visionary

Towards more sustainable food provision

Date

Milestone 2.1

Initial Conceptual Framework

Work Package 2. Mapping levels and lock-ins in the Food System

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Executive Summary

This Initial Conceptual Framework assembles the VISIONARY project's theoretical and conceptual foundations, explaining the systemic character of the food system and its transitions towards sustainability, the role of food actors' behavioural factors in conditioning such transition and the interaction between research and policy-making to accelerate. This initial framework sets the foundations for the 'Empirically grounded Conceptual Framework' to be released by Month 46. After a preliminary review of the approaches revolving around food system transition towards sustainability and its behavioural dimension (in particular of farmers and consumers), the document focuses on two main domains: 'behavioural food policies' and 'sustainable business models'. Finally, the document deepens into the transdisciplinary approach of the project, based upon the concept and implementation of Science-Policy Interfaces.

1. Introduction

This initial Conceptual Framework (CF) aims to assemble the VISIONARY project's theoretical foundations by adopting an interdisciplinary approach bringing together the expertise of the consortium, by integrating in a consistent manner a number of concepts, explaining the systemic character of the food system and its transitions towards sustainability, the role of food actors' behavioural factors in conditioning such transition and the interaction between research and policy-making to accelerate. Moreover, this initial CF sets the foundations for the 'Empirically grounded Conceptual Framework' to be released by Month 46, in which this initial version will be reviewed in the light of the results of the empirical results obtained, giving rise to a revision of the initial assumptions about concepts and categories. A key element of the final CF is to integrate VISIONARY'S transdisciplinary approach, as it will incorporate the new knowledge arising from the actors who will be engaged along the participatory activities of the project.

With this in mind, this initial CF has three main challenges. First, it must provide the foundations of an interdisciplinary project, able to blend theoretical and methodological approaches and to provide a common conceptual basis for researchers. In other words, the initial CF should become a 'meeting point' to different scientific trajectories. Second, it shall shape a solid base in which the project's research outcomes may fit in a coherent manner, to allow an empirically grounded CF to be developed at the end of the project. Third, and most importantly, the CF has to adopt an action-oriented approach, which is inherently linked to VISIONARY'S theory of change. According to Thornton et al. (2017), "[a] *theory of change provides a detailed narrative description of an impact pathway (the logical causal chain from input to impact […]) and how changes are anticipated to happen, based on assumptions made by the people who are undertaking the work*". In doing so, it "*can thus provide a means to make explicit the implicit, often elusive, hypotheses on the processes that bridge the gaps between research design, outputs, use, and outcomes*". The project's empirical outcomes should address those questions and hypotheses. In this way, this framework aims to become a bridging tool that enables connections between levels of knowledge (Partelow, 2023).

Taking this into consideration, we can assert that VISIONARY Conceptual Framework would fit into what Cumming (2014) classifies as an Action-Oriented Framework, since it recommends "*a particular course of action by an established set of actors in response to a particular kind of problem*" (p.10).

Box 1 summarises the narrative of this CF. The next sections establish and provide details on the conceptual building blocks of this narrative.

Box 1. The CF underlying narrative

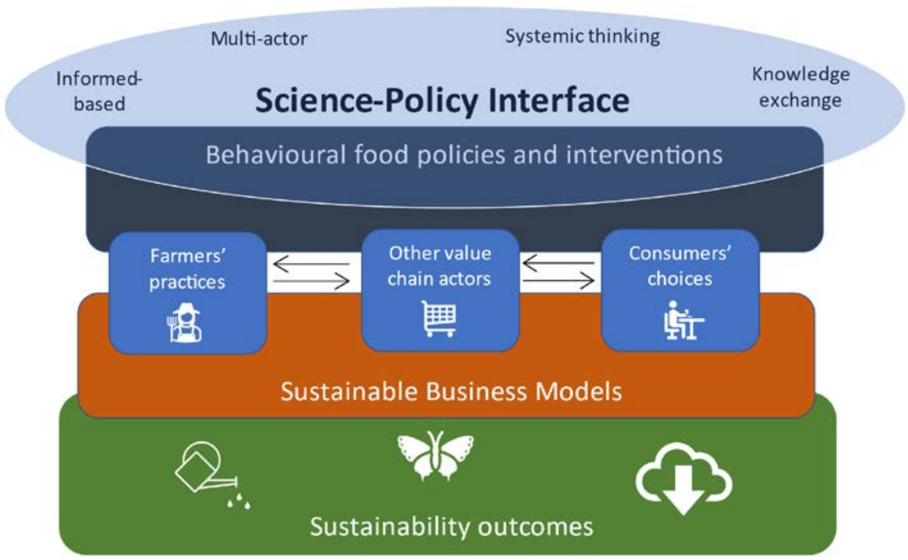
Food system transition -which expands beyond mere technological change to include social transformation (Conti et al. 2021)- requires transformative research, that aims to deliver on a normative mission promoting change processes (Reisch, 2021). This is our action-oriented focus. For this to be done, particularly in the field of behavioural analysis, Reisch suggests adopting a transdisciplinary research perspective. This would allow a better collective and shared understanding of the behavioural foundations of actors' decisions making in food systems. Moreover, pushing changes in a concrete direction requires feedback mechanisms as allowed precisely by transdisciplinary approaches (Conti et al., 2021).

There is an underlying Theory of Change approach in relation to behavioural-related interventions (Olejniczack et al., (2020), i.e. a specific causal chain about how and why planned activities and interventions – those addressing the cognitive mechanisms of individual actors and their choice architecture – will bring about change for the better. In this regard, VISIONARY focuses on activities and interventions in two interwoven domains: policy-making and business models.

VISIONARY integrates these elements, by combining (i) a system thinking approach, (ii) the findings of behavioural insights - i.e. pieces of knowledge based on empirical findings about behaviour (Troussard and van Bavel, 2018) - stemming from the case studies, and (iii) the multi-actor platforms of Science-Policy Interfaces.

Finally, VISIONARY will explore the way the concept of sustainable business models can become a meeting point of the different streams of knowledge about farmers', consumers' and other food actors' sustainable behaviour, as well as an approach to explore and promote farmers' adoption of sustainable practices.

Figure 1. Scheme of VISIONARY Conceptual Framework



2. Food systems

The need for adopting a systems approach to embrace food systems was formulated decades ago both in agriculture and ecology, although this idea gained prominence as food security narratives evolved (SAPEA, 2020). A report by the European Commission' Standing Committee on Agricultural Research concluded that a system-based approach across the combined domains of agriculture, fisheries, food, environment, nutrition and health "*contributes to a better understanding of the key parts of the food systems at various scales, helping to avoid overlooking trade-offs and synergies*" (European Commission, 2019).

A systems approach is understood as "*viewing a specific aspect […] as a component of a larger whole, having direct and indirect interactions with other, sometimes seemingly unrelated, aspects […]. This means that solving an issue in a particular sub-system should be approached with a 'holistic' perspective, taking account of possible trade-offs and feedback loops on other interconnected sub-systems*" (EC-DG RTD, 2020: 17).

The food system, as a complex system, is by definition "*non-linear, interconnected, multivariable, self-evolving and dynamic*" (SAPEA, 2020: 4). It "*includes all relevant actors, resources and activities relevant for the production and consumption of food and beverages and their associated wastes, as well as their impact on the economy, environment and society*" (European Commission, 2022a: 11). In the latter report of the European Commission, 25 groups of actors involved in the EU food system are identified, from which the following groups were remarked as the most relevant for sustainability, among them: input suppliers, intermediaries, primary producers, food & drink manufacturers, retailers, catering services & hospitality, consumers, finance, advice, interest groups, media, and policy makers.

Ericksen (2008) proposed a broad definition of food systems that not only include all the activities from food production to consumption but also the interactions between and within biogeophysical and human environments, the outcomes of the activities (contributions to food security, environmental security and social welfare) and other determinants of food security. Ericksen's holistic approach includes feedback and interactions with environmental and socio-economic drivers.

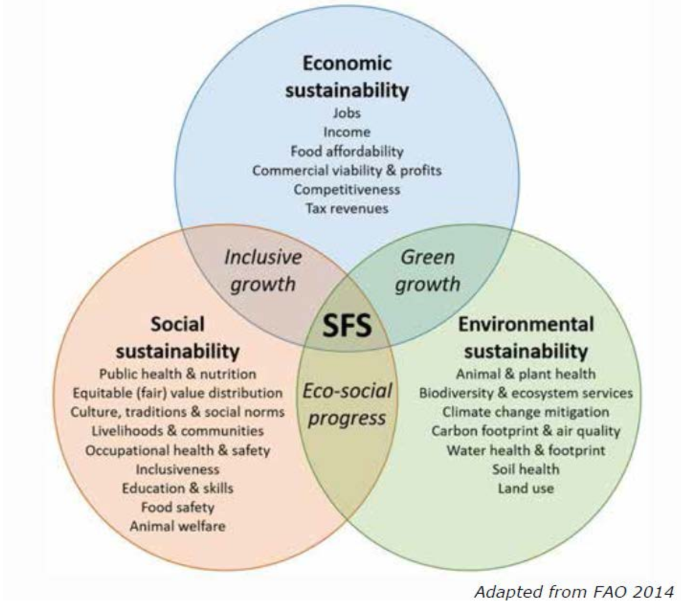
3. Food system transitions towards sustainability

3.1. Sustainability and sustainable food systems

Sustainability is generally expressed in terms of meeting the needs of the current generations without compromising the needs of future generations.

