



Concept cars

3



**Concept cars as a
design-led futures technique
for automotive corporations**



3. Concept cars as a design-led futures technique for automotive corporations¹

Chapter 2 proposed that the futures techniques that use the design approach to think ahead, including concept cars, are the most suitable for SMEs. Although there is an abundance of literature about management-led futures techniques and a growing number of publications about some of the design-led futures techniques, such as critical design and design fiction, there is almost no academic discourse about concept cars in the field of innovation and futures studies. This is especially surprising since concept cars have been used in the automotive industry for more than seven decades, and have become a widespread practice –each year, more than 50 concept cars are presented at motor shows around the world. In view of this gap in the extant literature, the purpose of this chapter is to understand concept cars in the context of innovation and position this technique with respect to the futures studies’ field of knowledge. Following the insights from the previous chapter, this chapter explores the main activities, outcomes, and characteristics of concept cars as a design-led futures technique and the value that this technique brings to automotive corporations.

This chapter reports on three empirical methods and their results: interviews with automotive designers (Section 3.1.) which sketch the characteristics of concept cars as an end and as a means, a field observation (Section 3.2.) that describes the role of these artefacts in motor shows, and a comparative analysis of three concept cars (Section 3.3.) that uncovers the activities used to make and share concept cars. It ends with Section 3.4., where we discuss these results in regards to the activities and characteristics defined in Chapter 2.

¹ This chapter is based on the paper: Mejia Sarmiento, J. R., Hultink, E. J., Pasman, G., & Stappers, P. J. (2016). Concept Cars as a design-led futures technique. In Proceedings of the 23rd Innovation and Product Development Management Conference (Vol. 1, pp. 1–21). Glasgow, U.K.

3.1. Interviews with automotive designers

A set of semi-structured interviews were conducted with –automotive– designers to understand concept cars as a design-led futures technique.

3.1.1. Method

All interviews were conducted by the author, in a one-by-one setting, and lasted between forty-five and seventy-five minutes. Six interviews occurred face-to-face in English and four interviews were via video calls and conducted in Spanish.

Participants

Table 3-1 presents an overview of the interviewees. Participants were selected based on their experience with concept cars as part of design, research and development, or marketing departments. Of the ten participants, seven have more than twenty years of experience with concept cars, two more than ten, and one less than five years. Participants developed different concept cars for different companies in the automotive industry, such as car manufacturers (Ford Motor Company, Nissan Motor Company, Tesla, Sherco, and Aprilia), suppliers (EDAG Engineering), and automotive design studios (Vercarmodel Saro).

Table 3-1. Sample of the interviews

Interviewees	Years of experience	Area(s) of experience	Conducted	Language	Length
Participant 1	› 20	-automotive- design	in person on March 23, 2015	English	45 min
Participant 2	› 20	-automotive- design	in person on March 24, 2015	English	49 min
Participant 3	› 20	design, innovation, & strategy	in person on May 1, 2015	English	58 min
Participant 4	› 10	-automotive- design & clay modeling	via Skype on March 3, 2015	Spanish	75 min
Participant 5	› 20	design & aesthetics	in person on March 19, 2015	English	46 min
Participant 6	‹ 5	-automotive- design	in person on March 9, 2015	English	73 min
Participant 7	› 10	-bike- design	via Skype on March 12, 2015	Spanish	47 min
Participant 8	› 20	-automotive- design	in person on March 14, 2015	English	49 min
Participant 9	› 20	-automotive- design & innovation	via Skype on March 27, 2015	Spanish	49 min
Participant 10	› 20	-automotive- design, innovation, & strategy	via Skype on March 31, 2015	Spanish	71 min



Procedure

In view of the previous chapter's findings, these semi-structured interviews followed a set of questions pre-arranged based on three categories: activities, outcomes, and the value that concept cars bring to automotive corporations. The interviews start with the author giving a non-disclosure agreement for the participants and presenting them the aim of this study. After that, the first part of the interview includes questions about the main activities that constitute this technique and their characteristics. The second part focuses on the technique's outcomes and the third, and final part, asks about the value that these companies can get from the application of this technique. During the interviews, the author took notes and recorded audio, which he subsequently transcribed.

Data analysis

Qualitative analysis of the interviews results followed the method suggested by Sanders and Stappers (2012): first, selecting quotes from the transcript, second, grouping these quotes, third, coding the groups, and finally, comparing the groups.

3.1.2. Results

The findings from coding and analyzing the interviews concern the three categories defined earlier: activities, outcomes, and value of their applications.

Activities

Regarding activities, the participants were most outspoken on the findings that are discussed and summarized in Table 3-2.

Table 3-2. Coding of the category activities

Definition	<i>An isolated multidisciplinary team makes concept cars in classified and costly explorations that include three making activities: (i) sketching, (ii) prototyping, and (iii) storytelling. As mentioned earlier, these explorations envision near and speculative futures of narrow domains</i>
Evidence quotes	<i>"You have a team that launch production cars within the product portfolio and another team that presents concept cars that feed that portfolio. We can say that in these two lines of work, one feeds the other, otherwise they cannot run so fast"</i> Participant 9
Contrast with the literature	<i>Like Crea (2015), the participants mentioned that in the automotive industry, designers are divided in two types: ones that develop the series production vehicles and others that envision the visions of the future cars. It seems like the latter inspires the former. Also like Berlitz and Huhn (2005), Styhre, Backman, and Börjesson (2005), and Backman and Börjesson (2006), the respondents claim that concept cars are part of expensive and short projects</i>



According to the interviewees, concept cars are made by teams which include multiple professionals from anthropology, sociology, psychology, marketing, engineering, and –interior, exterior, and color and trim– design. The multidisciplinary nature of these teams, which embraces diversity, is used to “stimulate creativity and force team members to confront different perspectives” (Participant 7) when making the concept cars. The respondents mentioned that these teams are small, vary from three to nine participants, and they are led by a senior designer who reports directly to a board of chiefs. When one of these senior designers joins the company, it is customary for automotive companies to give him or her the opportunity of making a concept car. For instance, according to the Participant 6, “when the senior designer Laurens van den Acker joined Renault, he developed a concept car to get rid of the styling of Mazda –his previous employer– and explore the Renault aesthetics and design language.”

