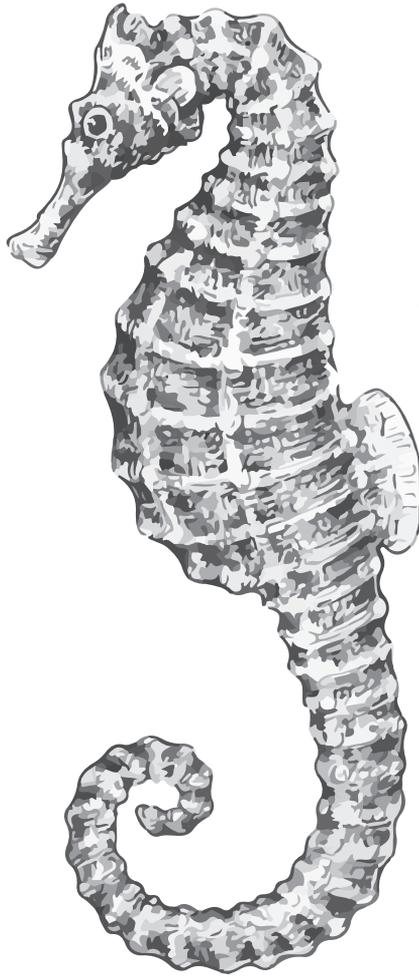




Vision concepts

4



**Design-led futures
techniques used
outside the
automotive industry**

4. Design-led futures techniques used outside the automotive industry¹

The previous chapter studied concept cars as a design-led futures technique and uncovered its relevance for SMEs. This technique and the resulting artefacts evoke discussions about the company's future that increase the range of opportunities when making-decisions on the world as it is that feed the innovation strategy. However, the technique is costly and requires a highly skilled team, which make it difficult for SMEs to implement. In view of these limitations, the objective of this chapter is to research related design practices outside the automotive industry and thus identify the ingredients to develop a design-led futures technique for SMEs, topic of the next chapter.

To cover these design-led futures techniques, this chapter conducts two literature analyses on designerly ways to speculate about the future and two comparisons of these design practices. Section 4.1. and 4.2. discuss two literature reviews –the former used the keywords concept product(s), concept service(s), and vision concepts, and the latter speculative design, critical design, and design fiction– in the literature search through Scopus, Web of Science, and Google Scholar. This literature analysis serves as a transition from concept cars to design fiction, including critical design, to introduce two comparative analyses, described in section 4.3. The first one compares different vision concepts (concept cars and concept kitchens/products) to identify the similarities among these techniques and thus identify what other design-led futures techniques have been proposed in a business-oriented context. The second comparison aims to identify and clarify the characteristics of critical design and design fiction in comparison with vision concepts and thus reflect on design's potential value for contexts other than product development in large corporations. In Section 4.4., the lessons from the two studies are brought to a conclusion about design-led techniques for envisioning the future.

1 This chapter is based on the papers:

Mejia, J. R., Simonse, L. W. L., & Hultink, E. J. (2015). Design of vision concepts to explore the future: nature, context and design techniques. Presented at the 5th CIM –Creativity and Innovation Management– Community Workshop, Enschede, The Netherlands.

Mejia, J. R., Pasman, G., & Stappers, P. J. (2016). Vision concepts within the landscape of design research. In P. Lloyd & E. Bohemia (Eds.), *Proceedings of DRS2016: Design + Research + Society – Future-Focused Thinking* (Vol. 4, pp. 1659–1676). Brighton, U.K.

4.1. Vision concepts, the confluence of visions of the future and concept cars

This literature review starts by discussing the way in which the notion of concept cars has been extended from the automotive industry to other contexts in a business-oriented setting. The term ‘concept car’ is used in technology settings to describe a pioneering result, or an experimental approach applied to encourage creative thinking. That is the case of the ‘Intel’s information technology (IT) concept car program’ that, according to Pickering (2004), stimulates the delivery of “proactive solutions that anticipate needs before they arise”. She states that these IT concept cars are the result of a process in which employees prepare a proposal and build out the experimental prototypes, such as posters with annotated sketches, proof-of-concept demos, storyboards, or videos that embody the ideas. These prototypes are used to communicate the concept car internally through “a community of practice” and in internal workshops, or externally through international fairs. Along with these – internal and external– events, focus groups, interviews, observations, and surveys are used to capture the user’s feedback. The insights of these tools are captured in the form of white papers, demos, videos, and case studies.

These experiments, in which “the funding process is streamlined”, usually take less than three months (Pickering, 2004). Although these exercises involve images of the future in the form of prototypes, they are just ideas of probable future products that are not necessarily used to give direction on the business’ future.

As the previous example illustrated and the literature analysis revealed, concept cars, as an approach and as an end, has been applied with microprocessors, cars, kitchens, or insurance, among others, to generate ideas of new products and services, or as a way to clarify the vision of the company and thereby generate concrete ideas regarding the business’ future innovation strategy.

To be as inclusive as possible, in this dissertation, we rechristened the notion of concept car, which is limited to the automotive industry context, as the broader *vision concepts*, which indicates that the artefact that is made does not have to be an automobile (it can be a product or a service), and that it embodies a vision of the company’s future. The notion of vision concept was developed by Keinonen and Takala (2006) as part of a classification that defined three type of concept products:

- (i) *product development concepts* used to unlock the problem and map the possibilities in the new product development process;
- (ii) *emerging concepts* that support the learning and decision-making process with regards to future product generations; and
- (iii) *vision concepts* used “to go a stage further”; these are made to support

the company's strategic decision-making beyond the scope of product development.