It is widely accepted that sustainability has environmental, social, and economic dimensions (EU Food Policy Coalition, 2021). As for the food system, Figure 1, adapted from FAO (2014) by European Commission (2020), shows the issues that may be included in each of these dimensions and in the intersections among them.

Figure 1. Sustainable food system



Source: European Commission (2020: 14).

In the particular case of sustainable food systems, some studies add ethics and resilience as other dimensions (European Commission, 2022a), require the system to be fair[1] (European Commission, 2022a), or distinguish five dimensions: (1) food security, safety and nutrition, (2) environment, (3) resilience, (4) economic viability, and (4) fairness inclusivity and ethics (SAPEA, 2020). VISIONARY system approach will tackle the mechanisms that connect these dimensions by identifying and characterising them in broad diversity of case studies in several countries.

There is not a universally agreed definition about what a sustainable food system is, and this reflects that conflicts of interests are common among the numerous actors involved in the food system (SAPEA, 2020). The HPLE (2014) defined a sustainable food system as "*a food system that ensures food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition of future generations are not compromised*". At the EU-level, SAM (2019) proposed that a sustainable food system "*provides and promotes safe, nutritious and healthy food of low environmental impact for all current and future EU citizens in a manner that itself also protects and restores the natural environment and its ecosystem services, is robust and resilient, economically dynamic, just and fair, and socially acceptable and inclusive. It does so without compromising the availability of nutritious and healthy food for people living outside the EU, nor impairing their natural environment*".

Stemming from the former definition, SAPEA (2020) puts the emphasis on the *outcomes* expected from a sustainable food system, which are:

[1] The concept of "fair sustainability" has been referred to as *"[t]he need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems*" (Agyeman et al., 2003, p.5, cited by SAPEA, 2020).

- To provide safe, nutritious and healthy food for all current and future citizens in a given territory without compromising the availability of and access to safe, nutritious and healthy food for current and future people living outside that territory.
- To provide food security without harming the environment. This outcome also integrates the spatial and temporal dimensions by ensuring a healthy environment in other territories and to future generations.
- To be robust and resilient in order to produce food, in a wider context that is itself not sustainable, but is challenged by environmental degradation, climate change, biodiversity losses and resources scarcity. Food systems also need to be sustainable in social and economic terms, resilient to price shocks and other crises, and responsive to social inequalities and other forms of injustice.

3.2. The transition to sustainable food systems as a contested field

The term "transition" is used in the analysis of changes in societal sub-subsystems (e.g. food, energy), with a focus on social, technological and institutional interactions (SAPEA, 2020). A range of theories have tackled the transition towards sustainable food systems from a social science perspective; many of them address the tensions between agency -understood as the ability to take action or to choose what action to take (European Commission, 2022a), and structure (explanations from a structural, institutional and collective level) (SAPEA, 2020).

A systems approach helps embracing the complexity of the transition towards sustainable food systems, which may entail unavoidable trade-offs (Béné et al., 2019) - such as gains in the sustainability dimension potential and losses in the others, or tensions between efficiency and resilience (European Commission, 2022a)[2] - generate unequal outcomes and conflicts of interests among different actors, and require coordination of actions at multiple levels of governance and scales (SAPEA, 2020). In this vein, identifying measures that anticipate the trade-offs, enhance synergies or align objectives emerge as a challenge for policy-makers (OECD, 2019a).

The transition towards sustainable food systems is thus a contested field both for scholars and policy-makers. Fraser et al. (2016) identified four different pathways in the literature to solve the 'global food crisis': (i) Technological innovation to increase food production, (ii) equitable food distribution as the centre of the food system needs, (iii) local food sovereignty, that are associated to 'local food movements' in the developed countries and to the notion 'food sovereignty' in the Global South – and increasingly in North America and Europe, and (iv) policy and regulation to fix market failures, that stress the need for policy intervention to correct "*perverse incentives that undermine the sustainability and security of our food systems*" (p. 79).

Later, Béné et al. (2019) also reviewed the different narratives that exist in the literature about what the failure of food systems is about. Four narratives are identified in this study that put the emphasis, respectively, to (i) the inability of the system to feed the world population, (ii) the inability of the system to deliver a healthy diet, (iii) the inability of the system to produce equal and equitable benefits, and (iv) the unsustainability of the system and its impact on the

[2] Other examples of trade-offs or "dilemmas" in the transition towards sustainable food systems are, on the supply side, the negative effect of the reduction of the meat consumption for the vitality of the livestock sector, and on the demand side, and the impact in the food affordability by poor people that an increase in food prices to internalise the environmental costs would entail (SAPEA, 2020).

environment. VISIONARY will deepen into the narratives about food system systems' failures, developed by a diversity of actors, including the researchers engaged in this project.

Also based on the literature, the SAPEA report (2020) explores alternative theoretical perspectives and "framings" of food – each one with its own narrative components and policy intervention approaches: food as a commodity, food as a human right, food as commons, food as humans' closest link to nature, and food as identity and culture. Within this framework, the current food system is considered to be pervaded by a framing of food as a commodity (European Commission, 2020). In a similar vein, the report conducted by the European Commission (2022a) highlights that the current EU food system is mainly focused on the economic dimension of sustainability, while ensuring a high level of food safety.

Therefore, market pressure within the current paradigm creates a mind-set focused on short-term economic gains by different actors of the food system, as well as to food prices that do not internalise the environmental externalities. Thus, one of the most important leverage points for a transition to sustainable food systems is a paradigm shift from the short-term, profit-focused views, towards a long-term food security taken in a broader sense. The transition may also entail a reorganisation of power relations among the food system actors (European Commission, 2022a; SAPEA, 2020).

The power concentration is widely acknowledged as an important trait of food systems. Some actors of the food system have more power than others - primary producers and consumers having lower level of individual agency, whereas the degree of consolidation of food manufacturers, international traders, banks and retailers gives them a substantial market power (European Commission, 2022a). The weak position of primary producers is regarded as one of the most important bottlenecks for transforming food systems (SAPEA, 2020). Retailers strongly influence primary producers and food manufacturers by means of contractual requirements and standards, and also consumers' choices (European Commission, 2022a) (SAPEA, 2020).

Transparency also emerges as a core principle to mainstream sustainability in the food system, as "a *necessary property to enable accountability and responsibility*" (European Commission, 2022a: 32). There is a lack of transparency in the social and environmental requirements across the value chain regarding the true costs of production, the origin and ingredients of the products, and the price composition. Transparent, accessible and comparable data and information on sustainability criteria should be exchanged between relevant actors, including the public authorities (European Commission, 2020; European Commission, 2022a). In this regard, labelling may reduce the 'information asymmetry' between consumers and producers, and 'sustainability labelling' can certify the compliance with social or environmental standards – in fact, some governments are introducing public standards to replace the private ones, for instance, regarding the carbon footprint of products (SAPEA, 2020).

The transition towards sustainable food systems also requires changes in technology, infrastructures, primary and secondary raw materials or energy supply (European Commission, 2022a). Social innovation can also change power relationships and drive food system changes. In this regard, alternative (niche) innovators and NGOs have the potential to become key food system innovators, by experimenting new solutions and inspiring other companies, governments and other more mainstream food system actors (UNEP, 2016). Nevertheless. the lack of independent extension services, insufficient environmental research and, generally speaking, the insufficient support for farmers to move to sustainable practices are a lock-in for the transition to sustainable food systems (European Commission, 2022a).

Research suggests an experimental, flexible and iterative approach to system change, with clear high-level goals, participatory governance structures and strong monitoring (European Commission, 2020). A range of leverage points needs to be identified to successfully introduce changes into the food system (European Commission, 2022a). SAPEA (2020) proposes to move from a linear understanding of food systems to a more circular approach, while at the same time "*including the social and human rights aspects (just, fair, inclusive and socially acceptable*" (p. 72).