Most of the time, these teams are in in-house, isolated units, which “are separated to avoid contamination regarding the daily work in projects that are part of the commercial [or production] portfolio” (Participant 1). Another reason of that isolation is confidentiality, or as said by Participant 3, “when making concept cars we shape the brand, that is why, if we have guests, which is not common, they are not allowed to enter with their cell phones, so they cannot take photos, and we also keep the prototypes covered”.

The participants report that, due to the team members’ high profile, the final cost of these activities varies between 200.000 and two million Euros.

According to the data, these making activities last up to 15 months. The teams start with an open creative brief, usually formulated by the marketing department and the chief designer, who work as holders that are “looking at the world to capture trends and then translate them to the concept” (Participant 2). In parallel, the chief designer put together a team including professionals from different areas. Subsequently, the team members sketch a large number of ideas following the creative brief. According to Participant 6, “the team makes around 500 sketches in the first period”. These drawings are presented to the board of directors to select the best idea. Once the best one is selected, its author is appointed as the lead designer. According to the respondents, the lead designer coordinates the detailing part that includes comprehensive sketches, which in some cases cover a 1:1 tape drawing on the wall, and intricate illustrations of the interior and the exterior of the concept car. Next, the team makes a 1:4 scale model. When the board of directors approves that model, –external– professional modelers make a 1:1 model in clay and try several finishes on it. The interviewees indicate that depending on the way that the company will share the concept, the type of finishes or even the kind of prototype changes, but “they show concept cars using detailed finishes” (Participant 1). Finally, the team defines a story to showcase the prototype, which is presented internally through different workshops and externally at motor shows.

Participants also mention that concept cars are explorations, limited by the business



of the company, which can go along the different time frames, from the world as it is to the speculative future. First, the concept cars of ‘upcoming vehicles’ that are in a range of five to ten years. These are “concepts developed using existing technologies and normally are built on existing platforms” (Participant 7). Participant 2 says that “these concept cars aim to mark the territory, exaggerating some features of the car to verify it on the market [...] in a certain way, these concept cars are the projection of the expected series production cars.”

The second category includes concept cars that explore new types of vehicles for the brand: “in explorations of up to 15 years [...] companies design concepts that are closed to the market, new categories of products or new lines for the existing products” (Participant 8). Third, the ‘visionary models’ that explore more than fifteen years ahead and “will never be in production” (Participant 7). Participant 9 states that “these concepts allow you to explore more radical situations, for instance, what will a car look like if there are no streets? In these kinds of projects, you have a team that includes engineers, anthropologists, and sociologists; [...] these concept [cars] end in radically new vehicles that companies present at shows.”

Outcomes

Regarding the outcomes, for instance the prototypes and documentation, their communication value was prominent (see Table 3-3).

Table 3-3. Coding of the category outcomes

Definition	<i>A concept car is an artifact of the future, which is embodied in a prototype and documentation, made to attract diverse people evoking their emotions</i>	
Evidence quotes	<i>"I think a concept car has an important attribute that is to provoke and draw attention"</i>	<i>Participant 10</i>
	<i>"...when concept cars are introduced to the public at the auto shows it's just for making the people say 'wow', the happy wow effect [...] if you don't get the wow effect, well, something is wrong..."</i>	<i>Participant 4</i>
	<i>"...basically a concept car is an element to provoke emotions: basically, they are used at motor shows to display the potential of the company creating expectations about the brand"</i>	<i>Participant 7</i>
Contrast with the literature	<i>In the same way that Santamala (2006) and Buijs (2009) discuss, participants state that concept cars are full-scale prototypes that look like a real series production vehicle. Unlike the sparse literature that study concept cars, interviewees emphasize the emotional evocation that those artifacts produce on people</i>	

According to the participants, concept cars, which “were formerly called ‘dream cars’ in the 1930s” (Participant 4), currently receive different names depending on the context of use. Some names emphasize their futuristic nature, such as ‘visionary models’ used by BMW or ‘advanced concepts’ used by most of the automotive designers. Other names focus on their function, such as ‘show cars’ which are “the few concept cars exhibited at motor shows” (Participant 1). Another function is related to the styling, receiving the name of ‘design studios’, which are “just for seeing” (Participant 3), examining the appearance of the interior and the exterior of the vehicle as “workshops of ideas about form” (Participant 10). Moreover, the expressions ‘research vehicles’ and ‘experimental vehicles’ employed by Mercedes-Benz are also used as synonyms of concept cars, to emphasize their use as “technology demonstrators, or to test the technology and see whether companies can put it into series production cars” (Participant 7). Therefore, it looks like the notion ‘concept car’ is an umbrella term that covers artifacts with similar attributes.

