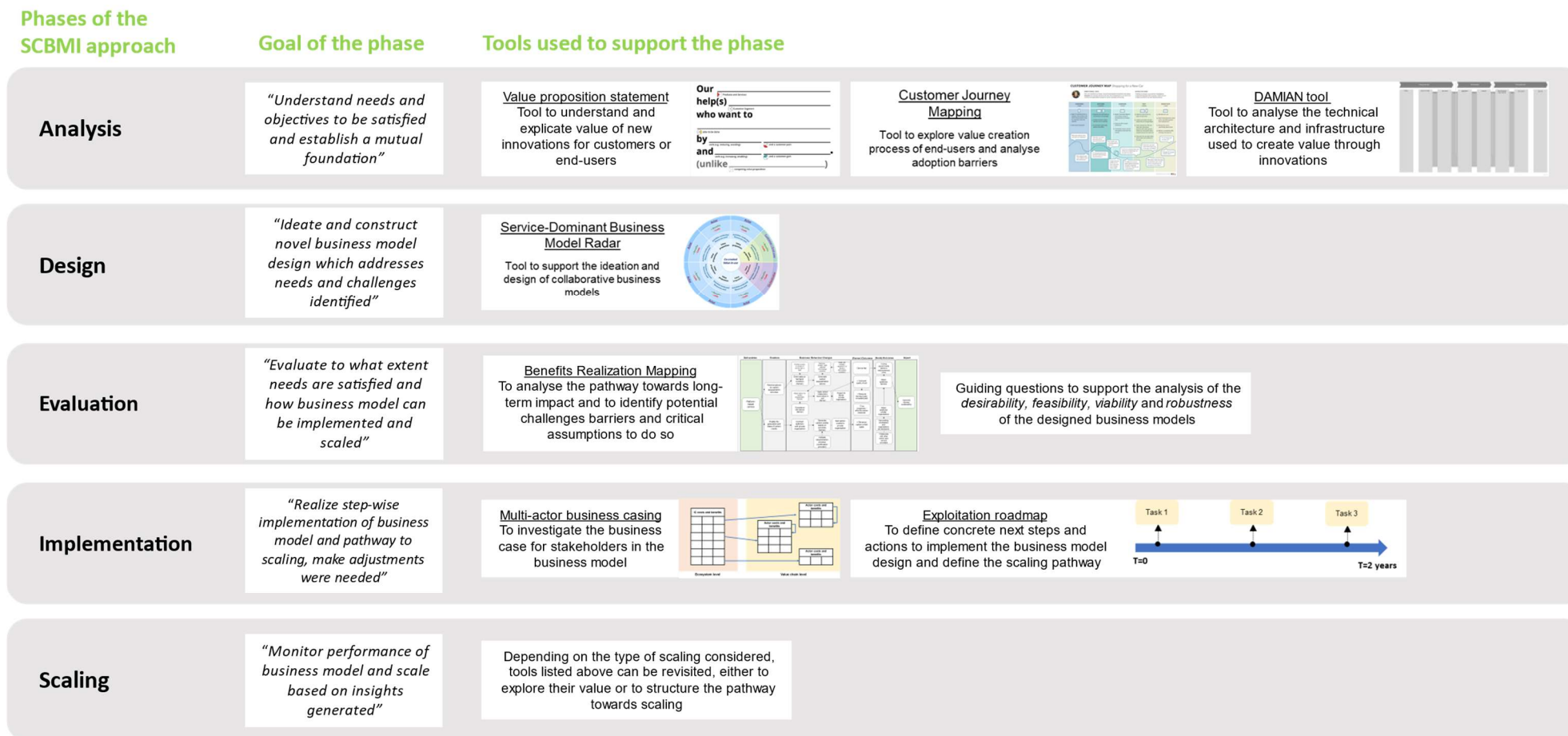


Figure 8 - Overview of the tools embedded for the SCBMI approach

5.1.3. Evaluation phase

Once the sustainable collaborative business model (as well as its alternatives) has been concretized, the evaluation phase takes place. This phase constitutes of assessing the long-term viability, feasibility and robustness of the business model design (as well as its pathway to scaling) and to understand to what extent the Ploutos principles have been fulfilled. This phase is generally iterative with the design phase: evaluation may raise challenges and barriers previously unaddressed, which pose potential changes for the business model design. This can result in several design and evaluation iterations before a valid and viable business model design is achieved and selected. To progress to the next phase, commitment of all stakeholders is needed on taking the business model further into the individual stakeholders' decision-making processes.

