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DESIGN ROADMAPPING

WHAT IS A DESIGN ROADMAP?

A roadmap on the strategy of design innovations takes the future vision as its destination. On the map are pathways that are dotted with new products and services landmarks. For the journey into the future time zone, a roadmap includes parallel tracks – next to the track for design innovation in the existing business, a roadmap introduces the next frontiers of innovation with new value propositions for new user groups. To learn more about the values of new users and prepare for the disruption that a new value proposition may create, the alternative pathways are mapped on the roadmap timeline - There are pathways that enhance the existing business propositions and there are alternative routes towards the exploration of new market spaces and new technology areas. The future timeline provides the backbone of the roadmap. Basically, a design roadmap is a map used to visually track and strategically explore future design innovations.

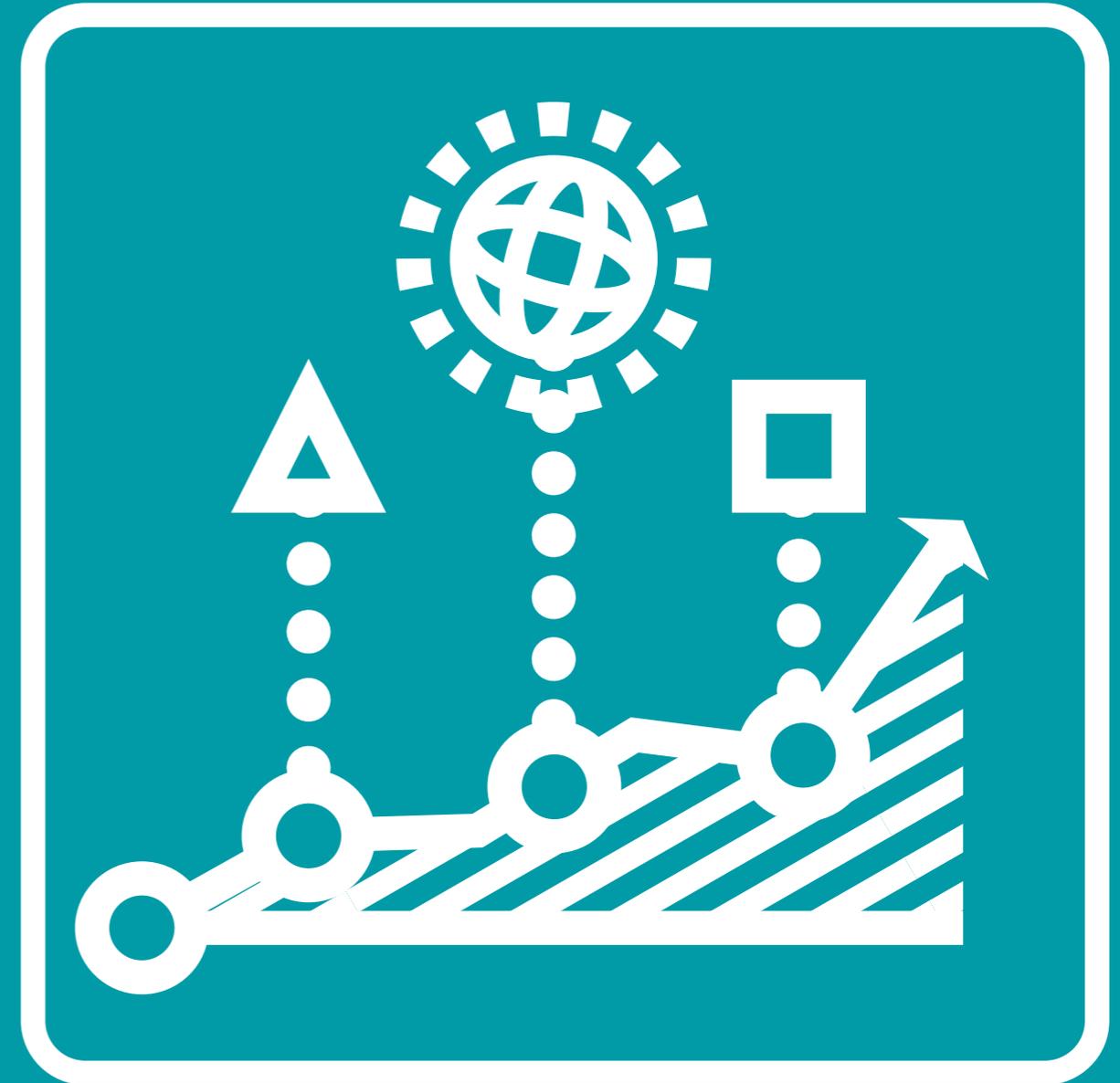
In this first chapter we will define what a roadmap is, and describe the overall process of roadmapping. We will also take a deep-dive into the history of roadmapping and grasp some inspiration from cartographic roadmaps. You will see that even the earliest roadmaps had extraordinary visual power.