According to the interviewees, all these futuristic artifacts are materialized through a variety of prototypes that moves from working prototypes, cars that can be driven, to representational models, in which “pretty much everything is fake” (Participant 3). As Participant 8 claims, “some concept cars are not functional, they are just mock-ups that are useful concerning ergonomics, but not mechanically”, “often they are driven by a crane” (Participant 9). That is the case of the ‘see-through prototype’ which is “like an empty shell with just a piece of the interior to show how the car would look like” (Participant 4).

These prototypes are used to draw the attention of people portraying a futuristic vehicle. Participant 10 states that “as designers, we know which key elements make a car futuristic and thus attractive, [...] it is easy to call the attention, well... if you put wider wheels in the car, and you make the lights smaller so that you do not see them and put a few LEDs there... so eliminate elements such as mirrors or plates, then it is done... all to draw people’s attention.” These components are possible because this concept does not have to comply with any regulation.

Value of concept cars applications

Regarding the value of these activities and outcomes, automotive designers talked about innovation and communication (see Table 3-4).

Table 3-4. Coding of the category value of the application of concept cars

Definition	<i>Even though not all of them sell cars, various enterprises, part of the automotive industry, make concept cars to innovate and share this innovation with others. Through these artifacts, companies can foresee the future by (i) experimenting with technologies and (ii) exploring design languages</i>
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Evidence quotes	<i>"The GINA model [the concept car shown in Chapter 1 Introduction] was just to show or to push what technology is about, how you can foresee the future of cars in the next [...] half century, what the future can be, it's like a what-if question, a complete design exercise"</i>	Participant 4
	<i>"...to open the mind of everybody in the public, saying that this is a company that is not afraid of taking risks, a company that puts a lot into technology, and lot of thinking in future design, so a concept car like that [...] pushes the boundaries of design and engineering"</i>	Participant 5
	<i>"The company can explore different areas to have a forward-looking idea about the coming future, [...] concept cars are design exercises that define the aesthetic appearance of the brand for the coming years..."</i>	Participant 10
Contrast with the literature	<i>Like Evans (2011) and Crea (2015), the interviewees point out that innovation is the primary purpose of concept cars. Unlike Styhre, Backman, and Börjesson (2005), the interviewees perceive branding as a byproduct of concept cars. Like most of the authors (Santamala, 2006; Backman & Börjesson, 2006; Evans, 2011; Lv & Lu, 2012), the respondents consider concept cars as a way to strengthen creativity and design capabilities.</i>	

The interviews revealed that different companies, such as car manufacturers, suppliers, and automotive design studios, make between six to ten concept cars per year, and only 20% of them are shared at motor shows. Participant 8 states that “when [he] worked at Nissan, the production of concept cars was very high; the Advanced Design Department was a real concept car factory” and Participant 3 echoes this, saying that “at Audi, we created an experimental car every three months, whether it is just for the lighting, or for the suspension...” In view of this ratio, the respondents suggest that most of the concept cars contribute to innovation and only a few are used additionally to show as branding exercises.

Through concept cars, these companies can foresee the future, by experimenting with technologies and exploring design languages. From the perspective of technology, most of the respondents claim that concept cars are ‘technology-push’ activities. In words of Participant 3, “concept cars act as a ‘probe’ or ‘trial balloon’ that uses technologies recently developed by the Research and Development Department, or sees a particular technology that is new to the company, or which integration is new to the market”. This ‘probe’ explores the way to integrate the cutting edge of these technologies to make “an advanced vision of what the company intended for [the] near future” (Participant 2) and then shared it with the audience. Other concept cars focus more on the styling and design language of the vehicles.

Supporting this innovation purpose and in view of the literature review of the previous chapter, we found that concept cars are also a means of communication, used internally and externally. When a concept car is shared internally, it is used to discuss different images of the future, “collecting many opinions and perspectives

from inside the company through surveys and user groups” (Participant 9). Externally, it is presented to “the general public, journalists and the other car companies” (Participant 4) at “motor shows like those in Frankfurt, Geneva, and in the United States, the Detroit auto show” (Participant 6).

In addition to the innovation end, the interviewees state that the concepts presented at motor shows are also ways to ‘show-off’ the capabilities of the company (Participant 1, 4, and 7). They “demonstrate that the company is still alive in the business arena, and it can spend some money, effort, and time developing something that has never been seen before” (Participant 1). Participant 2 claims that “a concept car is to show your muscles; it is to demonstrate to others, especially your competitors, that you are strong, and you can make nice things.” Like in the findings of the literature review, most of the respondents agree on the difficulty of capture data about the reaction of the audience when showcasing a concept car at a motor show. According to the respondents, most of the companies measure the impact of the concept cars by counting the number of pictures and the length of articles published by the media. These images and articles are carefully prepared by the companies in advance with the intention to disseminate the concept cars. Moreover, specialized focus group, also known as clinics, are conducted with a small sample of selected customers to ask feedback on the concept car. Interestingly, Participant 3 mentioned that, back in the 70s, different American car companies used to hire private detectives to carefully search for fingerprints on the prototypes every night at the motor show. In this way, companies could identify the concept car’s focal points, those parts of the model with more fingerprints on it, and then considered them for further development. However, no clear way of implementing the findings from this data was mentioned.

3.2. Observations of a motor show

In view of the findings of the interviews with the –automotive– designers and the categories defined in the previous chapter, we conducted a set of observations to have a more in-depth understanding of the outcomes of this design-led futures technique.

3.2.1. *Method*

The author observed how concept cars were staged at the 85th International Motor Show and Accessories in Geneva. This, according to the participants of the previous interviews, is one of the most important motor shows in the world.

