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Case Study Paper

Design capability when visioning for transitions: A case study of a new food system

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In recent years, more designers have been engaging in transitions, for which design expertise is used to develop visions of long-term desirable futures. However, little is known about how design expertise is positioned in transition visioning processes. In this case study, we follow a design agency in envisioning a future food system for a consortium working on the food transition. Based on our findings, we unpack several tensions that emerge between the transition context and design expertise. Such as the tension for designers to explore alternative futures that challenge the current system yet support stakeholders in seeing their place in the future. We conclude by reflecting on avenues for methodological development to optimally position design expertise for visioning in transitions.

Keywords: visioning, transition design, design expertise, design practice, case study

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In recent years, design has become more engaged with designing for transitions, such as in the domains of energy, mobility, and food. Transitions refer to complex, long-term, and non-linear processes of systemic change with an explicit directionality towards a sustainable society (Loorbach, 2007). There are four types of activities involved in fostering transitions: strategic activities that form long-term visions leading to changes in the socio-technical system, tactical activities that implement agendas within an actor-network, operational activities that involve experimentation and learning by doing in protected spaces outside the dominant system, and reflexive activities that involve monitoring, evaluating and learning of ongoing societal change (Loorbach, 2010). Therefore, one way to guide transition processes is through the formulation of a vision that fosters collectivity and mobilizes change toward more sustainable and just futures. Such visions and pathways to the

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vision require domain expertise, taking years to accumulate, to reflect the complexity of the related change domains. While designers have traditionally been highlighted as particularly relevant for the operational level of transitions, i.e., through developing innovations for experimentation (Ceschin & Gaziulusoy, 2016; Manzini, 2016), recent developments show designers being active in strategic activities as well, i.e., the visioning processes of transitions (Gaziulusoy & Brezet, 2015; Gaziulusoy & Ryan, 2015, 2017a, 2017b; Mok & Hyysalo, 2018; Quist et al., 2001).

Transitions have been framed as design challenges (Gaziulusoy & Ryan, 2015) with designers bringing valuable expertise to transition projects. For instance, a designer's skill to imagine and depict futures others want to act upon, to reframe and challenge existing practices, to develop new artefacts and images that foster dialogues around the future, and to integrate diverse disciplinary and stakeholder perspectives (de Koning, 2019; Dorst, 2019; Gaziulusoy & Ryan, 2015, 2017a, 2017b; Irwin, 2015; Loorbach, 2022; Norman & Stappers, 2015; Ryan et al., 2015). Additionally, participatory design approaches to vision building is a way to create higher ownership and to mobilize system actors, or front runners as referred to in transition management (Loorbach, 2007), towards the vision (Gaziulusoy & Ryan, 2015, 2017a, 2017b; Hyysalo et al., 2019). Yet, given that few transition design projects come into practice and few case studies exist that discuss visioning as part of them, there is a lot to learn about how designers can optimally stage their capabilities in this context. To gain more understanding of design capability in visioning for transitions, this paper studies the work of a professional design agency that was hired to envision a future food system — one that would not overproduce and waste food like the current system but actually cater for just enough. This transition goal is what joins the efforts of a consortium working in the food (waste) transition, including multiple researchers and food organizations. This case offers an opportunity for in-depth insight into how design visioning capability is applied in a transition challenge, expanding our knowledge of the current boundaries and roles of design theory and practice, informing future research into design visioning for transitions and methodological development.

In the following sections, we describe the state-of-the-art of how design capabilities are staged in visioning for transitions, and what opportunities and challenges this presents. Hereafter, we use the terms 'designing for transitions' and 'transition design' interchangeably to refer to work at the intersection of transition research and practice and design research and practice (Ceschin & Gaziulusoy, 2016; Gaziulusoy & Brezet, 2015; Gaziulusoy & Ryan, 2015, 2017a, 2017b; Irwin, 2015; Mok & Hyysalo, 2018).

1 Design visioning for transitions

Visions in transition design encompass compelling and inspiring depictions of preferable futures characterized by desirable social, economic, and environmental outcomes (Irwin, 2015). These visions serve as a reference for transition processes, providing clear direction for transformative design efforts. This conceptualization of preferable futures necessitates a long-term perspective that considers radically new socio-technical systems (Verganti, 2008). Consequently, design visions in this context challenge prevailing assumptions, explore and envision futures that promote sustainability and equity, and as such, pose normative questions (Junginger & Sangiorgi, 2009; Lockton & Candy, 2019). The designed artefacts in these envisioning processes, e.g., scenarios and images, then act as boundary objects that support the questioning, debating, and discussion of futures that people want or do not want (Dunne & Raby, 2013; Junginger & Sangiorgi, 2009; Sangiorgi, 2011). The timeframe for these visions var, with some scholars arguing for visions that are 40 or 50 years ahead as they represent the next generation (Jansen, 2003; Robinson et al., 2011), while others argue that visions beyond 25 years tend to be too futuristic and detached from present reality, making them less relatable to broader stakeholders and less capable of identifying relevant signals of change (Gaziulusoy & Ryan, 2017b). Ideally, transition visions are not so unrealistic that they are unachievable but also not so conservative that they do not inspire or drive change (Wiek & Iwaniec, 2014).

Due to the collective and political nature of transitions, participatory approaches to envisioning are standard (Gaziulusoy & Ryan, 2017a, 2017b; Hyysalo et al., 2019; Mok & Hyysalo, 2018; Quist et al., 2001; Ryan et al., 2015). In such approaches, the role of the designer, and as such the positioning of their capabilities, can vary greatly. For example, Gaziulusoy and Ryan (2017a, 2017b) and Ryan et al. (2015) engaged with professional designers in developing 'glimpses of the future' and engaged participants in role-playing within prototyped scenarios. This supported them in co-developing visions of urban futures in Australia in 2040. Along with their general design capability, designers were onboarded with systemic thinking skills and sustainability expertise. This was to ensure outputs were systemic, relating to multiple system levels (city, precinct, or neighbourhood), and depicted the changes (technological innovations, behavioural elements, products and services) needed to reach the desired transition goal, i.e., low carbon and resilient cities. In this case, the designer was prepared to address the systemic complexity of sustainable cities while generating design artefacts that participants (from the built environment sector, peak bodies, consultants, local governments, advocacy groups, social entrepreneurs, and research organizations) could relate to. This supported them in negotiating the future systems in terms of their functions and their physical manifestations, and allowed the identification of critical value differences within the stakeholders.

Case study of a new food system

In a study of the renewable energy transition in Finland, Mok and Hyysalo (2018), applied a Value-Sensitive Design (VSD) approach when exploring solar panel integration on heritage sites. The case investigated how human values inform the siting of solar panels in culturally sensitive locations and how the prevailing values can be negotiated and overcome through the proposition of alternative solutions. The project involved interviews with stakeholders (from the building site, solar technology providers, architect constituencies, and the National Board of Antiquities), as well as on-site experimentation of solar panel integration, and further visualization in the form of architectural renders of how to expand solar integration across the site. In this case, design was strategically positioned to reveal the likely 'reverse salients' (i.e., things that might hold the current system in place) by bringing a level of concreteness, grounding discussions around the values at stake, and supporting reflection on actual responses to solar integration rather than hypothetical responses. Therefore, the transition goal revolved around the adoption of solar energy on heritage sites and was relatively explicit and clear. Consequently, the participatory process and application of design capability were focused on identifying what was at stake when transitioning, the values at the core of stakeholders' resistance to change, and how these could be negotiated through alternative solutions. Building on this, Hyysalo et al. (2019) used codesign to support participants in iteratively developing mid-term pathways in the Finnish energy transition.