Design Roadmap

▾ Definition of what a roadmap is

Let's start with the definition of a design roadmap. A roadmap is defined as: *a visual portray of design innovation elements plotted on a timeline*¹. Elements such as user values, new products and services but also market segments, technology applications and touchpoints. Each roadmap has its particular format and visualisation^{2,7,8}. An example in figure 1.1 shows a service roadmap for a digital food service of a grocery organisation. Design studios all over the world, from Denmark to Australia and from Korea to the US, are experimenting with roadmapping. Each finding their own style in plotting the basic elements of value, product-, market- and technology choices on the timeline^{3,4,5}. Figure 1.2 provides a schematic overview of the typical elements included in a design roadmap. Depending on the context and the designer's signature, each roadmap design has its particular format, specific additions and signature visualisation. Figure 1.4 shows another example of a design roadmap.

Roadmaps not only provide strong visualisation and decision making support – they foremost enable organisations and designers to devise creative responses to future strategic challenges³. A roadmap supports the innovation strategy of an organisation, because the decision making for a roadmap involves the creation, exploration and convergence of ideas about the future⁶. In essence, a roadmap offers a



A ROADMAP is a visual portray of design innovation elements plotted on a timeline.

LAB ↗

Design a collage of roadmap metaphors

MATERIALS NEEDED:

- access to the Internet to conduct a web image search
- roadmap image matrix : 6x6 rows x columns digitally created.
- blanco sheet for the collage - for instance an One Note sheet.

1 Collect roadmap images and metaphors from the web that appeal to you. Use the search engine image view to pick visuals you like.

2 Fill out your roadmap image matrix with images that appeal to you for each of the 6 innovation elements on the roadmap: User Value, Market, Product-Service, Technology, Timeline (see figure 1.2 for the roadmap elements). Use one row per element and make a collection of several images per element until you completely filled the 6x6 matrix.

3 Pick 6 favourites out of all the images in your roadmap image matrix. Which 6 elements really stand out to you in your image matrix?

4 Take the sheet to portray the centerpiece of your collage. Pick one of your favourite elements, and give it centre stage on your sheet. It's up to you how much space on the paper you use, but remember that this will be the primary focus of the collage.

5 Arrange the other 5 favourites from your matrix and portray them around the centrepiece on the collage. Things to think about: do you want to arrange it symmetrically or asymmetrically? Would you draw two identical versions or two variations on the same theme? Are the images similar to your centrepiece or do they create contrast? There's lots of room to play here, so have fun!

6 Choose another set of images from your matrix, and arrange them anywhere on the collage. You can take the same approach as you did in the last step. At this point, your composition should be coming into its development.

7 Create or draw a pattern that connects or unifies the images on your collage, touching elements from each area. Think of this as a way to give an extra layer of background detail to your collage.

8 For the remaining white space, mentally divide the collage in half, then finish each half by colouring, rearranging, removing and adding images. Keep it simple. This final step will help you make your composition saturate the collage in subtle ways.

Creating a collage that centres on metaphors will encourage your ability to distil complex ideas into digestible sets of images. Starting with a simple, hands-on approach using the image search in your web browser, here is a perfect opportunity to prepare for your design roadmapping skills.

This is the kind of creative activity that you could easily do in one sitting, probably in less than four hours. The objective of the Lab is to activate your design roadmapping ideas and generate your first visual ideas for design roadmaps.



Prof. dr. SUSAN REID on the subject of Market Visioning and Creative Trend Research

LS In design roadmapping, formulating a market vision is an essential element. Your scientific research on market visioning^{11,25} shows that for successful development of radically new, high-tech products, a market vision is a prerequisite. How do the firms you researched start market visioning?

SR Well, according to my research, market visioning competence and market vision each have separate and cumulative impacts on early performance of firms involved with radically new high-tech products. The inherent risks and rewards associated with these types of high-stake ventures require that firms create long-term visions to guide their efforts. A clear and compelling vision about the product-market opportunities associated with radically-new ventures can help firms to achieve superior competitive advantages.