Finally, the review made by Conti et al. (2021) finds six thematic explanations of resistance to change in the agri-food system that hamper its transition towards sustainability: (i) technological persistence; (ii) misaligned institutional settings, policies and incentives; (iii) attitudes and cultures that cause aversion to change; (iv) political economy factors that skew the direction of change; (v) infrastructure rigidities; and (vi) research priorities, practices and dominant innovation narratives misaligned to the transformational change agenda. Interestingly, the behavioural-related dimension is a cross-cutting component in all these thematic explanations, as they either shape or are affected by the diverse behavioural factors explaining actors' decision-making. This is what the next section tackles.

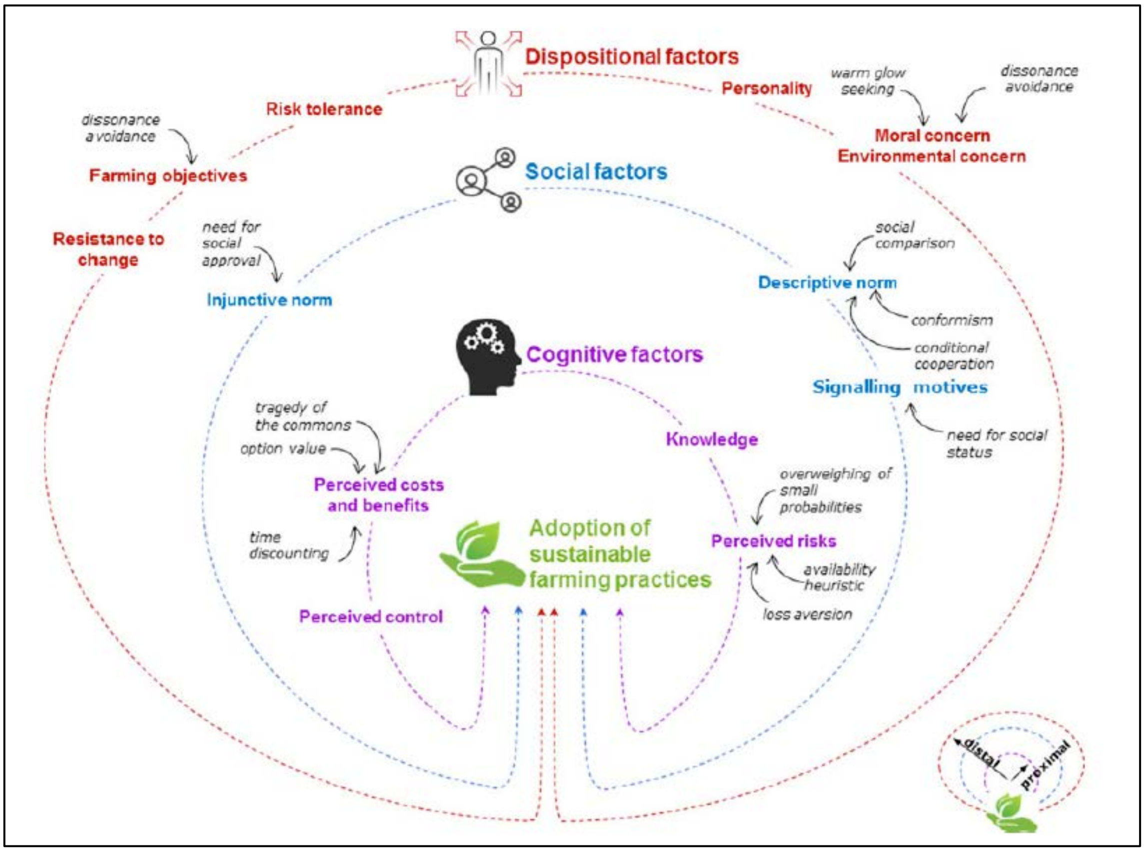
4. The behavioural dimension of the transition to sustainable food systems

Addressing the behavioural dimension of the transition towards sustainability inevitably requires focusing on the specific actor groups. From the diversity of actors who make up the food system (see above) scientific behavioural literature has focused -almost exclusively- on farmers and consumers, paying much less attention to other relevant actors operating in between. This is becoming evident in the literature review conducted in parallel to the preparation of this initial CF. Moreover, these two scientific streams have developed independently and disconnected, leading to distinct conceptual approaches and categories. Next sub-sections approach these two domains: farmers' and consumers' behaviours.

4.1. Farmers behavioural analysis

In the last years, there has been a proliferation of analyses about the behavioural factors affecting farmers' decision-making, in particular regarding the adoption of more environmentally-friendly farming practices. Dessart et al. (2019) review, compile and classify these factors. First, they use two categories based on the 'distance' from the concrete decision-making: (i) distal factors (like personality, risk aversion) are higher-order aspects not linked to specific decisions, but related to multiple behaviours; and (ii) proximal factors relate to lower-order aspects directly linked to the concrete decision to be made (e.g. the perceived costs and benefits of such action, i.e. the farming practice to he adopted). Second, along the spectrum of distal-proximal factors, Dessart et al. (2019) identify dispositional, social and cognitive factors (Figure 2).

Figure 2: Behavioural factors affecting farmers' decisions



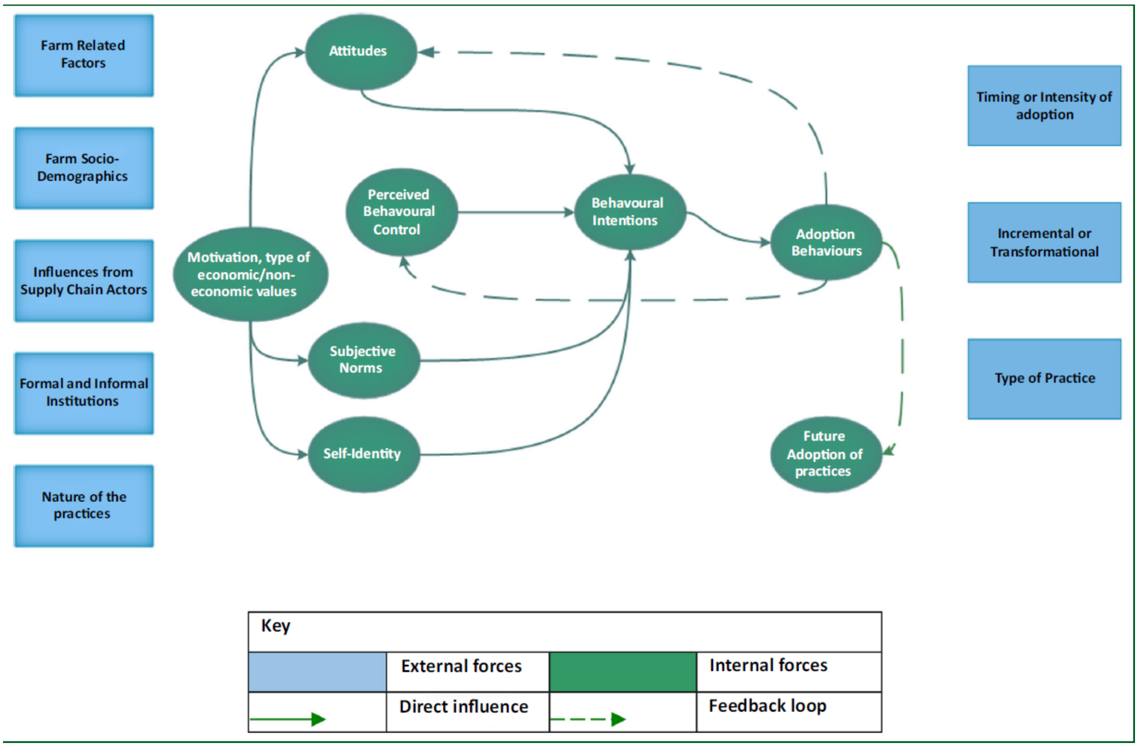
Source: Extracted from Dessart et al. (2019).

These authors conclude that addressing both distal and proximal factors would require an interdisciplinary approach, as the latter are more linked to economists' tradition and the former require a more systemic and sociological approach. In addition, they highlight the need to not focus exclusively on the analysis and implementation phases of decision-making, but to also pay attention to a previous 'willingness-to-consider' phase.

Dessart et al. (2019) focus their review exclusively on individual factors. However, VISIONARY will widen this approach by considering collective factors that, as shown by Barghusen et al. (2021), potentially enhance collaboration among farmers and thereby could bring about better sustainable outcomes. VISIONARY develops and tests collective incentive mechanisms that enhance farmers' adoption of sustainable agricultural practices as this may provide important policy insights for future sustainability strategies.