This phase can be supported through guiding evaluation questions (Gilsing et al., 2021), reflecting on various aspects of sustainable collaborative business models related to its *viability*, *feasibility*, *desirability* and *robustness*. Additionally, the Ploutos principles can serve as an important reference for which each business model design should be able to explain (at least in a quantitative sense) how the principles are fulfilled.

5.1.4. Implementation phase

Once the commitment of all stakeholder has been obtained on the collaborative sustainable business model design, the implementation of the business model can commence. The implementation phase focuses on creating and executing a roadmap to implement the business model over time and to realize the agreements made in previous phases. In this phase, SIPs should follow-up on how challenges identified for the selected business model and commit resources towards solving these challenges to help business model implementation. If necessary, appropriate interventions can be made (updating the business model design, re-evaluating design decisions or improving the logic by which impact is to be achieved).

To support the execution of the phase, a road mapping tool is provided (Phaal et al., 2015). Using the tool, SIPs make explicit when important actions in terms of business model realization are to be taken and how these actions contribute towards achieving long-term objectives. It also forces stakeholders to reflect on how these actions should be achieved (and by whom), and whether the SIPs are able to do so. In addition, this phase also involves tooling to support multi-actor business case analysis. As concrete investments towards realizing the business model are made, quantitative decision making support can be applied. This involves mapping the respective costs and benefits stakeholders generate through business model participation. This can help in clarifying how investments should be shared to ensure *all* stakeholders are able to capture (positive) value in return (adhering to the principle of mutual value).

5.1.5. Scaling phase

The final phase focuses on monitoring the performance of the sustainable collaborative business model (to validate whether a satisfactory business scenario remains to be obtained for all stakeholders involved), and to identify further pathways towards scaling. It entails a plan for the years to come, including a strategy to scale the business model up to a level that in principle should make it applicable in other regions of Europe. Logically, this may involve a reconsideration of previous analyses conducted as part of the SCBMI approach: for example, a scaling strategy may be built upon extending current value propositions to customers (deep scaling). This may therefore require organizations to re-evaluate how value is created for customers (customer journey) or may require different stakeholders to be involved (business model design consideration) in order to enable this.

5.2. Operationalizing the SCBMI approach through workshops

Building on the final SCBMI approach and the tools proposed to support its application in practice, we introduce a workshop based setup to operationalize the SCBMI approach. Accordingly, users can leverage this workshop structure as a basis for conducting SCBMI. The following set of workshops can be used to support the application of the SCBMI approach:

Workshop 1 – onboarding and value proposition statement, serves as a soft entry in the SCBMI approach. In this workshop, the goal is to understand the objectives, motivations and perceptions of stakeholders to be involved for a project or SIP and to see whether such perspectives can be aligned. SCBMI is very much a *collaborative, multi-stakeholder* approach: if stakeholders have different motivations or have vastly different objectives, this can create conflict or hinder the development and roll-out of innovative solutions as the project progresses (as for example stakeholders are only motivated by financial gain or do not consider the same scale for solution roll-out). It is also important to understand to what extent stakeholders have experience in business modelling and what their current role is for their respective organization: will you need additional support to help them make business decisions or can potentially parts of the process be accelerated as stakeholders are aware of business challenges faced? Workshop 1 is concluded using the value proposition statement – the stakeholder group should shed light on the innovative solution under consideration and collaboratively discuss *for whom (customer / end-user)* this solution is valuable and *how* its use enables *value creation for this customer / end-user*. Note that the Ploutos principles (farmer-centricity, mutual value) should drive discussions on how value is created. Any differences of opinion should be resolved before the next workshop is started.

Workshop 2 – DAMIAN and Customer Journey continues the discussion on the innovative solution, investigating *how* the solution will be used in practice by customers / end-users and *what* is needed to support the solution (in terms of stakeholders and technical background). It should be clear what steps the end-user / customer will take to use the innovative solution to create value and what efforts of stakeholders are needed to support this. This should be coupled to a discussion on what data is collected (and by whom) and whether this facilitates value creation (or could potentially destruct value due to privacy issues or due to the efforts needed by end-users). After workshop 2, the stakeholder group should fully understand how the solution will work in practice and what resources are needed to support its use.