These examples illustrate that designers bring tools and methods that support participation in the visioning process, addressing important topics such as representation in, ownership of, and responsibility for the directions taken in a transition. The designed artefacts help navigate social, ethical, political, and cultural questions related to the future. Nevertheless, a transition context is a challenging context for designers to operate in, potentially restricting some of their capabilities at times. For instance, in discussing design artefacts that represent potential elements of the future, stakeholders may be drawn into an assessment of their plausibility while the aim is to discuss their desirability (Gaziulusoy & Ryan, 2017b). The perception of resource constraints and institutional and structural barriers can hinder the generation of radical or novel artefacts (Gaziulusoy & Ryan, 2017b; Robinson et al., 2011; Wiek et al., 2013). Robinson et al. (2011) argue that equipping participants with process knowledge is essential for effective and equitable participation in the envisioning processes. However, communicating such knowledge is not always possible due to the methodological messiness of design visioning processes in transitions (Gaziulusoy & Ryan, 2017b; Loorbach, 2007; Robinson et al., 2011).

Designers imagine new realities and conceptualize innovations that positively contribute to the lives of individuals, organizations, and society. This expertise is deemed valuable in light of transitions. However, we also recognize that transition challenges stretch design capability during visioning processes and

as such, there is more to learn about what implications this has. From the literature, we see that design's human-centred and integrative thinking capabilities are stretched beyond end-users to explore the perspectives, needs, and aspirations of diverse stakeholders across various levels of the system. While this enables the imagination of new products and services that shift relationships between actors, it complexifies the process, asking designers to give form to system dynamics. We also recognize that the more active engagement of experts and other stakeholders in the process presents tension for designers to imagine radically new futures, to be confident enough to challenge the status quo, and to be able to defend underrepresented human values. By following a design agency to envision a future food system for a consortium working in the food waste transition, we want to gain a better understanding of how the designers stage their expertise, where they experience possible tensions, and how this can help to identify ways to support methodological development for design visioning in transitions.

2 Methodology

Our case study covers the careful observation and documentation of the visioning process for the consortium FETE (dealing with the food system transition 'From Excess To Enough'). Case studies are valuable for understanding contemporary phenomena within a real-life context and when posing 'how' or 'why' questions (Yin, 2009). Single case studies are particularly instrumental in research where there are few reported cases and an in-depth understanding of the phenomena is required (Yin, 2009). For this study, we collected data from various sources to capture the visioning process in which professional designers, researchers, and multiple stakeholders collaborated. We triangulated these insights to ensure the construct and internal validity of the findings (Corbin & Strauss, 1990; Yin, 2009).

2.1 Case setting

Food systems encompass all the actors and interactions involved in producing, processing, distributing, consuming, and disposing of food, as well as the policies and cultural norms that shape these processes (FAO, 2013; UNEP, 2021). Unfortunately, food distribution is highly unequal globally, leading to poverty and famine in some countries while others experience abundance. Globally, food waste accounts for 8–10% of global greenhouse gas emissions and contributes significantly to climate change, nature and biodiversity loss, and pollution and waste (FAO, 2013; UNEP, 2021). With the expected population growth by 2050, the food system faces additional pressures to meet rising food demand while mitigating negative consequences (Godfray et al., 2010; van Geffen et al., 2020). Achieving this systemic change requires a comprehensive approach, addressing consumer-related, retailer-related, and macro-environmental issues (Aschemann-Witzel et al., 2015; Schanes et al., 2018).

The FETE consortium initiated a 5-year project (September 2020–2025) to explore how to partake in a transition to a food system that avoids food waste. FETE brings together three Dutch universities and nine commercial and non-profit organizations within the food system. The university partners bring expertise in consumer psychology, retail environments, (food) experience design, design for behaviour change, and systemic design, and include three Ph.D. candidates and one post-doctoral researcher.[1] The food system partners in the consortium include a national nutrition centre, a food waste foundation, an IT consultancy firm, two food manufacturers, a waste collector, a food-focused business school, a meal delivery service company, and a fruit and vegetable wholesaler. These academic and industry partners have a shared interest to learn what consumer and retail practices, grounded in potentially new business models, can help foster the transition to a food system driven by the concept of 'enough' rather than 'excess'. This paper focuses on the initial year of the project, highlighting how a design visioning process delivered a vision for a food system that should guide the consortium's efforts to take a steering role in the food (waste) transition. Given the geographical location and expertise of the research group, the vision focuses on the Dutch food system as part of a global system that runs on overproduction and excessive food purchase, ultimately leading to extensive food waste.

We consider FETE as a representative case of transition design since 1) the multi-stakeholder consortium is set-up around a transition goal, 2) it includes public and private organizations producing knowledge, products and services at both the regime and niche level (Loorbach, 2007, pp. 139–140), 3) the representatives possess substantial domain knowledge and have agency within their organization (Gaziulusoy & Ryan, 2017b), and 4) the consortium is committed to a 5-year collaboration on the transition. What makes the project unique is that the content of the vision is not only needed to spur innovation but also needs to link to the objectives of the three Ph.D. studies – complexifying the process. While the system stakeholders are committed to the 5-year research on the transition, are interested to learn, and have a shared ambition to make change happen, there was no process outlined or explicit commitment that ensured experimentation along the envisioned transition paths.

2.2 Visioning approach

An Amsterdam-based design and innovation agency was hired to develop the vision for FETE. The agency allocated 144 h over 8 months to deliver the vision and assigned two senior designers with 15+ years of experience and two junior designers with 2+ years of experience to the project. The agency uses the Vision in Design (ViP) approach in all its projects. Below we briefly explain the ViP approach as prescribed to support the discussion of the positioning of design capability. Later we will describe the situations where tensions occurred and adaptions were made by the designers. For an elaborate

and detailed account of the method, see Hekkert and van Dijk (2011, pp. 133–187).

The Vision in Design method guides designers in developing design proposals based on the effect they want their design to have on people and society, including what new behaviours it should facilitate (Figure 1). The method asks designers to conceptualize this effect in reference to an anticipated future context, including positive and negative developments, to deliberately avoid fixation on problems in the current context. So, while a design challenge may be informed by the problems of today, the method helps designers work with the opportunities the future brings. While the outlook and description of this future are as neutral as possible—reflecting plausible and possible futures (steps 1–3)—the conceptualization of innovation as a response to the future is deliberately normative, transforming toward preferable futures (steps 4–7). The method involves interviewing experts from various disciplines to gather information that describes aspects of the future world, yet leaves the interpretation, framing, and meaning derived from this information to the designers. The method encourages the exploration of interconnections, integrating multiple perspectives, and adjusting boundaries when more information is gathered. The method is deliberately staging the responsibility and authenticity of designers as central in order for them to deliver original design proposals that they can defend. The founders of the method criticize customer-oriented design (i.e., designs based on what people say they want) and call for a deeper understanding of human values to drive design decisions. Although the method does not exclude the participation of stakeholders, it does ask designers to become owners of the process.

2.3 Data collection

The data collection in the present study focused on capturing the visioning activity. Following Dorst (2008), our conceptual framework (Figure 2) included the object of the design activity, the actors involved, the context in which the design took place, the design process as applied, and the design outcome.

