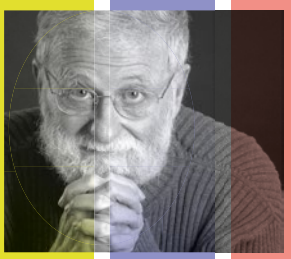
CRISP #5

Magazine
June 2015

We promise, no regrets!

This is the Grand CRISP Finale! Berry Eggen and Paul Hekkert look back and reflect on 4 years of CRISP — Page 1



A product is more than a product

Don Norman's manifesto explains why we don't design chairs anymore — Page 20

Featured themes

Designing Relationships, Orchestration, Embracing Complexity, and Strategic Value

THIS IS CRISP

Editorial note

It is fair to say in hindsight that, when we first had the idea for a CRISP magazine, we were pretty naïve. Few of our assumptions proved to be right. We assumed, for instance, that the project leaders would jump in and help, but we had obviously underestimated their daily workload. Having top-notch researchers write pieces that can enchant a broader audience also proved to be much more difficult than we expected. We also assumed that practitioners would see the magazine as a perfect outlet for their brilliant work. Here too, we were proven completely wrong. Instead, they played hard to get. Also, did you know you can debate on one picture for days? We were convinced that everybody would have the same idea about what makes a good photo — complete naivety!

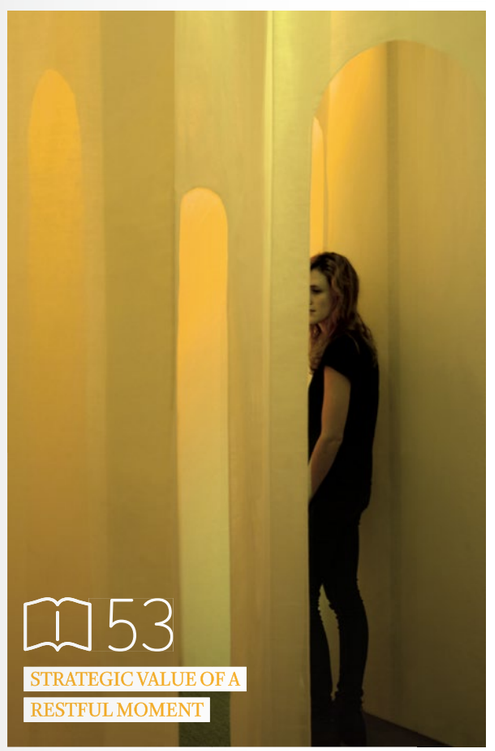
After the first issues, though, something magical happened. People began to see the magazine as a very effective carrier for the versatile CRISP message. CRISP members became enthusiastic and began to take ownership, and even began to involve people in their external network. This added a valuable extra layer to the original idea. All the efforts made were more than worthwhile and the magazine clearly contributed to the rising claim and fame of the programme.

We bow deeply to all those involved in the CRISP Magazine over the past two years. We hope it will inspire future research programmes to communicate 'CRISPly'.

Jeroen van Erp, Christine De Lille, Janneke Vervloed, Marte den Hollander

Colophon

See inside back cover for the full colophon.



CRISP has been provocative, inspiring, and innovative. Above all, CRISP has created the ties that bind. It has successfully and creatively brought together the worlds of research, government, and industry and has focused on these worlds' combined expertise and ambition with regards to tackling a wide range of social problems. As Minister of Education, Culture and Science, I applaud their combined efforts and cannot help but feel proud!

I am really impressed by the fantastic results achieved by the partnership of knowledge institutions and industry. The programme has provided us with new scientific insights into product service systems, as well as giving rise to a number of surprising prototypes. Based on these insights and prototypes, the project teams have also developed several products that are now ripe for commercial success. CRISP has contributed enormously to the entire scientific process, from fundamental research to products that will enrich the world, for which I am truly grateful.

A prime example of a fundamental scientific insight is one that originated in a partnership between psychiatrists, designers, and Philips. These partners showed us that specific combinations of colours and light intensities exercise a calming influence on people — knowledge that will be indispensable to caregivers, psychiatric institutions, and employers. The Active Cues Tovertafel ('magic table') is another inspiring example of a valuable product that originated within a CRISP project. People suffering from dementia can use the Tovertafel to play intuitive games that encourage them to remain and enjoy being physically and socially active. This innovative project was also built on a foundation of interaction between neuroscientists, health care professionals, and game developers.

These examples and the success of CRISP underline the fact that the 2025 'Vision for Science' that I presented together with State Secretary Sander Dekker in November 2014 will be a crucial step in our development as a nation. It will help us move towards science that attracts talent from every corner of the world and — once again — transforms our country into a global player. Ultimately, it will make our country better, smarter, and more sustainable.

I would encourage everyone involved in the CRISP network to maintain and strengthen the ties that bind far into the future, so that programmes like CRISP continue to blossom in the years to come. In doing so, we, as government, research institutes, industry, and society, can continue to work together to further enrich our country.

JET BUSSEMAKER

· Minister of Education, Culture and Science

DESIGN VISION — *CRISP Magazine #5*

Paul Hekkert chairs the executive board of CRISP, of which Berry Eggen is also a member. Both sat on the fl ight deck of the programme and wrote this reflective piece. Great stuff!

CRISP PROMISES, NO REGRETS!

Berry Eggen & Paul Hekkert

This is the Grand CRISP Finale: a successful scientific research programme set up together with and especially tailored to the Dutch creative industry. This is the moment to look back and reflect on some of the key structures on which the CRISP programme was founded, 'way back' in 2011.

With CRISP, we sought to answer the following central research question:

"How can we effectively and efficiently design successful Product Service Systems that provide a holistic and fulfilling user experience and provide strong economic and societal benefits?"

We addressed this question with eight projects, with business strategy, user experience, or intelligence as perspectives, and in two application areas, care and productivity. These eight projects were grounded in two research approaches, 'foundational' and 'inspirational testbeds'. Looking back, we believe that it was the complementarity of these two different types of projects that formed the solid ground for design researchers and creative entrepreneurs to truly collaborate. By combining these approaches, the programme struck a delicate balance between design 'thinking' and 'making', between design 'science' and 'practice'.

Foundational

Four CRISP projects were designed to deliver knowledge, tools, and methods on PSS development following a 'top-down' or 'theory first' approach. This is common practice in science and there was no reason to believe that PSS design, as a subject of study, could not be approached in the same manner.

However, these projects were not executed in academic isolation, and this had a major impact on their foundational character. In CASD, for example, strategic researchers had to negotiate with designers from the design consultancies NPK, FLEX, or Fabrique in order to study their strategic role in PSS innovation. In the G-Motiv project, academics needed to understand the realities experienced by service providers like Brijder, the addiction treatment specialist, and by Berenschot management consultants, in order to explore the added value of games. In the GRIP and PSS101 projects, industrial partners like Philips, Océ, and Exact continuously talked common (business) sense into the heads of the design researchers in order to identify the key steps of the PSS development process.

BY COMBINING THESE APPROACHES, THE PROGRAMME STRUCK A DELICATE BALANCE BETWEEN DESIGN 'THINKING' AND 'MAKING', BETWEEN DESIGN 'SCIENCE' AND 'PRACTICE'.

All this stakeholder involvement did not make the 'foundational' projects any less foundational. Instead, their involvement ensured that the theoretical frameworks deal with essential concepts and relationships of real (design) life, and that the tools and methods can and will be used by designers and managers. In sum, the active involvement of practitioners provided a sense of reality to the foundational research, and thereby prevented researchers from developing knowledge 'for its own sake'. Moreover, all projects were required to deliver practical applications to demonstrate their theoretical foundation. In this reality check, the foundational projects found plenty of inspiration in the other four projects.

Cross-pollination

Generally speaking, a testbed offers a means to test something in development. In a flower testbed, modified or exotic flower seeds are planted in local soil and grown under local weather conditions to see which ones will ultimately blossom. And that is exactly what happened in the other four CRISP projects. In these projects, new technologies formed the basis of prototypes that were developed and put to test under real-life conditions. The i-PE project took a new decentralised system-design approach as its starting point to design intelligent play objects, and the team iteratively developed their smart play environments together with creative professionals and school children. The STS project created an inspirational testbed at TU/e in which design researchers together with developers and designers from the textile industry explored the value in combining soft materials with high technology.

It is true that the application of smart technology played a key role in the testbed projects, but it was CRISP's unique focus on product service systems that brought in the much needed expertise of product and service developers. As a matter of fact, this expertise was considered indispensable right from the start and it ensured that the projects cultivated their prototypes and design propositions in the multi-disciplinary compost layer that fertilises the real-life testbed.

While inspecting the testbeds, you will encounter many spots where cross-pollination has taken place. Within the Grey-but-Mobile project, care provider Zorggroep Tellens copied the 'Skewiel Mobiel' service to their local area. The smart textile testbed in Eindhoven has become a 'pied-à-terre' for talented artists in residence. And SELEMCA's healthcare robot Alice will be premiered at the International Film Festival in Rotterdam.

Cross-fertilisation

More than the individual achievements of the two types of project, we celebrate the cross-fertilisation between the testbed and foundational projects. The fruitful communication between both project 'species' stems from the many design review sessions organised by CRISP. Over time, this communication went beyond a mere exchange of information and it has now become a form of collaboration in which theoretical frameworks and new PSS tools and methodologies are used by the testbed researchers to better understand and harvest the relevant design knowledge encapsulated in the application-oriented work.

Vice versa, the many concrete and successful collaborations that blossomed in the real-life testbeds provided rich cases to feed the further development of theories and models of PSS design. From these observations, it is clear that this mix of making and thinking, of practice and theory, has successfully led to many new insights and opportunities for the benefit of the design of current and future product service systems.

BERRY EGGEN — *1960*

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- Member CRISP Executive Board
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- Professor at Delft University of Technology
- Co-founder and chairman of the Design and Emotion society
- Chairman CRISP Executive Board

HIGHLIGHTS

That's asking for trouble: highlight a few *things* that have stood out after a 4 year programme involving more than 65 parties and over 250 people. Nevertheless we have done our best, so here you are, our selection: just to make sure you won't forget some of the awesome CRISP outcomes.

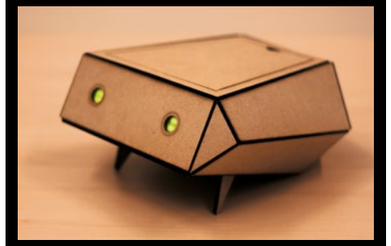
For more information on these highlights and other CRISP results, visit the online CRISP repository at http://crispplatform.nl.

Social Robots

When CRISP began, no one expected the CRISP SELEMCA project (Services of Electro-mechanical Care Agencies) would receive so much publicity, from articles in newspapers to documentaries, and even a short clip in the Boijmans museum in Rotterdam. If we were prone to envy, we might even think that money had changed hands! But this project really deserved all the attention it was given, because robotics in care environments is a complex and relevant topic.

Our existing health care system faces immense challenges: although an increasing number of people will be requiring care, financial cutbacks and personnel shortages are forcing hospitals to do more with less. Robots may offer a solution for considerably reducing the workload, even in cases of social interaction. SELEMCA's research is about how social robots can help during patient intake, diagnosis, monitoring, and rehabilitation exercises. But this proposed collaboration between care personnel and robots brings some challenging ethical quandaries. The SELEMCA project took these challenges head on with inspiring examples of robot technology such as Tinybots and Alice. The real value of these examples is their translation of SELEMCA's practical aspects into actual robots for healthcare environments.

Though Tinybots are simple in behaviour and appearance, they are designed for very specific problems. Through their efforts, SELEMCA provides us with a platform to uncover, discuss, and resolve the many dilemmas inherent in using robot technology for social goals, so that we can continue giving people the quality of care they deserve.



Tinybots may be simple in appearance, but help solve very specific problems.

Knowledge and play

One of the challenges of scientific research is that its theories and abstract frameworks often fail to convey their value; practitioners are left to wonder what they are supposed to do differently.

With the GlowSteps platform, the Intelligent Play Environments project (I-PE) developed a great research environment to create knowledge on designing environments for play. The GlowSteps platform also serves as an inspiring example to practitioners. The concept has matured considerably: the latest prototypes are of close-to-market quality in design and reliability, and the interaction has been enriched with sound. The software platform has also been improved to allow fast application development with partners. Knowledge gained from research using the GlowSteps platform has led to the development of the 'Lenses of play' framework.

The 'Lenses of play' cards set has been developed as a knowledge carrier; it translates the knowledge of the framework into a useful toolkit for practitioners. With its ability to bring together researchers and designers, fundamental knowledge, and tangible prototypes, I-PE is archetypically CRISP.

People playing with the GlowSteps.

The 'aha' about research

When the first ideas for a creative industries research programme emerged back in 2008, the creative industry wasn't the conscious, energetic and coherently operating sector it is today. In fact, many of those who played an active role in the sector didn't know each other and had yet to realise that they shared common interests and goals. When the government appointed the creative industry as one of the nine top sectors in 2012, they gradually began to notice how they would benefit from collaborating on agendas like international ambitions, human capital, and knowledge development.

Setting up CRISP presented two major challenges. Much of our attention went to identifying relevant research topics that would prove beneficial for the future of the sector. Our second challenge was to involve the designers, game-developers, fashion designers, and service designers in the project. To be honest, at that point, most of them hadn't a clue what research or researchers could mean to them. CRISP has, through its energetic Design Review Sessions, the CRISP magazine, and the many appealing results (varying from prototypes, new business models, and scientific articles), greatly contributed to people's awareness of the value research offers to the creative industries.

With this in mind, it is easy to see how the programme, unknowingly, has become a frontrunner for a new research culture where researchers, creative industries, industry, and the government work closely together. They share a goal: to develop profound knowledge and insights that, in the end, will help strengthen our economy and build a sustainable society.

Fabrics, services & networks

When CRISP began, the Smart Textile Services (STS) project faced a fairly overwhelming challenge in the complex web of partners, interests, and technology. Some of us might initially have wondered whether it would even succeed. Boy, did they prove us wrong! Through their explorative, bottom-up approach, the project team has managed to bind their network of partners to the project. They have helped the struggling but energetic textile industry with much needed rejuvenation and created a social fabric of partners, whose notions of the relevance of innovation have been turned upside down.

With Metatronics, the project developed a physical programming platform consisting of several modules that can be used with textiles. The platform offers design students prototyping tools that enable them to design and give 'wearables' dynamic qualities, with light, sound, temperature, and movement.

Textales is an STS Kickstarter project that explores storytelling by combining traditional textiles with an augmented-reality application. With this combination of digital dynamic properties and high quality textiles, the project aims to extend the longevity of textile products by changing the notion of what textiles can do. The industry partners behind Textales (Johan van den Acker Textiel Fabriek, Eindhoven University of Technology (TUe), and Unit040, a digital design company) are currently in discussion with international textile production companies to create a new textile story that they can use as a demo for business partners.

The project has also worked hard to share their findings with as broad an audience as possible by organising exhibitions and symposia, and by presenting their prototypes all over the globe. The BB.Suit, for instance, showcases a new way of 3D knitting by embedding copper yarns to connect with WiFi and GPS technology. The suit was tested during SXSW, a music and technology festival in Austin, Texas (USA). A model's location was broadcast on Google Maps and musicians were invited to upload their tracks to a purpose-built website that used the suit as a walking URL.

The STS project also has a future direction. The synergetic relationship between partners and external parties established during the project has led to grants for three research proposals: the CLICKNL Next Fashion "Crafting wearables" project, the Horizon 2020 ArcInText ETN project, and the NWO Creatieve Industrie Kiem, Material science and design fiction: collaboration for sustainable innovation in fashion.

Wearable Services exhibition at the Textiel-Museum, an exhibition concept by Oscar Tomico.

Beyond research through design

Although there are many complex solutions on the market for people who suffer from dementia, 'What remains?' offers a simple communication game that motivates the elderly with dementia to share personal information with their care providers. It might seem simple, but it incorporates much of what Careyn, a care institute and CRISP partner, has learned from existing methods. The game consists of personal pictures selected by the patient's relatives that encourage the patient to communicate their interests and life. As many elderly people with dementia have difficulty communicating, care providers can use this game to learn more about their patients and give better and more personalised care.

The 'What remains?' concept also embodies the added-value universities of applied sciences have to offer. Their approach goes beyond 'research through design' and, as a result, their members often come up with something that is close to product development. By inviting both universities and universities of applied sciences, CRISP was a platform that offered a wide repertoire of approaches.

A set of selected personal pictures to be inserted into the glass spheres. The spheres give the pictures a 'magical' atmosphere and motivate the people with dementia to tell personal stories.

Relax!

GRIP sought to build a body of research around a sensitive and often taboo topic: stress. The GRIP service model the team came up with represents their flexible PSS approach and delivery, centred around data design. The model supports practitioners throughout the design cycle in adapting to the emerging needs and insights of stakeholders, and helps them to define the roles and outcomes of design, not only at the start of the project, but also during development. Using this model, GRIP team members worked together with Philips and GGZE to design and refine a real solution for well-being.

The Relaxation Space is an installation that helps people reduce their stress levels through soothing lights and an interactive ambient soundscape. The concept has gone through several iterations and has been tested at several locations. The insights from these evaluations were used to improve the Relaxation Space, but also to adapt the service model. The Relaxation Space offers a first important step towards a healthier and happier Dutch society. A new mobile version of the Relaxation space, called the Room for Inspiration, was recently presented at the Salone del Mobile in Milan. It's projects like these that again prove that transforming your knowledge into something that people can touch and experience is a great way to stir up enthusiasm and create commitment.

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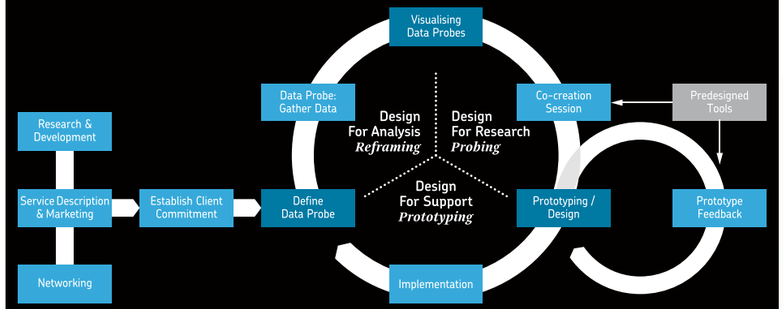
READ MORE ABOUT THE RELAXATION SPACE AND IT'S STRATEGIC VALUE



Designers (dark blue) and all stakeholders (light blue) alternate in taking central roles.

Is it a service? Is it a course? It's Super-Maker!

When Océ – Technologies B.V. introduced its elevated printing technology, they faced an unexpected paradox. The new technology delivers output never before seen: everyone wants to touch the elevated print samples to test their eyes.

However, the increased number of choice makes it difficult for people to choose. How can customers know what they want if the available samples hint at possibilities that are beyond their imagination? How can a designer use a design tool unlike any other if the possibilities of a technology are only partly understood?

Karianne Rygh of Design Academy Eindhoven worked together with Océ and the Delft University of Technology in a joint effort of the PSS 101 and CASD projects to come up with a new approach: the Super-Maker method.

Karianne hosted a series of multi-stakeholder co-creation workshops, inviting architects and students to come up with new application directions. Océ, rather than supplying a user manual, actively took part and introduced participants to the new technology, training and equipping them with the necessary skills to design and produce elevated prints while at the same time co-creating the possible outcomes. During the series of workshops, sample prints were produced on-demand, which helped the ideation process tremendously.

Perhaps even more importantly, the Super-Maker method itself was prototyped to determine how to co-create applications if the stakeholders and the available technology are new to everyone involved. This opened the way to the design of a process whereby Océ can roll out this method to co-create the technology with actual customers and their print buyers.

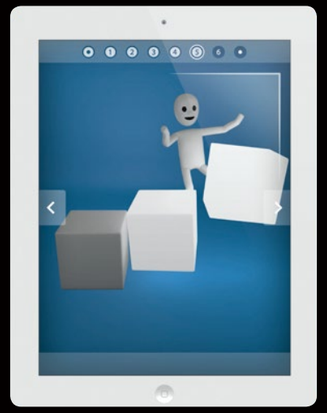
This open and collaborative approach represents a great example of what can happen when industry meets design research, and how design research can help demonstrate a technology's relevance.