Barnes et al. (2022) focus on the process of adoption of 'ecological practices' by farmers and the role of both internal and external drivers in such process (see Figure 3). In this framework, particular attention is paid to the nature of the ecological practice to be adopted. In this regard, Rega et al. (2022) classify five (non-mutually exclusive) 'farming approaches' in relation to ecological farming practices: conservation agriculture, low- input farming, integrated/circular farming, organic farming, and agroecological farming. With this in mind, VISIONARY's Case Studies (CS) are selected to cover a diversity of farming practices that will allow a cross-cutting view of the way they affect farmers' behaviour.

Figure 3. A behavioural model for ecological practice adoption



Source: Extracted from Barnes et al. (2022)

From their conceptual framework, Barnes et al. (2022) identify four types of farmers: (1) enabled, who hold positive views towards ecological practices and are closer to the adoption end of their scheme; (2) constrained, holding a positive predisposition towards these practices but are affected by limited knowledge, (SAPEA, 2020); (3) balanced, weighting equally productive and ecological motivations, and (4) unengaged, far away from interest on ecological practices.

4.2. Consumers' choices and food environments

Consumers, taken collectively, are acknowledged to have considerable influence on the food system changes (European Commission, 2022a). Large groups of consumers may play a key role in the transition towards a sustainable food system by way of 'responsible choices' – i.e. "*choices that are consistent with SDGs, but which may conflict with the consumers' short-term hedonic, convenience or economic goals*" (Thøgersen, 2011, cited by SAPEA, 2020: 116). This approach has been connected with the concept of 'citizen-consumers', who mobilise around issues such as the ethics of food production and consumption, the redistribution of surplus food, and food waste (SAPEA, 2020, EC-DG RTD, 2020).

However, the capacity of the consumers to lead the changes in the food systems has been widely challenged, given the information and power asymmetries that exist in such systems and the forces that shape the socio-cultural norms around food (SAPEA, 2020). Studies have shown how consumers' food choices are strongly influenced by the surrounding environment. The Behavioural Insights Team (2020) asserts that the drivers of food choices can be categorised as Individual, Social and Material (ISM model):

- The <u>individual drivers</u> are "'*inner' psychological drivers of our behaviour, both conscious and non-conscious. This includes our tastes and preferences, values and beliefs, but also ingrained habit, emotion, heuristics (mental shortcuts) and cognitive bias*",
- The <u>social drivers</u> include "*others' influence on our behaviour, including cultural norms and narratives, peer influence, and social identity*", and
- The <u>material drivers</u> "*are related with the wider physical and economic context. These drivers include the physical environment and the manner in which options are made available and presented to us, pricing, mass media and advertising, and technological factors that all shape our food environment*". (BIT, 2020: 28).

Within this simple model, the consumers' awareness about food sustainability would fall in the category of the individual drivers, but consumers' behavioural changes would also need changes in the physical and economic environments, including changes in the "choice architecture" – i.e. "*the way in which food choice is presented to nudge consumers to preferred choices*" (European Commission, 2020).

The above considerations directly connect with the concept of the '**food environment**'. The Agriculture, Nutrition and Health Academy Food Environment Working Group (ANH-FEW) define food environment as "*the interface that mediates people's food acquisition and consumption within the wider food system. It encompasses external* [exogenous] *dimensions such as the availability, prices, vendor and product properties, and promotional information; and personal* [endogenous] *dimensions such as the accessibility, affordability, convenience and desirability of food sources and products*" (Turner et al., 2017). The food environment conceptual framework developed by this Working Group is illustrated in the Figure 4.

Figure 4. The ANH-FEWG food environment conceptual framework

Source: Turner et al. (2017).

Within this conceptual framework, the external and the personal food environment dimensions interact with each other to determine the food acquisition and consumption. For instance, the prices, that are included in the external domain, interact with the individual purchasing power to determine the food affordability (personal domain).

Consumers' choices may be influenced by changes in the food environments, for instance in the choice architecture. Likewise, the consumers' preference for convenience food has been related with their lifestyles (little time to purchase and prepare food) and working conditions; and the affordability is linked to inequalities and low income (European Commission, 2022a).

The food literacy also plays a role in the consumers' choices, although the capacity of education to drive food system changes is contested. The EU Food Policy Coalition (2021: 15) poses that "*while education in itself will not deliver change at the required scale, it can be a powerful amplifier and enabler of other food environment policies*". Similarly, the BIT (2020) report states that the preferences across EU and USA are "*tasty, inexpensive, varied, convenient, and healthy foods, roughly in that order of importance*" and, although there is evidence that raising awareness and providing education changes the individuals' self-reported intentions, they do not necessarily change their actual behaviour. The latter report relates this fact with the concepts of "value-action gaps" or "intention-action gaps", which refer to the barriers that prevent the citizens to act according to their pro-environmental values - among which they mention "*lack of willpower, forgetfulness, limited know-how, low self-efficacy, ingrained habit, laziness, poor availability of options, cost barriers, or hassle and inconvenience*" (p. 32). These are aspects in which tailored behavioural- related interventions can make a difference.

5. Two domains of transition towards sustainability

As depicted in the initial narrative, VISIONARY's theory of change focusses on two main domains, which, in addition, are interwoven: policies and business models.

5.1. Behavioural Food Policy

Recent policy developments seem to point at a kind of "*behavioural turn in policy-making*" (van Bavel, 2020), in which "*the key is not to assume behaviour, but to test it. It is a fundamental inversion, from a deductive, top-down approach to understanding human behaviour to an inductive, bottom-up approach*" (p. 200). The European Union is paying growing attention to the use of behavioural insights in several stages of the EU policy making process (Troussard and van Bavel, 2018). These authors define behavioural insights as "*pieces of knowledge (not opinions) based on empirical findings (not intuition) about behaviour*" (p. 8). The EU has included the necessity to understand and use behavioural insights into the institution's 'better regulation toolbox' (European Commission, 2021c), arguing that they are of relevance all along the policy process, particularly at the stage of policy instruments choice and design.

In this vein, in relation to food, the term Behavioural Food Policy has been coined. It is conceptualised as food system policy that incorporates behavioural insights (Reisch, 2021: 669), so that policy making adopts "*an inductive approach [...] that combines insights from psychology, cognitive science, and social science with empirically-tested results to discover how humans actually make choices*"[3].

An important point regarding the behavioural insights supporting the policy process is that the evidence is very context-specific, since it revolves around individuals' behaviour. For this reason, cross-country comparative studies (like the ones to be undertaken under VISIONARY) have the

[3] Extracted from Behavioural insights - OECD. Accessed February 2023.

potential to provide broader evidence base for policy making at the international level (Troussard and van Bavel, 2018)

5.1.1. Enriched policy tool classifications

The contribution of the inclusion of behavioural insights in political sciences in relation to policy tools is twofold. First, it allows for a better understanding of how individuals' behavioural factors affect the design of policies and, particularly, why selected policy tools operate in one way or other.

Second, the knowledge about behavioural insights allows widening the range of policy tools that can be selected in the pursuing of political objectives, enriching in this way the traditional policy tool classifications. Schneider and Ingram (1990) made an outstanding contribution in this regard, by proposing five types of tools according to the behavioural assumptions underlying these mechanisms. Expanding on these, Olejniczak et al. (2020) identify six groups of policy tools available for policy designers. Combining these typologies, VISIONARY aims to analyse the policy and regulatory tools conditioning individuals' decision-making from the following classification:

- Direct regulation: Places a restriction or introduces rules that force compliance or make specific options unavailable. Includes bans, obligations, obligatory standards, etc. They are linked to penalties (from fines to conviction in courts).
- Economic incentives: Try to promote a given behaviour (which is voluntary) by providing incentives (monetary, time, other resources), based on a cost-benefit analysis carried out by the policy subjects. Some examples are tax reliefs and environmental payments. It would include the assumption by public agencies of centralised transaction costs to ease certain decisions (e.g. public certification schemes), as well as the opportunity to sell tradable environmental permits.
- Economic disincentives: Try to discourage a given behaviour (which is voluntary) by providing disincentives (monetary, time, other resources), based on a cost-benefit analysis carried out by the policy subjects. They include taxation, charges, or the obligation to buy tradable environmental permits.
- Public infrastructure: Focuses on providing means and opportunities for desirable behaviour, assuming that policy addressees will use them. For instance, roads, facilities, buildings, etc.
- Moral suasion: tries to provide compelling reasons (why to do it) to comply. These tools assume that people are motivated from within and decide whether or not to take policy-related actions on the basis of their beliefs and values.
- Capacity Tools/Boost: Provide information, training, education, and knowledge to enable individuals or groups to make decisions or carry out activities
- Nudge: A nudge is an element/aspect of the choice architecture that steers individuals' behaviour in a predictable way by exploiting cognitive shortcomings in human deliberation and choice, without changing the financial (dis)incentives. A nudge does not affect those features over which people have explicit preferences (e.g., money, convenience, taste, status, etc.), but rather those features that people would typically claim not to care about (e.g., position in a list, default options, framing).