This classification matches with the findings of Chapter 3, in which we defined concept cars for the world as it is, for the near future, and for the speculative future. In this dissertation, we understand vision concepts as a notion that blends the main findings of previous chapters: (i) vision and (ii) concept –cars for the speculative future. On one hand, as mentioned in Chapter 2, a vision, which in general terms is described as “conditions as we would like them to be” (Stokes, 1991), is located in the speculative future as part of mapping the preferable. According to Kaufman and Herman (1991), this destination is presented generally as a brief narrative that defines the focus and purpose of the organization in the long-term. Recent scholarly work in the field of innovation management defined three types of vision: market visioning (Reid & Brentani, 2015), technology visioning (Reid, Roberts, & Moore, 2014), and product visioning. The latter has been relatively unexplored, apart from a prior study (Simons & Perks, 2014) that mainly investigated the relation between product visioning and new product development performance. These studies found that product visions exert a large influence on a new product's success (Lynn & Akgun, 2001; O'Connor & Veryzer, 2001; Reid & Brentani, 2012). Empirical evidence also suggests that a clear and shared product vision in the front end of innovation can subsequently enhance and speed up functional integration during new product development (Tessarolo, 2007), whereas a weak product vision can lead to time-consuming efforts to integrate disparate functions. Similarly, Kessler and Chakrabarti (1999) suggested that a lack of shared vision can result in ambiguity and greater speculation among functions about what should be developed, often leading to conflict and delayed, and thus unsuccessful, new products. On the other hand, Chapter 3 stated that a concept is the combination of different abstract ideas, which in the case of the concept cars are related to technology and styling, to create a new interaction between the car and the user(s).

There are several design methods available to formulate a *vision* and explore what *concepts* are possible tomorrow. One is the Vision in Product design method by Hekkert & van Dijk (2011), who propose it as human-centered, context-driven, and interaction-based. This method is divided into two steps: the first for preparation and deconstruction of the present, and the second for the design work itself, design of the future. The second step is based on an in-depth understanding of the needs of people and the awareness of –future– context factors. These needs and factors are key to proposing a vision of what the future product should do and be before it has been conceived, including its reason for existence. In Vision in Product design, the vision consists of a statement that describes what the designer wants to offer people, within a particular domain. It should also include a definition of how this goal is to be attained through specified interaction qualities and product qualities. In this dissertation, we understand that while a method is related to a particular procedure of doing something, usually according to a systematic plan, a technique focuses more on the skills needed to effect a desired result. In this case, designers can use diverse

techniques when using the Vision in Product design method.

Although this method has been successfully applied by academics, designers, and companies, it does not provide explicit guidance on how to share the vision and concepts of these explorations with people inside and outside the company. Moreover, research has suggested that a collaborative approach is important to the product/market vision. O’Conner and Veryzer (2001), for example, espoused the importance of a shared mental model of the potential future product/markets before the new product development process itself starts. We are beginning to learn more about what this sharing process is. For example, Reid and Brentani (2012) found empirical support for the proposition that resource dedication, allowing for the timely dissemination of information to appropriate people, supports strong visions. To enable this, it is suggested that vision development should be shared between individuals and organizational systems (Stacey, 2001). Within organizations, the individuals typically engaged in envisioning are designers, and design techniques might facilitate the vision sharing.

4.2. Critical design and design fiction, other design-led futures techniques for a different context

This section continues with the analysis of the two design-led futures techniques defined in Chapter 2, *critical design* and *design fiction*. So far, these have been applied mainly within the design research and art community, not the business arena. According to Dunne and Raby (2013), these techniques typically use design as a promoter to start a discourse about the desirability of a new product or to open up the discussion about social implications of new technology. The resulting physical and/or digital manifestations of these techniques are not meant to be considered in their own right, but rather as provocations or stimuli, that should trigger and inspire people to consider their ideas concerning the future. These two techniques are studied under the umbrella of ‘speculative design’ (Auger, 2012). Speculative design is an area of design research, present in different design disciplines, where design is about ideas, not –factual– products. It produces artefacts, which are not intended to be mass-produced. Both Auger (2012) and Dunne and Raby (2013) distinguish speculative design from other design techniques as a space containing different forms of design that all happen when designers use fictional or imaginary worlds, thereby creating a space of challenges free from the restrictions of commercial products and separate from the marketplace. These imaginary worlds take place in alternative presents or diverse types of futures. Through the different forms of speculative design, designers facilitate “a dreaming process that unlocks people’s imagination” (Dunne & Raby, 2013) asking what-if questions and developing alternative visions. Speculative designers “use fictitious objects at the core of [their enquiries]” (Auger, 2012) as a way to trigger discussions with a broad audience. Several authors have looked at the aims these speculative designs serve and found that they can function as a form of

thinking, questioning and dreaming, as provocation and critique (Hales, 2013) and according to Dunne and Raby (2013) as inspiration, aesthetic exploration, speculation about possible futures, and as a catalyst for change.

In view of the landscape of design research, developed by Sanders (2006), in speculative design, “the designer is the expert who creates things to probe or provoke response” from their audience. Later, in 2014, Sanders and Stappers identified critical design and design fiction as design and making activities, which differ with regards to their time-frames. They argue that these activities “can be used in the early phase of the design process for making sense of the future, as vehicles for collectively exploring, expressing and testing hypotheses about future ways of living” (Sanders & Stappers, 2012). Figure 4-1 positions these design-led futures techniques across (i) the different time-frames: the world as it is, the near future, and the speculative future; and (ii) the design intent: provoking, engaging and serving people.

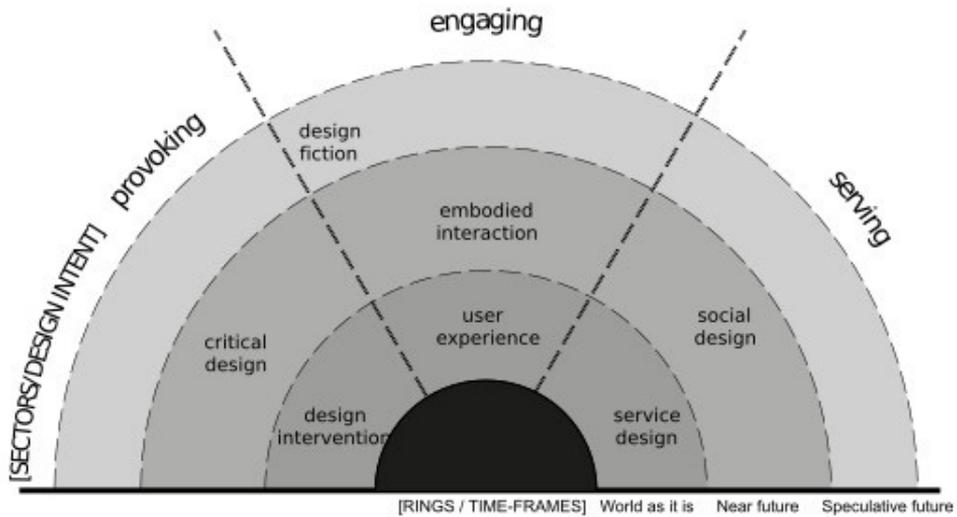


Figure 4-1. Critical design and design fiction as techniques to design and making based on time-frames and design intent. In the inner ring, the world as it is, in the middle ring, the near future, and in the outer ring, the speculative future. From left to right: design as a way to provoke, engage, or serve. Source: Sanders and Stappers (2014).