Procedure

Observations were made over a period of three days, from March 13 to 15, 2015. On the first day, the author conducted a general observation that gave him an idea of the structure of the motor show, as well as an inventory of the brands that exhibited



concept cars there. During the remaining two days, he conducted a two-hour-long observation per brand until the time ran out.

Data analysis

The data was collected in a notebook and through pictures and videos of the concept cars and the stages. Also, one participant was recruited and interviewed for the concept car interview study. The data from the observations were the author's notes, photos, and videos, and the brochures and other handout materials provided by each brand. The data was analyzed with qualitative methods as described in the previous section. Appendix Chapter 3 online <http://dive.pktweb.com/> includes the scan of the notebook and a selection of the most relevant pictures and videos.

3.2.2. Results

This section presents the results of the observations on concept cars at a motor show, which include the characteristics of these artifacts and the way car manufacturers share them at this event.

The '85th International Motor Show and Accessories' had two main moments: the media event, in which car manufacturers invited journalists and selected members of the public to the concept car's premiere, and the exhibition itself, in which the general public can see the concept cars. At both moments, automotive manufacturers, suppliers, and automotive design studios used prototypes and videos, images, and texts.

At this show, all the artifacts were showcased through representational natural-scale prototypes that have a detailed and glossy finish on the exterior; however, the interiors are just basic volumes that give to the audience only a general idea about the colors and trim. The videos, images, and texts were arranged in press releases, which were available via the companies' websites since the premiere at the media event. We identified that the videos have three main parts: The first part is an introduction of the brand, which connects the concept car to the company; the second part shows the artifact in its context of use; and the third part zooms in on the interaction between the user and the artifact, demonstrating certain concept car's features.

With regards to the exhibition, most of its area is covered by car manufacturers, which showcase up to three concept cars and no more than ten series production vehicles. As Figure 3-1 shows, the prototypes of the concept cars are exhibited on elevated platforms which are located in the most visible spot of the company's stand. Most of these platforms rotate, showing all the possible side angles of the exterior of the vehicle. Also, some of the vehicles have open doors to reveal the interior. Platforms are located in front of panels that act as backgrounds to project the video(s) in a loop. In addition to the prototype and the video, different components of the visual brand identity, such as the logo and the slogan, are arranged in a variety of

ways on the stage and in the concept car itself.



Figure 3-1. Image of two kids posing for a picture using the Infiniti QX30 concept car as background. The stage includes a rotational platform to showcase the prototype and a background to project the videos in a loop. It also displays the visual brand identity. Note the bar that keeps the general public far from the prototype. Source: the author.

We observed that most of the companies restricted the interaction between the audience and the prototype through barriers. Regardless of these constraints, car-enthusiast were anxious to experience the concept cars, to try and touch them, as shown in Figure 3-2. Seems like concept cars are one of the preferred background for selfies.



Figure 3-2. The top row shows a crowd in front of the stand of Peugeot at the 85th International Motor Show waiting to watch the Peugeot Onyx concept car and a young car enthusiast, who finally could reach the prototype. Source: the author. The bottom image displays the prototype of this concept car. Source: <http://www.peugeot.com/en/design/concept-cars/peugeot-onyx-car>.

Interestingly, only one company designed the exhibition in a way that it invites people to directly interact with the prototype. It had an open door to allow people to slide into the car, open the trunk, and mimic driving (see Figure 3-3).



Figure 3-3. Woman interacting with the concept car of BJC. Source: the author.

The observations also allowed us to identify that while several staff members promote the series production vehicles, answering questions and distributing brochures, nobody is in charge to inform the general public in regards to concept cars.

3.3. Comparative analysis of concept cars

In addition to the interviews with automotive designers and the observations of a motor show, we also conducted a comparative analysis of concept cars.

3.3.1. Method

A comparative analysis is a comparison that identifies variations among single cases to form a frame (Yin, 2009; Gerring, 2004; Eisenhardt, 1989). This method involves an examination of diverse subjects based on a set of criteria, which “enables the researcher to explore differences within and between cases” (Yin, 2003) with the aim to replicate findings across cases. The structure of this comparison followed the results of the previous chapter and sections. It focused on the activities of making and sharing concept cars and the outcomes of this design-led futures technique, to then identify the value that they bring to the companies. Through this comparative analysis, we have specific examples that gave us sufficient insights to conclude the study of concept cars within this inquiry.

Following Flyvbjerg’s (2001) recommendations, we selected three cases as a sample for comparison. It includes one example of each of the categories defined in Section 3.2 Interviews with automotive designers. These concepts, made by different brands,



were presented in different years and developed for diverse segments. All of them have already been shared internally and exhibited externally.

Procedure

The concept cars were examined following Yin's case study process (Yin, 2003). For each case, documentation was collected, resulting in a rich set of video, photo, and text material provided by the companies on their web pages, in the concept car's press releases, in external reviews from specialized magazines and blogs, and, finally, in relevant academic journals. Appendix Chapter 3 online <http://dive.pktweb.com/> shows this data.

Data analysis

For the analysis of the videos, we used the method of Garcez, Duarte, and Eisenberg (2011). First, we watched the videos –one for each concept car– several times to analyze their general structure; then we divided them into units of analysis to code the narrative elements (such as locations, characters, and storyline), which were identified and clustered on a timeline.

With regards to the rest of the data –photo and text material–, we analyzed the similarities and differences of the concept cars' making process along with the characteristics of these artifacts. As a starting point, we identify patterns throughout the cases and match them to the respective activities. As suggested by Miles and Huberman (1991), we tabulated these findings and formulated analytical statements, illustrating these with data from the cases.