Workshop 3 – Business Model Radar focuses on the design of the business model, exploring the business structure appropriate to support the innovative solution and understanding the costs and benefits that can be appropriated for stakeholders involved for the business model design. After this workshop, it should be clear what stakeholders take part for the business model design, why they are involved (what value do they contribute?) and how each stakeholder is able to capture value in return (generating a positive balance of costs and benefits) as a result of participation. It should also become apparent whether the business model design can be strategically motivated for each stakeholder (do we want to pursue this business model) and what potential business challenges exist towards its implementation. Workshop 3 is concluded with a draft business model design as well as an indicative analysis of what costs and benefits each stakeholder receives through participation. Considering the key decisions that are made as part of this workshop, which generally involve decisions which concern the exchange of costs and benefits, and as a result may concern opposite (conflicting motives), creating a level playing field and a transparent and trusted environment is important. Here, the use of an external facilitator or third independent party can help in overcoming barriers towards sharing (information on) costs and benefits as part of (collaborative) business model design. This facilitator then acts as a broker between parties in the collaborative business model (whilst maintaining and emphasizing the necessity of ‘collaboration’) and helps in driving the discussion on how costs and benefits are distributed. This is especially important in case dominant players or competitors are present at the table, which in traditional settings would exert power to drive business decision making. This facilitator therefore

guides the process of concretizing the exchange of costs and benefits, supports decision making on value exchanges and takes a holistic view on whether the business model design as a whole would result in a viable and feasible business scenario for all stakeholders involved.

Workshop 4 – Benefits Realization Mapping analyzes the operationalization of the business model design. Here, stakeholders should investigate through benefits realization mapping whether each step towards value creation can be executed or whether the necessary resources and capabilities are in place to do so. Stakeholders should challenge each step to identify possible implicit assumptions made for the business model design or challenges that should still be resolved. It also clarifies in detail what is asked from each individual stakeholder involved. Next to operationalization, the consortium / stakeholder collaboration should also zoom in on how the business model design will be scaled to achieve the impact goals set for workshop 1. Any changes required to the business model design as a result of BRM should be documented and made.

Workshop 5 – Business Model Evaluation concerns a final business model ‘check’. In this workshop, the business model design is considered in light of its desirability (how does it create / destroy value for end-users / farmers?), viability (how does it create / destroy value for stakeholders involved, both economically, socially as well as environmentally?), feasibility (what challenges do we still see towards business model implementation?) and robustness (to what extent can the business model design react to external changes?). Stakeholders should collaboratively discuss each criteria and judge or ‘score’ to what extent the business model performs for each criteria. If the business model design does not perform well for a certain criteria, the stakeholders should collaboratively decide whether this warrants business model redesign or whether this can be resolved for the current BM.

Workshop 6 – Reflection and next steps concludes the core sustainable collaborative business modelling process. Here, the consortium reflects on the decision made and plans the next steps towards execution. In case business model tests are specified (to validate assumptions uncovered through BRM) these serve as the starting point for further business model refinement or implementation.

Workshop 7 (ad-hoc) – depending on the next steps towards execution, a deepening of previous exercises or a concretization of the execution strategy can be considered. Accordingly, this workshop may entail (not being exclusive to) supporting the quantitative business case analysis of the SCBM or may cover drafting a roadmap including concrete next actions to support the implementation of the SBCM.

5.3. Variations to the SBCMI approach

Through application of the SBCMI approach for the Ploutos SIPs, we identified that the characteristics of the SIPs have significant implications for how the SCBMI approach is effectively applied. Several *generic innovation structures* can be identified which can be mapped to the SIPs, which influences how the SCBMI approach can best be applied. An innovation structure concerns the configuration of the business ecosystem to stimulate the realization or implementation of new (sustainable) innovations. Generally, SIPs take the form of a pilot in which retailers or cooperatives engage with farmers to stimulate the adoption of one or more technological innovations. This is the case for SIP 1, SIP 2, SIP 4, SIP 6, SIP 7, SIP 8 and SIP 10. In such an innovation structure, the technological innovation is leading: it serves as the starting point for business model innovation. Accordingly, a technology provider is involved which provides the technology as a (service) solution to farmers, after which decisions for the business model design are to be made on how the value generated through use of the (service) solution is shared such that all stakeholders are able to capture mutual value. It is evident that in such cases a clear technological innovation is driving the business model innovation process: the goal is to explore, analyze and implement this innovation through business model innovation. As a result, emphasis for the SCBMI lies on understanding the business model design which enables the technological innovation to flourish and to generate long-term sustainable impact. In terms of steps of the

SCBMI, this means that particularly the design phase (but also the evaluation phase, depending on the maturity of the SIP) of the SCBMI approach is critical.