Super-Maker exhibition during the Dutch Design Week 2014.

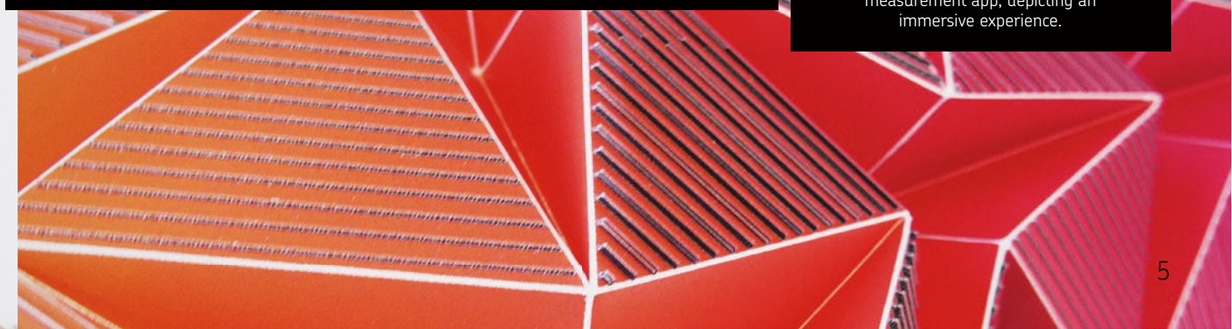
Apps to measure

The Intelligent Play Environment (I-PE) project sought to answer how we should design interactive playgrounds to motivate social and physical play. Interactive playgrounds only motivate social and physical play if they help create the right experiences. The I-PE apps are simple tools which measure the evoked experience. The apps were first presented to the public during the Design Review Session at the Dutch Design Week in 2013, and the responses were overwhelmingly positive.

The mirror app shows animated puppets which express experiences through movement and sound. With the mirror app, developers can measure experiences quantitatively (e.g., for benchmarking), while with the photo app, people can take pictures of installations, verbally describe how they experienced the installation, and indicate in the picture what parts of an installation evoked their experiences. This qualitative information provides detailed insights into players' experiences, and helps us better understand these experiences, which is vital for a redesign.



A still from the 'mirror' experience measurement app, depicting an immersive experience.



It's all about the people

The success of CRISP is to a great extent due to the people involved. If we had to choose two that convey much of what CRISP is about, two extraordinarily talented people, it would be Marina Toeters and Steven Fokkinga.

Marina has an ability like no other to connect technological developments with the softer side of fashion. She is a creative professional and designer, but also actively shares her knowledge with students at three institutions: Saxion, HKU, and TU/e. Many of the recent projects in fashion innovation would not have happened if it hadn't been for her ability to spot crossover opportunities. She is a prime example of the human capital of CRISP. With CRISP, she was given a platform to share her insights with a broader audience than fashion alone.

Steven Fokkinga presented his paper "From Goal to Means: Shifting the Use of Emotions in User-Product Interaction" at the IASDR conference in Tokyo in 2013.

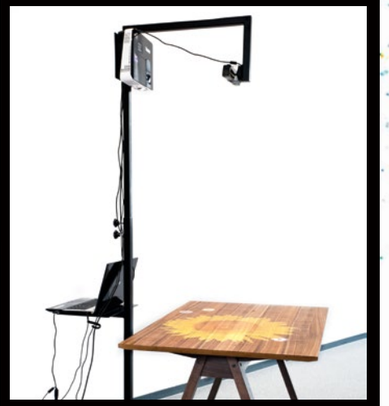
Marina Toeters presents Spine Dress, one of the CRISP results.

As a PhD candidate of Industrial Design Engineering at Delft University of Technology, Steven uniquely manages to combine experimental studies with design-inclusive research. His first conference paper won him a best paper award, and since then he has published articles in many high-ranking design journals, such as Design Issues and International Journal of Design. While still a PhD student, he even served as Guest editor to a special issue of the Journal of Motivation, Emotion, and Personality, a psychology journal. But his accomplishments are not limited to the world of academia alone: Steven also has succeeded in bridging the gap between academic research and industry. He has worked with the well-known emotion psychologist Agneta Fisher and with businesspartners like KLM and Unilever. As discussed in the previous magazine, Steven has also brought together research and design practice in his collaboration with Sara Ferrari for Alessi. He is idiosyncratic in his thinking; instead of people telling him what to do, he formulated and initiated his own research topic: the use of negative emotions to improve product experience.

Active Cues

Many elderly people suffering from dementia also suffer from apathetic behaviour; they have lost the ability to take initiative and rarely start an activity unprompted. Active Cues, developed by PhD student Hester Anderiesen, is an interactive Product Service System to help these elderly people. It consists of an installation that projects interactive games on a coffee table, motivating the elderly in care homes to engage in physical and social activities. The elderly can play games using their hands and by moving their arms. The combination of light cues and virtual objects that respond to their touch stimulates them, creating a lively and positive atmosphere.

But the elderly people are not alone; everyone who uses the installation is struck by the unexpected WOW factor. When we first discussed the Active Cues project in the second CRISP magazine, its future after CRISP was still uncertain. Anderiesen has worked together with game design company Monobanda to take the product to market and, on March 11th 2015, the first installation was presented at Viattence, a care facility, in Heerde. This start-up success is something that we couldn't have predicted when we began CRISP, but it sure is welcome.

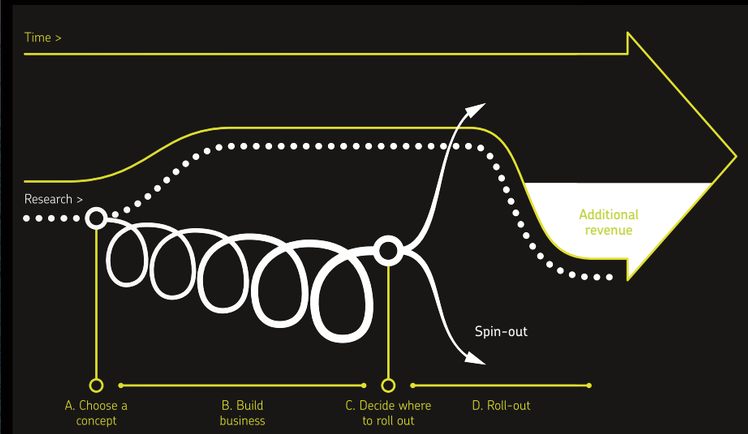


Interactive projected flower that grows when you touch it.

Organising a model

One of the goals of the PSS101 project was to develop tools for networked collaboration by starting with a need from day-to-day practice, but have those tools also be firmly grounded in scientific practice. One such tool is the disruptive innovation model, which describes phenomena experienced across several industries, and identifies factors to improve the process of disruptive innovation. People often assume that an idea from the research phase is introduced directly in a mainstream organisation and that it will generate substantial results shortly after introduction. In talks with several organisations, members of the PSS101 project time and again came to the same conclusion: having great ideas is simply not enough. People may have great ideas, and these may be picked up in the organisation with enthusiasm, but many perish along the way.

In sharing their experiences and case studies, their failures and successes, the project members noticed several similarities even though they came from different backgrounds and sectors. From these insights, they sketched a model to capture the messy reality of disruptive innovation.



A new concept (A in the figure) requires considerable validation before it matures into a measurable result. A dedicated group needs to build a business around the idea (B), which in the short-term will bring costs with it to the organisation Once the idea is proven to a sufficient degree, the organisation then has to decide whether the product will become part of their product portfolio, or whether it becomes a spin-out. Rolling out the new concept will hopefully generate additional revenue, but this may take longer than initially expected, as part of the organisation may need to be reformed.

CRISP in academic journals

In essence, CRISP is a scientific programme, which means that, besides the many theories, prototypes, start-ups, and other output, its researchers also share their insights through academic articles. Where some authors automatically resort to dry discussions of abstract issues, Damon Taylor succeeded in having an article published in Design Issues that instead rewards the reader with a stimulating and inspiring vision that points to ethical considerations. Ethical considerations that we may talk about from time to time, but have yet failed to incorporate in our design practice. His article, 'Spray-On Socks: Ethics, Agency, and the Design of Product-Service Systems,' uses two hypothetical sock PSSs to discuss the implications of designers' choices, seemingly prescient of the ambitions of the follow-up programme, CRISP 2.0, Paul Hekkert discusses further on in this magazine. The article argues that as the attention of designers shifts from product design to the design of experiences, they no longer design a neutral object but increasingly design for a value-laden idealised situation.

UNDER THE SURFACE

CRISP'S HIDDEN THEMES

Jeroen van Erp & Kees Dorst
On behalf of the Executive Board and
the International Scientific Board

Wondering about the results of CRISP? Longing to dive into the outcomes of the eight projects? Watch this! We have taken CRISP to a higher level and discovered four overarching themes: *designing relationships, orchestration, embracing complexity, and strategic value*. Call it serendipity if you want; in our view, these are the future themes of PSS research!

In the past four years, the Creative Industry Scientific Programme has explored how we can create knowledge that will help creativity assume a more strategic role in service innovation for society and the economy. We started the eight projects to stimulate synergy between the two traditional paradigms of product design and service design. But in designing and researching PSS, we found ourselves on completely new ground. About a year ago, we began to ask ourselves, "Can we capture this? Can we find deeper themes that transcend these projects?" To answer these higher level questions, we organised creative sessions where we zoomed out in search of the most relevant, overarching CRISP lessons on PSS design.

These four overarching themes offer up fresh perspectives on PSS design. Enjoy reading CRISP's epilogue.

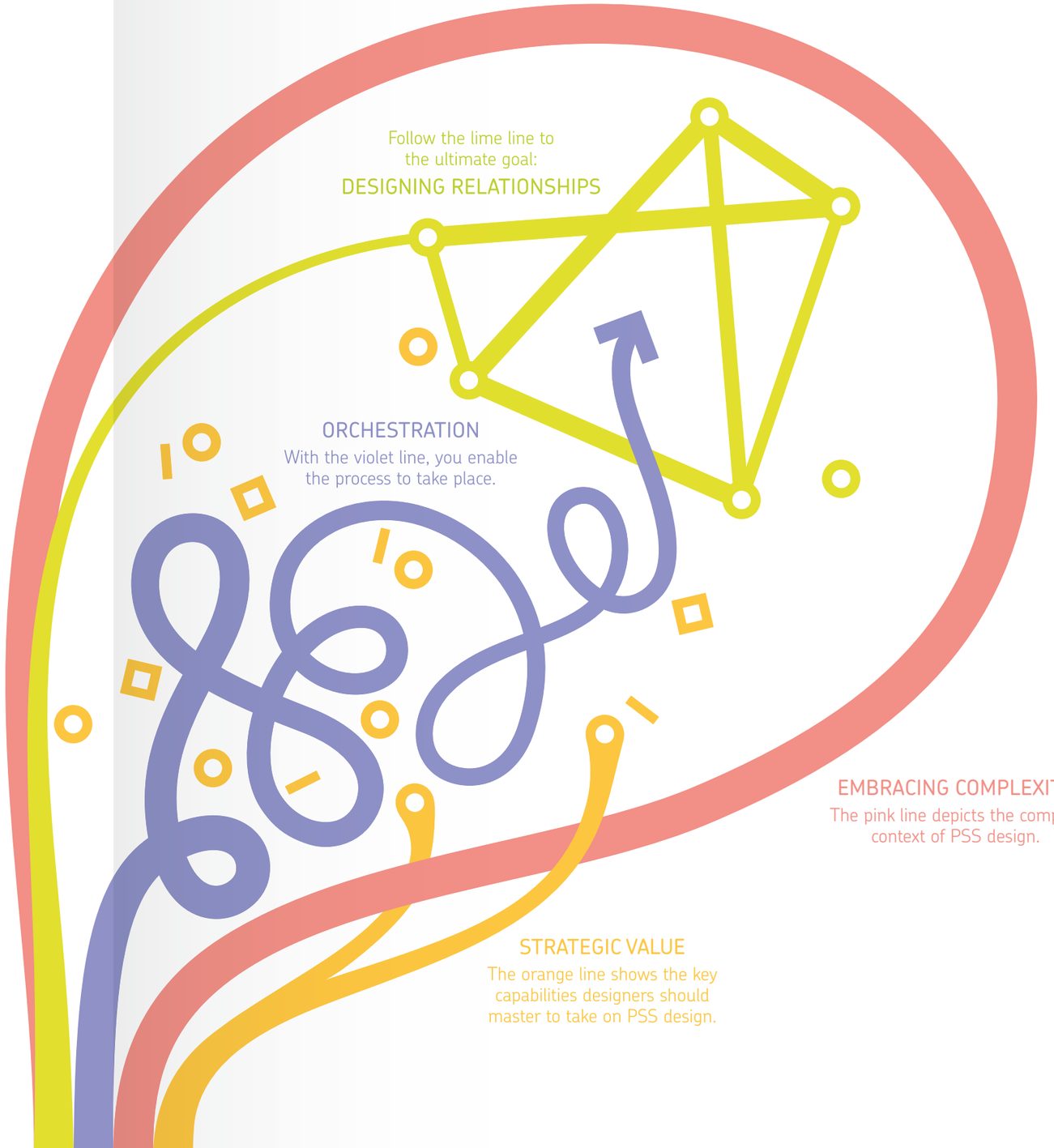
As we dived under the surface, we discovered four intriguing common themes and took the opportunity to dive even deeper. When CRISP started, the word relationships didn't seem to be relevant. However, after four years, it became clear that, across the eight projects, a PSS is all about maintaining a relationship between the user/consumer and the provider. When we defined **designing relationships** as a theme, it felt like we had hit a research goldmine.

We all recognise the problem of multi-ownership in PSSs. They are networks! Gradually, it became clear that the system only works well when every player in the system reads the same score. **Orchestration** is the term that emerged from our discussions and this became the second of our four themes.

We noticed that the extreme complexity was an important factor determining how PSS design works. Trying to overcome complexity through forced attempts to simplify things, for instance, led to frustration. The only way forward is to acknowledge and accept the intriguing dynamics of PSSs. This led to the theme of **embracing complexity**.

Initially, we thought that 'strategy' and 'value' in all their aspects were the sole domain of the CASD project; the acronym stands for Competitive Advantage through Strategic Design. That proved not to be the case. In other projects insights also emerged that contributed to this field. **Strategic value** is the fourth of our broad themes and is part and parcel of all CRISP projects.

FOUR LINES TO CONCLUDE OUR STORY



DESIGNING RELATIONSHIPS

CECI N'EST PAS UN PRODUIT

As we move from mass-produced, one-size-fits-all products to personalised, adaptive, and evolving Product Service Systems, the design deliverables take on other forms. **In this section, we look at 'what comes out of the box when the user unpacks what they paid for', and reflect on the new results that design should bring.**

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Thanks to
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A brief for a product-service system differs greatly from the traditional design brief for a 'four-legged chair with armrests' that you buy, take home, and use. In many ways, designing a PSS is like enabling evolving relationships. Based on the learnings from the CRISP projects, we have noted four factors that play a key role in enabling these relationships:

MORE TIME

The use of most chairs is quite straightforward, sitting on them is most often thought of as a single, timeless action. On the other hand, a relationship often starts with a first date, after which more encounters happen, either brief or long. And, as your perceptions may change, you experience them differently over time.

The Skewiel bus service that was designed as part of Grey-but-Mobile delivers its value through the interactions between the elderly and the driver that extend over a longer time span. Unlike the chair, a single photo of the bus, or the interface through which the service can be booked, such a single picture tells you very little about how people will actually use the service, and how they experience the benefits over time.

MORE GROWTH

Once bought, the chair is yours to keep and maintain. Typically, it will remain the same. In a relationship, your next encounter will not be the same as the first date. If the relationship doesn't evolve over time, you will probably experience that as a bad thing. Someone's first trial of the bus service may only be focused on getting from A to B. On repeated trips, the traveller may learn that not only are drivers kind enough to help you enter and exit the bus, they are also good company during the trip — open for a chat and a laugh, and happy to exchange tips on interesting things happening in town over the weekend. This social element may prompt you to recommend the service to your friends, and may impel the service provider to extend the service to better support this social element.

These two pictures tell very little how the relationship between volunteer driver Frits, his Skewiel Mobiel and Gerwin Sjollema developed over time. The companionship, the assistance and the chit-chat on their weekly Thursday drives has so much more value than a product-service system that improves the mobility of elderly people.

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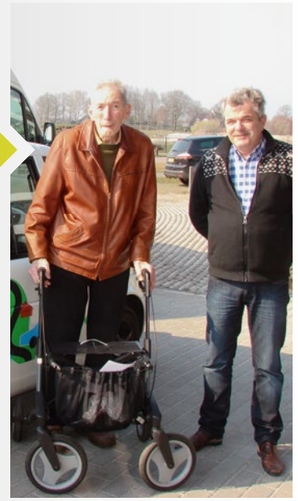
EMBRACING COMPLEXITY

Knowing what "more people" should be included, and then being able to include them in the process, adds to the complexity of PSS design.

MORE PEOPLE

When you buy a chair, you can sit on it, or let your guests sit on it. When you enter into a long-term relationship, it affects your other relationships, e.g., your family. You don't typically introduce a chair to your parents.

Designers have been looking beyond 'the thing' for quite some time. Interaction design and experience design place the activities and emotions of the user on centre stage, repositioning the products as props to support the action. However, most work has remained focused on the individual user, how they 'pushed the buttons on the machine' and reacted to the roller-coaster ride that they received in return. We must now, repeatedly, not just consider the primary user, but the people that are part of the service provided e.g., front-office workers, back-office workers, but also family, friends, and further social network. Without those others, the product element of the PSS would be a very limited thing indeed.



MORE FRAMING

For the user, the chair is good for sitting in, and unless they're really into chairs as such, that's pretty much it. But for someone in a relationship, their perspective evolves with the experiences in the relationship. Being in a relationship affects how you think about friendship, about care, trust, and the implications of breaking up. One challenge is to design a PSS so that it 'survives' its initial and often limited encounter. Another is how to design, or frame, what it can be, if it needs time to evolve? The extensions described here d on't come on their own. The measure of success of a PSS is often defined beyond the product. Is the bus service a success when the user can book a trip without error and manages to get from A to B? Or when it triggers the desired behaviour by the co-travellers? Or when it enables a more sustained social exchange between the elderly and their helpers? Or when this behaviour change is also beneficial to others passengers in the bus? Increasingly, the latter is the object of PSS design.

Now, is this new? Haven't we seen this all before? Wasn't it in the 60s that we said the design brief is 'get me something to sit on' instead of 'give me a four-legged chair with back support and no armrests'? Yes, and no.

NO MORE CHAIRS

Yes — the designer of a good office chair considers how long the worker has to sit on it; graceful aging has occasionally been considered in fashion, architecture, and product design; the impact of a throne on bystanders is a major design criterion; and marital beds have been designed to promote a happy relationship rather than merely enabling comatose sleep.

But, emphatically, NO — these things did not receive attention as systematically as they should have, because PSS design tends to turn things that are quite well-accepted upside down. Deep in our hearts, we often still consider functionality as primary and experience as a desired, but rather secondary, symbolic outcome. But with PSS design, the experience or user journey becomes the major outcome. In other words, functionality is defined in terms of experience. These constructs can no longer be seen separately. In the bus service example, it is just as much about not feeling alone or struggling to cope, as it is about getting from A to B. Other PSSs can be about feeling close to a loved one, rather than about just having a new smartphone. Or they can be about having a nice Kaffeeklatsch, rather than the latest Vitra craze. Or, they may be about the meaning of things to me in my daily life, rather than about impressing neighbours, being cool, and endless consumption. It's about well-being and not just welfare. The real value of a PSS is in its use. If it is not used, it hardly has any value, which is different from products. In PSS design, we don't design chairs anymore: we design and enable relationships.