Of particular interest is the distinction between boosts and nudges. As Grüne-Yanoff and Hertwig (2016: 152) point out: "*nudging interventions seek to co-opt this knee-jerk system or behaviours such as myopia, loss aversion, and overconfidence to change behaviour. The boost approach, in contrast, assumes a decision maker whose competences can be improved by* *enriching his or her repertoire of skills and decision tools and/or by restructuring the environment such that existing skills and tools can be more effectively applied"*.

In addition, the analysis of the policy and regulatory context has to pay attention to unfold and show the hybridity and interdependency of policy instruments (Blackstock et al., 2021). Hybridity refers to the fact that, sometimes, policy tools combine traits from more than one single traditional categorisation. Interdependency calls the attention to explore synergies between policy tools to attain a common objective.

5.1.2. Shaping the policy frame

A relevant lesson stemming from behavioural sciences in relation to policies is that individual choices between alternative options also depend on the way these options are formulated: the 'frame effect' (Hill and Varone, 2021). Thus, framing is a social and political construction of the policy issue (Peters, 2018). Frames are more than communication instruments, as they become "*mental models or heuristics that shape the way the world is viewed*" (Mair et al., 2019: 46). In this regard, framing determines (Olejniczak et al., 2020): envisioning the desired state, the (mis)behaving target group in which policy will focus, the type of behaviour in question, and the desired level of compliance. Understanding the way stakeholders frame the several environmental issues under analysis is a key endeavour of VISIONARY.

5.1.3. Operationalising behavioural insights in policy making

A Theory of Change also underlies the frameworks aimed to steer the incorporation of behavioural insights in policy making. In other words, they propose a pathway that incorporates empirical findings from the behavioural factors of interventions in other to produce an impact.

This is the case of the BASIC model proposed by the OECD (OECD, 2019b). BASIC is a toolbox elaborated by the OECD to equip the policy-makers "*with a best practice tools, methods and ethical guidelines for conducting* [behavioural insights] *project from the beginning to the end of a public policy cycle*". These guidelines revolve around 5 stages (see table 1).

Table 1. Stages of the BASIC guide

Behaviour	Identify and better understand your policy problem.
Analysis	Review the available evidence to identify the behavioural drivers of the problem.
Strategy	Translate the analysis to behaviourally informed strategies.
Intervention	Design and implement an intervention to test which strategy best addresses the problem.
Change	Develop plans to scale and sustain behaviour.

Source: Home | OECD iLibrary (oecd-ilibrary.org)

With a similar aim, Olejniczak et al. (2020) propose a framework to confront a policy problem by means of a behavioural hypothesis testing. It is also aimed to produce and measure an impact. It is based on the assumption that policy makers make three types of assumptions (see Table 2): frame the policy issue (*framing*), assume a desired state they want to achieve (*effects*), and hypothesize about what impedes/obstructs the compliance (*HOP*). From here, policy makers address the types of intervention that could overcome those barriers (*HIT*).

Table 2. The framework of policy problem solving as behavioural theory testing

Component name	Framing	HOP	HIT	Effects
Purpose	Framing policy issue in terms of behaviours of policy subjects	Hypothesizing about Obstructing Problems	Hypothesizing about Intervention Type	Setting indicators to measure change and success
Guiding question	Who, when and how misbehave?	Why they misbehave?	What will enable expected positive behaviour?	What positive change we expect?
Narrative of causal thinking	ASSUMING that the behaviour of a particular group is vital for addressing the policy issue …	IF these are the barriers that inhibit our subject group from complying with desired behaviour …	THEN we can remove those barriers with selected policy tools that address those blockages …	AND THEN the group of subjects will behave as expected … AND that would lead to improvement of policy issue.

Source: Olejniczak et al. (2020).

These two operational frameworks share two features. First, they both recommend to interact with policy-makers, citizens and stakeholders during the implementation of the phases/stages of the conceptual process. Second, these frameworks require policy-makers and stakeholders to negotiate and envision the desired state they want to achieve, which could be at the same time, conditioned by the uncertain evolution of drivers of change affecting (in our case) the food system. This is what foresight analyses allow to consider. For this reason, VISIONARY combines multi-actor interaction and foresight in the frame of its Science-Policy Interfaces (see section K).

5.1.4. Two final notes

Finally, there are two relevant issues in relation to the behavioural dimension of food policies that deserve attention. First, as explained above, food policy design and implementation have to be able to incorporate the behavioural dimension for a more effective and efficient impact. However, attention must be also paid to the cognitive limitations and biases of public decision makers. Dudley and Xie (2019, 2022) unfold these cognitive biases as they link them with the institutional framework in which policy-makers operate. They classify these biases as *availability heuristic* (which leads to assess the probability of an outcome according to how easily it is brought to mind), *narrow framing* (as a kind of myopia from excessive specialisation), *overconfidence* (in their own ability to understand problems), *loss aversion* (leading to maintain a current course of action rather than take new action that would improve expected outcomes), and *confirmation bias* (that leads to interpret evidence in a way that supports pre-existing beliefs). These authors also discuss on the changes that could reshape regulators' choice architecture to mitigate the factors aggravating these cognitive shortcomings. Interestingly, from this project's perspective, multi-actor platforms (as the VISIONARY' SPI, see below) have the potential to mitigate these problems, confronting decision-makers' views to diverse and even competing approaches. In addition, the use of experimental techniques allow for providing *ex-ante* evidence to make informed choices. This is what VISIONARY'S case studies aim.

A second point to be introduced is that of the ethical considerations of behavioural policies. Grüne-Yanoff and Hertwig (2016) discuss the criticisms made to nudge policies, which have been accused of undermining individuals' autonomy and even violating dignity. These criticisms would not apply to 'boost policies'. Grüne-Yanoff and Hertwig review the arguments made by the defenders of nudge-based intervention. In any case, according to Thaler and Sunstein (2008), governments and organizations inevitably find themselves in the role of choice architects, influencing individuals' choices regardless of the policy tools they use. In a similar vein, Dessart et al. (2019) also tackle the potential ethical conflict in relation to behavioural agricultural policies ("*Are farmers being manipulated?*", p. 451). These authors conclude that, from the policy-making perspective, the choice is to either let other forces dictate how the choice architecture is shaped, or take a more active role. The ethical assessment might address if these behaviourally informed policy interventions promote or undermine actors' welfare, autonomy and dignity.

5.2. Behavioural understanding of sustainable business models

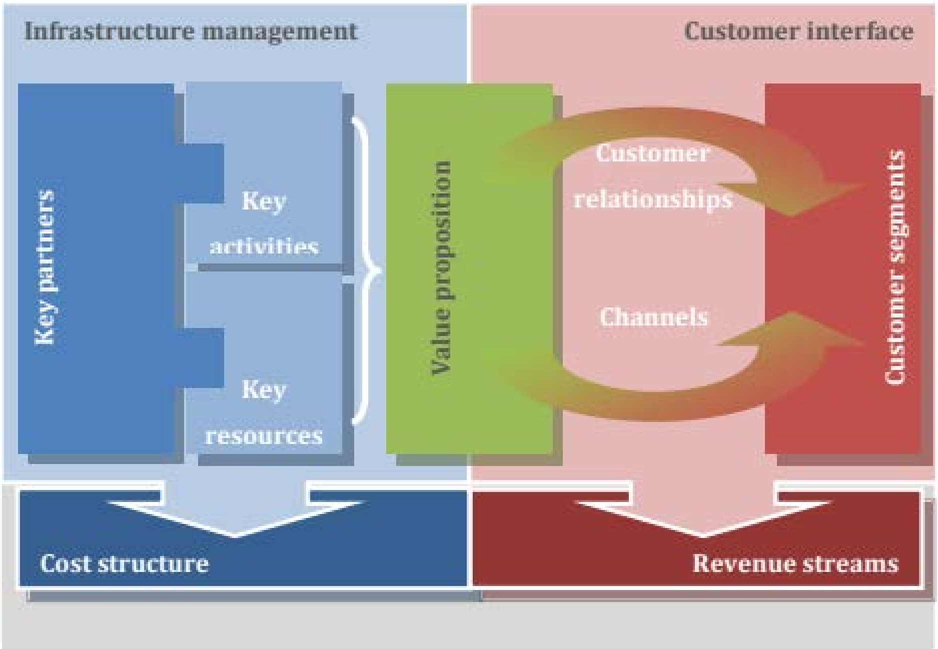
A second focus of interest of VISIONARY is that of food business models. There is an evident and two-directional link between policies and business models. First, businesses are the target of many policies aiming to accelerate the transition towards sustainability. In this regard, policy-makers "*can function as role model, regulator, capability-builder, financial support provider, and disseminator of information particularly regarding environmental and social challenges*" (Klewitz and Hansen, 2014: 67). Second, business are simultaneously policy actors who intervene in several ways in the policy-making process. In relation to small and medium enterprises, Burch and Di Bella (2021) recognise that they are important social and political actors, in particular when it comes to more local or regional levels, due to their greater local embeddedness (Di Bella et al., 2022).