Between November 2020 and June 2021, we followed the design agency in their visioning process. The authors triangulated data from observations, interviews, questionnaires, documentation, and design artefacts (i.e., visual outputs), as is recommended for rigorous qualitative research and to enhance internal validity (Patton, 2002; Yin, 2009). The first author participated in all design activities but did not have a decision-making role. The first author joined 40 online meetings with the designers during the 8-month project. This provided insight into the actions and decisions taken within the visioning process. On occasion, meetings included FETE researchers. The first author took notes of what was discussed in the meetings, specifically noting aspects related to the conceptual framework. In addition to notes, process

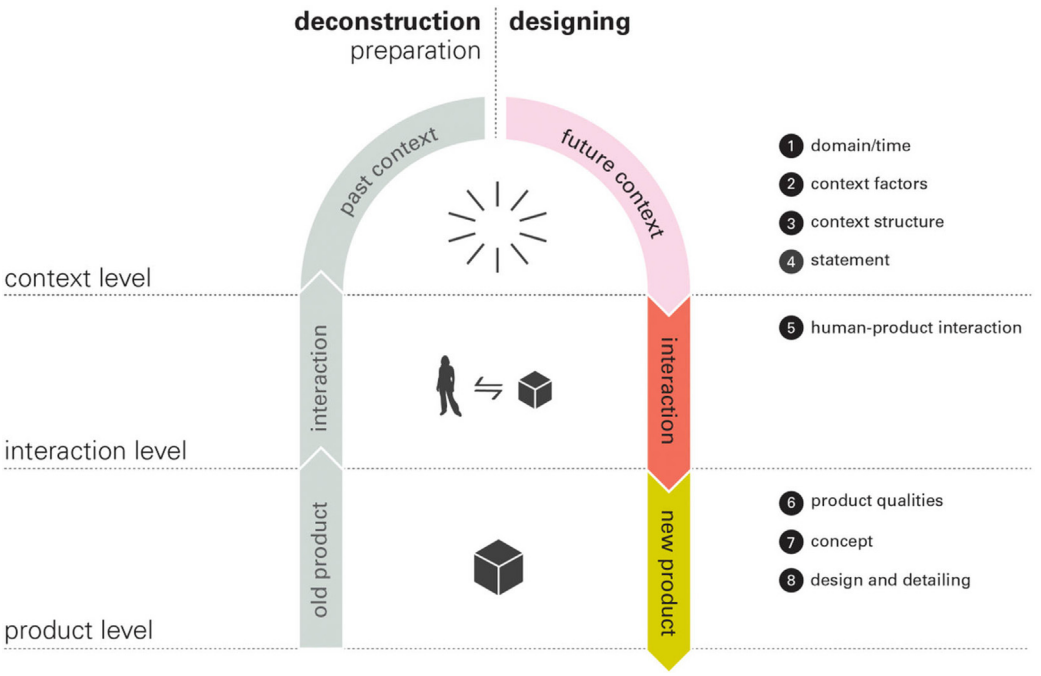

Figure 1 The stages, layered levels, and design steps of the Vision in Design approach (Reprinted with permission from Hekkert & van Dijk, 2011, p. 133)

documentation and physical artefacts, i.e., Miro boards being worked in, sketches, ideation post-its, draft and final reports, and email correspondence related to the envisioning process, were collected to triangulate and complement insights gained through observation and interviews.

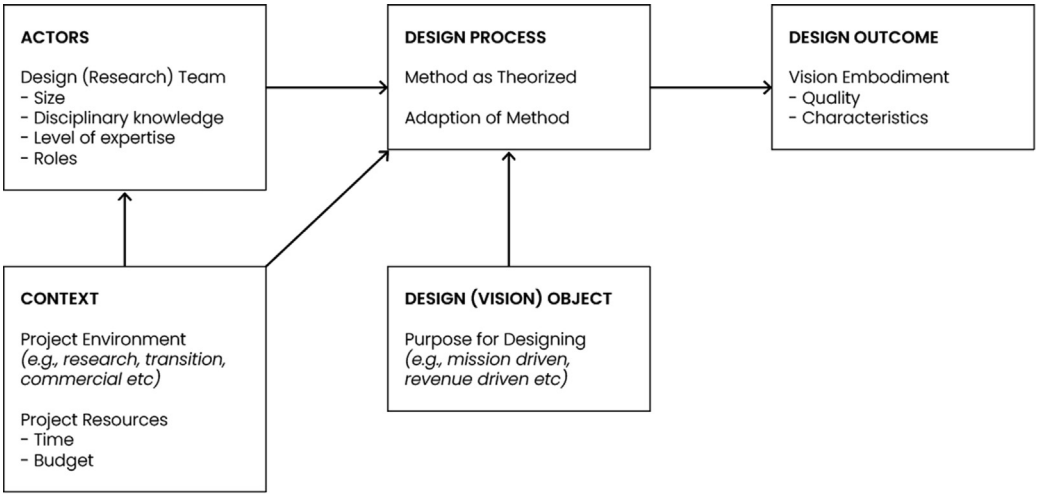

Figure 2 Conceptual framework showing the main things to be studied—key factors, variables, and their relationships

After the draft and the final version of the vision were presented to the consortium and other experts who participated in the visioning, questionnaires were sent. The questionnaires gathered insight into the assessed quality and value of the vision for various actors. The questions invited reflections on how inspired and stimulated they felt to imagine possible futures, how motivated they were to actively take steps toward the vision, what aspects of the vision they found desirable, feasible, and viable, and how well they were positioned to move towards the vision including any barriers or conflicts they anticipated.

The first questionnaire, sent after the presentation of the draft vision developed by the design agency, contained 11 open-ended questions and 5 statements with a Likert scale. It was sent to 24 participants from 13 different organizations, implying that in many cases multiple individuals from the same organization were invited to participate. The individuals who received the questionnaire, as part of the consortium or that participated in the visioning interviews as external partners, all held strategic roles within their respective organizations. In total, 10 responses were recorded representing 6 FETE partners (the national nutrition centre, food waste foundation, IT consultancy firm, meal delivery service company, fruit and vegetable wholesaler, and a food manufacturer), an additional education institution, and a Dutch Ministry. While not all FETE partners responded, the responses represent different perspectives and roles within the food system. The second questionnaire, sent after the presentation of the final vision, contained 3 open-ended questions and 12 statements with a Likert scale. It was sent to 19 participants from 9 different organizations. In total, 6 responses were recorded from 5 different FETE partners: two from the IT consultancy firm, and one from the national nutrition centre, the food waste foundation, meal delivery service company, and fruit and vegetable wholesaler. The responses represent different perspectives and roles within the food system, and there was a high overlap with the organizations that responded to questionnaire 1.

Upon completion of the project, the first author, following an interview guide, conducted semi-structured interviews with the four designers working on the project and two researchers from the FETE research team who provided the brief (from the University of Groningen and Wageningen University). Related to the conceptual framework, the interviews focused on five themes: the interviewee's background, adaptions of the method, the visioning process and outcome, the value of designers visioning for transitions, and collaboration. Through these themes, we aimed to deepen our understanding of how design capabilities flourished or were challenged in the visioning process. The interviews were conducted online via Zoom, lasted between 60 and 90 min, and were audio recorded (see Table 1).

Case study of a new food system

Table 1 Overview of data collected during the case study

Data source	*Description*	*Reason of collection*
Process documentation and artefacts	3 Miro boards, 2 iterations of system sketches, and 2 reports (1 intermediate + 1 final), and over 50 email correspondences.	Real-time logging of the envisioning process to report how decisions were made to get to the final vision.
In-depth Interviews	6 semi-structured individual interviews with the designers and two project leaders of FETE (audio recorded).	Individual and in-depth reflections of team members on the quality of the visioning process and vision.
Participant as observer	A notebook of personal notes.	Capturing insights that deemed noteworthy from a research perspective.
Questionnaires	16 completed questionnaires from consortium stakeholders representing 8 different organisations.	Stakeholder judgement on the value of the visioning process and vision.