MORE TIME

JUST SIT ON IT

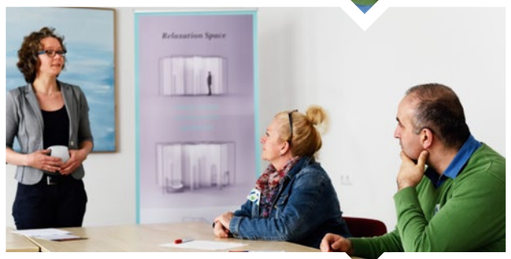
Today we think of interaction as a journey, not a moment in time. The glorified object presented on a white background has been replaced by blueprints of entire customer journeys and their possible ramifications, forcing us to pay attention to the times in-between the touchpoints: the anticipation, preparation, memories, and repeat helpings.

The insight of the longer timeline emerged from the GRIP relaxation space. At first, the designers had focused on the experience of relaxation in itself, i.e., the experience when the user is in the relaxation space. Gradually, it became clear that the location and time that the service was offered, the place of the space in the building, and the social organisation of work there were essential in defining and optimising its offering. The 'before' and 'after' became an essential part of the relaxation space concept.

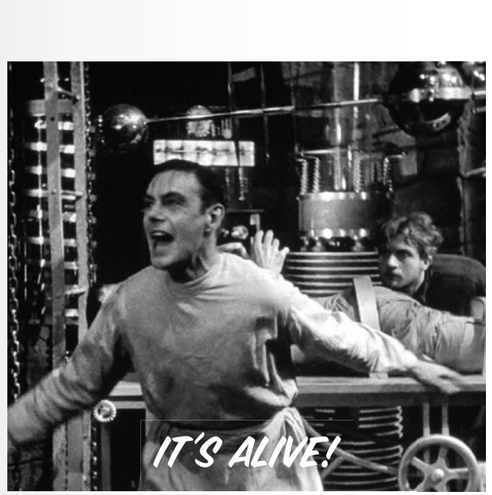
Many services come in the form of a subscription, a soft lock-in of the customer into a stable relationship with the provider, by means of a loyalty to a service or a brand. This lock-in has become an explicit criterion for success for the design brief.

The importance of stable, repeated use became apparent in G-Motiv; the Wuppermann factory now has displays installed that continuously visualise the workers' role in what was being made. The goal here was to create an awareness and social attitude of being involved in and responsible for the production. Whereas the facts could be recognised immediately, the changes in attitude and behaviour only become apparent after prolonged use of the tool.

Product design has a tradition of products on plain white backgrounds. With a PSS, this does not help the viewer to understand what the PSS is or has to offer. The essence of the offering is no longer a static thing, and it grows through usage. Time-spans enter the framework at different levels, from journeys of individual customers to the evolution of the service after its initial release.



The location and time that the GRIP relaxation service was offered, the place in the building of the GGZE and the social organisation of their work were essential in defining and optimising its offering for employees and clients. The 'before' and 'after' became an essential part of the relaxation space concept.



MORE GROWTH

IT'S ALIVE!

Services and PSSs come in iterations and versions

In G-Motiv's ActiveCues table, the users at Careyn who participated in co-creation got to use the tool first. As such, they proved its viability, so that potential business partners could witness what they'd buy into before the service was released to a larger target group.

The robot-care project Selemca found that users needed time to become familiar with a PSS and that its potential is only realised after hands-on experience. This leads to improvements and additional functionality to be addressed in new versions of the design. Johan Hoorn: "Ideally, some kind of 'optimiser-designer' should keep track of these progressive user insights, and thus be embedded in the PSS. The provider could offer this as a unique selling point, or comparably, as a service contract: an optimisation contract."

For the relaxation space developed in the GRIP project, each prototype was a further step in the transfer of the PSS from designers to other stakeholders. The first relaxation space was developed internally at Philips, allowing the company to use the functionality at its own discretion; later prototypes facilitated further research and development by GGzE and were designed to attract additional partners interested in the design of tools to make the space more interactive. Dirk Snelders: "Because so many interdependent parties are involved in its continuous development, there might be a feeling that PSS design is 'unfinished business'."

Unlike products, PSSs evolve over time. A product life cycle can be separated into clearly defined sequential milestones (e.g., design, production, introduction, purchase, use, disposal), and the 'design' was finished on completion of the production. A PSS, however, follows a more organic growth path: PSS prototypes might be placed on the market as beta versions, production of service elements takes place during use, and upgraded versions don't require purchase or disposal. That means that the design phase doesn't end with the release, or, to phrase it in software terms, the service can stay 'forever-beta'. The line between development and use has become blurred. This requires new insights into how to decide whether the design of a PSS is 'finished', or good enough to be 'let go'. The time scope of design has substantially broadened, which raises the question: how can we anticipate and manage the further development of the PSS after this moment?

MORE PEOPLE

TWO'S COMPANY, THREE'S A CROWD, MORE IS A SOCIAL NETWORK

When you enter into a relationship with another person, you soon realise that they come with their own ties to people and things. You cannot get away from the fact that you need to consider and **involve the other's friends, parents, colleagues, or car, house and other things.**

The two CRISP projects 'Grey-but-Mobile' and 'Smart Textile Services' illustrate the relevance of these multiple relations and how they are dynamic, conditional, and heterogeneous.

More people in the picture

When Martijn ten Bhömer designed a smart textile product to stimulate physical activity in the elderly and users suffering from severe dementia, he soon realised that more people were involved than just the patient. The first prototype, an interactive blanket, had to be used together with the physiotherapist, as part of the physical therapy. When the project moved on to implementation and testing of the prototype, family members also were involved. First they had to give consent, but their role quickly changed when the husband, for example, used the blanket to communicate with his partner. The second prototype, Tactile Dialogues, was designed to stimulate this communicational aspect through interactive tactile features. In the evaluation, it became apparent that the real empowerment came for family members and carers visiting the patient. Often such visits come with awkward feelings, due to the alienation of patients with severe dementia from their partner, children, and other carers. By tailoring and personalisation, and trying and testing, these groups could better deal with this situation.

Family members appreciated this opportunity to personalise the behaviour to fit to the specific conditions of the visit, for example, setting it to react to touch more quickly, more slowly, or more playfully.

In the case of Grey-but-Mobile, the elderly travellers expressed what they valued in the implementation of the service. It wasn't that they were brought from A to B by an electric vehicle. The real value was that their driver stayed with them, walked them to the shop, and helped with carrying the groceries. These drivers were all volunteers, recently retired, and drove the elderly around without any financial compensation. In roundtable talks, they explained how relevant and useful they felt, trying to make a difference to the lives of the elderly people in their community.

From solving a problem to exploring, establishing, and maintaining relationships

On first impression, both designs seem to focus on solving problems, i.e., the difficult communication with dementia patients in the Tactile Dialogues project of Martijn ten Bhömer, or the limited mobility of elderly people in the Skewiel Mobiel project of Grey-but-Mobile. Both design teams, however, would now argue that designing a PSS is about more than solving a problem. The focus of the project is on establishing an infrastructure that services social activities, through which relationships are explored, established, and maintained. It turned from solving typical problems of dementia or mobility into creating more opportunities for social exchange and feelings of closeness.

BUYING A PSS IS MORE LIKE BUYING A PET THAN BUYING A THING

As an extension to the PSS of Tactile Dialogues, an additional social activity was introduced where family members and professional carers analysed the video after the visits. In these sessions, the professional could point to specific details in the interaction, revealing to the husband that his interaction through Tactile Dialogues indeed triggered an emotional response from his wife. These sessions not only inform family members about dementia in general, but also make clear the specific condition their loved ones are in. The combination of visits with Tactile Dialogues and the review of those visits through video with the professional help family members to establish communication in the lost relationship with their spouse or parent.

CASD researcher Ana Valencia reached similar conclusions on the importance of social relationships when designing a PSS. Through interviews with designers and users and several smart-PSS case studies, Ana identified seven key characteristics that designers should take into account for designing smart-PSS — but also PSS in general — that can deliver meaningful user experiences. For instance, Ana found that designers should think about the extent to which a smart-PSS should offer an individual experience or a shared one (or both, like in the gaming industry). And in relation to that, designers should consider to what extent a smart PSS should create a community feeling among its users and stimulate long lasting relationships that go beyond the smart-PSS usage moments.

In Skewiel Mobiel, more was needed than an electric vehicle and a driver to solve the mobility problem of elderly people. Discounts were offered with local shops in the community to "lure" users into trying out the system. Volunteers were acquired through mouth-to-mouth, locally distributed leaflets, and through the network of the service provider. The elderly users developed relations with the receptionist who booked the services. He knew the clients and their preferences. Because of the rather fixed weekly routines of both clients and drivers, similar people saw each other quite often. This helped in shaping more tailored services between drivers, clients, and the local community.

These insights about the involvement and value of indirect users only came about when the PSS was implemented and further evaluated. None of these insights could have come from brainstorm sessions, stakeholder analysis or imagined customer scenarios alone. For PSSs to realise their full potential, they need to be implemented, and then nurtured and allowed to further evolve.

How complete must the implementation of a PSS be to enable unknown effects to be known?

DESIGNING A PSS IS MORE THAN SOLVING A PROBLEM FOR THE END-USER. A PSS CREATES OPPORTUNITIES FOR SOCIAL EXCHANGE

Tactile Dialogues was designed to stimulate physical activity through interactive tactile features. In its evaluation, it became apparent that the real empowerment came for family members and caregivers being able to communicate again with the person suffering from dementia.

Together with the physiotherapist, the blanket's behaviour can be personalised to suit the specific conditions for the visit, for example, by setting the interactive vibro-tactile features to react to touch more quickly, more pleasantly, or more playfully.

Husband and wife communicate through Tactile Dialogues to re-establish their lost relationship.

The PSS of Tactile Dialogues has an additional social activity where family members and professional caregivers analyse the video after the visits. In these sessions, the professionals point to the little, yet important details that reveal to the husband that his interaction through Tactile Dialogues did trigger an emotional response with his wife.

MORE FRAMING

TAKE A BROADER VIEW ON THIS

So, if a PSS has multiple forms of manifestation, evolves over time, and relies on the various people involved in it, how then should we communicate what it is, and what it has to offer?

To convey these aspects, a PSS requires an expressive language; one of PSS design's key challenges is to establish new frames for this. In addition, PSS design often means taking different perspectives on what is offered to whom. This means that PSS design also needs to communicate the consequences of multiple parallel frames.

In the case of G-Motiv, it's tempting to present the game as the result. But what has really been designed is the impact of the game, or, as Valentijn Visch puts it: "The result of a PSS is what we call the 'transfer effect': this can be anything from an awareness about something to a behaviour change, a more intense social relation or an information exchange. A game is a means, a tool to achieve this effect. By means of gamification, we change the experiences of the user, and this in turn should change the user in some way, for example their attitude or, compliance." Change is the objective of the PSS design, the game forms only a potential means — one among many.

Telling the story

Ideally, a PSS's representation should address both means and desired outcome, while at the same time showing interaction over time and the roles of the various people involved. This may sound ambitious and in conflict with the intended clarity of the message. However, if a white-background catalogue picture is worth a thousand words, a simple cartoon-like scenario board can often multiply the explanatory power, creating a narrative by introducing time. Blueprints can also be valuable, as they allow for additional layers: interaction schemes, stakeholder roles, front-office and back-office organisation, etc. Eloquence further increases when using video as a medium: a makeshift movie clip can do its own talking. In Smart Textile Services, video was often used to communicate the different stories or values of the Product Service System, as well as to explain the actual workings of its different components.

No matter what exact format is used: time, context, and outcome are essential. Put a PSS on a pedestal and these disappear.

Creating new categories

Compared to products alone, PSSs have a wider range of opportunities when it comes to fulfilling needs. As a consequence, the solution they provide might be hard to classify: it often doesn't fit existing categories. Careful positioning of the envisaged result is needed to manage expectations, inspire stakeholders with a proposition, and establish its future relevance. Early on in the Selemca project, the team struggled to grasp and communicate the potential usages and benefits of their new care robot. The confused responses from their initial audience of potential stakeholders taught them that they needed to position and further develop the care service around the robot in a real-life context. In so doing, they were able to craft the service concept in a more meaningful way. Framing a PSS in a social embedding turned out to be a critical success factor. If this is not there, it can be an innovation killer. The team then organised 'design for a dilemma' sessions that helped stakeholders to empathise with perspectives on care that differed from their own. In this way, they were able to overcome stereotypes about robots that constrained the initial acceptance of the PSS. This later stage of the project drew a great deal of media attention — and even resulted in a documentary, 'Alice cares', that featured in the Rotterdam Film Festival.

Visualising the intangible

Interaction, experience, behaviour: a large part of a PSS consists of intangible elements. Surprisingly, physical products still play an important role in conveying and shaping these elements. The way we behave, interact, think, and feel while doing something is not independent of the things involved. Even when the result is intangible, its development often requires tangible means. These artefacts, including sketches and early prototypes, enable conversations about the core idea of the PSS and how it could be implemented. In a later phase, deliberately designed boundary objects can help introduce the proposition to a larger audience. When Océ – A Canon Company opened up their new elevated printing technology to designers, they found it was not very helpful to just give out tooling and the corresponding instruction manual. The tools and instructions apparently did not trigger the imagination of what would be possible with this new technology. In PSS101, Karianne Rygh created a broad range of elevated printed samples to explore and convey the opportunity space to designers and others. This succeeded in triggering people's attention, and enabled participants to build on these samples with their own imagination.

Anticipating the potential

An additional challenge is how to frame or express the evolving nature of a PSS. It can be extremely difficult, especially at an early stage of the design process, to show the potential results of what a PSS could become in the future. Within PSS 101, the Networked Collaboration Canvas was developed to connect the variety of activities and the stakeholders involved in a PSS project design in order to improve their collaboration. Recalibrating these connections during the design process turned out to be an important activity, enabling stakeholders to reflect and anticipate on their actions and the corresponding impact on the networked collaboration. A PSS typically follows an organic growth path. Stakeholder feedback is integrated as the PSS is gradually scaled up. Improved versions are released, with ever wider audiences. Ingrid Mulder from PSS 101 likes to call this the "ripple effect", it bridges the gap from the lab to the market. Users who have been involved from the start will be the first to recognise the potential of the PSS. Their evolving insights can then be used to better express the characteristics and future value of the PSS to a wider group of people.

So... how broad should we go?.

THE EVOLUTION OF CHANCE IS THE OBJECTIVE OF PSS DESIGN

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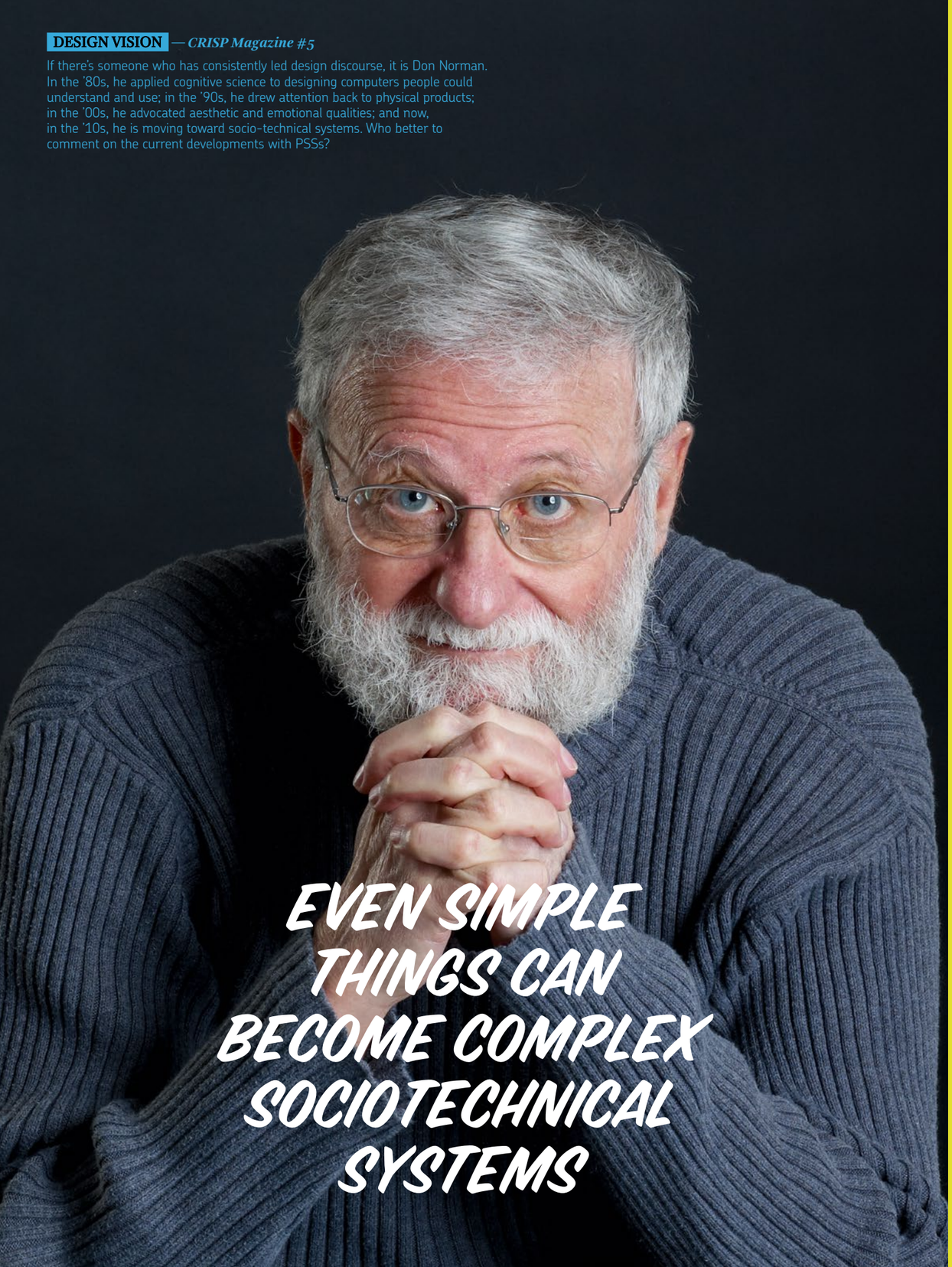
If there's someone who has consistently led design discourse, it is Don Norman. In the '80s, he applied cognitive science to designing computers people could understand and use; in the '90s, he drew attention back to physical products; in the '00s, he advocated aesthetic and emotional qualities; and now, in the '10s, he is moving toward socio-technical systems. Who better to comment on the current developments with PSSs?



A PRODUCT IS MORE THAN A PRODUCT

Don Norman

Today, designers think of systems, of services, and of lasting relationships. Design has moved on from things like chairs and simple systems to larger more important stuff, **working to improve things like those massive, complex, bureaucratic systems that seem suited for no one. It's time for a manifesto!**

Hey — we have one. *DesignX* we called it, put together by a band of kindred souls from Delft, San Diego, Shanghai, and Swinburne. DesignX aims at relationships that might have hundreds or even thousands of interconnections, relationships that can last a lifetime while simultaneously changing with time. It's a worthy cause.

Chairs are mentioned pretty frequently in this issue, so let's consider the poor, lonely chair, once a staple of a designer's portfolio. Even chairs can take part in DesignX, because the 21st century chair might be an active, dynamic device capable of complex relationships.

Imagine how the 21st century chair might perk up when guests arrive, autonomously transforming itself as needed. It can become a stepstool when someone needs to stand on it, or a bed, perhaps formed by enlisting other chairs so that they can support a horizontal body (or two or three). When self-organized into neat orderly rows of its collaborators, the chair can accommodate crowds. While awaiting the crowd's arrival, the chairs are a memory of the future, reminding us of the event that is to come. After they leave, the same chairs serve as a memory of the past.

Modern chairs will be intelligent, anthropomorphic, sensing, dynamic, capable of altering their shape, form, and function. Some chairs might come when called, others might lift people to reach high-up objects, and yet others might socialize with like-minded chairs, forming moving patterns across the room as they travel to wherever they might be most useful. These 21st century chairs are social, aiming to please. They will be active servants, relationship builders, and enablers of social interactions.