Sanders and Stappers (2014) position design fiction mid-way between engaging and provoking, on the outside ring of the speculative future. Critical design is located in the center of provoking, on the middle ring of near future. Although the spots assigned to critical design and design fictions seem adjusted to their characteristics, vision concepts are not part of this landscape.

In general, both in the field of innovation (management) and in the field of design, we found a lack of understanding on how vision concepts, critical design, and design fiction explore the future. It includes a lack of knowledge on how designers share these artifacts and what is the position of vision concepts within the landscape of design research.

4.3. Comparative analysis

In view of this gap in the literature, this chapter conducts two comparative analysis to collect the main characteristics of these techniques and then used as ingredients to develop a design-led futures technique for SMEs. This comparison also helps us to identify the position of vision concepts in the landscape of design research.

4.3.1. Method

The methods used in this chapter are the same as in Chapter 3, and for the same reasons. The goal is to unravel the characteristics of the design-led futures techniques used outside the automotive industry, more specifically vision concepts, critical design, and design fiction. In this chapter, we conducted two comparisons using the same categories defined in the previous chapter: activities, outcomes, and value of these design-led futures techniques applications.

In the first round, three vision concepts were compared. One, from the automotive industry, was described in Chapter 3. The other two cases come from another economic sector that has traditionally used design to explore the future, the consumer lifestyle industry: Concept kitchen 2025 by Ikea and Bio-digester –concept– kitchen island by Philips. To facilitate the comparison between the vision concepts, the chosen cases were designed for the same context, the kitchen, and with the same purpose, to cook food. All the selected cases had been completed, exhibit, and described in literature.

In the second round, we compared an example of vision concepts (the findings of the previous study); two examples of critical design, Digicars by Dunne and Raby, and Respiratory dog by Revital Cohen; and two examples of design fiction, Helios by Near Future Laboratory, and Song of the machine by Superflux. The latter four examples were critically discussed in Chapter 2. This comparison also positions these practices in the design research landscape.

Procedure

As in Chapter 3, this study followed Yin's (2003, 2009) method. We began with the collection of qualitative data recorded by videos and documented case material from multiple sources. This qualitative data includes internal information provided by the companies or designers on their web pages and in press releases, which comprise text, images, and videos; external reviews from specialized magazines and blogs (some including interviews with the designers); and related research papers published in scientific journals or books, if available. After selecting the cases, we analyzed the gathered materials.

Data analysis

The data analysis included the coding of the texts and the audiovisual material. In analyzing the materials, we looked for similarities and differences in the activities to make and share the artefacts. Then, we identified patterns throughout the cases and matched these to the respective aspects of the vision concepts. We tabulated these findings and formulated analytical statements, and illustrated them with individual examples and data from the cases (Miles & Huberman, 1991). Then, we iteratively compared the documented experiences with the videos. Finally, we generated a construct definition, characteristics of the sharing context, and an initial framework for design technique by induction (Eisenhardt, 1989; Pratt, 2008).

Appendix Chapter 4 online <http://dive.pktweb.com/> includes the videos and documented case material.

4.3.2. Results

Comparative analysis of vision concepts

This section presents the results of the comparative analysis that explores the consumer lifestyle industry, in which concept cars have been migrated to concept kitchens/products, on the criteria: activities, outcomes, and value of this design-led futures technique application.

Activities

With regards to the activities followed by the designers, Table 4-1 compares the three cases of vision concepts and the ways in which automotive and consumer lifestyle product manufacturers make and share them.

Table 4-1. Making and sharing activities of the three vision concepts

Case	Concept car	Concept kitchen 2025	Bio-digester -concept-kitchen island
Company	Automotive companies (findings of Chapter 3)	Ikea	Philips
			
Time frame	World as it is, near future, or speculative future	Speculative future (12 years)	Speculative future (10 years)
Team and departments	A specialized team that integrates around 6 designers and engineers from different departments	Depending on the stage of the project, special teams were arranged in 27 sub-projects. In total 54 designers worked together, including -senior- designers from IDEO and design students from Lund and Eindhoven University	The design team includes designers with "a wide range of design competencies, such as product design, interaction design, data visualization, service design, and communication design"
Duration	Around 12 months	18 months	Between 6 to 8 months
Making and sharing activities			

Appendix Chapter 4 online <http://dive.pktweb.com/> includes the visual comparison of the making and sharing activities.

In Table 4-1, the analysis reveals the techniques used to make and share vision concepts with particular attention to the role of the designers within the team, the staging of activities, and the inputs-outputs.

The comparison reveals that in making these vision concepts, companies arranged specialized teams that bring together designers and engineers from different departments. It seems as if these teams have expertise in broad areas of design, including research, prototyping, storytelling, and communication. On average, these teams worked together for nine months, which is considerably longer than the case of IT concept cars introduced earlier in this chapter. The comparative analysis includes the visual comparison of the flow charts of the making and sharing activities that each company engage in, which shows that the activities to make a concept car are quite similar to those for the other vision concepts. Grounded in the data, the three examples show that, in most of the cases, the team starts with *setting the*