2.4 Data analysis

Following the writing of the case report, a two-step inductive thematic analysis process was undertaken. The first step focused on identifying intriguing challenges or needs of the context that hinted toward tensions with design capability. All the data was entered into Atlas.ti, software for qualitative analysis. Following Graneheim and Lundman (2004), the written transcripts, questionnaire data, and case notes were broken down into meaning units (interviewee quotes), accompanied by condensed meaning units (interpretation of quote by the researcher) and labelled with a code (Table 2).

The second step focused on deepening our understanding of the themes revealed in step 1 by framing the condensed meaning units (researcher interpretation) as challenges or successes. Table 3 shows examples of how this process was undertaken. This process supported us in better explaining and

Table 2 Overview of codes

Codes
Abstracting between system levels
Aligning toward a future
Balancing trade-offs in the future
Bringing together different expertise
Catering to more complexity
Catering to the client
Challenging the current system
Challenging disciplinary blinders
Discussing and reflecting on the future
Embracing a wider scope
Encouraging responses through tangibility
Engaging stakeholders in the process
Exploring alternative futures
Looking at the future in new ways
Triggering stakeholders to see their place in the future
Trusting the process

understanding the codes, as well as exploring the interaction between them, such as if some codes came at the cost of others and, as such, what tensions they presented. Throughout the analysis, we took steps to reduce researcher bias and increase the internal validity and reliability of the results. The authors discussed interpretations of the quotes, and the authors who were less involved with the visioning process took an outsider perspective challenging emerging interpretations (Yin, 2009). Additionally, the second author accessed the data and followed the same analytical procedure confirming or challenging the findings of the first author, thereby enhancing the validity of the findings (Corbin & Strauss, 1990; Yin, 2009). In the next section, we describe the visioning process undertaken by the design agency.

Table 3 Examples of how the transcripts of the interviews were analysed

Interviewee words	*Researcher interpretation of challenges and successes*	*Codes*
'The project was called future food practices. At first really on consumer behaviour within this future context. Then it made sense to have more focus on products that the consumer uses throughout his day or life. But in the end, the system changes were much more interesting and valuable, and that required thinking about a new food system including what makes the world a better place.' Designer	Expanding the scope from daily food practices to new food systems supports asking normative questions about the future	Catering to more complexity
'In this project, it was really important to have something to talk about and trigger the stakeholders to sort of see their place in the system, see where they should be, where it matches their values, and where they want impact.' Designer	The visualizations of the systems anchored discussions and triggered stakeholders to reflect on their values and roles in the future	Triggering stakeholders to see their place in the future
'There were so many stakeholders involved, it felt like okay this is on a project management level something to get everybody working together to make something. That was not about the vision, the vision then becomes a means for something else. At the same time, the means, the vision itself seemed to be very important. So there were two outcomes to me, what I saw what was needed.' Designer	The visioning had two goals that at times competed: a project management goal to bring FETE together and an innovation goal to develop a quality vision	Engaging stakeholders in the process Exploring alternative futures

Case study of a new food system

3 *Case report: The FETE visioning process and outcomes*

Due to COVID, this project was executed entirely online. The designers invited others to be involved through online environments, including some that they were not familiar with. They used Miro, an online collaborative platform to collaborate on the content, and the online video platforms Zoom, Microsoft Teams, and Gather to support meetings and breakout rooms. All sessions lasted between 1 and 2.5 h.

Step 1 *Establishing project scope, domain, and kicking off the project*

In line with the ViP method, the design agency, together with the university partners, scoped the project to 'future food practices in the Netherlands in 2030' and outlined that the vision should move consortium partners out of their comfort zone and be thought-provoking. For the project kick-off, a 1-h session was organized with all consortium partners for which they were asked to bring two context factors related to food practices, i.e., developments, trends, states, or principles that shape future food practices. During the session, the designers introduced the visioning method and had the partners experience moving from steps 2 to 3 (factors to context structure) in the method, engaging them in the process while at the same time gathering first impressions of how stakeholders viewed future food practices.

Step 2 *Generation of context factors*

Next, the designers generated and collected 217 factors, i.e., building blocks of a future world (Figure 3). The factors were collected by reviewing literature and conducting 18 semi-structured interviews with experts knowledgeable of the Dutch food system, e.g., a sustainable food policy officer at the Ministry of Agriculture, Nature and Food Quality, an ecological nutritionist from a national nutrition centre, and a professor of Transitions and Transition Management. Together, the designers and researchers decided on the selection of the

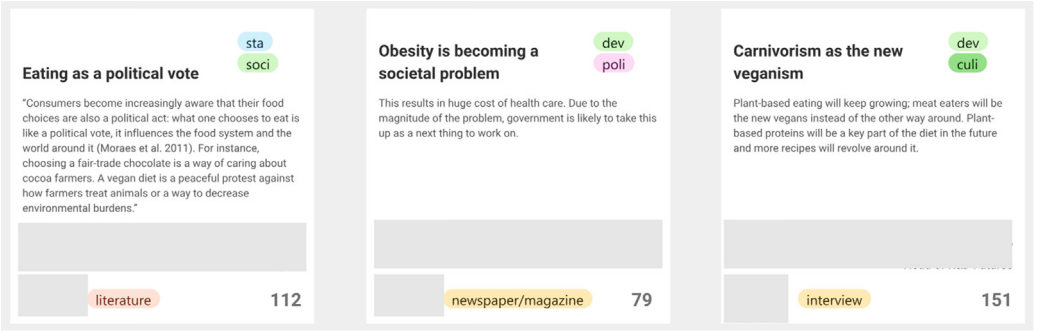

Figure 3 Examples of 3 factors collected. Privacy information about the designers and interviewees has been concealed

experts to interview. Many of the interviewees were experts in the current system rather than experts with an outsider look on the system (e.g., an anthropologist or demographer). This was partly because of the need to include all consortium partners in the interviews and partly because experts with different expertise were unavailable to participate. The interviews were conducted by the designers in pairs, occurred online via Microsoft Teams, were audio recorded, and lasted about 60 min. Following an interview guide, the designers prompted participants to provide concrete examples of how they saw food practices evolving based on their disciplinary expertise. The designers separately analysed the interviews and translated them into factors. The factors were compared, compiled, and verified with the interviewed experts to ensure the correct interpretation.

Step 3 *Structuring the context*

Clustering the factors to make a coherent image of the future occurred over six sessions. In the first clustering session, the designers invited the FETE researchers so that they could utilize the researchers' expertise as an additional source of information, offer further insight into the process, and communicate the outcomes of the expert interviews. During the session, one factor at a time was read aloud and placed in a Miro canvas, starting a new cluster or expanding an existing cluster based on group discussion of its current and potential meanings. In the first session, 60 of the 217 factors were clustered. The designers completed the clustering in the subsequent three sessions, forming 11 clusters, each illustrating a driver in changing food practices (see Table 4 for the 11 cluster titles). In the final two sessions, the designers wrote short summaries of each cluster (up to 300 words) to sharpen their meaning.

Next, the lead designer interpreted how these driving forces would shape consumption behaviours and translated the clusters into a three-by-three matrix to explain the future habitual practices of people when dealing with food—this was an iterative and fuzzy process. The framework's purpose was to reveal the variety of possible food-related behaviours in the future (what is plausible and possible?) and support decision-making regarding which behaviours to intervene with in the future (what is desirable?). At an interim presentation of the framework, the FETE researchers felt that the behavioural framework lacked explicit links to food waste. To address this feedback, the designers rewrote each cell as a 'modus operandi' informing various types of behaviours – from food purchase and preparation to the discarding of food. In the final framework (Figure 4), the vertical axis refers to the scope of people's worldview, what people consider their sphere of influence, and what people unconsciously perceive as the context to which their actions relate. The horizontal axis refers to people's way of dealing with the complexity of life and the food system.