In the 21st century, designers will produce many things besides chairs, many of which will not be objects. Some will be services and experiences, such as healthcare and wellness. Some will be ideas. Is an idea a thing, a product, a service? Whatever they are called, they need to be designed, not as isolated things, but as complex, inter-related systems, as total experiences, as relationships.

We design affordances to permit and encourage some activities, anti-affordances to discourage and prevent others. Anti-affordance? Yup, a term I coined for things deliberately designed to prevent an activity, such as barbed wire, or those nasty spikes on the top of fences, or little steel pieces on the edges of walls in public places meant to prevent skateboarders from practicing their grinds and slides along the sides of curbs and railings, preventing those acrobatic, amazing gravity-defying spins and jumps, where the skateboard miraculously follows the feet as if attached, even though it isn't.

Who was it who designed the skateboard that makes such feats possible? I suspect the capability was discovered, not designed, but once discovered, from then on it was designed with careful attention to the details of the trucks, the curvature of the boards, and their springiness. So successful were the acrobatic behaviors these designs afforded, that a new profession arose: designing against those affordances, designing anti-affordances to prevent the very activity that skateboarders love.

Sometimes it feels as if we, as designers, are fighting a duel, so that while we create marvelous devices capable of great intelligence, relationships, and creative expression, others work feverishly to deny these same characteristics. Creative relationships? Yes, all very good, they seem to say, but please, not in my back yard, nor front yard, nor within visible sight or audible distance.

Anti-affordances are one of the tools of the opposing designers. Imagine a chair designed to prevent sitting. Chairs, some people claim, are bad for health: killer chairs, they are called. Sitting is unhealthy, goes the new mantra: stand when you eat, stand while you work, and in the meantime, just stand. So while one community of dueling designers will create masterful, intelligent, shape-changing dynamic chairs that offer comfortable support, others will introduce anti-affordances to prevent that 'unhealthy' comfort.

Today's designers may create ordinary chairs, but increasingly we will all work on more complex things, some as radical as autonomous shape-forming chairs, but others more prosaic yet even more difficult, things such as healthcare, or the way that automated cars might interact with drivers, passengers, pedestrians, bikers, and skateboarders. Even simple things can become complex sociotechnical systems.

A product is more than a product, it is a relationship that drives multiple relationships.

DON NORMAN

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ORCHESTRATION

JAZZ IT UP

Team
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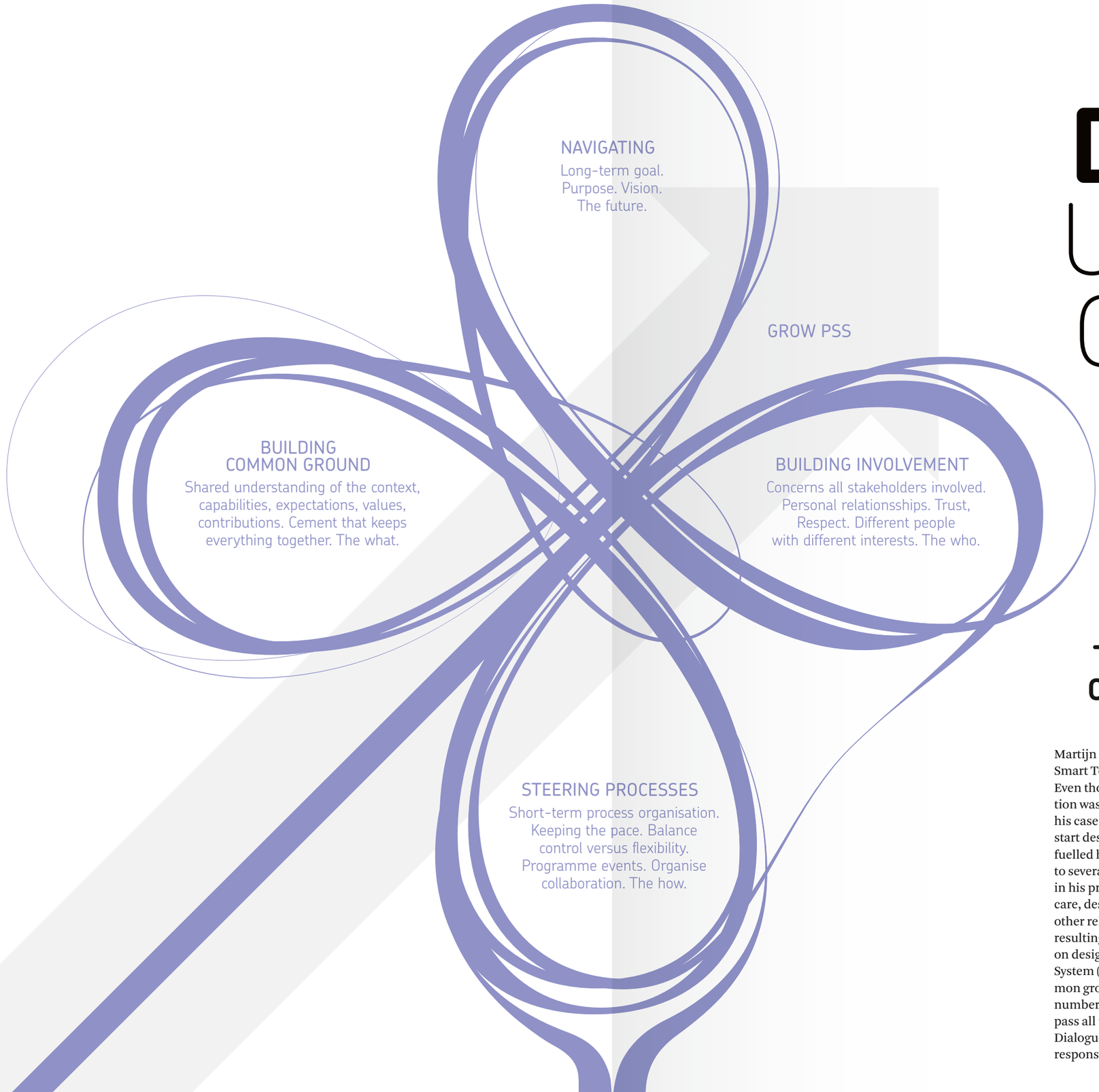
Thanks to
The authors wish to thank the many CRISP partners who kindly gave their time to be interviewed for this article. Your stories were truly valuable and inspiring. Fellow CRISP theme researchers who commented on early versions of this text provided invaluable feedback that greatly contributed to our thinking and writing. Thank you very much for your generosity.



ONE DESIGN UNDER A GROOVE

So many
you can't get around it
So complex
you can't get under it
So diverse
you can't get over it
This is a chance
To orchestrate your way
Out of your constrictions

Martijn ten Bhömer worked on Smart Textile Services in CRISP. Even though the field of application was a known, it was care in his case, it was still difficult to start designing a service. Martijn fuelled his imagination by talking to several stakeholders involved in his project from the fields of care, design, engineering, and other relevant areas. The insights resulting from project meetings on designing a Product Service System (PSS) helped create common ground, and Martijn made a number of prototypes to encompass all these insights. "Tactile Dialogues" for instance is a responsive pillow with embedded electronics. He used the pillow as input for a workshop where the prototype became much more pivotal to the meeting than he had anticipated. The prototype generated many new insights into the possible directions to take with the PSS they were developing. Seeing and touching the prototype motivated the partners in the project to invest their resources much more actively in the project, and through the prototype they were better able to convey the value for their own organisation. What did Martijn do that achieved these great results? →

In another CRISP project, the partners also struggled to get started. A large meeting was organised with partners from academia and practice (at the time many were still strangers) to run through all the tasks and responsibilities, but this failed to set things in motion, although the drinks afterwards helped to make some new connections. It was only when some partners began organising workshops where everyone worked and explored together that involvement was created and things began to roll. Why was this start so difficult?

These stories are not unique in CRISP, and probably not outside it either. The sheer complexity of designing Product Service Systems (PSSs) with collaboration across disciplines, across organisations, and across products, services, and systems can be overwhelming. Yet this complexity is not uncommon. Today's PSS designers often find themselves in these complex situations; there is even a typical design word for it: wicked problems. Embracing complexity and wickedness is then more fruitful than denying it or trying to simplify it, as we have learned in CRISP and as argued in one of the other themes of this magazine. This section is about the function of orchestration in PSS development, as networks evolve over time with ever changing participants and goals.

Orchestration

Orchestration has become a term for the CRISP community, one that helps us understand which activities take place in the PSS design process to align collaborators, to achieve and maintain harmony between them, and to sustain this 'while the music plays', responding to whatever happens in the orchestra or the world around it.

To better understand Orchestration as an activity crucial to PSS design in networked collaborations, we harvested knowledge from the CRISP projects, and several patterns emerged from the collection of stories.

Beyond design process and discipline

Two things became clear early on while we harvested knowledge, and they did not make the task of understanding Orchestration any easier. Firstly, the nature of the activities that, together, constitute Orchestration prohibit us from describing it as a design process in itself. Design processes are models of how designers proceed towards results. Models do exist for diverging and converging design iterations, for instance for parts of PSS development, but not for the entire activity. ➔

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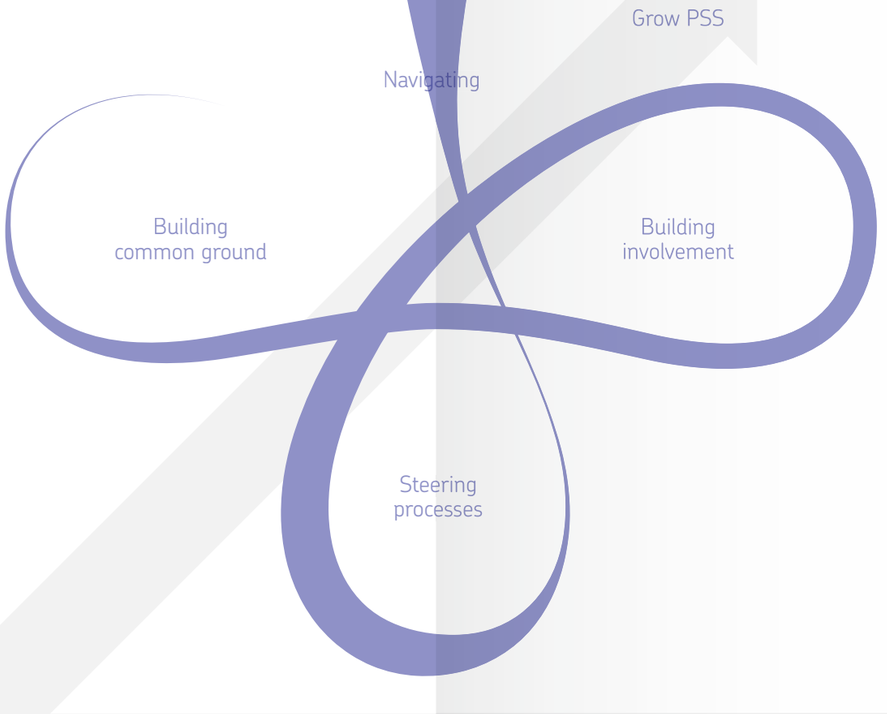
EMBRACING COMPLEXITY

Simplification is not an option in orchestration, instead you should embrace its complexity.

EXAMPLE

NOTHIN' CAN STOP US NOW

Oscar Tomico, project leader for Smart Textiles Services (STS), had to bring twelve partners from industry, academia, and the cultural sector together, more than thirty people in all. Early on in the project, he organised a meeting to *steer processes*, where participants had to present themselves and their interests in STS as a way of getting to know each other. He assisted the participants when presenting themselves in the best way possible, because he wanted to bring everybody to the same level. Everybody got their say, nobody could lean back or hide in a corner, and as a result, people started to connect (*building involvement*), and understood each other's contributions and expectations much better (*building common ground*).



LIKE THE INFINITY SIGN, ORCHESTRATION IS A BALANCED RELATIONSHIP, A CONTINUOUS MOVEMENT

There is nothing that describes how a network of collaborators comes together and stays together. In that sense, the activity of Orchestration is beyond the design process as we know it.

Early on, we also found that Orchestration is not a discipline, like design, nor is it a sub-discipline like interaction design. As an activity, it can be done by people from different backgrounds, and different disciplines can contribute to successful Orchestration, as we shall see. As such, Orchestration lives between disciplines, rather than being part of a single discipline. Orchestration is as much beyond a discipline as it is beyond process.

The flow of four principles

Four connected principles of Orchestration emerged from the CRISP experiences and stories about PSS development: Building common ground, Building involvement, Steering process, and Navigating. These are all activities in themselves and Orchestration is the activity that keeps these other four moving, connected, and in balance. Orchestration is a perpetual movement in PSS development that progresses towards the result, a PSS that is delivered and used, and even beyond, because a PSS is never finished and evolves over time. This can be visualised as a continuous movement that makes the PSS grow; it can make it fly.

Building involvement

A crucial Orchestration activity is building involvement among the participants in PSS development. The people involved often represent larger organisations, and each individual typically plays an important role. Successful collaboration relies on personal relationships and on the trust between them. Where no such relationship exists, Orchestration can help build these relationships and get the stakeholders that are needed for the PSS on board. "Good orchestration," according to Dirk Snelders and Evelien van de Garde-Perik of the GRIP project, "helps to create trust and keep it, and thus creates self-confidence with and between participants." They mention that two levels of trust must exist; level 1 between the individual participants in the network and, level 2 between each participant and their organisation, that after all has to deliver on the promises of their representative in the collaborative network. This is not to suggest that everyone stays on board from start to end. We observed some stakeholders leave the PSS development halfway, or individual representatives from organisations being replaced. If there is no alignment of values, contribution, or expectations, people quite naturally drift apart. New people might also enter halfway because new skills or resources are needed to develop the PSS. These new participants then need to be involved as they become new collaborators and are much more than 'mere suppliers'. ➔

FOR ALL FOUR PRINCIPLES, **DESIGN SKILLS CAN PLAY A VITAL ROLE**

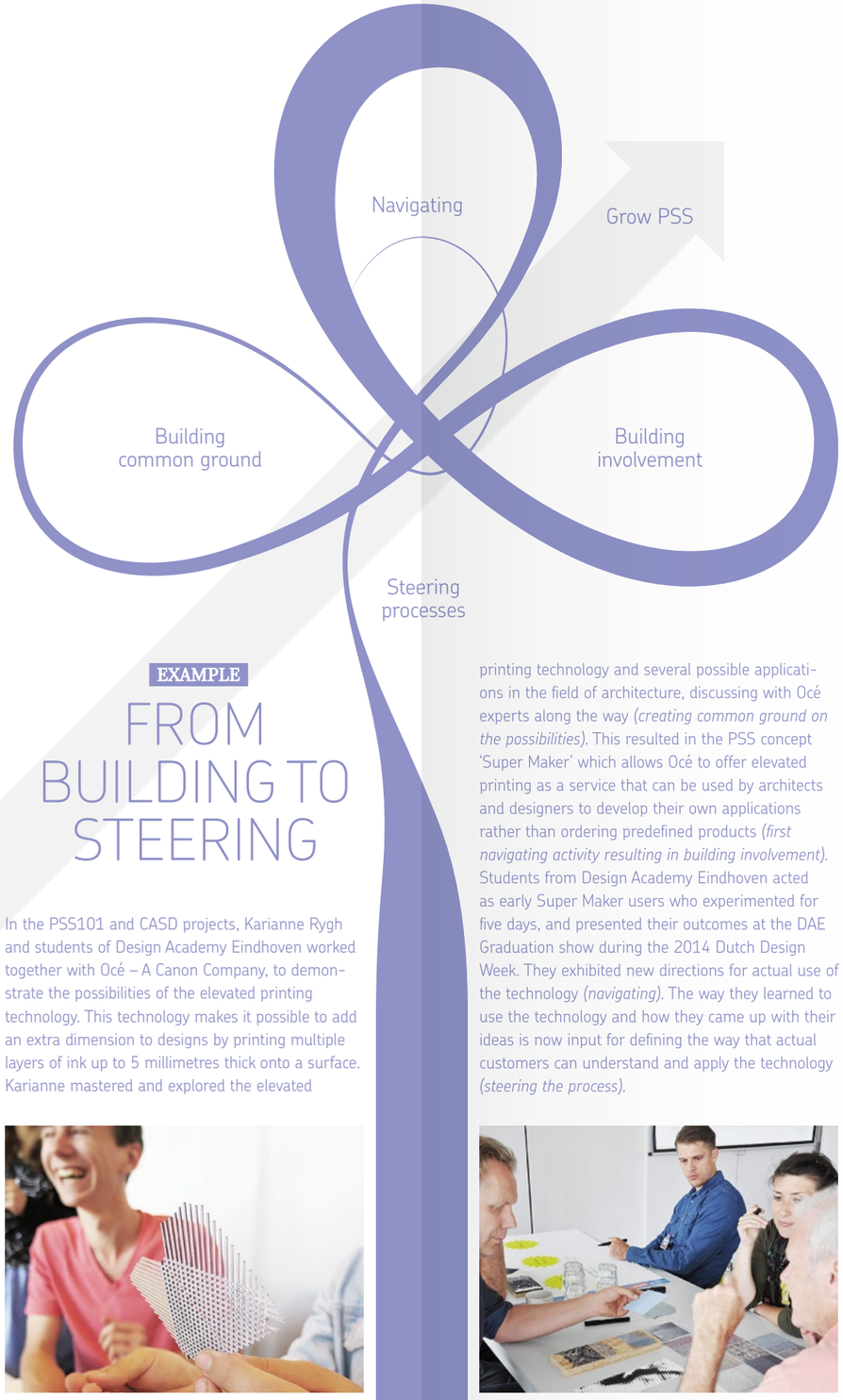
"Each change in the orchestra requires a new orchestration, building new relationships and trust for each new member," noted Dirk Snelders and Evelien van de Garde-Perik. Thus, building involvement continues over time. It is not a one-off activity performed only at the start of PSS development.

Building common ground

Building common ground is a similar Orchestration activity, but focuses on content rather than people. This activity is often overlooked or hurried through. When results are due and there is still a lot of development work left to do, it seems a waste of resources to spend time and energy on building common ground between the participants in the network. Aligning all stakeholders through sharing customer insights or discussing brand identity helps to establish common ground as the basis for fruitful collaboration, and this remains valuable throughout the project. Domain knowledge needs to be built, and everyone's values, contributions, and expectations need to be made explicit. This all starts with understanding the situation, as Lu Yuan of the Grey But Mobile project learned, "You need to provide a solid base first by exploring the field, by gathering insights." Gerda Gemser and Bram Kuijken of the CASD project noted in CRISP magazine #2 that it is essential that everyone adheres to the same set of goals. As not every partner has the same goals, creating common goals from different network perspectives, like users' motivation or business goals, helps building common ground. Orchestration needs to ensure that this basis is created, that relevant goals are created for every partner, and that both are shared in the network of collaborators in the project.

Steering

As stated at the start of this article, Orchestration goes beyond the design process, at least in PSS development, through networked collaboration. This does not mean that Orchestration activities are without processes on another level, for instance, when organising a workshop or doing field research. The steering of these kinds of processes is needed to achieve short-term PSS development goals, but the steering is a lot less useful for achieving long-term goals, as the network and the circumstances or context are often too complex and unpredictable to have a clear view of what lies so far ahead. Short-term goals are however more manageable, for instance when the aim is to create a bit more common ground by investigating a certain issue together. "Doing, not talking, is especially valuable during these activities," says Marie de Vos of the PSS101 project, and what is 'done' is often carefully prepared. Still, steering doesn't always mean taking the lead. Oscar Tomico remarks, "Let people feel responsible; they will take it up. The less I do, the better." ➜



EXAMPLE

FROM BUILDING TO STEERING

In the PSS101 and CASD projects, Karianne Rygh and students of Design Academy Eindhoven worked together with Océ – A Canon Company, to demonstrate the possibilities of the elevated printing technology. This technology makes it possible to add an extra dimension to designs by printing multiple layers of ink up to 5 millimetres thick onto a surface. Karianne mastered and explored the elevated printing technology and several possible applications in the field of architecture, discussing with Océ experts along the way *(creating common ground on the possibilities)*. This resulted in the PSS concept 'Super Maker' which allows Océ to offer elevated printing as a service that can be used by architects and designers to develop their own applications rather than ordering predefined products *(first navigating activity resulting in building involvement)*. Students from Design Academy Eindhoven acted as early Super Maker users who experimented for five days, and presented their outcomes at the DAE Graduation show during the 2014 Dutch Design Week. They exhibited new directions for actual use of the technology *(navigating)*. The way they learned to use the technology and how they came up with their ideas is now input for defining the way that actual customers can understand and apply the technology *(steering the process)*.