domain and time frame. Ikea, for instance, set up the domain, which they define as an ‘opportunity area,’ an area of interest that includes the people who are within this area and the emerging themes that can affect them, and a research question, which in this case is “how might we behave around food in 2025?”. Then, as part of *analyzing the context factors*, the team conducts activities to explore this domain identifying opportunities and trends. Philips, for example, starts with the “definition of a terrain to explore [and then] researches the chosen area to position this problem in context.” Concerning the methods of analyzing the context factors, some automotive companies (see Volvo and Citroën Lacoste in Chapter 3) and Philips monitor trends, whereas others (see Mercedes-Benz in Chapter 3) use future scenarios. Ikea opts to use observation to gain insights from the users whereas Philips employs expert interviews. Later, for *envisioning the alternative futures* and *mapping the preferable future*, all the companies use an iterative way to generate, select, and refine ideas and thus define a vision of the future. Like the automotive companies in Chapter 3, all the companies indicate that they use sketching and prototyping as the method of generating ideas. The team produces sketches and mock-ups as a result of several creative activities. Unlike the other companies, as uncovered in the previous chapter, the three automakers, which focus on the artifact, sketch the exterior and the interior separately and make scale models of the exterior to generate and then select ideas. Another important difference between the automotive companies and the lifestyle companies uncovered by the analysis is that the latter rely heavily on storytelling in combination with sketching and prototyping. When the designers share ideas, whether a new style, technology, or interaction, they create short stories to give the ideas context. Philips, for instance, “looks for disruptive narratives that connect the issues” and Ikea uses storytelling “to turn stories into [vision] concepts.” At the end of this activity, the team selects the final idea, details it through –CAD– models, and makes a final prototype. In all cases, this prototype, as well as the narrative, is used in a short video. At Philips, for example, they “produce a provocation in the form of a video and a physical materialization.”

In sum, the evidence suggests that storytelling support the visual synthesis and prototyping when companies make and share vision concepts. As defined in Chapter 3, all the companies exhibit the vision concepts to the public at external shows. According to Philips, “an exhibition can stimulate debates and generate ideas.” Ikea and Philips, as well as Volvo (see Chapter 3), use the vision concepts in private workshops and presentations with managers. Ikea is the only company that mentions another phase where they “take forward these ideas” for use in “product development for the future.”

Outcomes

The Table 4-2 displays the three vision concepts and presents the outcomes of the activities explained earlier, including the artefacts.

Table 4-2. Outcomes of the three cases

Case	Concept car	Concept kitchen 2025	Bio-digester -concept-kitchen island
Presented as	<i>A futuristic vehicle</i>	<i>A system of products for the kitchen</i>	<i>A repositionable kitchen island part of the Microbial home</i>
Artefact	<i>A functional or non-functional prototype</i>	<i>A non-functional prototype</i>	<i>A non-functional prototype</i>
Images of the prototypes			
Documents part of the press release	<p><i>Several pictures</i></p> <p><i>Short texts</i></p> <p><i>A video</i></p>	<p><i>23 pictures and posters</i></p> <p><i>A short text</i></p> <p><i>2 videos</i></p>	<p><i>13 pictures</i></p> <p><i>Short texts</i></p> <p><i>A video</i></p>
Videos			
	<i>The automaker usually produces a video about the concept car</i>	<i>Ikea produced a set of separated videos for each part of the system. This analysis is about "the table for living"</i>	<i>Philips produced a general video with all the components of the Microbial home</i>
Storyline	<i>The videos show various people making use of the concept car in a particular context. Most of the videos focus on the interaction between users and the vehicle</i>	<i>The video presents the interaction between a user and the table during the process to cook a recipe</i>	<i>The Microbial home is presented as a system including a summary of all the components and the interaction between the users and each element</i>
Characters	<i>Users</i>	<i>Users: a female cooking and a child playing</i>	<i>Users: a group of people cooking</i>
Main message	<ul style="list-style-type: none"> - <i>Interaction between users and the car</i> - <i>Brand identity</i> 	<ul style="list-style-type: none"> - <i>Interaction between the user and the product</i> - <i>Interaction between the product and other products (props)</i> 	<ul style="list-style-type: none"> - <i>An overview of the system of products and the products</i> - <i>The interaction among the users and the products</i> - <i>The research project context, opportunities and research question</i>

Background	<i>Exteriors</i>	<i>Interior (the kitchen): several illustrations of the concepts and top views of the prototype</i>	<i>Interior (where the prototypes are exhibited): several illustrations of the system to present the sequence</i>
Costumes	<i>Does not apply</i>	<i>Does not apply</i>	<i>Does not apply</i>
Props	<i>Different artefacts</i>	<i>Cell phone and tablet</i>	<i>Does not apply</i>
Soundtrack	<i>Music and voiceover</i>	<i>Voiceover</i>	<i>Music</i>
Length	<i>Around 1:30 min</i>	<i>02:36 min</i>	<i>06:50 min</i>

The data shows that companies name their vision concepts in diverse ways. As mentioned in Chapter 3, most of the automotive firms call their vision concepts “concept cars.” Ikea describes the outcome of the project as “Concept kitchen 2025,” and Philips uses the name “design probe,” which according to its design department is part of the design futures portfolio. These difference show that Ikea intends the outcome to be considered as a product proposal, just like the automotive examples, but the Philips team emphasizes the use of the design as an open-ended provocation about future life and the role of technology in it.

The analysis in Chapter 3 revealed that the outcomes of these explorations in the case of the automotive companies are products (vehicles), unlike the consumer lifestyle industries, which made systems of products, comprising several products and the relationship between them. That is the case of the Concept kitchen 2025, which includes a dining table, the “heart of the kitchen”; a pantry, which “makes food visible”; a composting and waste system; and a “mindful design” sink, which informs users about how to use water. Philips also introduced the Bio-digester concept as a repositionable kitchen island that is the central hub in the Microbial home system. The island consists of “a methane digester that converts waste into methane gas that is used to power a series of functions in the home”.

The comparison uncovers that all the companies deployed the vision concepts as prototypes, 1:1 models that present the main features of the –system of– products. Most of them are non-functional prototypes, like the Concept kitchen 2025, a set of full-size mock-ups that demonstrate the key elements of the product-user interaction, for instance “the system to recognize objects and their movement and to project a display through the camera and projector positioned above the table” (Ikea, 2015), but they are not functional: they cannot be used to cook a meal. In addition to these prototypes, the companies produce press releases for journalists, a set of supporting material that includes descriptive texts, a comprehensive set of images, and videos that present the vision concepts in their context, which round up a communication system.

Value of vision concept applications

Following Chapter 3, with regards to the value of vision concepts, we presented the lessons learned by the companies when making these artifacts –the exploration–,

and the insights from sharing the prototypes and videos (see Table 4-3).