Case study of a new food system

Table 4 The 11 driving forces (clusters) formed

1. The paralyzing complexity of conflicting concerns	7. Food to control one's body and mind
2. The comfortable graspability of single messages	8. Food as a delicious mirage in the mind
3. Headspace from outsourcing and efficient routines	9. The power of the extraordinary experience
4. Curbing choice to counter collapse	10. The power of demand and activism
5. Narrative fictions elevate the eating experience	11. Rethinking the commons
6. Eating as an act of autonomous resistances	

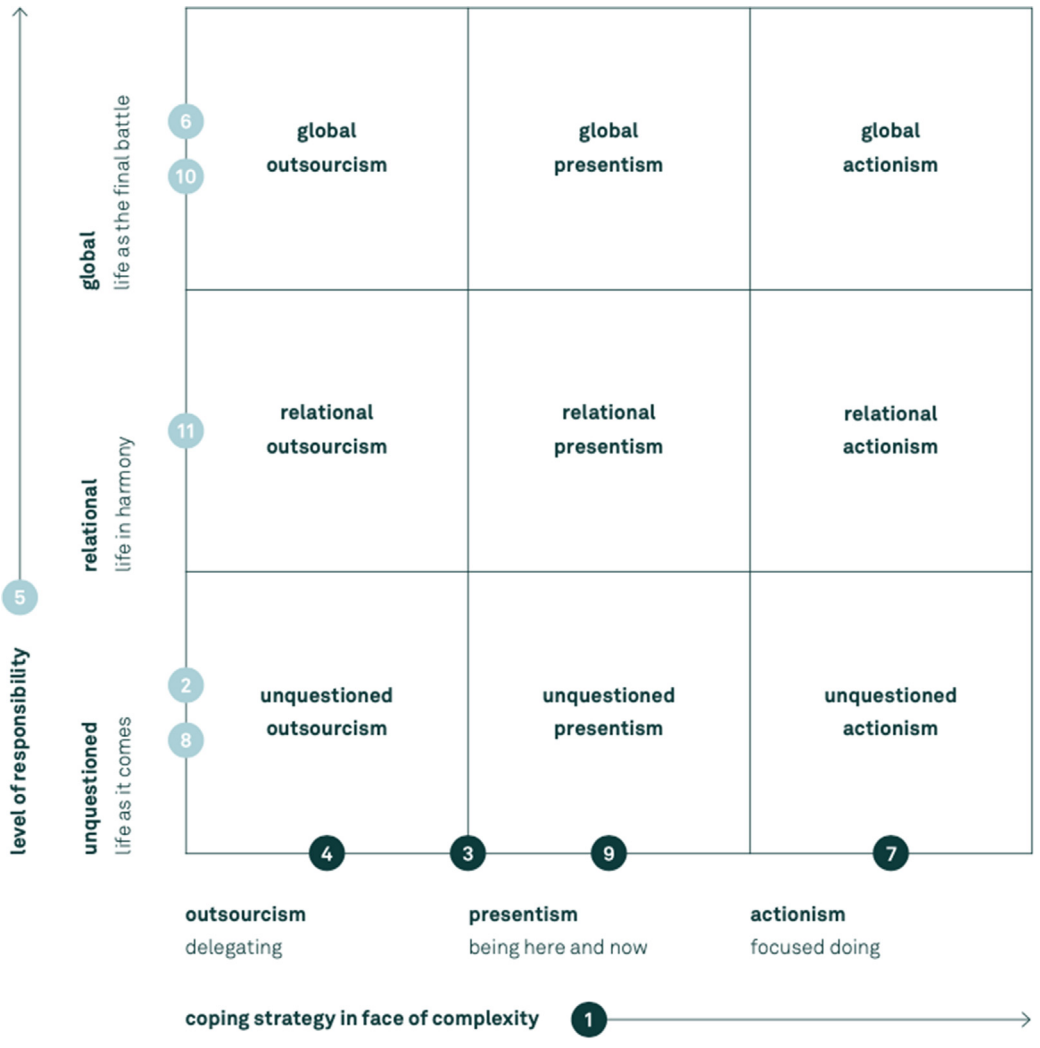

Figure 4 The strategic framework representing the nine behavioural drivers in future food practices. The numbers refer to the driving forces (clusters) that were developed in step 3 of the method

Step 4 *Statement definition and positioning*

When presenting the final framework, the designers wanted to engage the consortium in the process and have them provide input on which patterns of behaviours informed by a modus operandi the designers should focus their transition efforts on. Therefore, in smaller breakout rooms, the designers posed two questions: *For the transition from excess to enough, 1) how should the consortium respond to the future based on the practices that will evolve if we do nothing? And 2) where do you see the biggest levers for change?* To respond effectively to these questions, stakeholders wanted to quantify the future food waste levels for each of the practices. The lack of this knowledge hindered the consortium in making choices about which behaviours the designers should prioritize. This lack of positioning meant that the designers could not formulate a design focus (i.e., called 'statement' in the method, step 4) and needed to adapt their process. Additionally, the meeting confronted the designers with the fact that the transition context required multiple behaviours to be considered and linked. Without a statement as a backdrop for describing the interaction qualities that create a desired effect for people, the designers skipped the next step, step 5 defining human–product interaction, and went straight to ideating the new systems.

Step 6 *System ideation*

To kick-off ideation, the designers met with the FETE researchers to begin developing ideas for each practice (i.e., the patterns of behaviour informed by the modi operandi or cells of the framework). The lead designer instructed everyone to use post-it notes in Miro to capture examples and ideas for each cell of the framework. Once all cells had several ideas, the designers began building system narratives. The future context focused on the consumer level, describing nine dominant modi operandi (i.e., food practices), but a clear connection with system dynamics was lacking. When forming the new systems, the designers focused on user practices and zoomed into the everyday life of people. However, the researchers also wanted to learn, based on this everyday life, what future food systems that cater to enough could look like including the roles of retailers, producers, the government, etc. At this stage, the designers felt confronted and continued to let go of the method. They tried multiple strategies to think of food practices more systemically.

The first strategy mapped the modi operandi and corresponding practices temporally on five timelines: day, week, month, year, and life, to develop scenarios that illustrate how people switch modes and link those switches to food waste (Figure 5). They considered more dynamics, such as the role of seasons, the interaction between the behaviours, and what system infrastructure would support such changes. Other strategies included looking at the supply chain to link the practices and corresponding ideas to different stages from farm to