VISIONARY will focus diversity of business along the food value chain. However, the emphasis will be given precisely to small and medium enterprises (SME). Klewitz and Hansen (2014) compile several explanatory factors of the relevance of SME in relation to sustainability, among them: they are by far the largest group of all the companies active along the value chain, and is responsible for a high percentage of environmental degradation, they are not simply smaller versions of their larger counterparts and show different path to sustainable innovation According to these authors, SMEs have to confront specific disadvantages for any kind of innovation (access to resources, knowledge, etc.). However, they also suggest that SMEs have some advantages, including that -as organizational structures dominated by their owner-managers- they can be strongly value-driven. Besides, due to their size SME may be in a better position for radical innovations, which are connected to sustainability-oriented innovations (see below).

5.2.1. Business models

There are many approaches to the concept of a Business Model (BM). For instance, Fielt (2013: 86) defines a BM "*as the value logic of an organization in terms of how it creates and captures customer value and can be concisely represented by an interrelated set of elements that address the customer, value proposition, organizational architecture and economics dimensions*". Chesbrough (2010) conceptualises a BM as a system that structures the relationships, processes, assets, and physical objects as well as the value-generating functions of enterprises. As important as its core definition, the conceptualization of a BM also addresses its components or elements and their relationships (see Figure 5).

Figure 5: The BM template



Source: Extracted from Lüdeke-Freund (2010).

This visual conceptualisation centres on the value created for customers by the company (*value proposition*). That means the company organises its relations with the *partners*, the *activities* and the *resources* owned and provided by others to offer adequate value configurations for products and services. These components make up the infrastructure/management pillar, which is linked to the *cost structure*. The customer interface pillar links the *value proposition* with the *customer segments*, and includes the communication and distribution channels, as well as diverse customer relationships that are established. This second pillar relates to the *stream of revenues*. In relation to innovation, this author emphasises the necessity to "*understand if and how these pillars, building blocks and their relationships can translate sufficiency, efficiency and consistency strategies into business activities*" (p. 16).

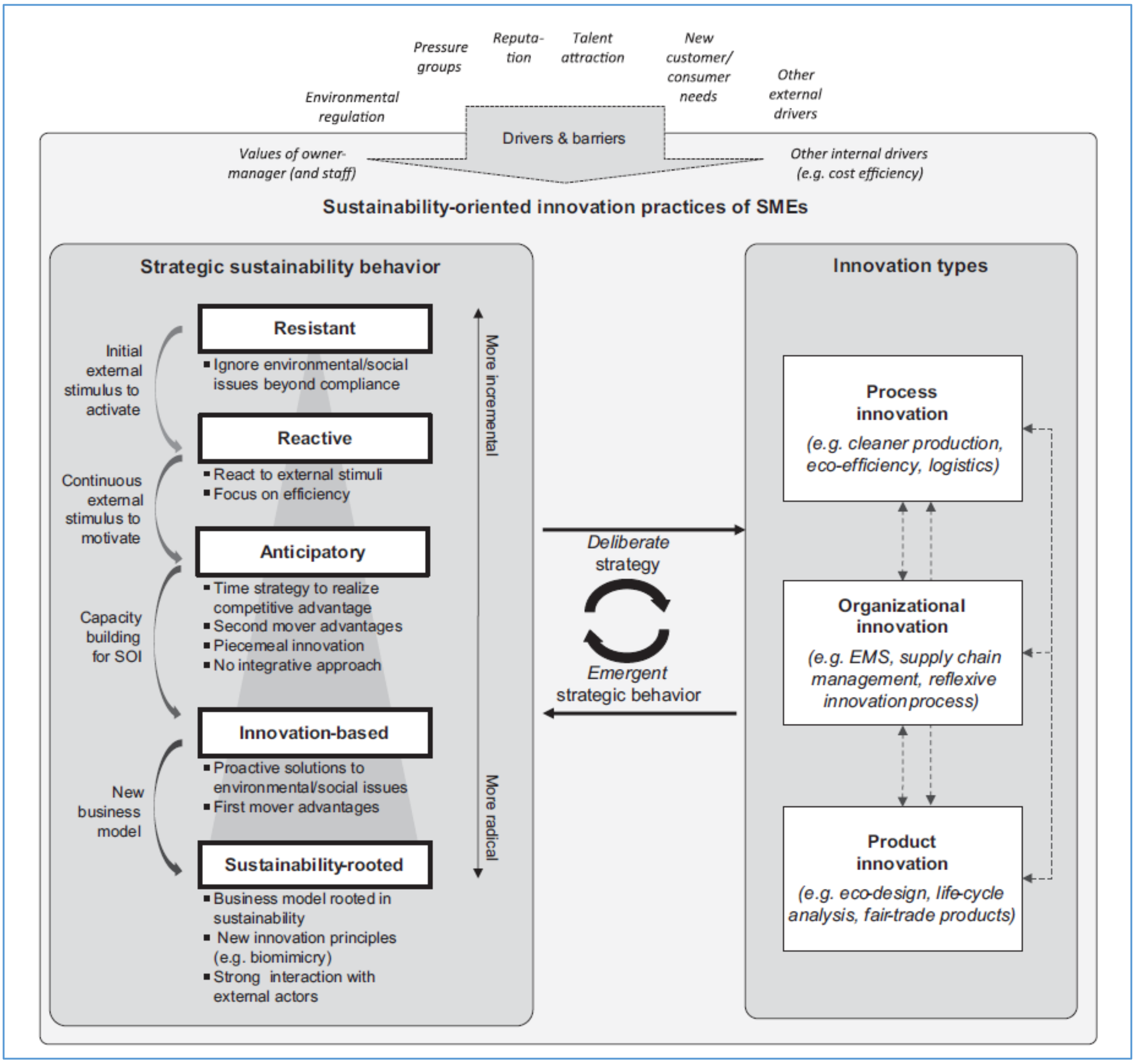
5.2.2. Business Model (Eco-) Innovation

The different definitions of a BM put emphasis on the way it describes the value logic of an organization in terms of how it creates and captures customer value as profit (Fielt, 2013). In other words, a business model must allow the company to capture part of the customer value and make a profit (Lüdeke-Freund, 2010).

In this regard, value creation is also central in the definition of sustainable business models (SMB) (Dyllick and Muff, 2015). In other words, for a business model to be sustainable, it requires to allow for a balance of value creation and value capture by the company (i.e. a shared value perspective (Al-Saleh and Mahroum, 2015)). In a similar vein, Emerson (2003, cited in Dyllick and Muff, 2015) introduced the concept of 'blended value' which combines the creation of revenue by the company with the generation of social value. Dyllick and Muff (2015: 6) define 'shared value creation' "*as creating economic value in a way that also creates value for society by addressing its needs and challenges. Ideally, the starting point for business planning thereby is society and its problems, rather than business itself, to unlock business opportunities in society*". Lüdeke-Freund (2010: 7) argues that "*business can contribute to solving or at least moderating* *sustainability challenges through radically novel value propositions, and successfully marketing such value propositions requires adequately radical business model innovations*".

This shared value creation is related as well with eco-innovation or sustainability-oriented innovations, as they are aimed to create both customer value and public benefits. Entrepreneurs' sustainability-related behaviours and values have been found to be strong determinants of eco/sustainability-oriented innovation in companies. The review made by Klewitz and Hansen (2014) about sustainability-oriented innovations[4] in SMEs revealed the importance of the strategic sustainability behaviour of these entities. In this regard, the research made identifies a 'continuum' of SME behaviours that is also related to a continuum from incremental to radical/disruptive innovations (Klewitz and Hansen, 2014). Figure 6 illustrates these authors' integrated framework for sustainable-oriented innovations of SMEs.

Figure 6: An integrated framework for SOI practices of SMEs.



Source: Extracted from Klewitz and Hansen (2014).

[4] Sustainable-orientation includes the three dimensions of sustainability, i.e. economic, social and environmental.

The taxonomy of sustainability behaviours proposed by these authors links the higher sustainability ambition -what they name 'sustainability-rooted SMEs'- to more radical product, process and organizational innovations (see also Lüdeke-Freund, 2010), and, very importantly, to proactive interaction and collaboration with multiple external actors.