LS Have you come across the use of (creative) trend research used in formulating a market vision?

SR Firms can come to a market vision from many different paths, including those routes to creating a market vision, which is largely top-down versus those which are more bottom-up. It would be more likely the case that if a firm is 'cognizant' of formulating a market vision and actively striving to do so that it would be a case of top-down formulation. In such cases, then, trend research might be used to create the market vision.

LS What do you consider as the most important elements in creating a market vision?

SR The numbers would say that the strongest, most important component of market visioning competence (in terms of statistical impact) was idea-driving, championing behaviour on the individual side, and having a proactive market orientation on the organisational side.

LS In your research, you showed that the impact of market visioning on innovation performance is positive, in particular on the key aspects of the early performance, early success with customers, and ability to attract capital for the business development plans behind the radical innovations. What are your thoughts about the impact of creative trend research?

SR I tested the model as a whole and found that market learning tools, which would encompass techniques like trend research, is a statistically significant component of the market visioning competence, which has an impact directly on ability to attract capital and indirectly on early success with customers. Importantly, I used four items to measure market learning tools and the item which had the highest standardized loading and reliability was measured using the item: "we tried to develop several potential technological scenarios before choosing market(s) to pursue"²⁶. This leads me to believe that in fields governed by technological development, it's important for the researchers to focus on technology trends in addition to the market trends in their field, and to do so early on, in the front end of innovation.

LS What are your recommendations for design roadmappers on creating a market vision?

SR I think it is important to try and understand the context under which a vision is being 'born', both in terms of initiation with a low or high level of market context, and in terms of whether the focus is from an individual or organisational perspective²⁷. The easiest to map will be in the case of an innovation being initiated from an organisation and having high extend market context. To this end, design roadmappers might start to work on contextualizing a given market vision form.

SUSAN REID is a professor at Bishop's University, teaching and researching in areas where marketing, innovation and entrepreneurship intersect: market vision, networks, radical innovation, brand and innovation management. She has published in refereed journals including: Journal of Product Innovation Management, Technological Forecasting and Social Change, R&D Management, World Development, Business History and International Journal of Technology Marketing. Her academic background combines with over 25 years of consulting, business and board experience for the aviation, biopharmaceutical, nanotechnology and consumer goods sectors (including for the ice cider and spirits business, Domaine Pinnacle, co-founded with her husband Charles Crawford in 2000 and sold in 2016). Her mission is to help others negotiate the path between their passion and successful product/market vision.

System roadmapping

PAUL HILKENS

Founded in 1877, Océ-Technologies B.V. is a global leader in digital imaging, industrial printing and collaborative business services. The company's mission is to accelerate new digital print technologies and transform them into local printing products and services for blue-chip multinationals around the globe and creative studios around the corner. A Canon Group Company since 2009, Océ now operates a vast global network of R&D centres, to connect emerging digital print technologies to future markets. Océ is headquartered in the Netherlands, in the heart of Europe's hi-tech corridor

As Vice President Materials & Device Technology Development at Océ-Technologies B.V., Paul Hilkens is committed to realising innovative system architecture as part of a coordinated technology strategy. This interest began during his Master's degree studies in mechanical engineering at Eindhoven University of Technology, and continues to play a key role in his current position, where he focusses on connecting emerging digital print technologies to future markets

One of his signature projects has been the roadmapping of the platform for the product family launched as the Océ VarioPrint DP line (figure 4.6). According to Hilkens this project is not only evidence of the value of system architecture for organising R&D activities, but equally importantly of the role good roadmapping can play in the presentation and communication of the business proposition throughout the rest of the organisation.



→
Figure 4.6
Océ VarioPrint DP line
Digital printing system for
production printing facilities,
found in company print rooms
and print shops.

© Océ photography.

Hilkens explains how he and his team introduced roadmapping at Océ, and the impact this had: "As a closely-knit team, we worked together for one and a half years. We started by introducing technology scouting alongside system architecture design." Following pilot projects mapping the research and development for two core technology modules, Hilkens and his colleagues created the first platform roadmap focused on a complete product line. He reflects on these early stages of the project: "From the pilots, we knew that roadmapping is a process with an outcome that you don't know when you set off. But at the end of this process there's an outcome that everyone sticks to."