Conversely, we also observe an innovation structure in which SIPs deal with orchestrating innovation initiatives (Ritala & Sainio, 2014). In contrast to the previously highlighted innovation structure, this is not necessarily driven by a concrete technological innovation. Rather, business model innovation is instigated by a clear market opportunity or need of end-users for which any technological innovation can be considered. This is the case for SIP 5 and SIP 11. In these cases, the focus is on identifying and establishing collaborations between partners to realize new value propositions or solutions (which in turn can be enabled by technological solutions). Business model innovation in these contexts focuses on fostering a landscape in which new value propositions can be offered, which in turn enable partners involved to satisfy the needs of end-users or to capture market opportunities. Accordingly, the analysis phase (and partially the design phase) of the SCBMI approach (particularly in terms of understanding the ecosystem of stakeholders relevant to consider) is key: to understand how generic configurations of business networks can enable new value propositions and what general roles and capabilities are required to do so. Consequently, to map such configurations to preliminary business model designs which serve as the basis for further collaboration and concretization.

Lastly, we identify innovation structures in which the (technological) innovation or solution proposed is already realized as part of a preliminary business initiative or business model, in which the challenge is to scale the business model to increase the sustainable impact that can be realized. This is the case for SIP 3 and SIP 9. In contrast to the first and second innovation structure (which do not possess a sustainable collaborative business model design available), for these cases, we see that the business model design, including stakeholders involved, is more or less concrete and that the value of the solution offered can be demonstrated (concrete end-users can be identified). Here, SIP stakeholders intend to investigate as part of the SCBMI approach how the business model can best be scaled to other users. Accordingly, particularly the late phases of the SCBMI approach (evaluation, implementation and scaling) are emphasized: exploring different scaling strategies which can be pursued to help SIPs to increase their reach to additional customers or different markets.

Figure 9 summarizes the findings above and presents an overview of how the innovation structures identified influences where the focus of the SCBMI approach lies. One can see that if a SIP is driven by the marketization of a new technological innovation, the goal is to find a SCBM which helps in doing so. In this case, the output of the SCBMI approach should be one or more SCBM designs which clarify how the technological innovation is realized, how stakeholders involved are able to capture value and how impact is generated. As a result, the focus of the SCBMI lies in the design and evaluation phase. Whilst the analysis phase is still important to consider (stakeholders may have conflicting opinions or beliefs on *how* and *for whom* the technological innovation is relevant), the activities conducted as part of the design and evaluation are key to support the intentions of the SIP and require increased emphasis.

For the second innovation structure (orchestrating the innovation landscape), SIPs are driven by concrete needs or challenges faced by end-users to be addressed, but without a concrete technological innovation driven the innovation process. In this case, the SCBMI approach should help in clarifying what value propositions are relevant to solve the challenges faced by end-users, and identifying what network of stakeholders would be needed to be able to support these value propositions in practice. It therefore describes a generic collaborative structure of how stakeholders may collaborate (and ideate solutions for end-users) to address the challenges identified. As a result, the focus of SCBMI lies in the analysis and design phase: the goal is to understand what value propositions helping in solving the needs of end-users and what stakeholders are needed to provide such value propositions. In turn, this network of stakeholders can consequently further concretize these value propositions to specific end-users. Although not considered as

key to this innovation structure, the evaluation phase can still be helpful to consider here to understand which generic structures are viable and feasible in practice.

For the third and final innovation structure, SIPs already have a business model design in place and desire to explore how the business model can be scaled. In this case, the SCBMI approach should help in clarifying what scaling strategies are appropriate (and why) and how these scaling strategies can be realized. Accordingly, the SCBMI approach should emphasize the implementation and scaling phases to do so. Note that the design and evaluation phase may be revisited depending on the type of scaling strategy considered: in case existing value propositions are altered or extended to facilitate scaling, this may have implications for how the SCBMI is defined and how value subsequently is captured.