3.3.2. Results

This section presents the results of the comparative analysis of three concept cars – the Your concept car, the Citroën-Lacoste concept car, and the Mercedes-Benz F 015 Luxury in Motion– using the categories defined earlier.

Activities

With regards to the activities, Table 3-5 shows how these companies explore different time frames: from the world as it is, such as the “not too futuristic four-seat coupe YCC” (Volvo Car Corporation Communication Centre, 2004), to the speculative future, such as the F 015, a self-driving luxury sedan “fifteen years ahead of current developments” (Mercedes-Benz Cars Research & Development Communications Centre, 2015).

Table 3-5. Making and sharing activities of the three concept cars

Case	Your concept car (YCC)	Citroën-Lacoste concept car	Mercedes-Benz F 015 Luxury in Motion
Company	Volvo	Citroën and Lacoste	Daimler AG
			
Time frame	World as it is (undefined)	Near future (5 years)	Speculative future (15 years)
Team and departments	<p>2 project managers</p> <p>1 technical project manager</p> <p>1 deputy technical project manager</p> <p>1 communications director</p> <p>1 design supervisor</p> <p>1 exterior designer</p> <p>1 interior designer</p> <p>1 color and trim designer</p>	<p>Several designers from the Automotive Design Network, a Citroën design department, and the Lacoste Lab program</p>	<p>A particular team arranged between the Advanced Design Studios and the Engineering and Construction Department</p>
Duration	15 months	9 months	24 months
Making and sharing activities			



Appendix Chapter 3 online <http://dive.pktweb.com/> includes the visual comparison of the making and sharing activities of the three concept cars.

The inquiry reveals that in making these concept cars, companies arranged specialized teams that integrate employees from different departments or even from two different companies, which is the case of the Citroën-Lacoste. The F 015 is an example of the former strategy; it was made by a team led by the head of one of the Advanced Design Studios departments, “where the decision is made about the brand’s design idiom in 20 or 30 years”. According to Daimler AG (n.d.-b), these divisions “absorb, analyze and creatively implement [...] trends in concept cars, acting as seismographs for movements from areas including the arts, cultural activities or architecture”. The head of Advanced Exterior Design says that the advanced designers vigorously lead “the portfolio strategy in the role of visionaries within the company” (Daimler, n.d.-a). The team that made the F 015 also includes other professionals such as designers and engineers from the Engineering and Construction Department and marketing experts who “jointly draw up the technical specifications for [this] new research car” (Mercedes-Benz Cars Research & Development Communications Centre, 2015).

Interestingly, in the automotive industry, which is mainly driven by men, Volvo commissioned the making of the YCC to nine women, four in managerial positions, one expert in communications, and four designers (Styhre et al., 2005). It seems that the company took seriously the slogan of this concept: “a car designed by women for women” (Volvo Car Corporation Communication Centre, 2004).

Table 3-5 shows the flow charts with the making and sharing activities that each company undertook. These activities last less than two years in all the cases. The simplest example is the making of the Citroën-Lacoste concept car, which was approached as the design of a pair of shoes, according to the Lacoste Lab’s head. He summarizes the process as: (i) *look*, observing the future trends; (ii) *ask*, inquiring about the users’ dreams in regards to their future lifestyle; and (iii) *solve*, designing the concept car with particular attention to the color and trim development.

In sum, the results show that the making activities start *analyzing the context factors*, in which Volvo and Citroën applied trend analysis, and then *envisioning the alternative futures*, in which Mercedes-Benz used scenario thinking. Through these analysis and exploration, designers define an image of the future, such as the future scenario ‘City of the Future 2030+’ developed by Mercedes-Benz for the F 015. In the second set of activities, which is part of *mapping the preferable future*, all the companies use an iterative way to generate, select, and refine ideas. The three companies made sketches –of the exterior and the interior of the vehicle–, and scale prototypes –of the exterior– to generate and select ideas. Once the final idea is selected, it is refined through more sketches and prototypes, including the final prototype. In the end, as already mentioned, all the companies exhibit the concept car to the public at external shows. Volvo and Daimler AG also mention the use of these prototypes in internal workshops.

Outcomes

Table 3-6 presents the outcomes of the activities explained earlier, including the artefacts.

Table 3-6. Outcomes of the three cases

Case	Your concept car (YCC)	Citroën-Lacoste concept car	Mercedes-Benz F 015 Luxury in Motion
Presented as	"A not too futuristic four-seat coupe"	"A crossroad super-mini SUV with an off-beat sporty design"	A self-driving luxury sedan "fteen years ahead of current developments"
Artefact	A functional prototype	A non-functional prototype	A functional prototype
Images of the prototypes			
Documents part of the press release	6 pictures 18 pages-long text 1 video	6 pictures A short text 3 videos	31 pictures 2 texts 2 videos
Videos			
Name	Volvo YCC - Your concept car	Citroën-Lacoste concept car	World premiere of the Mercedes-Benz F 015
Storyline	Interviews with the designers about the user's expectations, including images of the YCC's main features	A group of young people enjoying a sunny day at the beach	The self-driving car drives four business people over a desert. In the meantime, they control it through several touch-screens
Characters	Designers: the design team	Users: 2 young women and 1 man	Users: 4 businesspeople