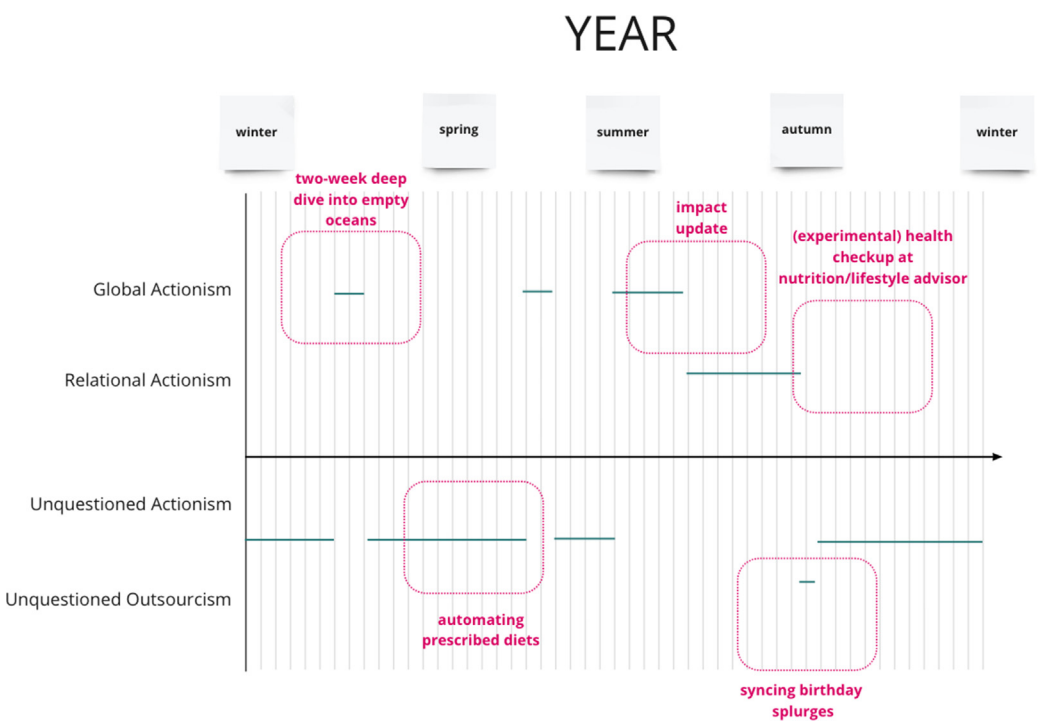

Figure 5 Example of the temporal strategy employed by the designers

fork, as well as considering what new roles actors may have (e.g., considering consumers as producers).

Over 7 sessions, 4 systems that represented a future food system that caters to enough were developed. System 1, 'Monitoring the food system', uses data to optimize food flows throughout the supply chain. System 2, 'Vitalizing the food system', repositions food consumption into a large set of lifestyle choices. System 3, 'Sharing the food system', views social identity formation as an important driver in the food system. System 4, 'Opening the food system', aims to develop public responsibility to take care of our natural environment.

Step 7 *Concepting the systems*

To give form to the systems, the designers created drawings with the overall system dynamics (Figures 6 and 7) and described the system infrastructure, its effects on food production, and the components of the system with regard to processing, purchasing and consumption, and resource and waste recovery. To communicate individual behaviour, they developed day-in-the-life scenarios following consumers through the system and included concepts of new products and services that supported the narrative (Figure 8). These

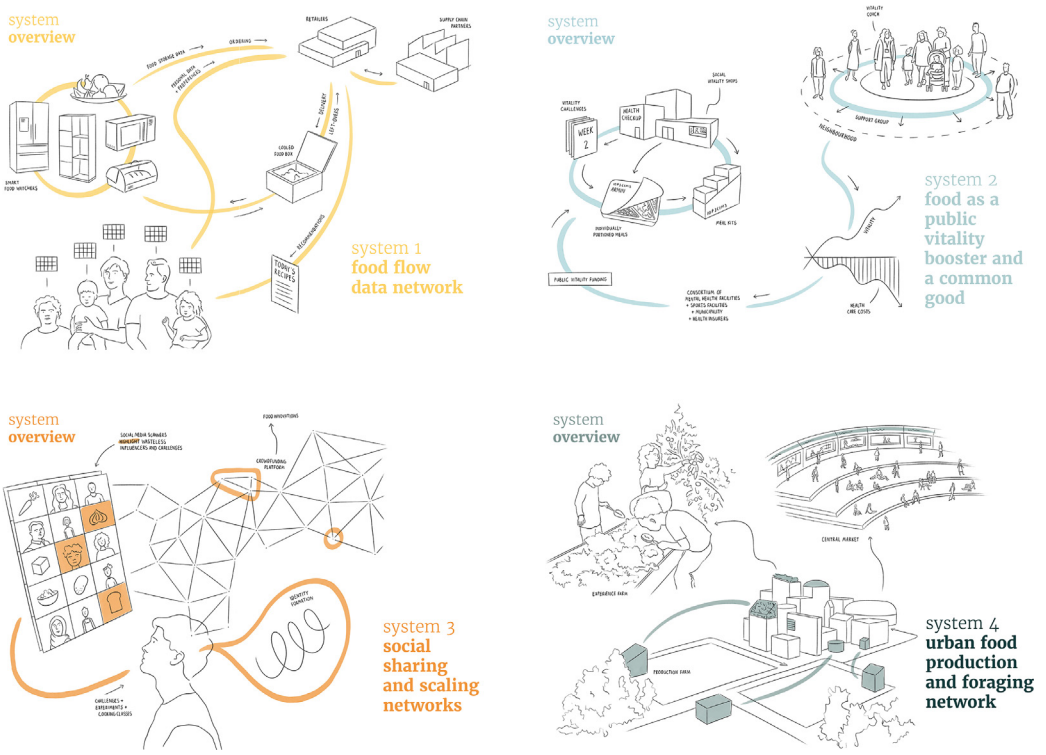

Figure 6 Overview of the four systems developed by the design agency

design artefacts aimed to help stakeholders step into the system and respond to the propositions.

When presenting the systems to the stakeholders, they were asked to reflect on *which system they found most inspiring, desirable, and likely; and which system they thought lends itself best for the transition from excess to enough*. These questions served as a way to align the consortium within the broader food (waste) transition and determine a direction for innovation efforts. However, the consortium differed greatly in their responses.

The scope of the project for the design agency ended with the presentation of the 4 systems. However, to ensure the collective efforts of the consortium were moving in the same direction, the first and second authors combined the four systems into one unified vision (Figure 9). This was done by identifying consumption behaviours of a system that caters to enough. For example, if people have the knowledge to adapt portion sizes with different products, they are better able to prepare enough food with less food waste. Then, for each system, the role and value of consumers, retailers, and producers were identified, along with the interactions between these actors. With consideration of the consortium feedback, a unified system was developed focussing on four system

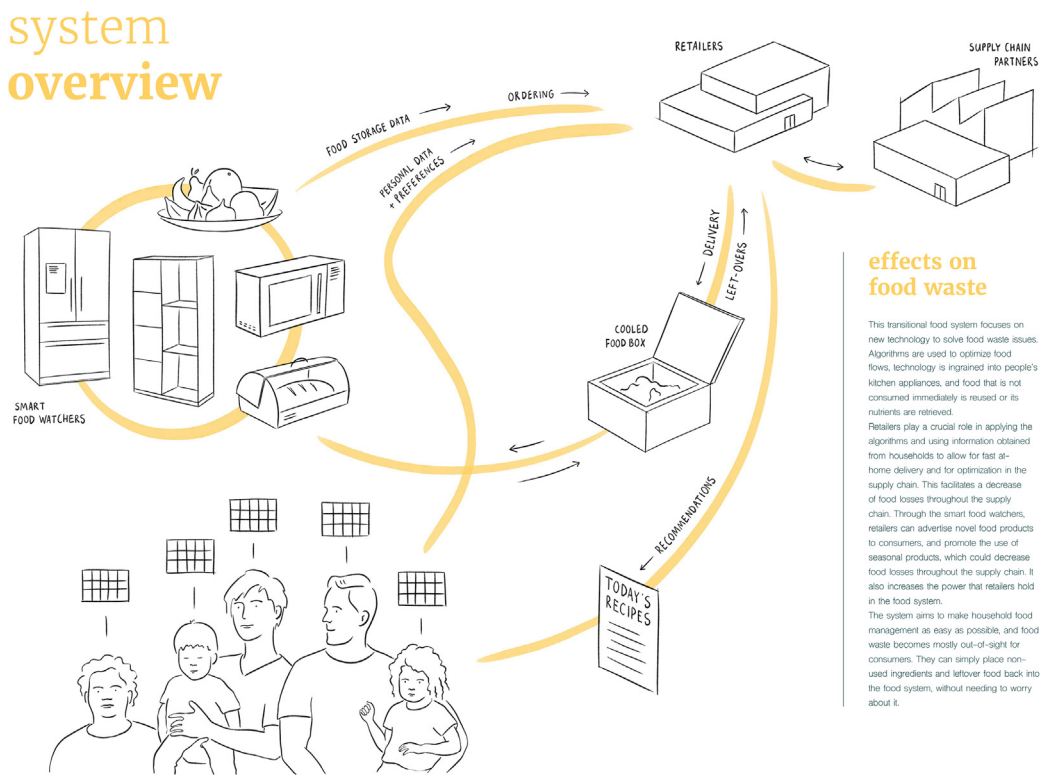

Figure 7 A visual describing the overview of System 1, which focuses on using data to optimize food flows throughout the supply chain