YOU NEED TO MOVE WITH THE PROCESS, HELPING IT IN THE DIRECTION IT NEEDS TO GO

This, of course, creates a growing shared ownership in the project with the different participants, and leads to building involvement as well, something that is necessary to keep networks stable.
The steering by Behzad Rezaei of PSS101 leverages existing ownership, "Support more initiatives for self-organisation and connection among citizens. Do not take initiative away from citizens."
This shows that several types of steering are possible, and perhaps even needed. Steering can range from facilitating to directing, depending on the partners involved, the initiatives they have taken already, and how far they have progressed in the project, for instance. To achieve the longer term and more complex goals of PSS, something else is needed however, and that is the fourth and last Orchestration activity.

Navigating

Giving direction is very difficult in networked, collaborative PSS development. After all, there is no central overview, nor is there clear network leadership. Insights can be gained over time, and shared goals can be set by building involvement and common ground, but how to get there is another matter. This is where navigating becomes important.
In an ever-changing and complex environment, navigation is a crucial activity to get to that dot on the horizon that is the shared goal of a network developing a PSS. "Envisioning is a great skill to have when navigating," says Giulia Calabretta, project leader of CASD. "Designers bring to the table the envisioning way of working, and activate that capability in other people. (…) Business and technology people also have this capability but they don't use it at the moment of joint discussions or workshops." This kind of envisioning is not just limited to products, or to the content of a project. Navigating can also refer to which kind of activities could contribute to the project, what will be done in workshops, for instance, or what changes could be aimed for with the project.
Jeroen van Erp, Executive Board member of CRISP and creative director of design agency Fabrique, also recognises this skill of designers, "Designers are able to imagine the needed changes, creating trust and alignment of people. (…) Imagination by word and visuals plays a huge role while orchestrating during the conceptual phase where creativity acts." But he has also spotted a weakness in designers when it comes to exerting control over the design process, "The mentality of designers has to change; they must not want the last say on the details, but they must set the direction — they must let go!" This is a good illustration of the nature of navigating as an activity within Orchestration. Envisioning, imagining, prototyping, and making, are all part of it, but these together do not create a final PSS. As Monique Kemner of PSS 101 says, "You need a visual representation to communicate the proposals to all stakeholders, otherwise people are not easily convinced." ➜

ORCHESTRATION IS A BALANCING ACT RATHER THAN A PROCESS

But it remains a representation. The prototype developed by Martijn ten Bhömer described in the opening paragraph of this article is not the real thing. It is an experiential demonstrator for the different participants in the network; If they had simply stood back in awe, the prototype would have failed. Bringing appealing prototypes and making them central to meetings is a great way of navigating with a network. Afterwards, participants can take a prototype with them and use it in their organisation to discuss the understanding that has been achieved and the issues that have arisen, using their own organisational language, as well as the shared language of the prototype. That is the power of dropping something (physical or not) on the table.

The four activities mentioned above came together in many different ways in CRISP PSS projects. There is no specific order of Orchestration activities; it depends on what is needed in the design process at that moment in time.

Many stories illustrate how these activities made an impact. These stories can be understood as movements of the propeller that represents the continuous flow of Orchestration in PSS development.

Orchestration is a balancing activity

Orchestration has proven to be a very fruitful term to use when we try to understand the networked collaborative PSS development that is so important in many CRISP projects. This is also true for the complex opportunities and wicked problems that our economies and societies are faced with today. But it is not an easy term to use. It is not a clear process that can be explained in a diagram — Orchestration is an activity that consists of several other, related activities that together make PSS development flow and fly along a non-predefined path.

Yet, design has a role to contribute to Orchestration. PSS development can only be achieved by many disciplines working together, and design has a distinctive, strategic value to offer in this mix. Creating harmony and aligning people in networks are elements of Orchestration that happen more easily and with better results when design skills like storytelling, visualising, and prototyping are used to build common ground and involvement. Typical design activities such as creative workshops clearly help to navigate towards successful PSSs. The next theme, Strategic Value, expands on these typical design qualities and their value in PSS development.

THEME TEAM

BAS RAIJMAKERS — *1962*

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- Reader at Design Academy Eindhoven
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- Member CRISP Programme Committee

JANNEKE VERVLOED — *1978*

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- Project manager business collaboration of Valorisation Team at Delft University of Technology, Industrial Design Engineering
- Knowledge Transfer Officer at CRISP

KLAAS JAN WIERDA — *1972*

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- System developer at Océ-Technologies
- Member CRISP project PSS 101

DESIGN VISION — *CRISP Magazine #5*

Orchestration as an activity, without the name, has been recognised quite a while by Professor Robert Young of Northumbria University, involved in the International Scientific Advisory Board of CRISP. He gives his view on what must be the basic components of what it is to orchestrate.

BEYOND STRATEGY

Prof. Dr. Robert Young

The next great challenge for design is to reconceptualise the professional role of the designer in the context of PSSs. Design's ambition within orchestration must lie beyond strategy, in policy. The concept of orchestration can prove a valuable aid towards achieving this.

If we break down what needs to be done in order to orchestrate, the basic components are creating respect and building trust. In the same way, to draw an analogy with the traditional role of the designer in the past, the kinds of fundamental skills that we as designers need in order to explore, understand, and create meaning at a deeper level are our abilities to sketch, represent, prototype, and make things tangible.

If you compare this to the problem of how to orchestrate teams to interact effectively at a fundamental level, it's about how first to establish trust and then encourage respect between and across team members. It's therefore about how this can build the reputation of designers and the design process as the medium of orchestration in the context of projects. If design manages to achieve this, it will enhance the power and influence of design as an inter-discipline which acts on behalf of the project and its stakeholders. Without this, permission to act will not be given, at an individual level, within communities, and certainly not at a corporate or organisational level. Therefore, designers must address these fundamental elements of orchestration for them to increase their sphere of influence and power, and to address the great challenges presented by PSS projects.

Until design can actually build trust, gain respect, and demonstrate effectiveness when handling the practical levels of orchestration, it won't be able to work at a strategic level on PSS projects, let alone move up even further to engagement at a policy level. If, in the orchestration of PSS, we are looking at ambition within design, it must not perform simply as a functionary discipline at an operational level, it must, at the very least, play a strategic role, but ideally the role of design is to help form the policy that decides which projects should be entered into and how these projects should be gone about — 'orchestrated'.

This necessitates a transformative level of design acting at the policy level, rather than attending to the operational elements within the system, and certainly not simply tending to the configuration of aspects around the product.

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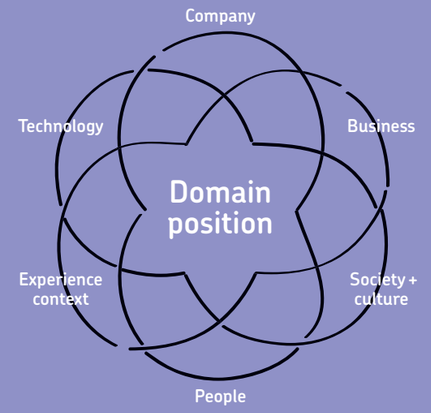
- Professor of Design Practice at Northumbria University, Department of Design
- Coordinator of Northumbria DESIS Lab
- Member CRISP International Scientific Advisory Board

DESIGN VISION — *CRISP Magazine #5*

Eva Deckers and Paul Gardien of Philips, also involved in CRISP, present their view on orchestration, based on their paper, *Innovating Innovation—deliver meaningful experiences in ecosystems*, presented at last year's DMI conference in London. They eloquently detail how a large corporation like Philips brings people and organisations together to truly innovate.

EXPERIENCE DOMAINS FOR COMMON GROUND

Eva Deckers & Paul Gardien



Six perspectives influence the domain position.

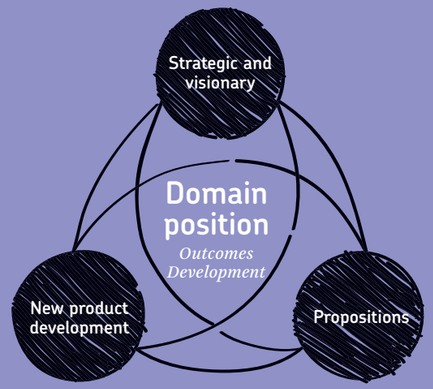
For a company to deliver meaningful experiences in an ecosystem, it has to understand what drives end-users and their experiences in this ecosystem. In other words, we need a clear story for innovation in which our offering plays a part; a story that is relevant and applicable in society. We need a clear positioning on what we want to deliver and why. At Philips, in answer to this need, we introduced so-called 'experience domains'.

An experience domain is a thematic, strategic area in which design, research, and business activities are organised and initiated. An experience domain revolves around a specific user group or experience. It provides a platform where people can collaborate, integrate, and build on each other's skills. This dynamic aspect is vital, as an ecosystem cannot be designed from the outset; it needs to evolve. Based on the knowledge paradigm, we take a dynamic approach: experience domains develop over time and provide direction and opportunities.

An example of an experience domain is the research project we are currently conducting which supports women during labour and delivery. Our proposed solution consists of an app that serves as a breathing coach and an interactive visual animation projected on the wall of the delivery room. You could consider this as being a stand-alone idea, but in the wider ecosystem of mother-and-child products and services, it links to the existing Philips ultrasound equipment as well as to the baby care products parents use when the newborn comes home.

The experience domain thus needs to demonstrate balance and find synergy between projects that are more strategic or visionary in nature, projects that aim to put forward realistic product and business propositions, and projects on new product developments that are on their way to market. This includes a balance between open and closed innovation projects, or cycles within projects. Finally, a balance needs to be found between short-term, highly structured processes, such as a one-week hackathon, and a much more flexible approach to the overall development.

The 'Orchestration' activities discovered in CRISP are similar to this, and help designers maintain that balance. Getting to grips with this complexity means that designers have a new role to play. Rather than providing creative direction at every touch point, they will have to champion and facilitate balance and synergy between projects within the different innovation horizons, shaping and framing a story of the ecosystem that will immediately make sense to end-users and to the company's other departments.



Different types of projects are connected. The projects integrate and feed back to the experience domain position.

EVA DECKERS — *1986*
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· Member of the Philips Company Design Board
· Member CRISP Programme Committee

KEEP ON JAMMING!

Bas Raijmakers, Janneke Vervloed, & Klaas Jan Wierda

CRISP has begun to reveal this potential, but there is clearly much more yet to discover. **Recent interviews with CRISP partners alerted us to three promising directions for further exploration.**

Over the past years, it has become clear that CRISP projects have created new and relevant PSS design knowledge around what we now call Orchestration. Our experience with these projects has enabled us to identify and describe four principles of Orchestration.

Understanding what Orchestration is and can be offers us an exciting opportunity to think about design in a new way that goes beyond design processes and design disciplines as distinct, predictable entities. Focusing on Orchestration as an activity helps us understand how and why design can contribute to addressing the complex opportunities and wicked problems that are so typical of the world today.

Orchestration principles

In the PSS101 project, Marie de Vos recognised the importance of good Orchestration, but wondered, "how should I 'do' Orchestration in practice?" She was not alone. There is a clear need for more knowledge on Orchestration principles which leads to practical guidelines on how to perform Orchestration activities in and between projects, for example, building trust in networks as noted by Robert Young in the previous article. Orchestration also requires that we look ahead to provide direction to complex PSS development. Process management is well understood in the short-term, but developing a direction for the future can form a greater challenge. Which guidelines can be developed?

Orchestration styles

In music, it is common to have many styles of orchestration. In PSS development, we have already seen examples of different styles of orchestration. Oscar Tomico of the Smart Textile Services project phrased it as follows: "Two projects in the smart textiles context] were orchestrated in a completely different style. In the end, though, both projects delivered equally relevant and valid outcomes."

Different approaches to orchestration in PSS development may be as personal as musical preference. How can we recognise and benefit from these different styles of Orchestration? How can we develop a style that fits a person or organisation?

Scaling up Orchestration

As a PSS grows, increasing numbers of people become involved. This scaling up also requires Orchestration, and may lead to more than just a PSS. As Behzad Rezaei of PSS101 says: "Organisations will become more and more a part of a network, a network that also includes customer-clusters." Robert Young even spoke of "a transformative level of design acting at the policy level." What is the societal impact of Orchestration on a larger scale or at a higher level? How can we scale up Orchestration beyond development of a single PSS, and what opportunities does this create for designers?

In the last four years, CRISP has created a considerable amount of new and relevant knowledge about Orchestration that is now available and actionable for the Creative Industries, their partners, and clients. At the same time, we are just at the start of understanding how Orchestration can help us as designers to play a more strategic role in industry and society: let's jam on!

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STRATEGIC VALUE

"Future directions of Orchestration also relate to the opportunities that design professionals want to take, designers as facilitators versus makers, discussed in the Strategic Value article "What does the designer want".

EMBRACING COMPLEXITY

BECAUSE IT IS HERE TO STAY

Product Service System development is hard, but pretending complexity disappears when you ignore it solves nothing. PSS design teaches designers **to embrace complexity and discover the rich insights that lead to excellent PSSs.**

Team
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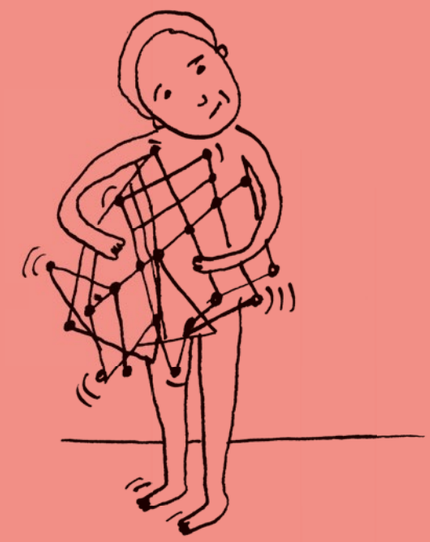
Thanks to
Robert Pauwe, Wang Long Li, Desmond Germans, Barbara Bierens de Haan, Johan Hoorn, Berry Eggen, Valentijn Visch, Behzad Rezaei, Michelle Baggerman, Karianne Rygh, Rick Schotman & Arnold Vermeeren

Illustrations & handwriting
Jan Rothuizen



SCHIPHOL AIRPORT

PROVIDES DIRECT CONNECTIONS TO 323 AIRPORTS IN 98 COUNTRIES WITH AROUND 53 MILLION PASSENGERS. IT'S EUROPE'S FOURTH LARGEST PASSENGER AIRPORT.

WHAT KIND OF NAME IS THAT FOR AN INTERNATIONAL AIRPORT

WHY NOT RENAME IT? GOUDA CHEESE AIRPORT... OR HEINEKEN TULIP AIRPORT?

DREAMLINER (GREAT NAME FOR AN AIRPLANE)

THE EMIRATES A380 A SUPER DOUBLE DECKER VISITS SCHIPHOL DAILY

THE SPACIOUS (MODERN) DEPARTURE HALL 3 LOOKS GENERIC WITH ALUMINIUM AND POLISHED STEEL.

WALKING BELT

COFFEE CORNER

WC

THE BUSIEST BURGER KING IN THE WORLD

THIS IS WHERE THE (ILLEGAL) TAXIS PICK YOU UP.. PSSST.

DEPARTURES 3

RAILWAY

AMSTERDAM

THIS IS ME DEPARTING FOR ICELAND WITH WOW AIR

HE MISSED THE RIGHT EXIT (AGAIN) BUT EVERYTHING IS EVENTUALLY TURNING IN CIRCLES

SPAGHETTI TRAFFIC

IF YOU DARE!

LEIDEN
DEN HAAG
ROTTERDAM
EINDHOVEN

JUST ANOTHER WORLD TRADE CENTRE

THIS AIRPORT KNOWS SEVEN WAVES OF INCREASED BUSINESS
THE FIRST STARTS AT 5 O'CLOCK WHEN THE NIGHTFLIGHTS ARRIVE FROM ASIA AND NORTH AND SOUTH AMERICA

TRAINS

IN THE WATCHTOWER THE GATE KEEPERS CONTROL EVERYTHING THAT FLOATS AND FLIES.

WHY DO OFFICE BUILDINGS LOOK SO MUCH LIKE OFFICE BUILDINGS (BORING)

OUTSIDE SMOKERS
THEY LOOK GUILTY WITHOUT PLEASURE

SHORT TERM PARKING

THERE ARE AROUND 36.000 PARKING SPACES.. SO SCHIPHOL IS MOST OF ALL A CAR PARK

14.500 PLACES FOR STAFF

AROUND 65.000 PEOPLE WORK AT SCHIPHOL

MUST BE STRANGE TO WORK AMONG PEOPLE WHO ARE ALWAYS IN TRANSIT

A FAMILY FROM IRAN I MET ON THE TRAIN STATION

THEY KEEP ASKING ME IF THIS IS THE TRAIN TO SCHIPHOL

THEY KNOW THIS ALREADY BUT THEY NEED THE CONSTANT REASSURANCE

IS THIS SOMETHING ONLY HUMANS CAN GIVE TO OTHER HUMANS? (DO WE NEED MORE PEOPLE INSTEAD OF SIGNS?)

BAGS

THE GIRLS SMILE A LOT.

THEY BOUGHT LOTS OF CLOTHES AT H&M (CARRY ON?)

THE TRANSPORT SYSTEM IS 2.5 KILOMETRES LONG

SCHIPHOL IS A ONE-TERMINAL SYSTEM GREAT FOR TRANSFERS

CAN IT SUSTAIN THIS AND KEEP GROWING?

A MINIMUM TRANSFER TIME FOR A SUITCASE IS 45 MINUTES.

BUT THE BAGGAGE CONTROL CENTRE CAN PUSH THINGS IF NEEDED.

AMSTERDAM

TRACKS UNDERGROUND

THE TRAIN TICKET MOST FREQUENTLY SOLD IN HOLLAND IS A ONE-WAY TICKET TO AMSTERDAM

THEY NEVER CHECK YOUR TICKET.

IS A RESTAURANT (FAST FOOD)

WINDOWS

MIND YOUR STEP

CASINO

MUSEUM
CHAMPAGNE
BOOKS
CLOTHING
PERFUMES
SUNGLASSES
LIQUOR
TOBACCO
SWEETS
GIFTS
BAGS
SUSHI
MASSAGE
LIBRARY
COFFEE

CHECK IN

ARTWORK WITH A (MEETING) FUNCTION

THE BORDER

CAFE REMBRANDT (HANG OUT FOR PEOPLE WHO WORK AT SCHIPHOL)

THE ONLY THING PERMANENT HERE IS CHANGE

ARTWORK (BY ROB BIRZA)

MIND YOUR STEP

THE (HUMAN) ASSEMBLY LINE.

WHEN YOU WANT TO FLY YOU SELL YOUR SOUL A LITTLE BIT (YOU BECOME AN OBJECT THAT HAS TO BE MOVED)

€ 2.99 FOR A SMALL BOTTLE OF WATER! SCHIPHOL USES 13.3 LITRES OF DRINKING WATER PER PASSENGER (HOW MUCH IS THROWN AWAY AT THE SECURITY CHECK?)

ONE MORE CAPPUCCINO BEFORE YOU BOARD

MOST PEOPLE TRAVEL FOR LEISURE 43%

BUSINESS 32%

THE OTHER 25% IS LOST IN TRANSIT?

SIR RORICK FROM BELFAST IS AT GATE B19 BUT NEEDS TO BE AT H7 (THAT'S A LONG WALK!)

THIS WILL TAKE 26 MINUTES! 10 IF YOU RUN!