Main message	- Designers' intentions	- Brand identity (user's lifestyle)	- Interaction between users and the car
	- Car's features	- Interaction between users	- Interaction between users
	- Brand identity	- Interaction between users and the car	- Interaction between the car and pedestrians
			- Brand identity
Background	<i>Interior: studio</i>	<i>Exteriors: a beach</i>	<i>Exteriors: a road in the desert</i>
Costumes	<i>Does not apply</i>	<i>Lacoste polos, sunglasses, jeans</i>	<i>Semi-formal dress</i>
Props	<i>Does not apply</i>	<i>Camera and Lacoste accessories</i>	<i>A fictional cellphone</i>
Soundtrack	<i>Voiceover and direct voice during interviews</i>	<i>Music</i>	<i>Music: Empty beaches, night traffic</i>
Length	<i>03:45 min</i>	<i>00:53 min</i>	<i>01:53 min</i>

Concept cars are presented as vehicles of the future, or as Citroën mentions when talking about the Citroën-Lacoste concept car, it is “another step towards the car of the future” (“Citroën Lacoste car, concept cars,” 2015). The analysis unveils that the companies share concept cars through different types of artifacts, and videos, pictures, and texts. The artifacts range from functional prototypes, the YCC and the F 015, to non-functional prototypes, the Citroën-Lacoste. Surprisingly, although the F 015 is the concept car that explores a further time frame, it was displayed as a fully working vehicle and selected members of the public, journalists, and stakeholders were given the opportunity to take it for a test drive.

Besides the prototypes, each company also created videos, pictures, and texts, grouped in press releases, which are available on the company’s web page. For instance, Volvo presented the YCC in an 18 pages-long text named “Your concept car, by women for modern people” (Volvo Car Corporation Communication Centre, 2004). The document includes an introduction of the initiative “all decisions made by women” and a detailed explanation of the concept car’s main features. The inquiry shows that all videos involve users, the context of use, and the brand identity. Just as in the Citroën-Lacoste’s video, the F 015’s video shows various people making use of the concept car in a particular context. The former focuses on user’s lifestyle and the latter on multiple interactions, such as the interaction between users and the vehicle, between users, and between the concept car and pedestrians.

Value of concept cars applications

With regards to the value of concept cars, we divided it in two: the lessons learned by these companies when making the concept cars –the exploration–, and the insights from sharing these artifacts (see Table 3-7).

Table 3-7. Values delivered by the three concept cars

Case	Your concept car (YCC)	Citroën-Lacoste concept car	Mercedes-Benz F 015 Luxury in Motion
Exploration	<i>It explores various design solutions focusing on "the most demanding premium customer: the independent, professional woman"</i>	<i>Co-branding exploration of a new design language, "where the car meets fashion and sports", focusing on the young user's lifestyle</i>	<i>It explores the application of new technology for "the efficient professional of tomorrow"</i>
Context of the exploration	<i>"In Volvo concept cars function as a test bed for new ideas and thereby also as a means for experimentation" (Backman, Börjesson, & Setterberg, 2007)</i>	<i>"Concept cars are laboratories for new ideas, which [they] share with the public at major international motor shows ... they reflect their ambitions, values and imagination"</i>	<i>"F 015 addresses the question: how to enable people to do what they want or need to do?"</i>
Shared at	<i>Geneva International Motor-Show</i>	<i>Paris Motor-Show</i>	<i>Consumer Electronics Show, Las Vegas</i>
Year	<i>2004</i>	<i>2010</i>	<i>2015</i>

The analysis reveals that companies introduced concept cars as explorations of the future, centered on human beings. This is the case of the F 015, an inquiry that follows the question: "how to enable people to do what they want or need to do?" (Mercedes-Benz Cars Research & Development Communications Centre, 2015). These explorations "combine a variety of boldly innovative technologies in a form which can be visualized, driven and readily evaluated" (Mercedes-Benz Cars Research & Development Communications Centre, 2015). An example is the YCC, used by Volvo to develop a new technology –subsequently patented as Ergovision– that combines ergonomics and the adjustment of the line of vision to ensure good visibility (Volvo Car Corporation Communication Centre, 2004). Daimler AG also made the F 015 to experiment with self-driving technologies under the concept of 'an exclusive cocoon on wheels,' which includes "four rotating seats that allow face-to-face configuration, as well as six display screens ... built into the front, rear and side panels" (Mercedes-Benz Cars Research & Development Communications Centre, 2015). In contrast, the Citroën-Lacoste concept car focuses more on styling with "traditional colors like white and dark blue, with touches of bright yellow" ("Citroën Lacoste car, concept cars," 2015).

The three companies arranged these research, development, and innovation activities, in separate and specialized portfolios. Daimler AG, for instance, put the F 015 in the Research Vehicles' Portfolio, which includes a total of 24 concept cars developed between 1993 and 2012. Within those portfolios, concept cars are used as "test bed for new ideas" (Backman et al., 2007), which "cultivate boldness, creativity, and



optimism [...] exploring the future of driving” (“Concept cars, automotive future,” n.d.).

Besides this exploratory role, companies also use concept cars as a means to enter into “dialog with [their] customers” (Mercedes-Benz Cars Research & Development Communications Centre, 2015) “shar[ing] with the public at major international motor shows” (“Citroën Lacoste car, concept cars,” 2015). In this sharing role, for instance, Daimler AG applied the F 015 to contribute to “the discussion about self-driving cars and their impact on the society” (Mercedes-Benz Cars Research & Development Communications Centre, 2015).