principles describing actors' interactions: 'embracing flexibility', 'regulating vitality', 'recognizing the value of food', and 'optimizing through learning'.

A report, and then a 3-min video developed in collaboration with an animator (Figure 10), were made to communicate the unified vision within and outside the consortium. Therefore, the vision was the primary deliverable, merging the anticipation of a plausible future with a vision of a desirable future. The innovation concepts developed (steps 6 and 7) served to illustrate the future context and inspire future innovations rather than represent implementable designs.

4 *Findings and discussion*

In analysing the FETE visioning process, we found several tensions that indicate the need for better support to improve design capability in visioning for transitions – of which some are confirming earlier work. We unpack these tensions and consider how they relate to the *position* of the designer in the process, as well as the *quality* of the eventual vision. We discuss how potential choices in the process and/or methodological support could strengthen the role of design in developing visions for transitions.

Figure 8 The beginning of a scenario exploring how a family would experience System 1, the data-driven system, in their daily life

First, we observed an ongoing tension between exploring alternative futures that challenge the current system on the one hand and depicting probable futures that allow stakeholders to see their place in the future on the other. One of the decisions in the process that affected this tension was the choice of experts to be interviewed. The need to include people from the consortium who largely represent the status quo and provide an insider perspective limited the capacity to include experts with an outsider perspective – one that provides alternative ways to look at food production and consumption.

> '*The more you start with a set of insider experts, the less room you have to find other angles. And it's not always that in the other angles the answer comes but I think it needs to be there for the exploration. For the sake of having a 360 view, this selection process was compromising*'.
> *Designer*

A key consideration is the *purpose* of the vision and, therefore, the steps taken to increase the quality of the vision in light of this purpose. In this case, a key purpose was to engage the consortium in the process and bring a sense of collectiveness to the transition. However, to foster the transition, it should also spur innovation that fosters the desired change (i.e., transformative knowledge in Gaziulusoy & Ryan, 2017b). Therefore, the designers tried to balance making the vision inspirational to ideate from with making it relatable for the

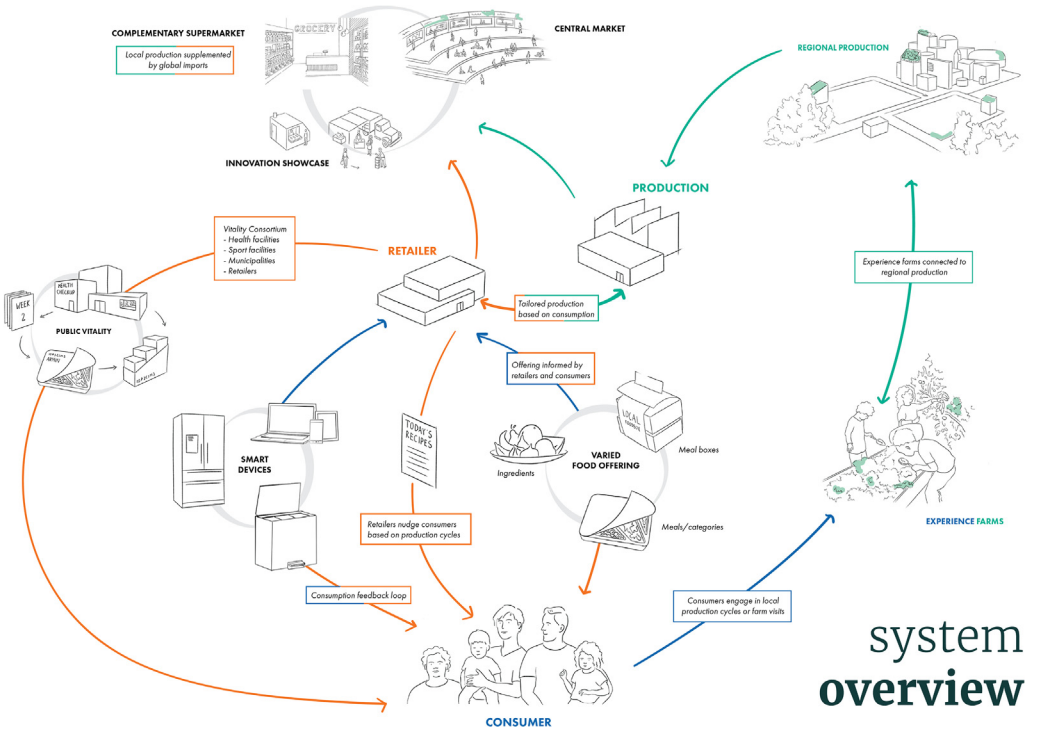

Figure 9 The system overview of the unified vision, illustrating the relationship between the elements

stakeholders. This meant adapting the language used throughout the envisioning process and removing some ideas that were seen as improbable or too specific. For instance, one early idea was 'urban food foraging', the practice of identifying and collecting the wild foods growing around the city as a way to engage in dialogues of food justice and environmental land use emphasizing the centrality of food in caring for others and the environment. Some partners felt this was too niche and did not relate to a large enough consumer segment.

> '*As designers, we're usually making these visions inspirational for ourselves, so we get an itch to start designing. I think a bit of that was lost when we made [the vision] more relatable and approachable. But in the end, it's not us who need to work with it, it's all the stakeholders in the project team, which was fine.*'
> *Designer*

While the designers took ownership of the vision content, reducing stakeholders' cognitive load (in terms of complexity), minimizing the time asked from stakeholders, and minimizing the reliance on stakeholders' system thinking skills (issues raised by Robinson et al. (2011), Hyysalo et al. (2019) and Loorbach (2007) respectively), the designers did not manage to position themselves in a way to challenge stakeholders in their ideas about the future.

Figure 10 Screenshots from the animated video providing a feeling for the formgiving applied

The designers' lack of domain knowledge is an influential factor in this case as it negatively influenced some stakeholders' confidence in the designer's ability to envision new food systems. The timeframe allocated for the project, 144 h, also limited the opportunity for the designers to gain the requisite domain knowledge and manage the design visioning needed to deliver a high-quality vision that mobilizes the stakeholders. Nevertheless, it is naïve to think designers alone would be able to attain the domain expertise needed to present internally consistent scenarios for such a complex domain (Gaziulusoy & Ryan, 2017b; Wiek & Iwaniec, 2014). Moreover, it should be questioned if such a situation is even desirable. As noted by Gaziulusoy & Ryan, 2017a, designers are skilled at connecting otherwise unconnected ideas and thereby represent new ideas and interactions in visioning processes, and this is (likely) aided by the outsider perspective they have in transition visioning processes. This paradox became clearly apparent in our case study: the more the designers felt a lack of trust from the stakeholders, the more they tried to conform to stakeholders' input, and the less daring and challenging their ideas became. However, the less challenging and daring the designer's ideas were, the less trust the stakeholders had in the designers' ability to challenge their thinking.