THE (UNDERGROUND) LUGGAGE SYSTEM IS A MAN'S WORLD

ABOVE, THE GROUNDCREW IS FEMININE (WOMEN IN BLUE UNIFORMS)

UNDERNEATH THIS PIER IS A HOLDING AREA FOR APPROX. 60.000 PIECES OF LUGGAGE

A FEW WEEKS AGO, I MADE A (LAST) PHONE CALL BEFORE BOARDING

WITH MY FAMILY (SENTIMENTAL)

IN THE BASEMENT 13 METRES BELOW (SEA LEVEL)

MOST DELAYS ORIGINATE SOMEWHERE ELSE... TODAY THERE IS A STRIKE IN PARIS AND YESTERDAY THERE WAS A STORM. AND THE DAY AFTER TOMORROW IS STILL UNKNOWN

BAGS

TUT TUT

THIS IS NOT A TOY TRAIN.

THE AIRSIDE HAS MORE ELEGANCE

LOOKING OUT OVER THE GREEN GRASS AND RUNWAYS THE WORLD IS PEACEFUL...

ARE ALL THESE SHOPS HERE FOR THE PASSENGERS OR FOR PROFIT?

THESE GATES ARE SHAPED LIKE A TUNING FORK.

PASSENGER RORICK YOU ARE DELAYING THE FLIGHT

THERE ARE AROUND 200 SHOPS AND RESTAURANTS HERE, AS IF THERE IS NO SHOPPING AND EATING ON BOARD?

OUTSIDE THE SMELL OF KEROSENE IS EVERYWHERE

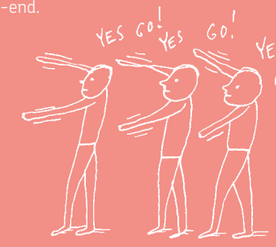
SMELLS NICE IN A DIRTY WAY

SCHIPHOL SLURPS AROUND 12 MILLION LITRES A DAY (I DOUBLE CHECKED THIS BECAUSE IT IS SO MUCH!)

THIS AIRPLANE GETS A REFILL

HAND-DRAWN COMPLEXITY

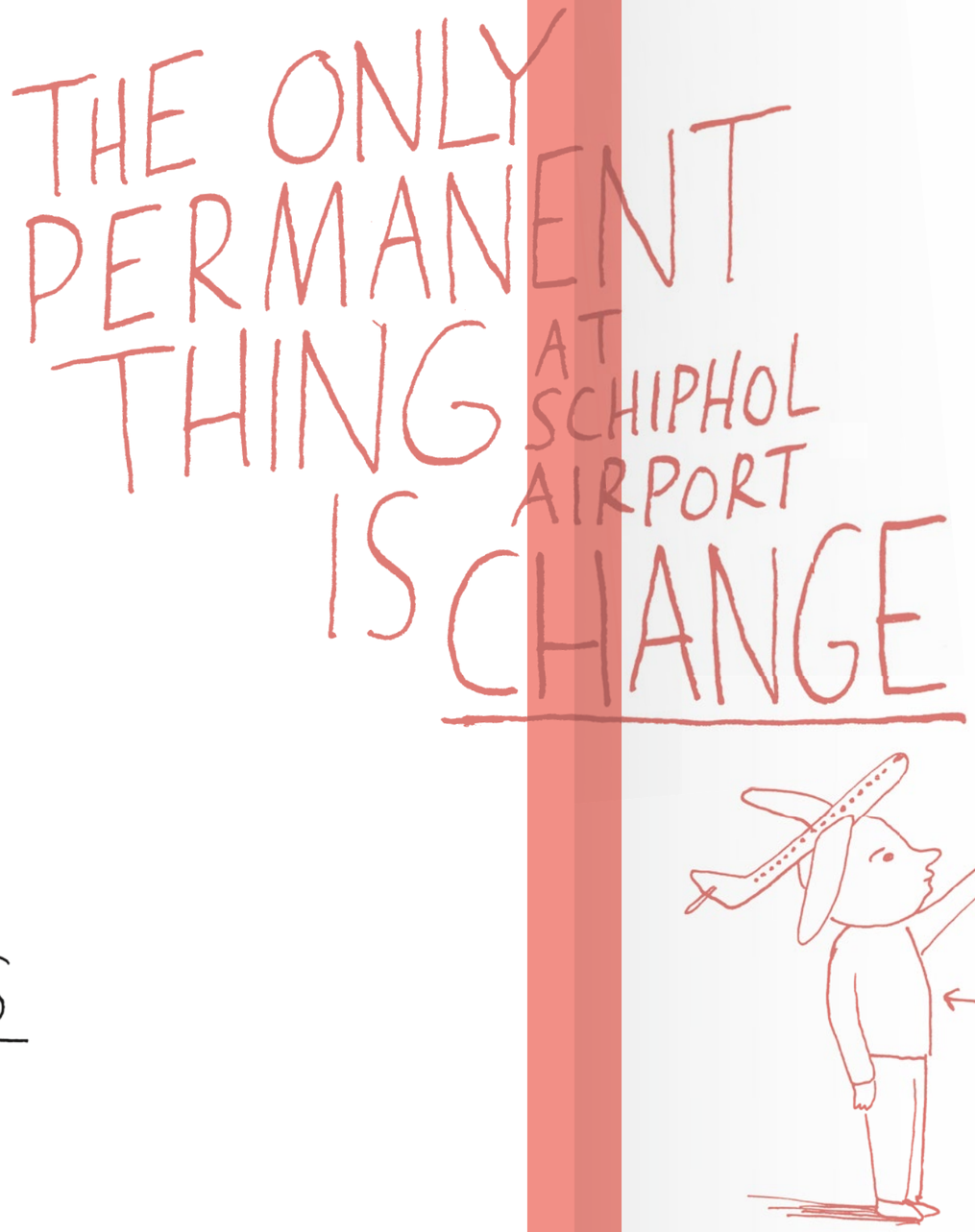
We asked Jan Rothuizen to come up with an illustration depicting the range of complexity in an airport ecosystem. Because whether you realise it or not, an airport is a PSS too;there are numerous types of users (business travellers, holiday visitors, groups, people with reduced mobility, and children travelling alone), different journeys to be followed throughout the airport (online or onsite checking in, Schengen or Non-Schengen flights, luggage or carry-on), and all of that is supported by a connecting infrastructure that needs to be updated "while keeping the shop open at all times."
If passengers were to become aware of the complexity behind their journeys, this would lead to anxiety and stress and affect their travelling experience. It all has to work seamlessly, at all times. To offer passengers a coherent experience, several very different organisations have to work together at the back-end.



When they set out four years ago, little did the intrepid group of designers and researchers know what challenges and discoveries would lie in store for them.

All they had to go on was the promise of an interesting transfer of the knowledge and practice of the conventional design discipline to the creation and development of Product Service Systems. The challenges they faced can only be properly understood in hindsight; there were many, none was small, some turned out to be huge, and their root cause lies in the complexity of PSSs themselves.

Because all is not what it seems in Product Service Systems: the product part is often not 'a' product at all, but more than one, a whole suite of technically advanced elements and systems that function through a connecting infrastructure. The service part is often also not one but several services, each consisting of many elements, relationships, and interdependencies. And the user of a PSS is hard to identify; in many situations, there are various groups of people, or even a whole segment of society that fit the user role. And what to think of the complex web of stakeholders that needs to be built to create the PSS, and to develop and implement it?



OBSERVATIONS

RUNNING AROUND LIKE CHINESE JUGGLERS

As you set out to develop a PSS, the first thing you realise is that many PSS elements have to be designed/developed in parallel; the designer soon begins to resemble a Chinese juggler, having way too many plates spinning on his sticks, running around in a desperate attempt to not have them all come crashing down. This is where the classic design methods, that divide the design project into a succession of steps and simplify the design problem by cutting it up into manageable subproblems, just get completely overwhelmed by the complexity of it all. These conventional methods no longer lead to good results.

So, what, besides panic, is the designer to do?

Well, the good news is that in the very complexity of PSS development lies the solution to this quandary; if you can let go of the need to be in control all the time, and come to the challenge with an open mind, the complexity will show itself not as a problem but as a richness from which new patterns of meaning and value emerge, in due course. You design by exploring and developing these patterns.

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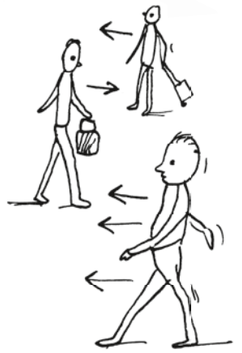
CREATING A HIGH-TECH CRAFT.

Speaking of patterns, sewn into the fabric of Smart Textile Services (STS) projects is the combination of high and low tech, of electronics and craft, brought together to create meaningful concepts. Consider as an example Textales, a jacquard-woven fabric produced by Johan van den Acker Textielfabrieken, which becomes dynamic through a screen-based augmented-reality application developed by Unit040. They created an experimental high-tech bedspread on which apps can bring characters to life as if they were present on the textile itself. Children can move the characters by manipulating the textile to create their own bedtime stories. The qualities of the textile thus offer us fascinating new ways of interacting with the digital world.

IT'S THE USER, STUPID!



But complexity issues are not limited to technology. The issues often arise on the human side, as a PSS sparks behaviour that completely change the impact a PSS can have. This fascinating dynamic is something to be mindful of — things could go wrong. Some PSSs seek to help vulnerable groups in society, like people suffering from dementia. This requires a keen sensibility for the possible impact of the PSS and a lot of experimentation to map the possible side effects. Designing PSSs for these groups is important, but it is also a morally laden balancing act. The social robot Polygon, for instance, is designed to have conversations with patients. It is currently being field tested with patients who are diagnosed with acquired brain injury (ABI) to possibly counteract loneliness and provide them with social support. Affection and empathy between entities: both product and person are the drivers for its success.

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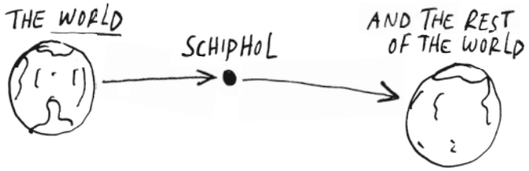

DESIGNING EXPECTATIONS

"In creating Polygon," says Robert Paauwe of the SELEMCA project, "Wang Long Li, Desmond Germans and I learned that it is not only about designing a product, but also about thinking about how Polygon could form relationships with its users over time (an aspect more elaborately discussed in the 'designing relationships' theme). We designed the embodiment of Polygon so that it does not give the impression that the 'robot' could do everything. The different expectations people have in combination with many factors related to social interactions make designing this simple social robot complex. As this makes it very difficult to study robots from a purely academic perspective, we founded Tinybots. With this company, we hope to transition social robots from academia to real-world applications."

TRUST THE WISDOM IN THE NETWORK

Although a focus on users can help guide PSS development, this does not mean the other stakeholders should be left out. STBY, a design research company, was asked to help the Province of North-Brabant to develop a new policy and implementation plan for water management. They used the "Value Pursuit" tool developed in PSS101, discussed in CRISP magazine #2, p40, to uncover the needs, struggles, and contributions of key stakeholders, such as the water management companies, water committees, conservationists, city councils, farmers, and industry. This helped them when discussing who could have what role in implementing the policy. Thus PSS design was used to develop and maintain a very complex network of stakeholders. According to Marie de Vos, who works at STBY: "When you look at an issue in its broader context and learn to embrace that complexity, it becomes easier to come up with the right question to tackle the right problem. Designers' strength lies in their practical, hands-on attitude towards complexity, and having the tools necessary to deal with it." ↗

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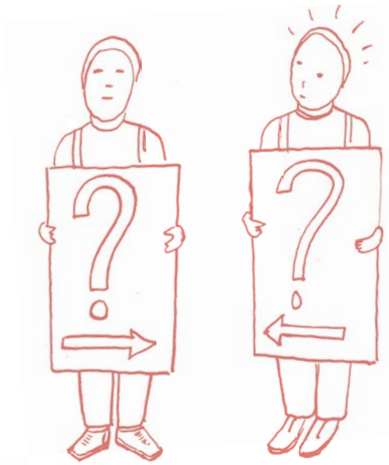
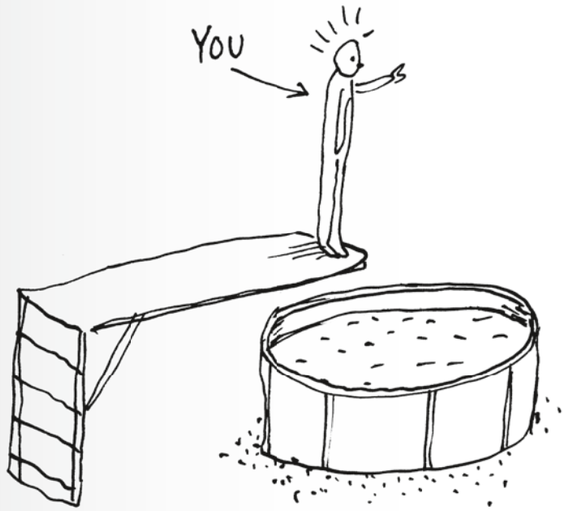
HIGHLIGHTS
SOCIAL ROBOTS

Social Robots describes how the Selemca project dealt with designing in a social and complex context.



CONQUERING COMPLEXITY



JUST DIVE AND SWIM

A first step to get a grip on a complex situation can be to soak it all up, like a sponge, to thoroughly get to know all aspects of a complex issue. But sometimes, this is just impossible. Karianne Rygh, a Research Associate at the Design Academy, joined the PSS101 project about a year after CRISP began. Because all the other project members already knew each other, she first tried to get a grip on the whole project, to get an idea of what she could and should do. She spoke with all team members about the project and what they were trying to achieve. She quickly learned that everybody had their own perspective on the project, and very different expectations. Each of the team members used very different words to simplify the project as they explained to her what was going on. On the way home after a CRISP meeting, she shared her frustrations with Bas Raijmakers, who heads the Research Associates team at the Design Academy. After listening to her, he said: "You seem to think there's a grand master plan, but there isn't: that's what we are trying to make."

WHEN IT GETS TOO MUCH MAKE IT PERSONAL

Just like Karianne, Michelle Baggerman joined a CRISP project, STS, a year after most of the other project members. She too felt that most of them were up to speed and that she had to catch up quickly, get a grip on what was going on and come up with a plan of action for her own contribution. It was tempting to go into all the details, but she sensed there was just not enough time to do that. Instead, she needed to get a sense of what was going on and, based on her intuition, decide where she could contribute. Although she was familiar with textiles, embedding technology in fabric was new to her. As she struggled to get to know the technology and its potential, she decided to try it out for herself. By prototyping for her own purposes early on, Michelle developed the means to help others to have a similar learning experience. ➔

BALANCING BETWEEN CHAOS AND STUCKNESS

According to Berry Eggen, Professor of User Centered Engineering at Eindhoven University of Technology and member of the I-PE project, many of the issues in PSS design resonate with the field of complex system design from the engineering disciplines. “When it comes to self-organising complex systems, chaos theory identifies three types of systems: systems that, after incubation, die or get frozen, systems that end in random behaviour, and the so-called complex systems that constantly change and show emergent structures that adapt to the environment. When we embrace complexity, we want to design PSSs that belong to this third category. But engineering science tells us that this is not a trivial challenge. Whether a system, once it comes to life, develops into a truly complex system, depends on the initial conditions and the local behaviour and intelligence of individual ‘agents’ that make up the system. The slightest mistake in the conditions, or inappropriate communication between agents and their environment, and we end up with a fixed or random system.” This is not the first time that the connection between chaos in dynamic systems and PSS development emerges. In the very first CRISP magazine, artist duo Driessens & Verstappen, also part of the I-PE project, shared what they learned on the subject of complex dynamic systems with their super organism simulation (p16-17).

SPEAK YOUR LANGUAGES

To make that implementation easier, it is important to know the languages of the stakeholders because you then need to translate the service from something that is valuable to the users to something that is valuable for the organisations. Before you present it to the board, ‘reframe’ the prototype into the “language of the organisation.” Behzad Rezaei, founder of Connect to Innovate and member of the PSS101 project, “I always start with creating data sets concerning targets, added value, cost structures, etc. that my clients are familiar with. Since most board members are (unconsciously) risk averse, seeing measures they already know helps in creating a common ground. Than, I transform the same data set to show the perspective of the customers. In this way decision makers become involve in discussing everyday context of their customers, beyond numbers!” ↗

ORGANISING: FLEXIBILITY

When it comes to implementation, the nature of product service systems necessitates that the organisations that deliver these PSSs are incredibly flexible. They should be ready at any time to tweak and change the PSSs — or even radically overhaul their very structure, and create additional services. ➜

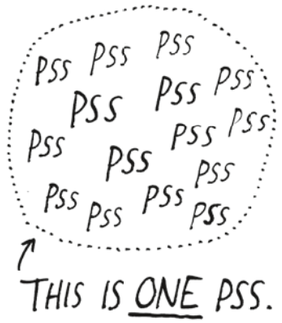
PREPARING FOR THE FLIGHT

GETTING REAL

Robert Ehrencron (KLM) discussed with Marina Toeters (Saxion Hogeschool) what they learned during CRISP of the challenges of implementing a PSS mindset in an organisation. Robert Ehrencron: “As long as it is still on paper, or just a prototype, people are open to the new idea. But, we see that once the step has to be made from plan to actual practice, the complexity to make it real grows substantially.” “When innovation requires changes to an existing process, it will initially be seen as an ‘operational disturbance’ of a highly optimised process and, as a result, won’t be implemented overnight. You can’t just stop a well-oiled process to plug in a new one; the risks are much too great.” “Innovations that follow an incremental approach, an almost unnoticed transition from old to new, have a better chance of survival. It is easier to improve the service by changing an existing product with a better one than, for instance, to organise a completely new way to motivate cabin staff before a flight.”

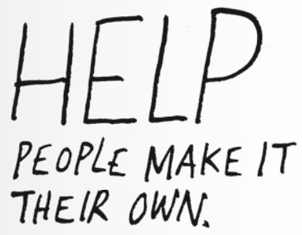
MANY SMALL PSSs MAKE A BIG ONE

From Rick Schotman (Grey but Mobile project): At one moment, the care provider Skewiel was taken over by the larger care provider, Tellens. Now the service had not only to be successful at one location, it had to be scalable, standardised and more efficient. Rick noted, “The numbers have to win it.” This poses new challenges; the business model should be reviewed and other locations should be able to organise the service without loss of quality. For the business model, the functionality of the service isn’t the most interesting aspect. If you look at Skewiel mobiel as only a “mobility service” it is expensive; you have to be able to show the benefit in a broader sense. This is quite difficult: how do you make a multifaceted service fit in existing business structures?” ➜

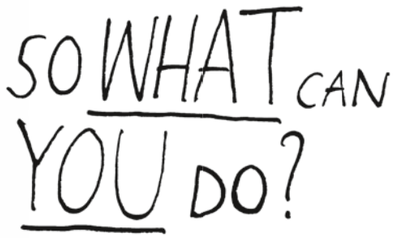


When we began with our theme, we had a general idea of the types of complexity we would encounter in the various CRISP projects.

In November 2014, at the Design Review Sessions, we organised a round-table discussion for those interested in sharing their experience, and together decided on the key aspects in embracing complexity. Participants from all eight projects were present and highly engaged in the discussion. We used the outcomes as the basis for this article.

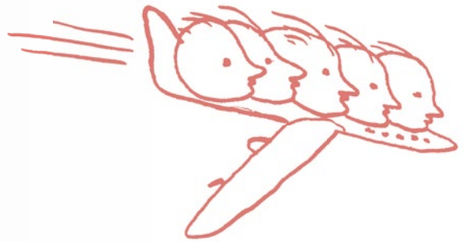


Another problem is the scalability of the service. People who haven't participated in the development of the service see it as yet another service they have to deliver. They will probably not deliver it to the same standards as the initial service. Most important here is to be able to communicate very clearly what the aim of Skewiel Mobiel is. This can be difficult as it is quite abstract, but you still should be able to translate that into common language. For Skewiel Mobiel, this meant it had to be made clear the service isn't simply a mobility service, but a service that enables people to continue doing their activities.