This is precisely the approach of Burch and Di Bella (2021), who advocate for a relational perspective (rather than a firm-centric perspective) of transformative business models able to respond to the challenges presented by the Anthropocene. These authors identify five 'building blocks' that unfold the mechanisms needed for SMEs to address sustainability challenges, and that expand the notion of business models that traditionally focused, almost exclusively, on value-generating mechanisms. Business models based on these building blocks would enhance the relational capabilities of a business to influence system leverage points. These blocks are:

1. Contributing to, and learning from the local context which allows -among others- to work with other local businesses towards ecosystem-based contributions.
2. Institutionalizing co-production, by establishing an inclusive and iterative process for businesses to collaborate in pursuit of public goods with partners.
3. Experimentation with community partners, and an openness to failure, which would result in unique skillsets, testing new ideas and expanding the identity of the organisation.
4. Establishing new hierarchies, providing individuals within the organisation with new opportunities.
5. Nourishing and acting on imagination and play to accelerating transformative change towards sustainability.

6. Our transdisciplinary approach

6.1. Transdisciplinary research for transformative research

In responding to the actor-oriented nature of the project, VISIONARY adopts a transdisciplinary approach, involving multiple actors both in the consortium (academic, NGO, SME), and in its methodological design and implementation. This implies, among other issues, that the needs and constraints of stakeholders are incorporated early on, for instance involving stakeholders in the development and fine-tuning of experimental designs and research questions.

Lang et al. (2012: 26-27) define transdisciplinarity as "*a reflexive, integrative, method-driven scientific principle aiming at the solution or transition of societal problems and concurrently of related scientific problems by differentiating and integrating knowledge from various scientific and societal bodies of knowledge*". According to these authors, transdisciplinary research needs to comply with three requirements: focuses on societally relevant problems; enables mutual learning processes among researchers from different disciplines and actors from outside academia; and aims at creating knowledge that is solution-oriented, socially robust, and transferable to both the scientific and societal practice. In a similar vein, Caniglia et al. (2021: 94) assert that "*knowledge should emerge from entangled processes of action, learning and capacity building through co-production and transdisciplinary involvement of multiple societal actors*". Moreover, transdisciplinarity can also serve different functions, including capacity building and legitimization (Lang et al. (2012).

In VISIONARY, transdisciplinarity finds its main locus in the Science-Policy Interfaces.

6.2. Science-Policy Interfaces

6.2.1. Defining Science – Policy Interfaces

Scientific research plays a crucial role in the definition and implementation of policies when they seek to be informed by evidence, despite not being the only influence on decision-making. In the past decades, there has been a growing activity around the knowledge exchange processes that occur between the producers of knowledge ('science') and the users of this knowledge for decision-making (‘policy’). This activity is leading to the implementation of practical experiences and generating academic and grey literature that analyses the characteristics and operation of these processes, known as the Science-Policy interface (SPI). Van den Hove (2007: 815) defines SPIs as “social processes which encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision-making”. More recent works building on van den Hove’s definition (Sarkki et al., 2015:505) describe them as “*organizations, initiatives or projects that work at the boundary of science, policy and society to enrich decision making, shape their participants’ and audiences’ understanding of problems, and so produce outcomes regarding decisions and behaviours*”.

SPIs are emerging as key elements of governance particularly in sectors where scientific knowledge is (or should be) closely linked to decision-making, such as health, environmental governance or the transition of food systems towards sustainability. Regarding the transition towards sustainability, Turnheim et al. (2020:116) argue that “the key question for policymakers is no longer whether or why transitions are needed, but how to make them happen. Governments are thus increasingly eager for knowledge and evidence that can help them rethink public policies and institutions. In this context, transitions research is entering mainstream policy”. Particularly in the case of food systems’ transition, authors like Haizelin et al. (2023) point out the complex setting of science-society relations involved, and how SPI play a key role in this transition.

There is a generalized call in the policy arena for establishing and strengthening the connections between science, policymaking and society at multiple levels. At European level, there is a Scientific Advice Mechanism (SAM) working since 2015 to provide independent scientific advice directly to the European Commission on topics of high political and strategic importance. This mechanism is composed of the Group of Chief Scientific Advisors, the Scientific Advice for Policy by European Academies (SAPEA) and a Secretariat in the European Commission (European Commission, 2021b). In the same vein, the recently published Commission Staff Working Document (SWD) on “Supporting and connecting policymaking in the Member States with scientific research” (European Commission, 2022b) aims to stimulate discussions on connecting science with policymaking in EU Member States.

This tendency is made evident in the European food system policy sphere by the reports “Everyone at the table: co-creating knowledge for food systems transformation” and “Everyone at the Table. Transforming Food Systems by Connecting Science, Policy and Society” (European Commission, 2021a; European Commission, 2022c), ordered by the European Commission to a High-level Expert Group, which assess the needs and options and make recommendations for strengthening science–policy interfaces to improve the governance of food systems.

At a more global scale, FAO’s first pillar for its Science and Innovation Strategy (FAO, 2022) “Strengthening science and evidence-based decision-making” resonates with this trend, with one of its outcomes being “Science-policy interfaces for agri-food systems strengthened”.

6.2.2. Inclusive Science – Policy Interfaces

Along with researchers and government actors, a wide diversity of stakeholders with a vested interest in the outcomes of the political decisions can intervene in the knowledge exchange processes that occur in SPIs. These actors "can participate as policymakers in the policy arena or influence policy from outside the policy arena" (Schut et al., 2013: 93). Moving beyond the conception of SPI as a bilateral relation between scientists and policy-makers from the public administration, various authors (van den Hove, 2007; Cvitanovic et al., 2015) recognise the value of the experiential knowledge contributed by all participants to the exchange processes in the SPIs, noting that scientific knowledge is not the only type of knowledge relevant to SPIs and that other types of knowledge are also exchanged and created. SPIs must allow for the articulation of these different types of knowledge, which can be done by ensuring that these interfaces are participatory (van den Hove, 2007). As Bednarek et al. (2018:1177) state, "accounting for the broader context of actors, perspectives, values, contested evidence, decision-making history, and power dynamics is critical in shaping a productive knowledge exchange process".

However, many existing initiatives promoting the use of knowledge in policy decisions are facing implementation challenges mainly due to SPIs still being understood as linear processes between scientists and decision-makers. A way towards improved implementation and behavioural change could be a non-linear approach to SPIs, with SPIs being managed as collaborative and participatory processes where scientists, decision-makers and representatives of the general public are engaged in an iterative multi-directional dialogue that contributes to enriching decision-making (Kelemen et al., 2021; Sarkki et al., 2015; Cash et al., 2003).

According to Cvitanovic et al. (2015), the most widely advocated approach identified and developed as a response to the need for innovation and collaboration in knowledge exchange processes in order to overcome barriers to the flow of knowledge in SPI processes is '*knowledge co-production*'. "Under this approach, managers actively participate in scientific research programs from the onset, collaborating with researchers throughout every aspect of the study, including design, implementation and analysis" (Cvitanovic et al., 2015: 29). This approach contributes to a better understanding and strong sense of ownership of the research by all actors participating in the knowledge exchange process of the SPIs. Nevertheless, as some authors such as Turnhout et al. (2020: 18) suggest, "*it is important to understand co-production as both a knowledge-making and a political practice which is inevitably imbued with unequal power relations that need to be acknowledged but cannot be managed away. Instead, it will be vital to allow for pluralism, create scope to highlight differences and, enable the contestation of interests, views, and knowledge claims. […] We recognize that such a (re)politicization of co-production can be risky and it may not result in actionable knowledge in a depoliticized or instrumental sense, but nevertheless argue that it is essential for co-production to realize its transformative potential*".

6.2.3. The boundary between knowledge and policy

Science aims to produce new knowledge aimed to address societal needs. The literature uses the term '*boundary*' in knowledge-action systems to describe the space for the exchange of knowledge between different actors in policy decision-making. According to Cash et al. (2002), boundaries, while not rigid or impermeable, demarcate the socially constructed and negotiated borders between science and policy, academic disciplines, geographical and political jurisdictions, as well as between different forms of knowledge. Boundaries serve useful purposes such as protecting science from political bias, but they can also act as barriers that "impede communication, inhibit coordination and hamper integration, especially in interconnected problems that manifest in complex relationships such as those found in human-environment systems" (Cash et al., 2002:7).

To effectively link knowledge and action across boundaries, Cash et al. (2002) and Cash et al. (2003) point out that two fundamental elements are necessary:

- Scientific information must be perceived by relevant actors as credible (trusted), salient (relevant) and legitimate (unbiased and "fair") in order to be effective in political processes. In fact, credibility, relevance and legitimacy are known as the CRELE (Credibility - RElevance - LEgitimacy) attributes of knowledge for effective SPIs (Sarkki et al., 2015). Nevertheless, different actors often have different perceptions, therefore salience, credibility and legitimacy are often attributed and interpreted differently on different sides of a boundary.
- Boundaries must be managed so that they adequately fulfil their functions of communication, translation and mediation, avoiding the dissonances described in the previous point.