Our inquiry uncovers two types of sharing, *public* and *in-company*. With regards to *public sharing*, the three cases were showcased at international commercial events. Interestingly, Daimler AG presented the F 015 at the Consumer Electronics Show instead of at a motor show. It seems that the company wanted to emphasize the technology behind the interaction between the users and the concept car, as the consumer electronics industries do it. The other two cases were exhibited at the international motor shows closer to their target customers: the Citroën-Lacoste in Paris and the YCC in Geneva. With regards to the number of attendees and the social media coverage, the F 015 was reached by more than 175.000 industry professionals who attended the Consumer Electronics Show. The show reached more than 703.000 mentions of CES2015 during the event, and 7.51 billion total potential Twitter impressions (Pryor, 2015). According to Backman and Börjesson (2006), the YCC was covered by 272 articles and press clipping in 20 countries, representing more than 2.5 million Euro in –free– advertising. About *in-company sharing*, Volvo used the YCC in 50 workshops and presentations to company’ employees (Backman et al., 2007), and Daimler AG used the F 015 in more than 15 internal presentations (Mercedes-Benz Cars Research & Development Communications Centre, 2015).

3.4. Discussion

This section discusses the insights from the interviews, observations, and case analysis presented earlier, which come from various sources and different perspectives, answering the research questions C, D, and E, formulated in Chapter 1. It first looks at concept cars as outcomes, then the activities to make and share these artifacts, and finally, list the values that this design-led futures technique bring to the automotive industry.

3.4.1. *Concept cars in the automotive industry*

As *outcomes*, concept cars are fictional artifacts used to render tangible images of a preferable future. The findings suggest that these futuristic artifacts are easily recognizable as vehicles ahead of one’s time, cars that one can see at the street in the time to come. They incorporate avant-garde style and cutting-edge technology.

Designers use several tricks to achieve that futuristic appearance, such as applying exaggerated proportions, flimsy structures, fluid lines and surfaces, unusual doors, large transparent surfaces, and bright colors. Their look and feel is reinforced by the implementation of state-of-the-art technology, referring to new or improved engines, components, materials, finishes, and systems of navigation and communication. The exploration of both styling and technology results in new ideas about the interaction between users and vehicles, different users within the vehicles, and vehicles and their context.

These futuristic artifacts are embodied by full-size prototypes and the novel interactions are presented through videos. The 1:1 scale prototypes enable people to perceive the artifacts' appearance, such as seeing their proportions, shapes, transparencies, and colors, and touching their textures, and thus experience the concept cars as true to reality as possible. However, people cannot interact with the prototypes, nor experience the speed and movement, because, most of the time, the prototypes are showcased static. Knowing that an important part of the cars' experience is their movement, automotive companies also provide videos to complement this experience. The videos show the interior and exterior of the prototypes in movement including the different users (drivers and occupants) and the context (such as pedestrians, other vehicles, and roads). The prototypes and the videos are supported by images and texts that are available for the audience through different media, which is also used to experience the concept car. Therefore, the prototypes, the videos, and the visuals help the audience to believe in the novel ideas of the interaction among users and the concept cars in particular future contexts.

Our findings show that the combination of these physical and visual narrative manifestations support companies in sharing tangible images of the future that can be experienced by a large audience, and thus they are easy to understand for most people. In view of that, companies use the prototypes, the videos, and the visuals to trigger conversations that occur inside the organization, including diverse employees at different levels. It seems that these conversations, which can take diverse forms, such as workshops, focus groups, or exhibitions, are useful to collect ideas and identify opportunities about the future of the product and the company, and to align the agenda of different stakeholders. As a consequence of the attributes of these manifestations, concept cars evoke strong emotions in people, motivating them to get involved in these conversations actively.

In some cases, these exhibitions also occurred outside the organization, to the general public. Through these shows, companies can claim a position in the market, marking a terrain and demonstrating their capabilities and skills. Even though this branding quality has an important value for companies, we are more interested in the exploratory benefit of these artifacts. Therefore, more than merely striking artifacts that show the brand's values, we consider concept cars as probes, which incorporate futuristic styling, technology, and interaction to influence a large number of parties stimulating innovation in the automotive industry.

3.4.2. Use of concept cars in the context of innovation

In the previous section, we considered concept cars as an end; in this section, we understand them as a means, as a *design-led futures technique*. From this perspective, concept cars are applied by diverse companies –car manufacturers, suppliers, and automotive design studios– as a way of exploring the complexity of the future, and thus supporting the decision-making in the world as it is. Our findings show that just like the futures techniques defined –by Voros (2007) and Hines (2016)– and suggest a few things we can do about that. Three reasons are offered for why jobs are important to futurists: (1– in Chapter 2, concept cars are applied to envision images of preferable futures. These images move from the speculative or near future back to the world as it is and supports companies in making decisions and mapping some areas of innovation.

Grounded in our evidence, we suggest that automotive companies apply concept cars, as a design-led futures technique, through a set of making and sharing activities shown in Figure 3-4.

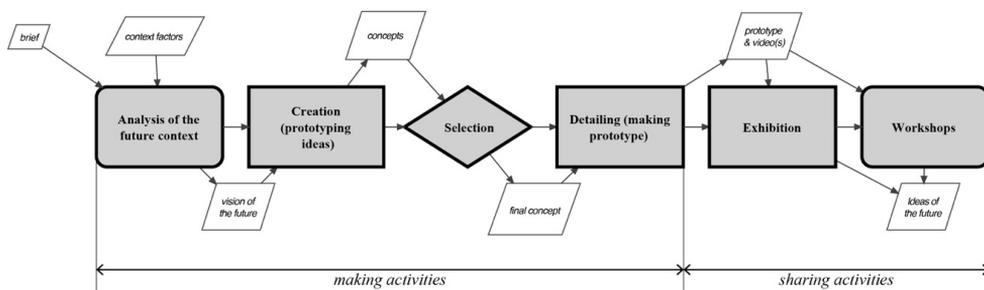


Figure 3-4. Concept cars making and sharing activities. Source: the author.