Table 4-3. Values delivered by the three vision concepts

Case	Concept car	Concept kitchen 2025	Bio-digester -concept-kitchen island
Exploration	<i>It explores the application of new technology and a new design language for a specific segment of users</i>	<i>This exploration aims “to inspire ourselves and inspire people around us [through] a tangible communication of what are the behaviors of the future and what the kitchen looks like in 2025” (Ikea, 2015)</i>	<i>This concept kitchen is intended “to stimulate discussion around waste and how we deal with it”, it is “testing a possible future - not prescribing one” (Philips, 2015)</i>
Context of the exploration	<i>Concept cars are investigations, guided by -what-if- questions, that explore the future to discover possibilities</i>	<i>Ikea and the external stakeholders have developed this “investigation around the question: how might we behave around food in 2025?”</i>	<i>Philips has developed this project “to ask questions about the viability of biological processes in our home and places of work”</i>
Shared at	<i>Motor-shows</i>	<i>Several workshops at a six-months exhibition Ikea Temporary in Milan in which the general public could interact with the prototypes</i>	<i>The Dutch Design Week in 2011. Alongside the exhibition, the “Philips foresight initiative” was developed</i>
In-company sharing	<i>Additionally, some concept cars are used internally in presentations to employees</i>	<i>During the process, several presentations were arranged with different employees of Ikea</i>	<i>Together with the exhibition and the webpage, they used a comprehensive report that “captures all the concepts, though processes and intellectual property ideas” as the input of several workshops within the company</i>
Year		2015	2011

The evidence suggests that, when it comes to the exploration and its sharing context, the purpose of making and sharing vision concepts is clear: exploring the future and communicating a message to a broad audience. These explorations inspire designers and –design– researchers, and such communications seek to state a strategic intent to the audience, stimulating discussions and dialogs with various stakeholders. That is the case with the Concept kitchen 2025, whose central goal is “to inspire ourselves and inspire people around us” by tangibly communicating “the behaviors of the future and what the kitchen will look like in 2025,” as one of the Ikea managers explains. Similarly, probes projects from Philips “are intended to understand future socio-cultural and technological shifts” and test possible outcomes, culminating in “a provocation designed to spark discussion and debate around new ideas and lifestyle

concepts”. Correspondingly, as critically discussed in Chapter 3 in the case of Daimler AG, the intention of the vision concept is to “enter into a dialog with customers.” This analysis suggests that the insights gained from the debates around the vision concepts feed into the future innovation strategy of the company, improving the innovation hit rate.

In examining how companies shared the vision concept in their organizational context, we found three types of sharing: public, in-company, and team.

Unlike other prototypes used in the front end of innovation or new product development, which are usually kept confidential from the outside world, these vision concepts are shared either in-company or publicly. Quite strikingly, Philips explicitly wants to make it clear that the vision concept “is not intended as a production prototype nor will it be sold as a Philips product.” All of the studied vision concepts were showcased publicly at international events to the general public. Just like concept cars, which are exhibited at international motor shows, but also with no test drives. The two concept kitchens were demonstrated at international events. The Ikea concept kitchen was showcased at an independent exhibition (#IKEAtemporary) in Milan including several workshops, and the Philips Bio-digester was presented at the Dutch Design Week in Eindhoven. It was used in several workshops and also, as Philips claimed, in a dedicated foresight project, a “far-future research dialogue by Philips Design to track emerging developments in politics, economics, environment, technology and culture.” Evidence of this project is the webpage <https://www.90yearsofdesign.philips.com>

The analysis shows that, with respect to in-company sharing, some car companies such as Volvo (see Chapter 3), and the consumer lifestyle companies Ikea and Philips use the vision concept in several workshops and presentations for the internal innovation community. Philips also includes a report that “captures all the concepts, thought processes and intellectual property ideas.” The strategic choice for concept cars is part of a dedicated vision concepts portfolio (see Chapter 3 for the example of the Mercedes-Benz Concept Vehicles portfolio, first created in 1991), and the concept kitchens are part of particular innovation programs, such as the Philips design probes program that ran from 1996 to 2012.

As presented in the previous chapter, in-company and team sharing is only exclusive in the Volvo case where a dedicated (future) monitoring and concept center unit was established. In all other cases, joint management of tangible vision concepts and commercial prototypes is practiced across different departments. In most cases, special teams co-created the vision concept, involving non-design stakeholders.

Comparative analysis of critical design and design fiction

This section presents the results of the comparative analysis of five examples of three different design-led futures techniques: one vision concept, which corresponds to the findings of the previous study; two cases of critical design; and two cases of design

fiction.

Activities

Table 4-4 shows the analysis of the activities with special attention to the approach, type of team, role of the designer, and role of the others.

Table 4-4. Making and sharing activities of the five design-led futures technique

	Vision concept	Critical design		Design fiction	
Case	<i>Findings of previous study</i>	<i>Digicars</i>	<i>Respiratory dog</i>	<i>Helios: Pilot, quick start guide</i>	<i>Song of the machine</i>
Author	<i>A large corporation</i>	<i>Dunne and Raby</i>	<i>Revital Cohen</i>	<i>Near Future Laboratory</i>	<i>Superflux</i>
					
Time frame	<i>Speculative future (more than 10 years)</i>	<i>Speculative future</i>	<i>Near future</i>	<i>Near future (less than 5 years)</i>	<i>Near future</i>
Team and departments	<i>A multidisciplinary in-house design team with around six designers</i>	<i>A multidisciplinary independent design team</i>		<i>A multidisciplinary independent design team with external advisors</i>	
Duration	<i>Around 9 months</i>	<i>Unknown</i>	<i>3 months</i>	<i>4 hours</i>	<i>Unknown</i>

This comparison shows that, in all five cases, design is used as the main instrument to achieve the desired goal, discuss the present in view of an exploration of the future. This exploration of the future covers two different time frames: the near future, in which designers envision the changes of the next five years or less, and the speculative future, in which companies anticipate the next 10 years or more.

When it comes to the role of the (individual) designer, though, there appears to be a clear distinction between vision concepts, driven from a strategic and business-oriented perspective, and critical design and design fiction, which use a non-commercial view. Vision concepts are typically created by an in-house design team within a corporation context, in which the resulting outcomes should primarily reflect the image and values of the brand rather than those of the designer. By contrast, critical design and design fiction especially seem to be much more driven from a designer's personal stance and opinions than vision concepts that depends

on the company strategy. The analysis revealed that some cases are presented under the name of a large corporation or brand, such as Philips as in the case of the vision concept Bio-digester kitchen island; a design agency, such as Superflux, the author of the Song of the machine; or an independent designer, such as Revital Cohen, the designer of Respiratory dog. In the cases of the Digicars and the Respiratory dog, for instance, the names of the designers are explicitly stated; In case of the vision concepts, such as the Mercedes Benz F 015 Luxury in Motion presented in Chapter 3 and the Philips Bio-digester kitchen island, introduced earlier in this chapter, the designers remain anonymous.