Innovation structure:
marketization of new technological innovation



Characteristics of SIP:

- Technological innovation as a starting point
- Goal is to work towards SCBM to create impact through technological innovation

Outputs for SIP:

- SCBM (alternatives) which support realization of technological innovation to create impact

Impact on SCBMI approach:



Focus of SCBMI to understand how the SCBM should be designed to support the innovation and how stakeholders are able to benefit through SCBM

Innovation structure:
orchestrating the innovation landscape for new value propositions



Characteristics of SIP:

- Concrete needs and challenges of end-users as starting point
- Goal is to understand through SCBM what value propositions (and technologies) can be supported to address challenges

Outputs for SIP:

- Generic SCBM structure, identifying stakeholders and roles to be included to support a set of value propositions that can help to solve challenges

Impact on SCBMI approach:



Focus of SCBMI to understand what value propositions are required to satisfy end-user needs and what network of stakeholders (generic SCBM structure) should support this

Innovation structure:
Scaling of sustainable business model for increased impact



Characteristics of SIP:

- Ready or implemented sustainable business model as a starting point
- Goal is to scale sustainable business model to increase impact

Outputs for SIP:

- Scaling strategies and roadmap to increase the impact of current sustainable business model

Impact on SCBMI approach:



Focus of SCBMI to understand how the current SCBM should (and can) be scaled to create additional value and how this scaling strategy can be operationalized

Figure 9 - Variations of SCBMI to support generic innovation structures identified for SIPs

6. Conclusion

In this deliverable, we presented the *final version* of the SCBMI approach. This final version can be considered as an update of the alpha version presented in *D3.1 – Ploutos SCBMI approach – initial version*. Through application of the initial version (and subsequent intermediate versions) of the SCBMI approach for the SIPs in Ploutos, we were able to collect feedback from users (i.e. stakeholders for the various SIPs), as well as identify opportunities for further improvement. Based on these insights, we iteratively improved and fine-tuned the final version of the SCBMI approach, paying attention to how we can improve the relevancy of the approach for the SIPs as well as improve the replicability and efficiency of the approach.

The final version of the SCBMI approach consists of 5 phases which aggregate the nine steps previously introduced. These steps represent the *analysis, design, evaluation, implementation* and *scaling phase*. In response to feedback received, this aggregation allowed us to generalize or ‘simplify’ the approach for the SIPs. In result, it improved the interpretability of the approach and made it less overwhelming and daunting for new users of the approach.

In contrast to the alpha version of the approach, the final version includes an explicit mapping of what tools can be used to support which phases of the SCBMI approach. On the basis of this, we operationalize the SCBMI approach and propose a workshop-based setup for conducting the SCBMI approach. Accordingly, the set of workshops can be used by (new) SIP stakeholders or by external users to support the SCBMI approach.

In addition, through application of the SCBMI approach, we identified that the use of the SCBMI approach can be catered to the needs and characteristics of the SIP under consideration. Here, we identified three generic innovation structures (*marketization of a new technological innovation, orchestrating the innovation landscape, or scaling the sustainable business model for increased impact*) which have an impact on what part of the SCBMI approach should be emphasized. For example, for SIPs characterized as *the marketization of a new technological innovation*, the goal is to generate a SCBM which can support the realization of the technological innovation in practice as well as enable (sustainable, societal, economic) value creation. In such cases, the design and evaluation phase of the SCBMI approach are key, as these phases are dedicated to generating and evaluating a viable and feasible SCBM to be used in practice. SIPs can use this categorization to reflect on their current characteristics and accordingly emphasize certain phases for the SCBMI approach.

The final version of the SCBMI approach can be considered as a prominent output of the Ploutos project, and will feature as part of the (practical) takeaways presented in D3.12 – Consolidated Ploutos SCBMI (as well as to a lesser extent in D3.8 and D3.11). The SCBMI approach will also be used in different projects to support sustainable collaborative business modelling. For example, the SCBMI approach is currently being applied as part of H2020 ZeroW and H2020 COMMECT to support collaborative business modelling for sustainable impact.

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