Before the making activities, the team receive a creative brief that includes a design challenge and the time frame of the exploration. The making activities start with the analysis of the future context factors through observations, interviews, and focus groups. In view of these factors, they define, in alignment with company’s values and strategic direction, an image of the future. Based on this vision, designers make sketches and rough prototypes, at different scales and resolutions, to create, develop, test, select, and share ideas with several people within the company. When the final idea is selected, they make a refined prototype and video to visualize the concept car and its iteration with its users within the future context. After the making activities, the company shares the prototype, the video, and the visuals to allow many parties involved in change, both inside and outside the enterprise, to experience the concept car and to spark discussions about its future and present. The evidence suggests that concept cars follow a hands-on way of researching the future where visual synthesis and prototyping play a significant role.

The activities described above resemble what Wright and Cairns (2011) and Kreibich,

Oertel, and Wolk (2011) define as *scenario thinking* (see Chapter 2). However, unlike that technique which ends in various scenarios, concept cars present only one chosen future which impedes the exploration of alternative options. They also differ from the way Styhre, Backman, and Börjesson (2005) and Santamala (2006) describe the concept cars' development process.

Our evidence also suggests that this design-led way of exploring the future plays out on the three different time frames –the world as it is, the near future, and the speculative future–, and end in the preferable future. Based on the combination of time frames and the alternative futures –proposed by Henschley (1978) and Voros (2001)– defined earlier, we classify concept cars into three different groups:

- *Concept cars for the world as it is.* These are made to project and announce modifications into upcoming series production vehicles, which are usually launched one year after the concept cars are presented. These concept cars, which are typically built on existing platforms, extrapolate current knowledge about technology and visible trends into new car models. They examine probable futures with a strong emphasis on branding.
- *Concept cars for the near future.* These concept cars aim to inspire the design of new category of vehicles for the brand, which could be developed during the next five years after the concept cars are showcased. They envision new type of vehicles which incorporate current knowledge and a mix of ongoing and new trends. They push the boundaries between the probable and plausible futures combining branding with innovation.
- *Concept cars for the speculative future.* These concept cars are entirely new 'visionary models', which explore at least fifteen years into the future. These are vehicles built from scratch that propose new styling, ahead of the lines of the current series production vehicles, and explore novel technologies and interactions, even some that have not necessarily been proven to work. These concept cars, which will never be produced, are mainly innovation exercises. They are actively connected to the preferable futures, creating visions of the future that are selected based on the values of the brand and its strategic projections.

The outcomes and activities presented earlier contain the benefits explained below.

3.4.3. *Value that concept cars bring to the automotive industry*

Grounded in our evidence, this design-led futures technique offers several benefits for automotive corporations.

First, this way to investigate the future uses an intuitive approach in which designers focus on the users. Designers research the context factors by being immersed in the context –living in it–, which gives them the possibility to observe people's behavior empathically and thus discover the trends and emerging themes first-hand. In view



of these trends and emerging themes, they can define a future vision which is human centered. Therefore, all the results derived from this vision, such as artifacts, visuals, and narratives incorporate the users to a certain extent. Maintaining a human-centered focus throughout the whole exploration ensures that the outcome, the map of the preferable future, will incorporate a human perspective. This helps companies develop innovation driven by people's needs, desires, expectations, which can end in new products, services or businesses that are closer to the users; hence, an innovation that positively impact the company, users, and society.

Second, concept cars are 'vehicles' to innovate and to share this innovation with others. The findings suggest that concept cars are a way to stimulate the creation and exchange of ideas with consumers, opinion leaders and innovation team players at three different context levels, team, in-company, and public. With concept cars, companies share tangible images of the future that are easy to understand for people inside the company as well as outside. Presenting these visions to diverse stakeholders stimulates conversations that generate numerous new ideas and opportunities concerning the company's future at different levels, from a company's strategy to its products. It also helps align the agendas of different stakeholders.

The other benefit of concept cars is that by making these artifacts, companies effectively increase their innovation capabilities, learning by doing. They incorporate new knowledge about trends and technology and discover how to make an idea concrete and actionable, and also find a way to communicate this idea.

Although the features described here present concept cars as an attractive futures technique, they have two clear limitations: the implementation of this technique requires a substantial investment of resources and it presents a singular outcome, hiding the opportunities offered by other futures.

In view of the characteristics defined in the previous chapter, we can clearly identify the tangible quality (Abstract–Tangible) of concept cars as outcomes and the visual richness of their communication (Textual–Visual). Through the analysis in this chapter, we established facts that helped us to understand that car manufacturers, suppliers, and automotive design studios apply various kind of concept cars to conduct precise (Narrow–Broad) explorations along all time frames (Short Term–Long Term). Moreover, considering the benefits and limitations of these artefacts, we propose that designers who work in the field of design and innovation management can use concept cars as a design-led futures technique or as a 'vehicle' to complement other futures method.

Considering that this design-led futures technique does not fit SMEs due to the limitations introduced earlier, we will continue this inquiry comparing concept cars with other design-led futures techniques in Chapter 4. With the results of this comparison, we will also investigate how to apply concept cars from the current niche of large corporations to the area of SMEs in Chapter 5.