In order to better understand the dynamics at the science-policy interface, the concept of '*boundary work*' was introduced. According to Schut et al. (2013: 92), Gieryn (1983) and Jasanoff (1990) "refer to this concept as the practices of safeguarding, withdrawing and (re)negotiating boundaries between research and policy". Boundary work acknowledges the negotiated role of research in decision making. It seeks to maximize the positive functions of boundaries and, at the same time, to overcome barriers to knowledge exchange.

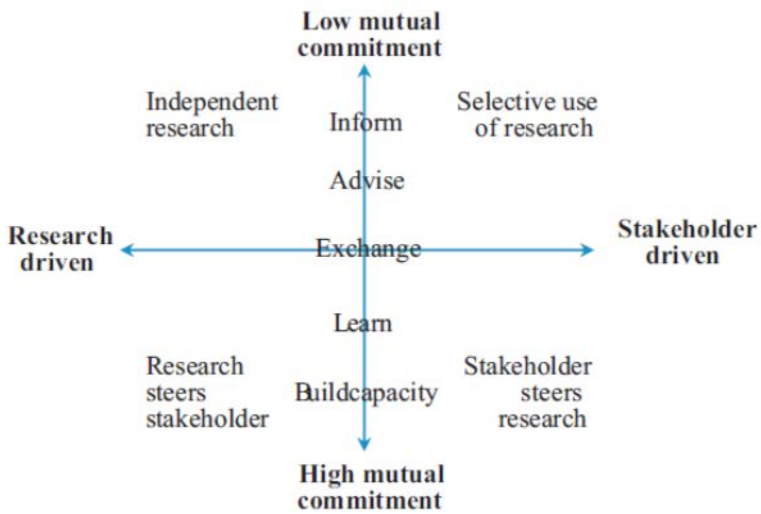
Other authors (Bednarek et al., 2018:1175), concerned about the complexity of responding to social problems such as sustainability, advocate "to 'span the boundaries' between science and decision-making and create a more comprehensive and inclusive knowledge exchange process". They use the term '*boundary spanning*', defined as "work to enable exchange between the production and use of knowledge to support evidence-informed decision-making in a specific context" (Bednarek et al., 2018:1176).

Guston (2001:399) finds that "the blurring of boundaries between science and politics can lead to more productive policy making" but that there is a need for stabilization of the boundary work that links the two domains. This same author identifies '*boundary objects*' as one of the factors that can contribute to this stabilization of the boundary work. Star and Griesemer (1989: 393) defined boundary objects as "scientific objects which both inhabit several intersecting social worlds and satisfy the informational requirements of each of them". They are adaptable to different viewpoints and, at the same time, robust enough to maintain identity across them. Some forms of boundary objects, as the result of joint production by experts and decision-makers, can be models, scenarios, assessment reports and, in some cases, entire organizations (Guston, 2001; Cash et al., 2003).

The VISIONARY project is planning to produce some boundary objects such as reports, foresight analyses, policy briefs and factsheets regarding the adoption of practices in food production systems that are more environmentally friendly, economically viable and socio-culturally appropriate. These objects will be tailored for specific user groups, including policymakers, farmers, retailers and processors.

Moreover, '*boundary arrangements*' are also an important part of boundary work, which "describe the relationships, formal and informal agreements and expectations regarding the division of tasks and responsibilities between different actors or organisations in policy, decision-making or other negotiation processes" (Hoppe, 2005, cited by Schut et al., 2013:92). With the aim to understand the complexity of boundary arrangements at multiple research–stakeholder interfaces, Schut et al. (2013) propose a relational framework to classify nine types of boundary arrangements according to the power relations and the nature of the collaboration between researchers and stakeholders. Figure 7 shows the classification of the proposed boundary arrangements. According to this typology, the arrangements with a more balanced power relationship between researchers and stakeholders would be placed in the vertical axis. In these cases, and depending on the level of mutual commitment, the type of interaction at the interface can range from mere information exchange to building the researchers' and stakeholders' capacity to influence the policy process.

Figure 7. Classification of boundary arrangements at the research-stakeholder interface



Source: Schut et al., 2013

6.2.4. VISIONARY'S SPI

VISIONARY is a research project by nature, hence, in its initial phase the boundary arrangements (Figure 7) to be established will be research-driven, although with an aspiration to establish *exchange relationships* between researchers and stakeholders by which "*research acknowledges that stakeholders have specific needs and questions, and proactively seeks to reconcile demand and supply*" (Schut et al., 2013: 94), establishing interactions on research demands and information exchange. As the project develops, the aim is to increase the mutual commitment between researchers and stakeholders, with the ambition to establish *co-learning* and *capacity-building relationships*.

The organization and governance of SPIs show a large diversity of typologies. As discussed by some authors (Kelemen et al., 2021; Görg et al., 2016), two governance models stand out: (i) the platform approach and (ii) the network approach. There is the more formalized *platform model*, conformed by member organizations with a stronger governance structure, which is based on the needs and interests of the organizations involved. Examples of a platform approach include global intergovernmental organizations, such as IPBES[5] and IPCC[6] and other international (regional) platforms.

On the other hand, the *network model* is a more informal organization approach, complementary to other existing structures, which engages individual members on a voluntary basis, hence depending almost entirely on the dedication of individuals. This is the model that VISIONARY plans to adopt for the governance of the SPIs to be established by the project.

Finally, SPI are designed to achieve two main objectives: identify behavioural interventions to be tested in the empirical case studies and co-construct policy recommendations. Nevertheless, it would allow to addressing other questions arising from this CF. For instance, SPI would allow to explore the occurrence of the cognitive limitations and biases of the public decision makers and other policy-related stakeholders (see section 5.1.4). Also, they would complement WP5 mental models to tackle the question of how narratives are created and frame the analysis and proposals regarding the transition towards sustainable food systems.

6.3. Participatory foresight for identifying behavioural interventions

The European Commission defines the concept of foresight as: "*a process which combines three fundamental elements: prospective (long-term or forward-looking) approaches, planning (including policy-making and priority-setting) approaches, and participative approaches (engaging stakeholders and knowledge sources)*"[7]. In this regard, according to McEldowney (2017: 2) "*foresight studies involve identifying alternative images of the future and choices of action based on those images. It is not about predicting the future, rather it is about exploring a range of possible futures supported with analysis of scientific and technological trends*".

Participatory foresight exercises have become a popular tool to tackle the uncertainties and challenges of agriculture and food security (McEldowney, 2017). In addition, these activities align with transdisciplinary approaches of research, and also have the potential to become science-policy boundary objects, as they allow for the exchange of knowledge between policy stakeholders and scientists. Moreover, participatory foresight has the potential to contribute to what Miller (2015) names "futures literacy', i.e. the capacity of social and economic actors to be able to undertake anticipatory activities beyond the more conventional approaches of 'preparation' or 'planning'. This could, potentially, reinforce the 'emancipatory dimension' of foresight (Ahlqvist and Rhisiart, 2015), or the empowerment of participants, understood as "*a process aiming at developing the capacity to use the future and by its usage to self-determine it*" (Bourgeois et al., 2017: 180). Foresight analysis and the creation of future scenarios contribute to actors'/stakeholders' capabilities development (Caniglia et al., 2021). Beyond this, other 'soft' impacts (Bourgeois and Sette, 2015) of foresight as a process can include networking and awareness. The co-creation of visions of the future -a key ingredient in foresight exercises- is also a necessity of transformative research towards sustainable food systems (Reisch, 2021).

[5] Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
[6] Intergovernmental Platform of Climate Change.
[7] Popper, R. (2009) Mapping Foresight: Revealing how Europe and other world regions navigate into the future, EFMN, Luxembourg. http://ec.europa.eu/research/social-sciences/pdf/efmn-mapping-foresight_en.pdf. Quoted in Bourgeois (2012).

6. Preliminary research questions

The following box synthesises the preliminary research questions for the VISIONARY project, deriving from the elaboration of this Initial Conceptual Framework.

Box 1. VISIONARY's research questions

1. How new knowledge on behavioural insights can contribute to creating value in new Sustainable Business Models?
2. How Sustainable Business Models can modify/intervene in other actors' behaviour (e.g. consumers, clients, providers, partners)?
3. Is the business model/value creation approach an appropriate way to explore and promote farmers' adoption of sustainable practices?
4. Can we connect/reconcile in a coherent manner the two streams of knowledge (farmers' and consumers' behaviour)? Can the concept of value creation/SMB be the link we need for this?
5. Do SPIs constitute an appropriate frame for identifying, developing or assessing behavioural interventions?
6. How does systems thinking (or the lack of) influence the interaction among actors, the SPI process and its outcomes?

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