Although the approach of these designers is well-documented through books, such as *Speculative Everything* by Dunne and Raby (2013), the Ana Jain's (Superflux founder) TED talk 'Why we need to imagine different futures', the blog of the Near Future Laboratory (2009), and the online portfolio of Revital Cohen (<http://www.cohenvanbalen.com/>), the specific making and sharing activities that they follow are unknown. However, this analysis found that the Near Future Laboratory, which designed the Pilot, quick start guide, started with a broad spectrum of questions that guided them into a discussion about generic interactions with a fictitious car, with detailed definitions of these interactions but without the definition of the actual product or its technical requirements. Creating the guide was thus considered more of an exercise that provided room for conversations about the topic, rather than an end in itself.

Outcomes

The Table 4-5 presents the outcomes of the vision concepts, critical design, and design fiction, including the artefacts.

Table 4-5. Outcomes of the five cases

	Vision concept	Critical design		Design fiction	
Case	<i>Findings of previous study</i>	<i>Digicars</i>	<i>Respiratory dog</i>	<i>Helios: Pilot, quick start guide</i>	<i>Song of the machine</i>
Presented as	<i>A futuristic product service system</i>	<i>A piece of art</i>		<i>A design exercise</i>	
Artefact	<i>A functional or non-functional prototype</i>	<i>Scale models</i>	<i>Non-functional prototype</i>	<i>Mock-up</i>	<i>Non-functional prototypes</i>
Images of the prototypes					
Documents part of the press release	<i>Pictures</i>	<i>Pictures</i>	<i>Pictures</i>	<i>Pictures</i>	
	<i>Texts</i>	<i>Texts</i>	<i>Texts</i>	<i>Texts</i>	
	<i>Videos</i>	<i>Videos</i>		<i>Videos</i>	
Videos					
Storyline	<i>The video focuses on the interaction between a user and the vision concept</i>	<i>An animation describes a variety of scenarios of traffic systems, in which the Digicars are the main characters</i>	<i>No video is available</i>	<i>No video is available</i>	<i>The video describes a day in the life of Mark, a blind user of Song of the machine. It includes the different features of this treatment such as infrared radiation and gesture control to attend a video call</i>
Characters	<i>Users</i>	<i>Digicars</i>			<i>A user</i>
Main message	<i>- Interaction between users and the vision concept</i>	<i>- Interaction between the product and other products</i>			<i>- Interaction between the user and the artefact - The interaction among the users</i>
Background	<i>Exteriors and interiors</i>	<i>Exteriors</i>			<i>Interior (Mark's apartment and train interior) and exteriors (park)</i>

Costumes	<i>Does not apply</i>	<i>Does not apply</i>	<i>Does not apply</i>
Props	<i>Different artefacts</i>	<i>Does not apply</i>	<i>Cell phone and tablet</i>
Soundtrack	<i>Music and voiceover</i>	<i>Music</i>	<i>Music</i>
Length	<i>Around 1:30 min</i>	<i>1:56 min</i>	<i>05:11 min</i>

The analysis reveals that all five cases produce physical manifestations that companies and designers use to communicate their results to the outside world. Although all these manifestations are shared externally, the treatment that the companies or designers gave to the artefacts and the way they share them are different. While vision concepts are presented as futuristic product service systems in commercial settings, the critical design outcomes are exhibited as pieces or art, and the design fictions are showcased as design exercises.

Overall, this comparison identified a difference, going from very detailed, full-scale or even functional prototypes, in vision concepts to scale models and sketchy prototypes in critical design and design fiction. In the case of the Mercedes-Benz F 015 Luxury in Motion project, presented in the previous chapter, its main manifestation is a fully working prototype, a car that can actually be driven and experienced. In the Philips case, presented earlier, the displayed prototypes were non-functional, but full-scale and highly detailed. The Digicar case, on the other hand, presented the outcomes by means of small-scale models, which were supplemented by visual supporting material, and the quick start guide, produced in the Helios case, is a basic mock-up made by the designers in a couple of hours.

With regards to the use of video, all the cases of vision concepts analyzed in the previous study, including all the concept cars discussed in previous chapter, and one example of critical design and one of design fiction of this comparative analysis, show the value of this medium. In the case of the Song of the machine, we observed that the main manifestation is a video, and the artefacts are mainly props part of this visual storytelling exercise. We also observed that while the videos of the vision concepts look like finalized commercials with professional actors and well-produced effects, the videos of the critical design and design fiction are more exploratory, using amateur setups and simpler props. That is the case of the Song of the machine video, in which the designers designed the artefact, made the prop, produced the video, and played the role of the characters.

Value of the application of critical design and design fiction

As in the previous study, we divided the value of the application of critical design and design fiction in two: the lessons learned by these explorations, and the insights from sharing these artifacts (see Table 4-6).

Table 4-6. Values brought by the five cases

	Vision concept	Critical design		Design fiction	
Case	<i>Findings of previous study</i>	<i>Digicars</i>	<i>Respiratory dog</i>	<i>Helios: Pilot, quick start guide</i>	<i>Song of the machine</i>
Exploration	<i>It explores new interactions, related to the application of new technology and a new design language, to envision the future and thus discover opportunities</i>	<i>The project presents perspectives on a fictional future for a country. It experiments with different forms of government, economy and lifestyle</i>	<i>The project asks questions like could animals be transformed into medical devices? and could humans become parasites and live off another organism's bodily functions?</i>	<i>The project asks questions like how does the car pick up groceries? and how do you activate and lock the "Child Safe Mode" for your teenage son to take to football practice?</i>	<i>The project asks questions like what if we could change our view of the world with the flick of a switch? and how might you choose to "compose" your vision of the world?</i>
Context of the exploration	<i>Vision concepts are investigations, guided by research questions, that explore the future to discover possibilities</i>	<i>Critical design projects formulate questions about the way that products, services and systems are made and used</i>		<i>Design fiction projects are "micro futures-studies [that focus] on the everyday life, its short term evolutions, and the standard objects or services that might fill these possible futures" (Girardin, 2015)</i>	
Shared at	<i>Commercial shows</i>	<i>Design Museum in London</i>	<i>Royal College of Art exhibition</i>	<i>Conference Interaction 15, IxDA 2015</i>	<i>Science Gallery's HUMAN+ exhibition</i>
In-company sharing	<i>Some vision concepts are used internally in presentations to employees</i>	<i>Does not apply</i>		<i>Does not apply</i>	
Year		<i>2012</i>	<i>2008</i>	<i>2015</i>	<i>2011</i>

When it comes to motive, this analysis revealed that there is a distinction between the vision concept example and the critical design and design fiction examples.