The good news is that in the very complexity of PSS development, also lies the solution: if you can let go of the need to be in control all the time, and come to the challenge with an open mind, the complexity will show itself, not as a problem, but as a richness from which new patterns of meaning emerge.

As a PSS designer, you have to approach the total context as broadly as possible, right from the start. Continue iterating, as if it is an open-ended process from which more and more depth and richness emerges. Communicate this richness of the process as openly as possible, so that all stakeholders can take whatever they need from it, when they need it. You design by exploring and developing these patterns of meaning.



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STRATEGIC VALUE

IS EVERYWHERE

Design professionals seem to act more and more as facilitators, supporting and training companies in pursuing innovation directions. However, design professionals are traditionally 'makers' and like to act as such also at a strategic level: **they want to have ideas, create PSS concepts, and translate them into tangible elements; they want to be the main actors and we think they should be.**

Team
Giulia Calabretta, Maaike Kleinsmann,
Daniëlle Arets & Onno van der Veen

We would like to thank all CRISP design professionals and practitioners we interviewed over the last four years. We would have never been able to disentangle your unique strengths without your unique openess and enthusiasm.

THE STRATEGIC DESIGNER'S PSSs PALETTE

Giulia Calabretta &
Gerda Gemser

10 CAPABILITIES

Doing a great job in designing successful PSS is rewarding but tricky. Here is a set of additional capabilities that design professionals should master to play a strategic role in PSS design and management. The palette comes from investigating multiple PSS projects where CRISP design professionals were involved. Design professionals should learn how and when to use these capabilities throughout a project and always remember to combine each of them with visualising and making things tangible.

INSPIRING
Make PSS stakeholders confident in thinking and acting differently.

ENVISIONING
Developing a long-term vision for PSSs (of for a PSS).

TRANSLATING
Converting PSS information from a certain language to another (e.g., verbal to visual, visual to verbal, tacit to explicit, explicit to tacit).

ORCHESTRATING
Combining and balancing different perspectives, knowledge and expertise relevant to a PSS.

FOCUSING
Keeping stakeholders' attention and resources focused on achieving both short-term and long-term PSS objectives.

SIMPLIFYING
Reducing a PSS's perceived complexity by organising PSS information in simple ways and concentrating on a PSS's key elements.

EMBEDDING
Making the organisation embrace the PSS mindset, the PSS vision, and the PSS itself.

ROADMAPPING
Defining all the steps to implement a long-term PSS vision.

ALIGNING
Keeping the PSS aligned with the company's strategy, its values, and its resources.

22
ORCHESTRATION

Typical design techniques, such as visualising and prototyping are often used to build a common understanding; that is why we came to understand that orchestration is a very important element when designing PSS. See pages 22-30 on Orchestration for more information.

VISUALISING

THE CAPABILITY THAT COMPLETES THE PALETTE

Visualising: Making everything tangible, concrete, memorable. Envisioning through scenarios. Aligning and orchestrating through prototypes. Inspiring through personas. Embedding through customer journeys using visual skills and tools to master all the other capabilities.

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WHAT DOES THE DESIGNER WANT?

Giulia Calabretta, Maaike Kleinsmann, Daniëlle Arets & Onno van der Veen

What is it about design and its practitioners that is so valuable for strategic innovation? We set out to answer this question and who better to help us than CRISP members?

We talked with design professionals, but we also wanted to hear from the project leaders and company managers who worked with the designers. How did they experience the strategic value of designers during CRISP?

Several interviewees indicated that innovative companies like to work with designers because of their ability to envision the future. When business practitioners pursue innovation, they tend to get caught in short-term approaches that don't work well for PSS development. Creating successful PSSs like the iPhone or Nespresso requires an unwavering long-term vision. Designers can apply their creativity and trained intuition to shape a vision of the future that fits the company's strategy and assets. At the same time, they can use their visualisation skills to translate a vision into tangible artefacts, such as PSS touch points or prototypes.

Envisioning through prototypes

When Océ–Technologies B.V. asked CRISP design professionals to help them find new PSS applications for their elevated printing technology, this was the reason why. They wanted designers to think long-term, to grasp the essence of the technology for the user, and to cut across company departments to achieve a common goal.

Elevated printing is a new technology that makes it possible to add an extra dimension to designs by printing multiple layers of ink up to 5 millimetres thick onto a non-porous flat surface. In the 'Incubator 2.5' research project, Karianne Rygh, a Research Associate of Design Academy Eindhoven, collaborated with researchers from Delft University of Technology and experts from Océ. The project explored how elevated printing technology could be applied in the field of architecture and how design professionals in general could contribute to determining new business opportunities for this innovative technology.

To facilitate the discovery and discussion of these opportunities, Rygh designed an archive of explorations in elevated printing in a tangible sample book. The book was initially used during conversations with potential clients, such as Marcel Wanders Studio and Next architects to showcase the technology and to learn from them how they could use it in their work. Unfortunately, the interviews often only produced broad and generic responses and never led to new knowledge, for instance, on additional and more specific applications, or on the practical challenges in using the technology.

> What designers do is envision stuff and make a prototype, or make a visual, or make a concept, which then brings the project further. I think that's the most visible contribution, also the most recognisable.
>
> Klaas Jan Wierda, Océ-Technologies B.V.

With that aim, Rygh decided to use what she had learned about using the new technology and she shifted the focus from the printing samples to the process of developing the samples. She thought that perhaps this approach would bring a deeper level to the discussion, one that is less general and more focused on finding new, viable, and valuable opportunities for the technology. Rygh designed the Super-Maker; a co-creation session where all relevant stakeholders–in this case, architects, designers, researchers, Océ printing experts, and business developers–participated in workshop activities, experimented with the technology, and produced tangible representations of the application ideas that emerge. As workshop participants visualised their discoveries and used them to communicate with their co-workers or clients, they became extensions of the designers' strategic role of identifying opportunities for the elevated printing technology.

The CRISP design professionals involved in the 'Incubator 2.5' research project helped identify long-term innovations directions for Océ and their elevated printing technology, but also helped translate them into tangible samples that serve to envision these new directions.

This shows that design professionals can and want to use their ability to envision possible futures in PSS innovation effectively, but it also suggests that they have a long way to go to convince managers to fully adopt a long-term innovation vision. This becomes especially important when they move from the business unit level to the corporate level, as discussed by Berry and Karpen in their article on page 56. It is often difficult to get people on board if they are not fully informed, or if they lack a proper understanding of the concept in question. By using a 'thinking through making approach' to understand stakeholders' needs and by 'dropping something on the table' (Stappers, 2014) to get them to imagine and see the potential in their own and others' innovation, designers can help guide new ideas through an organisation. Rygh's decision, for instance, to embody the explorations and subsequent research in tangible objects helped to trigger discussions and a dialogue between relevant stakeholders at Océ, allowing them to communicate with one another in new ways and to explore new innovation opportunities.

Do we need a new envisioning language?

Corporate commitment is crucial for the development, management, and healthy growth of a PSS, because of its longevity. Unfortunately, design professionals still lack PSS-specific envisioning tools that speak a management-friendly language and that match innovation visions with executive boards' key performance indicators. The question has now become, 'how can we upgrade designers' envisioning skills and tools so that they are perceived as reliable and actionable by managers in an executive board? At the same time, how far should we go into this adaptation process without compromising the intrinsic identity of design professionals?

Similar questions arise when design professionals' PSS concepts reach the implementation stage and need to be embedded in an organisation. CRISP projects like the Active Cues for dementia patients or the Adaptive Relaxation Space show that design professionals are good at gaining user insights and transforming them into prototypes or other tangible artefacts. However, it remains a

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challenge to embed the resulting concepts into the company while ensuring that the company markets a PSS that users really want. At that stage, design professionals' strategic contribution involves interpreting and transforming information mainly across three key actors:

1— the users, whose needs form the starting point for the innovation process;
2— the design professionals, who capture the user insights and transform them into a proposition that fits the company;
3— the companies that create and market the PSS.

In this situation too, design professionals lack the right language to talk to CEOs, nor do they have the complete overview of the key actions necessary to embed the concept in an organisation. We still need to study how design professionals should present a PSS to stakeholders in a concise, comprehensible, and appealing manner. Where and when should design professionals start the implementation? Within CRISP, opinions differ on whether future design professionals should be equipped with skills for embedding, or whether they should focus on the ideation process and leave the strategic implementation to others.

The embedding debate

Some CRISP practitioners feel that design professionals should take responsibility for embedding in order to pursue long-term coherence in designing and managing a PSS. They should support the company in coming up with PSS 'stories' that are meaningful to the users. From that point of view, developing additional skills and tools to equip design professionals for embedding will become a priority, as well as understanding the added value of such skills and tools.

Another camp of CRISP practitioners feel that embedding is too far removed from core design competences and is the responsibility of other actors within a company. They plead instead for a close collaboration between design professional and the company-designated actors for embedding. From that point of view, investigating this interface in more detail would then be valuable. What skills and abilities should both actors have? What language should they develop to make the best fit between design making (i.e., the PSS concept) and corporate KPIs (i.e. a successful PSS embedding)?

I would like to brush up the design probes and see how we can make them consistently work without falling in the obvious trap. It is really difficult for people to understand that these probes serve to gain insights and that when probes trigger a major negative reaction, that is still a wonderful result. As such, probes are a very powerful tool in the early phases of innovation.

Geert Christiaansen,
Philips Design

A BOTTOM-UP APPROACH TO PROVOKE VALUE

Martijn ten Bhömer &
Maaike Kleinsmann

In the Smart Textile Services (STS) project, we saw design professionals doing something differently. Instead of setting the PSS innovation strategy that the partners should follow, what you might call a top-down approach, the design professionals allowed strategic value to emerge during the project by following a bottom-up approach.

Martijn ten Bhömer is one of the PhDs involved in the STS project. He worked together with partners to develop Smart Textile PSSs for eldercare. He met with partners interested in eldercare and, based on their input from previous meetings, presented them with several prototypes. These formed the input for co-creation sessions in which stakeholders could contribute to the innovation process with their knowledge and skills; a physiotherapist, for instance, would point out and explain which area of the body needed to be trained and how the application might be tested; an electronic engineer would offer suggestions on the electronic circuit used and contribute with their own technology; a textile designer would choose the yarns and sew the product together.

De Wever, a service provider of eldercare in Tilburg, is one of the partners in Martijn's project. Martijn worked in close collaboration with the family of the elderly, physiotherapists, motivational therapists, and managers, to develop multiple PSSs to support the services around care for people with dementia. Early in the process, De Wever supported the development of these PSSs, not only by offering their expertise, but also by actively being involved in the testing of the PSSs: a big commitment, as they had to involve other staff members, real clients and their families. Besides benefitting from the knowledge the CRISP research resulted in, De Wever, through their commitment, also positioned themselves, according to Ben Janssen, as an organisation which "stands for innovation, and is involved with new innovation."

Another partner in the STS network is Metatronics, an electrotechnical engineering firm that created an electronics platform which supports designers and students working with smart textiles. This platform arose out of the need that, in order to experience and test the PSSs, the PSSs' products needed to be prototyped. The Tactile Dialogues PSS, for instance, required a pillow with touch sensors and vibration actuators. Likewise, the Vigour PSS needed a cardigan with movement sensors and auditory feedback, and was based on the same electronics platform as Tactile Dialogues. Through their involvement in CRISP, Metatronics adopted Wearable Technology as a key expertise. They are currently developing the electronics platform further, and have produced a large batch as a do-it-yourself toolkit which they plan to give away to all visitors of the upcoming Electronics & Automation Fair, in June.

For these two STS partners, strategic value clearly emerged during CRISP, but the project also had strategic value for Martijn. He took the Tactile Dialogues further in a collaborative venture with another partner, Borre Akkersdijk (owner of ByBorre). Together, they created two spin-off projects (one exhibited at SXSW2014, another at the Beijing Design Week 2014), and are currently working on starting a new company.

These examples show that it is not only up to the PSS concepts to create value for the community of partners involved in the process. These concepts functioned as drivers for a sustainable business infrastructure that emerged throughout the process. They served as a tangible representation of the project's status quo. The concepts also supported the stakeholders in keeping the common goal in mind, as they enabled the stakeholders to elicit their individual values at every moment in time.

We expect that this infrastructure will soon provide the partners with the opportunity to further harvest the value created in the STS project, by letting their individual and common businesses grow. The STS project is one of the great achievements of CRISP: it demonstrates the power of 'making' in the design process to create sustainable business value.

Defining the role of designers

This embedding debate is part of a larger conversation on the role that design professionals play in strategic design tasks. On the one hand, design professionals act as facilitators, supporting and, increasingly, training companies in pursuing attractive innovation directions. But traditionally, design professionals are 'makers' and like to act as such, also at a strategic level. They want to have ideas, create PSS concepts, and translate them into tangible elements. They want to be the main actors in strategic design projects.

Combining facilitating and making

In their article, Ten Bhömer and Kleinsmann discuss how design-making could support the formation of strategic directions within and between companies. The examples provided by CRISP projects suggest that playing only the facilitator role may lead to a sub-optimal use of designers' potential in PSS innovation and take away the main reason to hire a design professional: their unique ability of seamlessly switching between the role of facilitator and 'maker.'

When it comes to the fundamental question of who design professionals really want to be when they take on a strategic role, the best answer might be to balance between facilitating and the actual 'making'. CRISP provides some initial suggestions on how to achieve that balance. For instance, we have learned that prototypes can serve as a bridging tool between these two roles.

When prototypes are used as a probe, as a means to harvest inspirational data about people's lives, values, and thoughts, the design professional could facilitate rich design conversations about the probe, leading to new value propositions. Yet, the same prototypes could also represent the 'making' role of the design professional, as the other stakeholders involved in the PSS project often use the prototype to evaluate the design and the status of the project.

Use prototypes to balance the roles

Design professionals should realise that it is their responsibility to ensure that the prototype serves the right purpose at the right time in the project. This is especially difficult for the probing function, a function that other stakeholders frequently disregard as they often only use prototypes to evaluate market potential.

Several questions remain unanswered. In which projects, for instance, should design professionals act more as facilitators or as 'makers'? What other tools can support them to balance both roles? How should design education support future design professionals in playing both roles? ➜

Based on CRISP research, we have learned that as design projects become more strategic, as they begin to affect a company's strategy and core values, designer professionals should act as facilitators rather than makers. However they might feel about the issue, design professionals should get used to integrating facilitation activities in their projects. The facilitator role is essential for the successful completion of strategic projects, especially in the complex context of PSSs. The increasing importance of this role presents design professionals with a valuable opportunity to extend their service offering, and thereby increase their influence on companies' innovation strategies.

If design professionals want to take this opportunity, they will need to invest in developing specific skills, and design education needs to support them in that ambition. Education programmes for strategic designers could put emphasis on developing the soft skills required for effective facilitation, including interpersonal communication, emotional literacy, and leadership. The same programmes should provide future designers with a more thorough understanding of business processes, corporate priorities, and company culture. We should continue investigating the design profession and develop new, design-driven tools to enable design professionals to play a facilitating role in a unique and effective manner.
We count on CRISP's posterity to follow this thread.

The main point is the role that the interplay between strategy and bottom-up plays in the project. You can see that with reference to the PSS networks.

We distinguish three networks: the user network, the design network, and the organisation network. We (i.e., the design professionals) look at all these networks when designing product service systems, and we look at this strategically and practically; we work at an operational, tactical and strategic level.

We're continuously mediating between these levels, but the strategic level is mainly concerned with the organisation network.

Ingrid Mulder,
Delft University of Technology

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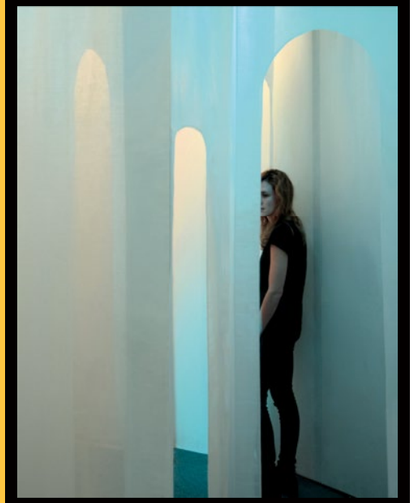
1 Stappers, P. J. (2014)— *The designer as instigator in networked collaboration*—Value Pursuit, Strategic Creativity Series, volume 7, pp 57-60

STRATEGIC VALUE OF A RESTFUL MOMENT

Evelien van de Garde,
Dirk Snelders & Federico Trevia

Time for a retreat, time for a moment of rest: this has become rare in our 24/7, always connected economy. On top of that, the topic of stress has become taboo, especially at work. The GRIP project—about how designers achieve a balance between flexibility and control when designing a PSS—led to the design of the Relaxation Space. This is a space with environmental light and sound effects in which workers can relax, either alone, with co-workers, or with service providers or researchers. The original Relaxation Space was designed to break through the taboo of work-related stress and to raise awareness among office workers and their organisation.



The Relaxation Space combines appealing technology and design which motivates workers to balance their levels of stress and relaxation, as well as making organisations more sensitive to the needs of their employees. The space has already been used by service providers for breathing relaxation and meditation training in an office, but it can also be applied in more diverse domains, such as reducing anxiety in hospital waiting rooms, improving concentration for performance in sports and education, and stimulating creativity. The design was evaluated positively by the stakeholders, GGZE and Phillips, because it provided new opportunities for them to further develop their own expertise. This resulted in new directions for their activities and businesses. The mental health care organisation GGZE is now investigating the value of a first prototype in a real-life setting: The Room for Inspiration.

Stakeholder Philips Design also saw the potential of this Relaxation Space and the knowledge they gained may have potential applications in other fields of Philips' vast array of businesses, far beyond the original work-related stress 'application'. In addition, Philips Design has already applied the GRIP approach of working in partnership with external parties and knowledge institutes on a longer term basis in a current project in another domain.

The initial Relaxation Space has been rebuilt and redesigned a number of times and, as such, has been a stimulus for the Dutch Design Sector and Creative Industries. In addition, the design industry has shown interest in the Relaxation Space thanks to its presence at a number of events e.g. the Service Design Network, PROUD Proms @ DDW in Eindhoven, Design Matters in Amsterdam, and Salone del Mobile in Milan. The publicity created by these events has established a reputation for the stakeholders from the creative industries involved in the project, such as Philips Design, Studio Knol, and de Bende. It has helped to create intangible capital (i.e., goodwill) for all parties, in the form of better access to information, social networks, and economic resources.

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- Member CRISP project CASD
- Member CRISP Board of Creative Professionals

When we stress the importance of design for business innovation, it is sensible to approach experts in the field who research how design approaches can be translated to management studies. We asked Daved Berry and Ingo Karpen to share their thoughts on how designers can effectivly apply their abilities to support innovation.

THE DESIGNER-MANAGER INTERFACE: PITFALLS & POTENTIALS

Daved Berry & Ingo Karpen

> Designers often think from the user's perspective, but they don't design for the organisation around it.
>
> Klaas Jan Wierda, Océ-Technologies B.V.

Designers certainly have a set of key abilities and tools with which to support managers in setting innovation directions and finding opportunities. However, several questions remain on how to effectively use these capabilities in a management context.

FastCompany recently published an intriguing article called "Why Samsung Design Stinks".[1] It appears that Samsung doesn't employ bad designers; rather, it's that the designers' ideas are so contested by management that they ultimately die from a thousand cuts. This raises a fundamental question around the designer-manager relationship: How can designers work more effectively with the managers of this world? From the managerial side, one answer has been that managers can better understand design by becoming designers themselves.[2] The manager-as-designer movement began with ABC's widely viewed 'shopping cart' documentary on IDEO, and then went viral with the Harvard Business Review article on IDEO's approach to design thinking.[3] Suddenly, hundreds of thousands of managers thought that they should think and work like professional designers. And, even more importantly, they thought that they could.

This proved to be remarkably naïve. Like many other professions, design takes the proverbial 10,000 hours to master, and merely watching a few design videos and reading a few books simply doesn't do the trick. It's no surprise then that the manager-as-designer movement, and particularly the evangelist version of design thinking, has been heavily criticised by managers, designers, and design researchers.