“When implementing your vision, you put your trust in the fact that having the right people on board will give you the best possible outcome for the future.”

↳ Mapping technology evolution

When it comes to mapping technology evolutions, Hilkens is clear about the benefits of combining roadmapping with strategic architecture: "The fact that we are currently seeing new products being launched every year, could lead us to believe that the evolution of technologies and life cycle changes are moving at a faster pace compared with say 10 years ago. But I know from experience that most of these developments have taken much longer than one year; often 2 or 3 years, and sometimes even longer."

“In order to be able to anticipate change as part of a longer-term strategy, roadmapping offers the perfect way to manage the fit of core technology development with market requirements.”

The introduction of the concept of roadmapping at Océ started with a round of stakeholder interviews with senior managers in the organisation. They felt that roadmapping would be strategically important in three ways. Firstly, by involving business strategists, service and business managers

within view³. Innovation practice has shown that it often takes longer to accept the reality that a business is declining than would be rational and best for the company⁶. Apparently, it is quite difficult to change the mindset of people who have become accustomed to successful products. It is not uncommon that a roadmapping process starts in a situation of a business that loses strategic fit.

HORIZON 3 → Value Proposition Creation

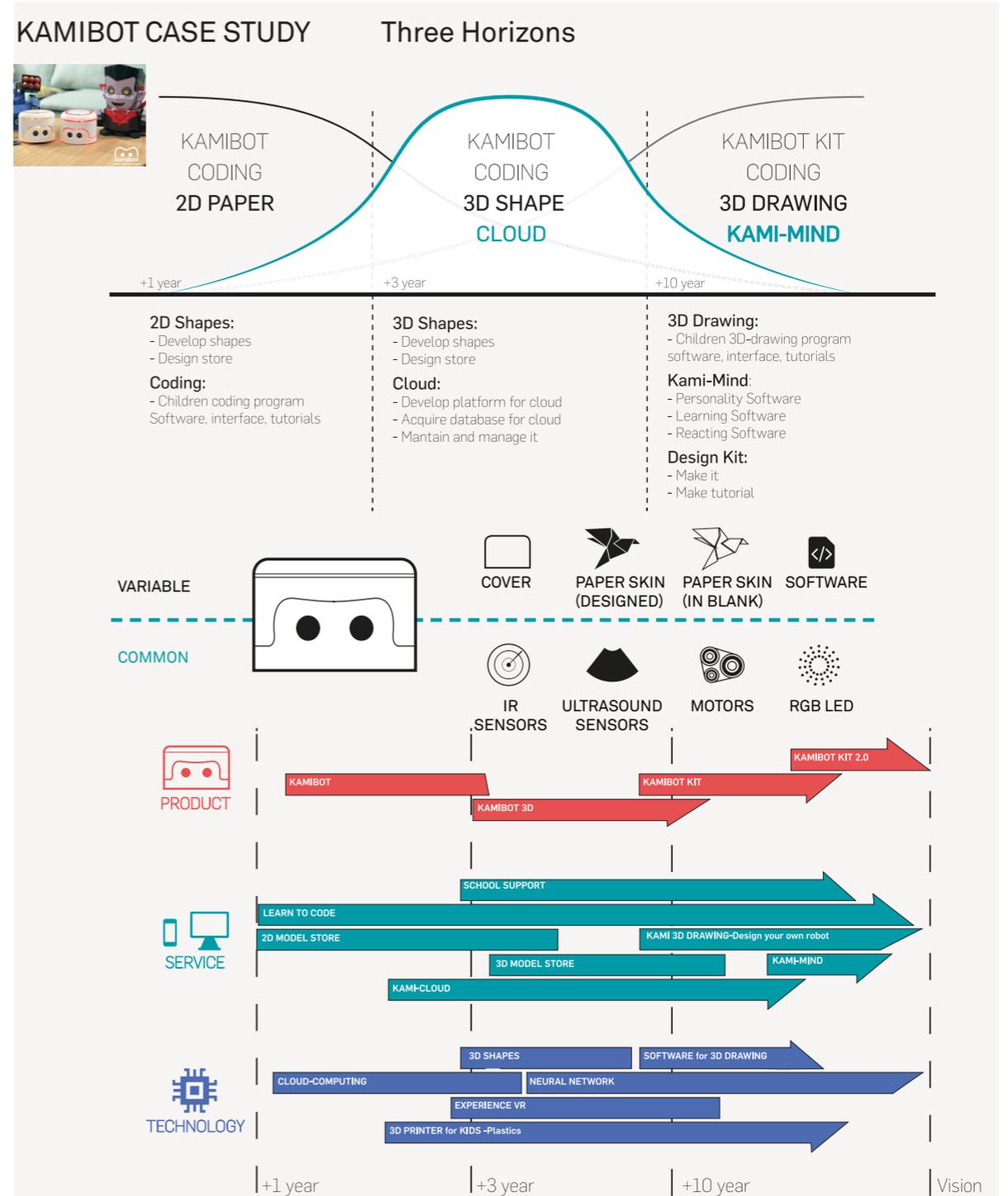
The third horizon captures a strategic scenario with a state of growth on the long run. It is a disruptive innovation scenario with a new value proposition that inhibits the potential to displace the system of the first strategic life cycle. The future vision we discussed extensively in the third chapter, is the end point of this innovation scenario. The desired values of the imagined value proposition of the future are, at best, marginal in the present. Rather than a progression, this third horizon's scenario inhibit a disruptive change of new value(s) over time that potentially offers a more effective response to the external environment³. The time pacing is expected to be more long term, taking several years for the new business development of new value propositions that also might involve the creation of new business models⁵. The start of this strategic innovation scenario is in the present by seeking a strategic fit with emerging signals.