As the previous study defined, vision concepts are currently primarily developed within large companies, in a business environment, and the knowledge and exposure gained through these explorations should directly benefit the company's innovation strategy. In the case of the Mercedes-Benz F 015 Luxury in Motion (introduced in the previous chapter), for instance, Daimler's main intent is to show its leading

position with regard to self-driven cars, building its brand image in relation to this significant business trend. According to Dieter Zetsche, head of Mercedes-Benz Cars, the company is sharing this experimental vehicle to stimulate the dialog about autonomous cars. Daimler claims that their concept cars feature innovative technology that enter into a dialog with customers, inspiring the market and helping them sound out customer interest (Mercedes-Benz Cars Research & Development Communications Centre, 2015). In view of the findings of the previous chapter and study, we also observed that concept cars and vision concepts require considerable resources in terms of budget, people, and time.

This analysis shows that critical design and design fiction, on the other hand, are mainly applied within the context of a design –research– lab, a design agency, or even created by an individual designer. These contexts are usually unable to free up the amount of resources that a vision concept requires. Moreover, we also observed that when applying these design techniques, their main motive is not to make money, but to generate awareness, raise concerns or challenge values about (the use of) new, emerging, and future technologies, products and services. That difference in motive is apparent, for instance, in the Song of the machine case. In that case, Superflux, a collaborative design practice, and Dr. Denegaar, an optogenetics researcher at Newcastle University, collaborated to design for the ‘imminently probable’. They sought to explore the design possibilities and near-future implications of emerging technologies on people, culture, and the environment. At the core of this discussion was “a conscious awareness of the substantial difference between this hybrid optoelectronic system and the ‘closed’ technology of bionic implants” (Song of the machine, 2011b).

As in Chapter 3, and the previous study, this analysis also exposed that all these design-led futures techniques, even if they are in a business-oriented or non-business-oriented context, are investigations guided by a research question. Some of these questions are more pragmatic, such as the case of how to enable people to do what they want or need to do? formulated by Daimler AG, and others more inspirational, such as could animals be transformed into medical devices?

The differences in motive and design intent also lead to differences in the ‘main audience’ that is targeted as well as the venue that is used to present the results. This study observed that vision concepts are generally aimed at large audiences and are therefore typically showcased at big international commercial events, to generate as much attention and exposure as possible. On the other hand, critical design and design fiction target a smaller group of specialized people, usually within the design research and art community. These are communities with a lively discourse that expresses itself through blogs, magazines, and (scholarly) events. As a consequence, both techniques require less promotional efforts, but their results are also less apparent to the general public.

In sum, this analysis provided us with arguments to state that vision concepts are designed to engage the general public about the brand and the innovative and future-

oriented character of the company. As a consequence, exposure to the outside world is directed completely towards communicating this positive image, using design primarily as an aesthetic tool to attract attention and polish the message. Critical design and design fiction, however, both use design as an instrument to challenge and provoke, resulting in representations that are usually less polished and sometimes even uncomfortable to experience. Although design fiction mostly tries to at least wrap its provoking message into an engaging video or appearance, as with both Helios and Song of the machine, critical design typically uses a more confrontational and direct approach. The Respiratory dog case, for instance, presents the somewhat unusual prospect of a retired greyhound acting as a human prosthesis in the form of a piece of art.

4.4. Discussion

4.4.1. *Design-led futures technique outside the automotive industry*

The comparison among concept cars and concept kitchens/products shows that, as *outcomes*, vision concepts are tangible prototypes and visual narratives used to create and discuss new strategic ideas for innovation in the future. An important difference between concept cars and concept kitchens is that the former's outcome focus on the object, the car itself, while the latter's outcome presents a context or scenario in which diverse products and services interacts within a product service system. Whereas the concept car is embodied by a prototype of an object that is staged in a video of the future context, the concept kitchen is represented by a set of prototypes of objects, such as stove, oven, counter, and table, that are showed as a system and also presented in a video. In this sense concept kitchens, can be seen as a material scenario that includes a collection of concept products. Both the scenario and products share the tangible properties of concept cars.

With regards to the tangible artifact, vision concepts seem to differ from new product development prototypes in three different ways: (i) the embodiment of the vision concept in a 1:1 prototype can be similar, but the narrative about envisioned interactions with the product in the future is different; (ii) these prototypes and narratives are part of a dedicated portfolio, outside of the commercial portfolio, in which the experimental artifact is not intended as a production prototype nor will it be sold; and (iii) unlike commercial products, which are part of a new product development project that is kept confidential from the public, the tangible prototypes of vision concepts are shared with an internal and external community. With regards to the visual narrative, its richness and inherent narrative structure could provide designers with the opportunity to merge the richness of today's everyday life with the possibilities of the near future in a believable and compelling way.

The findings suggest that vision concepts are usually shared at three different context levels: *public* in commercial shows with the media, the opinion leaders, the

specialized public –consumers–, and the general public, and, and *in-company* and *team* with innovation team players. Since vision concepts are aimed at large and diverse audiences, they typically use a variety of rich visualizations with high levels of detail and fidelity, such as glossy pictures, videos, and texts to be distributed as press kits for maximum exposure. Showcasing the vision concept in public also aims to convey positive images that benefit the business contributing to a positive brand image regarding a specific brand value.

The comparison among vision concepts, critical design, and design fiction demonstrates that while the prototypes and videos of vision concepts leave little to the imagination, the open-ended probes in critical design provoke the audience to actively create their own impressions. While vision concepts and, to a lesser extent, design fiction generally are aimed at presenting a ‘comprehensive’ picture, critical design intentionally leaves blank spaces which need to be filled in by the audience. Again, the models used here were intended as vehicle for speculation about potential scenarios of transportation in an imaginary country.