> '*There comes a point when the project lead suddenly finds the narrative in his mind and is like "okay, I believe in this". You have to believe in the future you present yourself. If you believe in the message, it is easier to transfer it to others.*'
> *Designer*

Case study of a new food system

From this paradox, we see that the information feeding into the envisioning process should be equally aimed at supporting an understanding of the status quo *and* at helping to challenge the status quo. This means that design's capability to combine various sources of information and do research into areas that may be seemingly unrelated to the challenge at hand should somehow be safeguarded, in order for designers to imagine radically new futures, relationships, and products and services. Additionally, more care should be taken in considering how to support designers to productively challenge the current thinking of stakeholders and not only learn from them. This may be by 1) positioning design experts in a core team with other experts, like transition researchers or domain experts, to explore possibilities prior to validation with system stakeholders; 2) engaging individuals working for the involved organizations who might be better equipped to assess the vision in terms of its innovation potential (e.g., R&D developers) and not only including individuals who have the mandate to enact changes (e.g., managers); and 3) explicating to the individuals involved that part of the transition process and design approach is to challenge their thinking, articulating potential friction (e.g. voicing that they, as stakeholders, might be part of the problem hindering the transition) and being able to make explicit methodological steps for this process.

We also see added tension in terms of who is responsible for safeguarding the values that drive the transition (e.g., sustainability and equity), seeing this as a designer's responsibility on the one hand while shifting this responsibility to the stakeholders on the other (Gaziulusoy & Ryan, 2017b; Hyysalo et al., 2019; Mok & Hyysalo, 2018). This raises attention to the concerns around the ambiguous nature of values and for better ways to engage with values, morals, and ethics in transition design visioning processes (Borning & Muller, 2012; van Wynsberghe, 2013). While this is already happening around the adoption of new technologies (e.g., as in Value-Sensitive Design (Friedman, 1996; Mok & Hyysalo, 2018)), supporting designers in explicitly engaging with moral and ethical questions in their practice is relatively underdeveloped (Chan, 2018). During the process, we observed several controversial and moral discussions being avoided or ending without closure. For instance, a concept proposed by the designers involved government tracking of food flows through individual consumption data, raising concerns about data privacy. While some stakeholders were uncomfortable with personal data collection, others saw it as an opportunity to shape consumer behaviour and were supportive of this future. This conversation ended without a collective perspective on how privacy 'should' be considered in a future food system.

'*There were some controversial things, like the ethical discussions or discussion on what will be really good in terms of being in a food transition that we*

sometimes evaded. Maybe because these discussions lead to delays and potentially don't reach a common ground. I would just be very curious to have a really open-minded discussion on why certain ideas are bad'.
Designer

So, while the designers were able to bring tangibility to the future, they were unable to cultivate an environment for deep reflection: *What future do we want to see come true?* The designed artefacts helped to relate to this question and revealed various value conflicts between and within stakeholders, yet the dialogue was not well supported. For instance, there was a discussion around the plausibility of certain developments, e.g., speed delivery of groceries and their desirability, knowing it could help decrease food waste but also negatively affect the use of urban spaces and labour conditions. Additionally, participants may have different viewpoints themselves, depending on whether they respond as a representative of their organization or personally.

'*The vision should really provoke people to see things in a different way, and that's what we had with this whole idea of food for health. The idea is that a certain consumer segment really makes health focal in all their food purchases and that you better think about how the system can be set up in a way that the consumer doesn't buy seven salads a week, of which he trashes four or five? I think that is really something that is kind of thought-provoking. But are we really going to live like that?*'
Professor of Services Marketing

'*For my organization, we rely on technology, data exchange and the collaboration of the bigger companies and bodies in the chain. So, the system with a focus on data is most desirable from a business opportunity point of view. Personally, I believe in "education" and bringing broader value as a way to bring about positive change*'.
Vice President, Business Content Lead of IT Consulting Firm

Ultimately, how to address these conflicting values and decide what vision would become leading in the transition is a core step the designers struggled with. Especially since the method that was used in our case study asks designers to take responsibility rather than leaving it up to the client or stakeholders. There is a need for an independent actor to articulate the underrepresented values and ask normative questions about the future we as a society want. Since the Vision in Design method stages the designer as this actor, adaptations to the method or additional tools should support the designer in taking on this role. We suggest further exploration into how to position stakeholders and designers to have moral discussions and equip designers in transition contexts to better support these reflexive processes and/or collaborate with experts to do so (van der Bijl-Brouwer et al., 2021) – potentially including other disciplines, like philosophy.

Case study of a new food system

Finally, we saw a tension in developing design artefacts as a way to communicate the experiential qualities of the system (i.e., in the everyday life of people), yet helping participants to see these as part of complex system dynamics. The designers used a combination of the system overview and the day-in-the-life scenario to communicate the vision, but the consortium partners began picking specific elements that presented innovation opportunities for their organization rather than viewing the systems as one whole which would require developing new relationships with other stakeholders.

> '*We were really searching for what the [FETE stakeholders] needed to be able to look into the future. In the end, they really needed tangible products. But the products were meant to explain the system, not present product opportunities. But that was tricky, because the system transitions were more interesting than the products. So, it's a bit of a waste that the focus for stakeholders became product level rather than the underlying big system changes.*' *Designer*

The authors tried to address this by selecting and communicating four principles that represented the relationship between the systems, including the new dynamics between consumers, producers, and retailers. This process highlighted a challenge between giving form to things in a concrete enough way to aid in understanding while emphasizing the new complexity behind it and leaving enough room for the imagination so that others feel they can move along the pathways toward the vision. Currently, designers use, for example, scenarios (e.g., Candy & Dunagan, 2017), metaphors (e.g., Lockton et al., 2019), and system mapping (e.g., Sevaldson, 2011) to communicate system dynamics and relationships often depicting certain system levels (e.g., city) and particular changes (Forlano & Mathew, 2014; Gaziulusoy & Ryan, 2017a). However, more exploration into how to support designers in connecting the experiential and system qualities in the future and giving form to the dynamic relationships between these, representing multiple changes and system levels simultaneously, is something we consider to need further exploration if we wish to position visualization and experiential design capability better for fostering transitions.

5 *Conclusion*

In this paper, we articulated how design capability can be positioned in a transition design visioning process by following a design agency as they envisioned a new food system for a research group working on the food (waste) transition. We aimed to expand our knowledge of the current boundaries of design expertise in transition visioning processes. Central to our contribution is the unpacking and articulating of several tensions that emerged in the process for design expertise in transition contexts. These tensions indicate the need to better understand how to position design capability in transition visioning

processes to support designers in productively challenging the current system yet supporting stakeholders in seeing their place in the future, in positioning designers to have moral discussions and/or equip them to better support such reflexive processes, and in supporting designers in giving form to dynamic relationships and connecting the experiential and system qualities in the future. Given that this study follows one design visioning process in one transition context, it bears the danger that the findings are specific to the design method, designers themselves, or the specific case. As such, future research is needed to investigate the extent to which our findings are representative. Nevertheless, our findings provide further avenues for research and actionable insights for design for transitions methodology and practice.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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Notes

1. The PhD candidates are located at the University of Groningen, Wageningen University, and Delft University of Technology, and each has two supervisors. The postdoctoral researcher is positioned at Wageningen University.

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