HORIZON 2 → User-centred Value Creation

This strategic scenario of user-centred value creation in the second horizon falls between the disruptive and the enhancement scenarios. It concerns growth and transformation and thrives on design research dedicated to insights about the desires and dilemmas of users³. New insights on emotional and functional values allow designers to create new markets with new products and services that differentiate from the existing product/market combination. Such a newly discovered value insight delivers new meaning for a new market segment⁵. Furthermore, the design of a next generation product, platform or service that incorporates the application of new technologies can be part of this scenario³. The user-centred value creation includes then the testing of the new technology application by users in the existing market. A major challenge in this strategic scenario is overcoming the dilemmas for reaching the third strategic life cycle. In this intermediate time space, the current and envisioned product lines collide. This scenario is therefore typically unstable and characterized by clashes of multiple values and directions of creative solutions³. It takes an entrepreneurial mindset to identify propositions that enter the growth stage of critical market acceptance. Making sense of the lessons learned about user acceptance of new technologies is crucial for this scenario³. Therefore, in this scenario, several alternative paths of value

→ Figure 5.3
Kickstarter case study Kamibot

cc Joana Portnoy, Anne Brus, Ruben Verbaan & Marco Bonari, 2016. Lecture for the Design Roadmapping .Master Course Strategic Product Design Faculty Industrial Design Engineering, Delft University of Technology.





↑ ↗
Real Time Schiphol, 2017.

© Maarten Baas
Courtesy of the artist
Rob Hodselmans photography

“Real time is a term that is used in the film industry. It means that the duration of a scene portrays exactly the same time as it took to film it. I play with that concept in my Real Time clocks by showing videos where the hands of time are literally moved in real time” - *Maarten Baas*.

Real Time clocks show a video performance made by BAAS which takes exactly twelve hours to film and twelve hours to watch it in its entirety, thus creating a hyper-realistic representation of time.