In sum, no matter the level of resolution of these tangible –futures– concepts supported by the stories of the videos, they embody several ideas, which make the ideas concrete and actionable.

4.2.2. Use of these design-led futures in the context of innovation

Our findings suggest that the process of future exploration, regarding vision concepts, is led by a research question and developed by a highly skilled team. Designers are part of all concept visioning teams and some also include a brand and communication professional and an engineer.

We suggest that the design of a vision concept is not a simplified new product development process. Instead, these activities appear to be part of a special exploration project that yields a conceptual solution and has a strong focus on communication. In view of the findings of this chapter, we incorporate some insights to complement the making and sharing activities of concept cars defined in Chapter 3, Figure 3-4:

- In the first part of the process, the (i) analysis of the future context, the design team should conduct interviews, focus groups, and observations to uncover trends and drivers. Through these activities, designers identify future opportunities and risks, define a domain, formulate a research question and then define an image of the future. This is similar to the first part of the Vision in Product design method (Hekkert & van Dijk, 2011) that includes the description of a domain and timeframe and the collection of context factors to design the future context.
- In the second part, the (ii) creation, the design team could use the outcome of the first step, the image of the future, and create several ideas through sketches and short storylines. Then, the team (iii) selects one concept and narrative

from this initial idea, one that fits well within the predefined domain. The design of the narrative is somewhat distinctive, especially because the story is about the future vision and not just about the description of the product. In some way, this step is similar to the definition of a vision statement proposed by Hekkert and van Dijk (2011). The statement explains the desired relation between the product(s), people (including users and other stakeholders), and their context.

- The four last parts of the process concern the distinctive parallel design of the vision concept and the narrative. Based on the selected idea, the design team (iv) details the concept through making the prototype(s) and producing the video, which is part of the press kit, including several texts and images of the vision concept. The prototype and the video are then (v) exhibited and (vi) used in workshops with the managers or other stakeholders.

With regards to the position of these design-led futures techniques within the landscape of design research as proposed by Sanders and Stappers (2014), Figure 4-2 presents the location of vision concepts, critical design, and design fiction, as making activities. The three speculative design techniques we compared encompass the three different time-frames. They use fictional time-frames as a mechanism to unlock the imagination, gain a fresh perspective on reality, and to escape from the constraints imposed by the market. While the speculative future opens possibilities, designers establish a distinct area of interest, as a scope for the project, which guarantees that they remain focused during the exploration and the discussion.

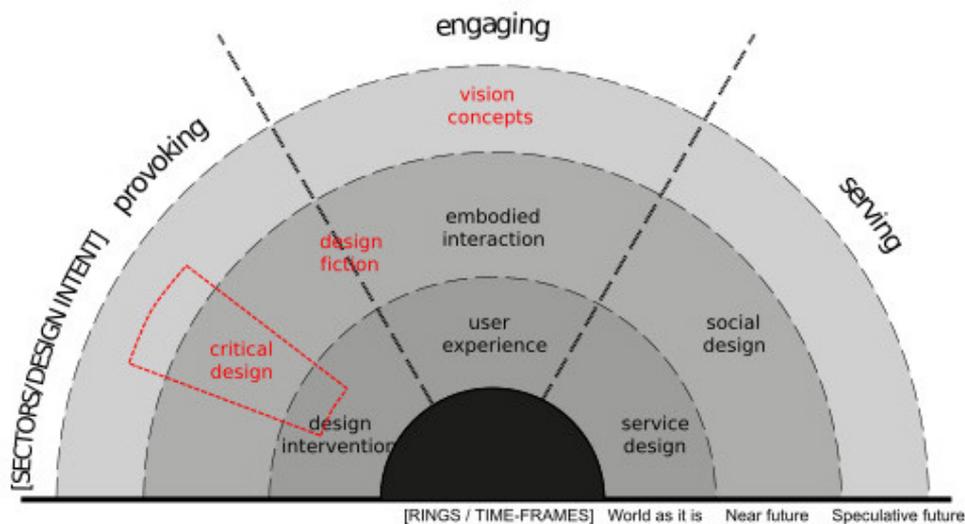


Figure 4-2. The spot of vision concepts, critical design, and design fiction within the landscape of design across time scales. Source: the author.

Based on our findings, we suggest repositioning critical design and design fiction. Design fiction should be moved from the speculative future to the near future in response to its interest in mundane short-term speculations. It is now located in the central slice just in the middle of embodied interaction and critical design, mediating between technology and its impact. Design fiction is also mid-way between engaging and provoking, producing videos and other types of visualizations that both attract and challenge design research and art communities. Critical design can cover a wider variety of times, ranging from alternative presents to speculative futures. It is clearly in the provoking area, making unpleasant proposals presented as rough prototypes and other type of visualizations to trigger reactions.

Vision concepts would be positioned on the outside layer of speculative future, while concentrating on a particular domain. These two characteristics are consistent with their business-oriented approach, taking into account the type of business and the market dynamics, as well as the domain in regard to its strategic direction, e.g. fifteen years into the future for automakers within the domain of private mobility solutions.

4.4.3. Value that these design-led futures techniques bring outside the automotive industry

Concerning the purpose of these design-led futures techniques, the findings suggest that they are a way to stimulate the creation and exchange of ideas and thus to engage the public at large.

Overall, we found that while the three techniques are all future-oriented and design-led, they clearly differ in terms of intention and character. Because of its business context, vision concepts are mainly oriented on generating strategic value for a company. As a consequence, their perspective on the future tends to be on the safe side, resulting in outcomes that are mostly in line with the brand and mainly presented and discussed within the limited scope of the domain in which the company operates. Critical design and design fiction, on the other hand, are not bound by commercial restrictions and are thus able to generate scenarios that are more challenging and disruptive, addressing certain issues from different viewpoints (social, cultural, technological, environmental, or economical) other than a commercial one. This freedom also enables designers to actively facilitate and engage in the discussion that should result from their work.

Unlike design as a problem-solving strategy, where the design process has a (commercial) product as the end result, in speculative design, designers make prototypes, videos, and other visualizations as means (of communication). The end goal, then, is to engage and (or) provoke a discussion about a well-defined domain. To do this, designers explore the future to develop a set of neat ideas: a concept. The concept is deployed in a narrative for a certain audience and shared through different manifestations, combining prototypes and other type of visualizations.