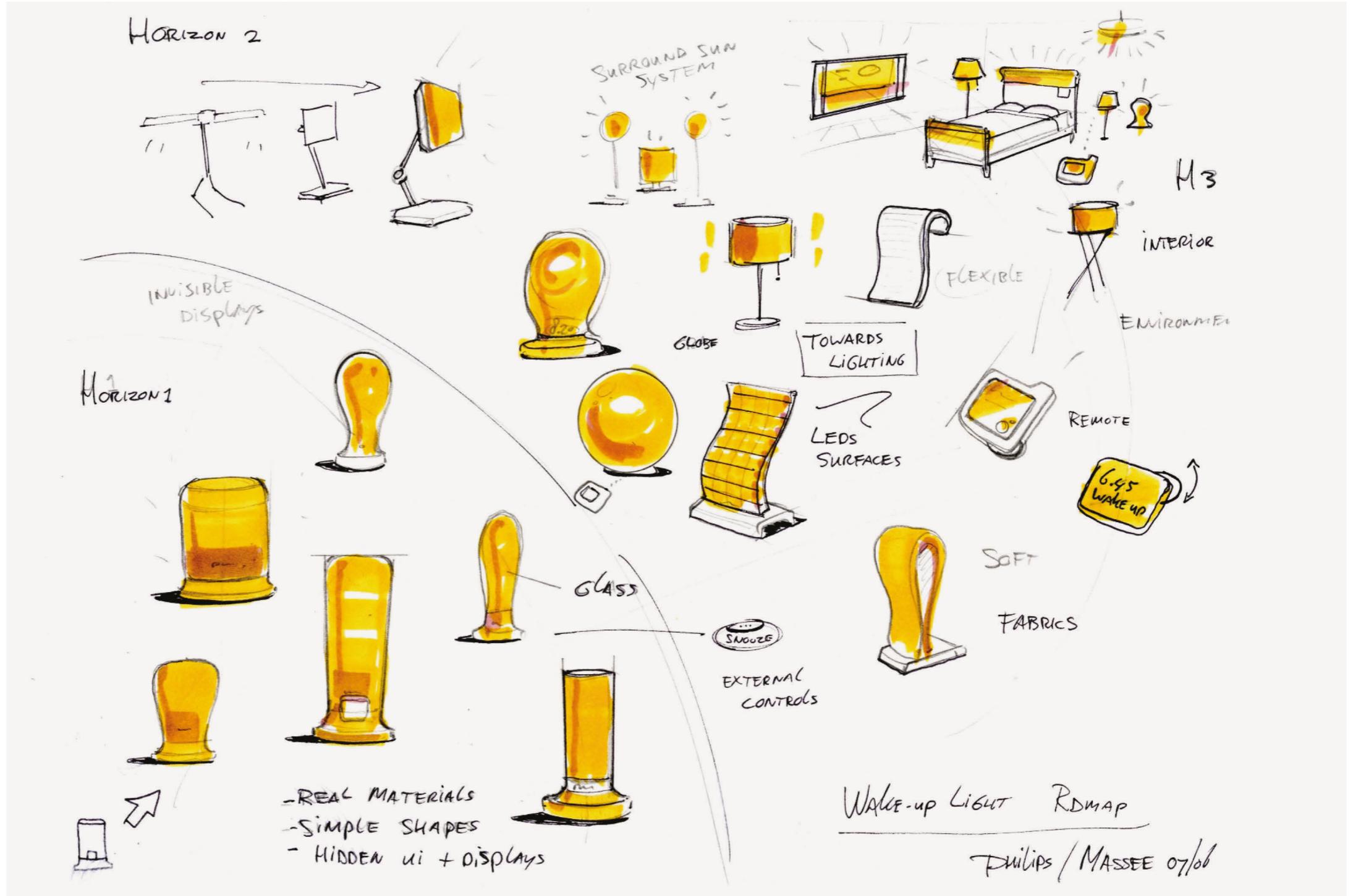


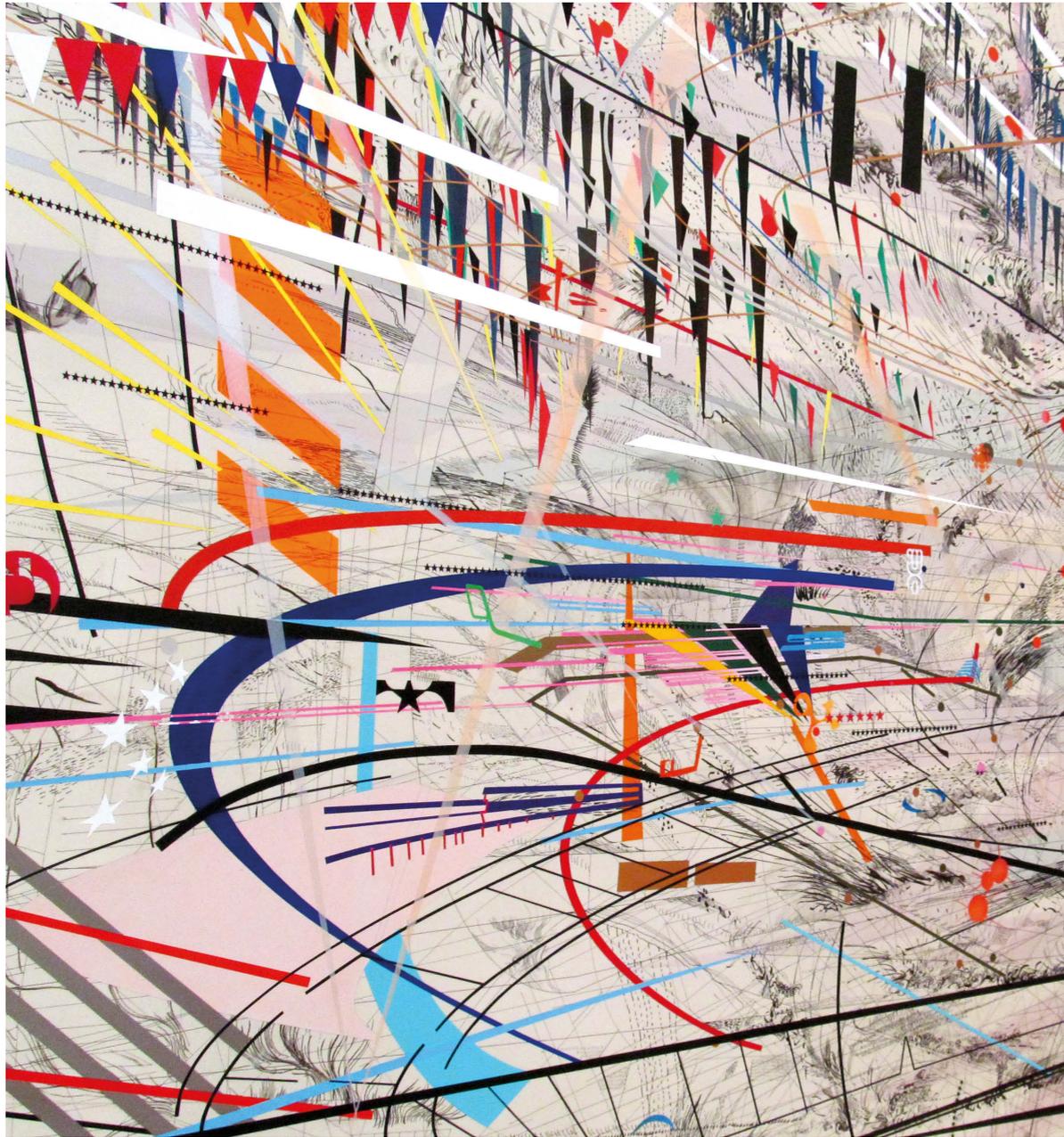
DESIGN ROADMAP

Wake-up-light PHILIPS

→ Figure 5.13
Sketched Design Roadmap for the Wake-up-light

© Bart Masee, 2006
PHILIPS DESIGN.





↑
Stadia I, 2004

©Julie Merethu,
Artwork: ink and acrylic on
canvas, 107 in. x 140 in. (271.78
cm x 355.6 cm). Courtesy the
artist and SF MOMA

IN SUM

In this chapter, we have provided several guidelines to facilitate the mapping sessions. First to talk about the future values and share imaginations, gut feelings and beliefs. Second to map user values and new technologies to the products and services you envision and third to create and fine tune the design program roadmap for strategic review and decision making.

The three minimal critical dialogues we highlighted are:

- Value mapping session
- Idea mapping session
- Pathway mapping session

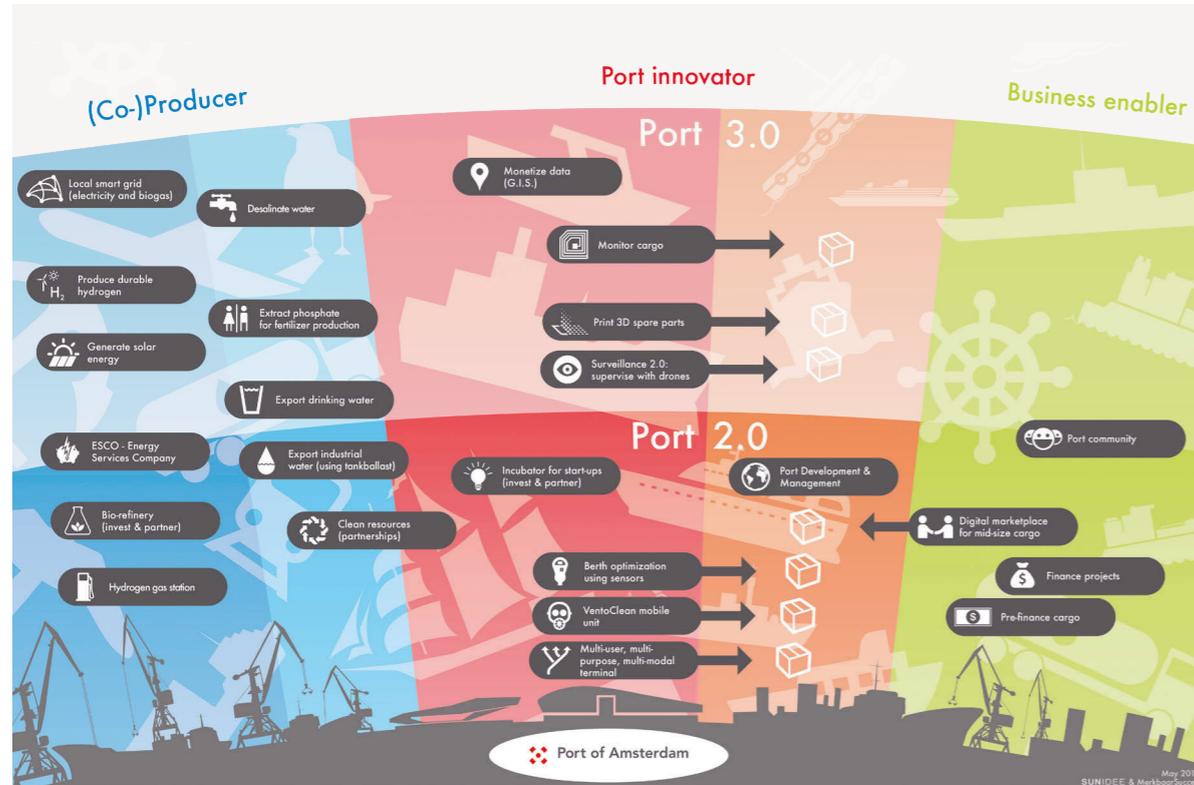
Prior to the sessions, we advise to carry out design research activities on, for instance trends and technologies, or the strategic directions on time pacing. These activities in advance, provide the input for the dialogue sessions. For the follow-up and consolidation of the collective decisions we recommend a creative visualisation of the roadmap with artefacts of the future vision, the product roadmap or program roadmap.

To end, with respect to the facilitation of decision making across multiple innovation domains; in this chapter we showed that design roadmappers use a decision grid to prioritize and select new product and service innovations with the highest probability of overall success. The grid provides support and transparency in the tactical go/no-go decision making process.

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DESIGN ROADMAP

Port of Amsterdam



↑
Figure 7.1
Design Roadmap
Port of Amsterdam

- breakthrough innovations, new business models, geographical expansion, etc.;
- Business-to-business customers, who want to feel confident that the company is pursuing continuous innovation, and will rely on their customer-supplier relationship;
- Legislators, NGOs and representatives of the general public, such as journalists, who are interested in learning how the company impacts the world on a societal, environmental and economic level.

For these audiences, your roadmap design should be extremely visually appealing and self-explanatory. In some situations, it might also be used as a marketing/PR tool. Typically, the roadmaps you create for network stakeholders should exclude confidential information that is shared with the internal audiences. Therefore, edit the roadmap's content carefully – together with the roadmap's internal stakeholders, consider upfront which confidential information must be excluded. Remember: communicating with external audiences amounts to public disclosure of the organisation's innovation plans. It is a very sensitive document, since its content should be agreed by the stakeholders with the commitment to make the roadmap come true. The only exceptions to this rule are roadmaps that are made as part of a future exploration study, showing what could be possible and purely intended to inspire people and inform strategy making.

How to's

Getting different stakeholder audiences to commit to your roadmap is not an easy job; there is often the “not invented here” hurdle. Here are some guidelines in this regard¹:

- Identify and interview the target audience members you choose to work with carefully. Ask senior stakeholders whom to assign particular tasks, which will ensure that future roadmapping team members are those trusted for their professional expertise and decision-making skill.
- Keep 1-2 senior managers closely involved in the roadmapping process. They can for instance give a short speech when the roadmapping team first gets together. They can also take part in progress update meetings, where they can give their feedback about intermediary results.
- Find a balance between including team members with strong social networks within the organisation and more ‘hardcore’ content specialists – consider at the start of the roadmapping process to interview stakeholders to understand their needs and expectations but also to find out whom to invite for the roadmapping team.