There is, however, an upside to all this. The manager-as-designer movement has sensitised many managers to the possible benefits of having designers working *with* them on managerial issues, and also pushed design into mainstream management studies. To avoid death by a thousand cuts, what do designers need to do to successfully collaborate with managers? Based on our experience and research, we propose three things to think about: profitability, understanding, and feasibility.

Profitability

Managers spend much of their time focusing on key performance indicators (KPIs) connected to costs, revenues, and profits, and they have to justify any under-performance relative to these. Most designers think about other things. Making business models as a core part of the design process can create common ground. The Business Model Canvas, with its visual character, is one of the more designer-friendly business modelling tools out there, and it provides a vocabulary that both executives and designers can relate to. Designers need to consider 'cost structures' and 'revenue streams' as much as 'value propositions'.

Understanding

Understanding how executives frame problems & opportunities, or better yet, the situation, and how the situation is problematic from the manager's point of view, is key to coming up with more relevant designs—whether at the product-service level or at a strategic level.[4] What are managers' perceptions of their organisations' purposes and priorities? Which of the KPIs are they struggling with and why? Which human or leadership issues stand in the way of achieving desired KPI standards? Managers often approach their situations in linear, deductive, 'let's fix it' ways. There can be a bias against more creative, and even chaotic designerly approaches that use frame-breaking toolsets. Importantly, designers need to understand when a manager's perspective represents some underlying bias rather than a real barrier to the realisation and implementation of the design. An empathetic understanding that includes the ability to understand and even foresee the possibility for perceptual biases and objective barriers to implementation can make or break the design effort.

Feasibility

Successfully dealing with managers means developing human-centric solutions *and* ensuring goal-effectiveness and process efficiencies; that is, combining creativity with uncompromising impact on the situation itself, and by extension, the manager's KPIs. As such, designers have a dual responsibility to 1) envision the new desired reality, and 2) predict *and* overcome barriers for this reality to come into being, as seen through the managers' eyes. Feasibility here is not only a matter of money; it considers the potential risks & costs of innovations against their potentiality and impact.

As in the core Strategic Value article, we don't have an answer to whether it is better for designers to have clear design boundaries or that they should actively engage in managerial issues. If the latter is case, reality often requires designers to have a culturally sensitive and convincing storyline for managers within clear boundary conditions—a storyline that goes beyond aesthetics and human stewardship and towards one that elegantly considers organisational purposes, priorities, and KPIs. In doing so, designers can directly contribute to managers' success and are more likely to be heard.

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2 Boland, R. and Collopy, F. (eds). 2004. *Managing as designing*. Palo Alto: Stanford Business Books.

3 Brown, T. 2008. Design thinking. *Harvard Business Review*, June Issue: 1-9.

4 Bunginger, S. 2014. Towards policymaking as designing: Policymaking beyond problem-solving and decision-making. In Bason, C. (ed) *Design for Policy*, pp. 57-69. Farnham, England: Gower Publishing Limited.

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LOOKING BACK LOOKING AHEAD

REFLECTING ON 4 YEARS OF CRISP

When the programme started, we were only focussed on the research itself. But over the last 4 years, we began to realise that much more than bare knowledge was developed under the CRISP umbrella. **Here you find some reflections from different viewpoints.**

All scientists lean on the work of their predecessors. Daniëlle Arets and Janneke Vervloed explain the legacy of CRISP, which is much more than just what is stored in the repository.

SPREAD THE MESSAGE

Daniëlle Arets & Janneke Vervloed

Spreading knowledge is becoming almost as important as creating it. In recent years, disseminating knowledge has been at the core of every scientific research programme. Scientists and universities acknowledge the need to share their findings and experiences earlier on in the research process to ensure that their insights are valuable for society. For an ambitious programme like CRISP which explores how design can play a more strategic role in product-service innovation in society and the creative economy, it is especially important that the research results align with the creative professionals, businesses, and the consumers the services are meant for. The Creative Knowledge Office (CKO) of CRISP was initiated to take on the role of disseminating the insights gained from the many research projects, connecting these, and sharing these PSS insights with the outside world. Connecting a network with over 500 members, 40 researchers, more than 65 industrial partners varying from large industrial companies to small SMEs, and public institutes has proved to be quite a bold and challenging endeavour.

Designing Collaboration

At the start of CRISP, most researchers thought it was simply another research programme. However, early on, they came to understand that CRISP aimed at creating joint knowledge on PSS design. What the CKO tried to instigate was that dissemination and valorisation had to develop alongside the programme. In a programme that involves so many stakeholders, it is crucial that knowledge is continuously shared. It is in fact an important aspect of 'doing research' in PSS design. In addition to common scientific activities such as writing papers and presenting at scientific conferences, the CKO stressed that knowledge can and must be shared in other ways, at the different phases of the research process.

Over the last four years, the CKO initiated many activities to stimulate internal knowledge exchange, such as design workshops, lectures, presenting/writing classes, and CRISP visits, where several industry and design partners (e.g. Philips, Fabrique, and Océ) invited a group of young professionals from CRISP to show how they deal with design research. Every six months, we organised 'Design Review Sessions' (DRS) for all the researchers and partners involved in the programme. Addressing topics as *What is Service Design, What do we mean by Product Service Systems* or *The role of industrial partners in knowledge creation*, these sessions aimed at creating a shared understanding of the key parameters of research and knowledge crossovers between the partners involved. The 5 editions of the CRISP magazine have formed an extra dissemination activity, initiated and created with project members as part of the programme. The first issue included 37 contributions and created stronger connections between the members of the eight projects. The magazine was a tangible outcome of the work developed in CRISP and it has become a vehicle for sharing our insights with the creative industries at large, including popular scientific articles by researchers and industrial partners as well as guest contributions by experts in the field. These magazines have also highlighted important key concepts in the programme such as the importance of *prototyping or Value Creation*.

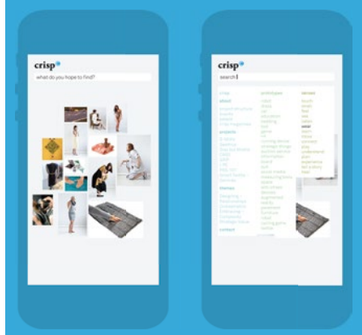
In this, the final year of CRISP, the CKO has mainly focused on deeper, cross-project research themes that aptly connect the insights of the eight research projects. We have organised workshops hosted by Professor Kees Dorst, with project leaders and project members from academia, business, and design practice, to find and explore the four overarching knowledge themes at the core of CRISP: designing relationships, orchestration, embracing complexity, and strategic value.

EXTERNAL LINKS

REPOSITORY

The repository, designed by Richard Vijgen & Ellen Zoete, comprises everything concerning CRISP you might want to look up or use for future reference.

Website
http://crispplatform.nl



Not an easy message to sell

An even greater challenge has been informing outsiders about Product Service Systems. Given that it had taken quite some time to get all the CRISP members to share a common understanding of the overriding research questions, you can imagine that PSS is not an easy message to sell to the outside world and the press. As journalist Tracy Metz, moderator during the Design Review Sessions, remarked, "And on top of that, there are all these abbreviations!" Now that CRISP is coming to an end and PSS knowledge is in the process of being adopted by creative professionals, and a number of prototypes are finding their way to the market, the message is becoming more 'crisp and clear'. Increasingly, people seem to understand that design–as proclaimed a number of times in this magazine–is so much more than 'making chairs'. Design research can help to reframe the questions and goals of science and industry, and present outcomes in an interesting way for the benefit of the worlds of science, the public sector, industry, and design.

A crucial notion is how the different CRISP projects have managed to turn the intangible into tangible outcomes. As Pieter Jan Stappers quipped, "it is vital to drop things on the table." The tangible outcomes not only stimulate stakeholder-alignment in a design research project, they also help the CKO to communicate what happens in the projects to the broader audience of the creative industries. If you want to know more about this, head on over to the 'Orchestration' theme.

For example, the relaxation space developed in the GRIP project became tremendously valuable when discussing the strategic value of design in the CASD project, and was exhibited in Milan. The Value Pursuit developed in the PSS101 became an inspiring workshop tool which helped to align stakeholders in other projects, and the tool actually helps creative professionals in their PSS development.

When it comes to sharing knowledge through other means than scientific papers, the prototypes developed in CRISP certainly achieved the aim of sharing knowledge with wider audiences. Talks and exhibitions at (inter)national public conferences have also helped to spread the message. The Smart Textile Services project has been exhibited over 90 times in 17 different countries all around the world. Design Academy Eindhoven *Graduation Show* and *The Mind the Step* exhibition organised by Design United were major attractions at the Dutch Design Week, as well as at the international design fair Salone del Mobile in Milan, and succeeded in attracting many visitors from outside the scientific community. More popular scientific conferences like the *Health and Design* conference (Taiwan), the *Feral Experimental* (Australia), and the *What Design Can Do* conference (The Netherlands) invited CRISP researchers as keynote speakers and exhibited CRISP prototypes in their international exhibitions.

Transferring knowledge in CRISP, presenting imaginable stories, and sharing comprehensible design tools and visualisations has allowed the stakeholders to become involved in the research projects and has helped them to define the potential outcomes. This incremental approach has been crucial in all eight research projects, and over the last four years we have been able to transfer valuable knowledge for networked collaboration. Stimulated and supported by the CKO, CRISP has opened up a new generation of researchers from academia and industry with a specific mind-set in creating and sharing PSS design knowledge. CRISP findings have been taken to places where they really matter, using the skills and expertise of all stakeholders in the programme.

The final challenge for the CKO has been to archive this knowledge in an accessible way to ensure that the knowledge created can evolve over time. With the online repository, we have built a vivid knowledge platform that highlights not only the prototypes created in CRISP but also the cross pollinations that resulted in the overarching themes of network collaboration, as well as the experts who developed that knowledge. We are pretty sure that this will be a living archive that helps to keep the CRISP community alive in the future!

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- Project manager business collaboration of Valorisation Team at Delft University of Technology, Industrial Design Engineering
- Knowledge Transfer Officer at CRISP

CAPITAL CRISP

Gerbrand Bas

We were all baffled by that short YouTube clip featuring an adorable dog-like behaving sheep. The sheep in question had been raised in a dogs' nest, the story explains, and ever since, had behaved like one. Nature vs nurture epitomised!

DESIGN VISION — *CRISP Magazine #5*

Gerbrand Bas is one of the wise men of the CRISP supervisory board. He acts at a distance but beware: the moment he says something, you should listen because he's always right. That makes this reflection so very valuable.

Within CRISP, we have a similar juxtaposition. The programme has been around for over four years; quite a long period for a designer, merely a blink of an eye for a researcher. But did they ever get to meet somewhere in between? To put it differently: did the researchers become sheep, the designers dogs, or did we all become just curious enough to plead for a second round?

'The Creative Industry Scientific Programme will develop a knowledge infrastructure that will consolidate its leadership position as pioneer research programme within the Dutch Design Sector and Creative Industries and will stimulate its continuing growth'

Mind the capitals, I'm quoting the CRISP website here and wonder how we would now rephrase the 'about' section. Ignoring the fact that the design sector was being unnoticeably swallowed whole by the creative industries, did we actually manage to consolidate its leadership position? Did we actually manage to defend the stronghold? We are now suddenly living in a time where 'doing is the new thinking' and R&D has become R&Do.

Now, after four or, in some cases, even more years of hard work, we can reflect on the results. So much research effort condensed in a... well... in a what exactly? A report? An article? Several articles? A thesis? Several theses? Or hard and tangible products and services?

More important, however, was the unique way the eight projects were reviewed. Imagine being a researcher and constantly feeling the burden of having to present your interim findings to a critical audience, every six months. No black box research; no ivory towers: the real thing. For the last four years, this has been the essence of my CRISP pitch.

If you look at it, it is not that different from designing and presenting your sketches and concepts to whoever commissioned your project. However, in this case, the commissioner's place is taken over by an impressive 'overhead' of boards. Is the quality of the deliverables equivalent to the sheer number of boards the programme comprises? I'm on the fence here. On paper, it seems a bit of overkill to have four boards; we probably could have done with one or two less. But involving all these people created the support the programme definitely needed to convince the design sector, certainly in its first years.

Our sheep, of course, never learned to bark and the dogs are probably still fairly confused, but somehow the CRISP approach seems to fit very well in this new reality. We have seen that the new and exciting challenges we face are in need of being researched by a special breed of researchers and designers; not simply to consolidate our leadership position as a creative nation, but as a way of rethinking our profession!

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- Secretary to the board of Kennis en Innovatie Coöperatie Creatieve Industrie CEO at Yard 9
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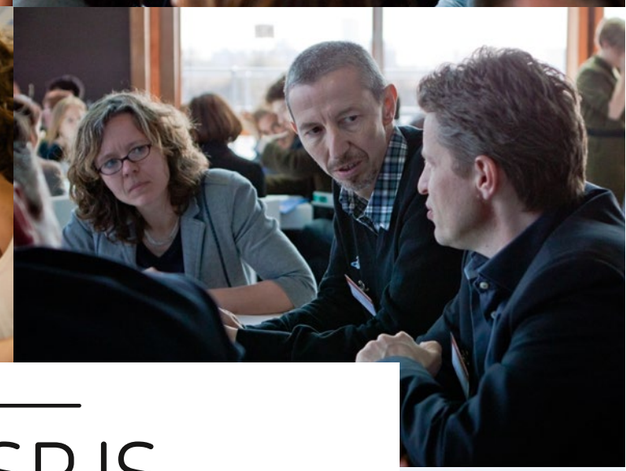
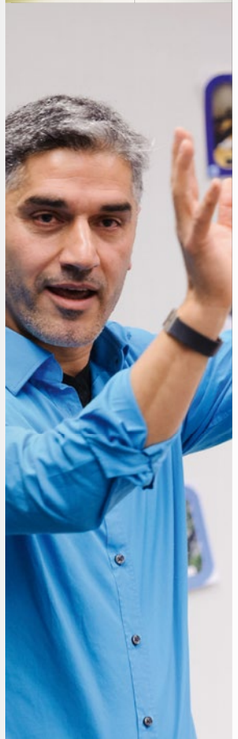




CRISP IS THE PEOPLE

Over 300 project people involved in eight CRISP DRS sessions sharing knowledge, findings and experiences within the network

It's easy to acknowledge this now but when the programme started, nowhere was it mentioned that a versatile programme like CRISP would be a fantastically fertile soil for talent. When the programme was shaped, the focus was on the science, which doesn't sound unreasonable for a scientific programme. There were several quite heated discussions about the value of the knowledge that was to be developed. The governmental institutes involved were worried, for instance, whether there would be sufficient outcome with a spill-over effect to other sectors. We now know this to be the case, but the biggest, unexpected spill-over effect is what the programme did for the people in the community. They have found each other, they have grown, and they have started businesses. This is a huge asset for future scientific programmes within the creative industries.

FACTS & FIGURES — *CRISP Magazine #5*

CRISP started four years ago with the aim to strengthen the Dutch (creative) economy with PSS design knowledge. On a basis of societal challenges and design transitions researchers, managers, and designers collaborated and worked very hard to make a change and have an impact. *Information depicted is based on data as provided by NWO & project leaders.*

FACTS & FIGURES

OVERARCHING THEMES

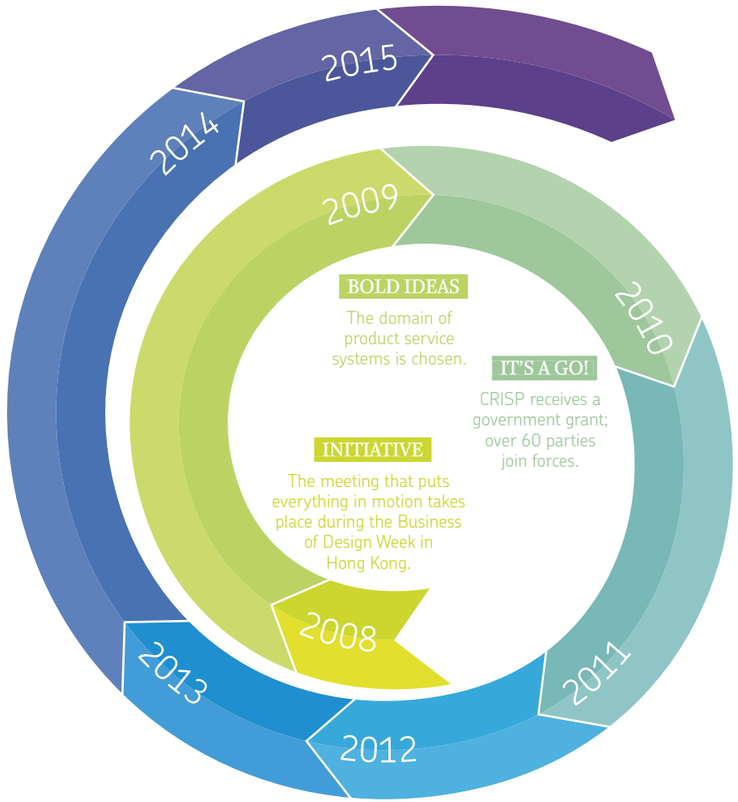
After a few workshops, four overarching themes are defined: designing relationships, orchestration, embracing complexity, and strategic value.

CELEBRATING CRISP

Magazine #5, a two-day event and an impressive repository round off the programme in June 2015. Design research will never be the same.

WHAT'S NEXT?

All kind of new initiatives emerge under the umbrella of CLICKNL: the knowledge and innovation network of the creative industries.



CRISP MAGAZINE #1

Don't you design chairs any more? This is the title of the first CRISP Magazine. It is presented in April at DRS #4 in Amsterdam.

THE FIRST WORKSHOP

Workshop 'the Art of Presenting Science' in Delft. The second and third DRS take place in Delft and at Design Academy Eindhoven.

CRISP KICK OFF

The official kick-off takes place in Delft on the 6th of April. The first Design Review Session is held at the TU in Eindhoven in October.

Erik Huizer
Captain of Science at Topteam Creative Industries

The results of CRISP, a programme in which partners from several sectors participate, are a great example of what the collaboration between the creative industries and other sectors such as health care, transport and sports, can mean.

Thomas Widdershoven
Creative Director at Design Academy Eindhoven

The collision between conceptual thinking and scientific process proved a great success as it helped turn sometimes dense scientific research into imaginable stories, dreams, and scenarios as well as valuable prototypes.

Marjan Hammersma
Director General Culture and Media at the Ministry of Education, Culture and Science

The experiences and results of CRISP have made the Dutch creative industries even stronger and more professional.

Ruurd Priester
Research Fellow at Amsterdam Creative Industries Network

CRISP has done important work on our knowledge infrastructure. The challenge now is to make the results concrete and accessible for creative companies.

Ena Voûte
Dean of the faculty Industrial Design Engineering at TU Delft

CRISP's joining of industry, academics, and creative professionals helps us prepare design students to face more complex societal problems.

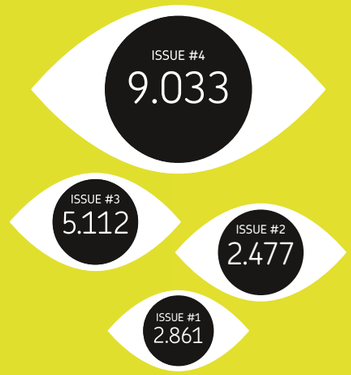
CRISP PROGRAMME FINANCIALS

€ 19.000.000

€ 10.000.000 — GRANT OCW (FES FUNDS)

€ 9.000.000 — MATCHING PRIVATE CONTRIBUTIONS

CRISP MAGAZINE ONLINE VIEWS



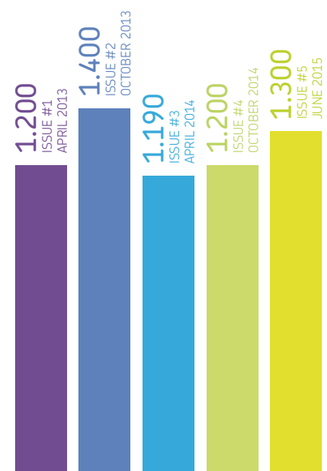
CRISP MAGAZINE TOTAL ARTICLE COUNT

84

CRISP MAGAZINE TOTAL PAGE COUNT

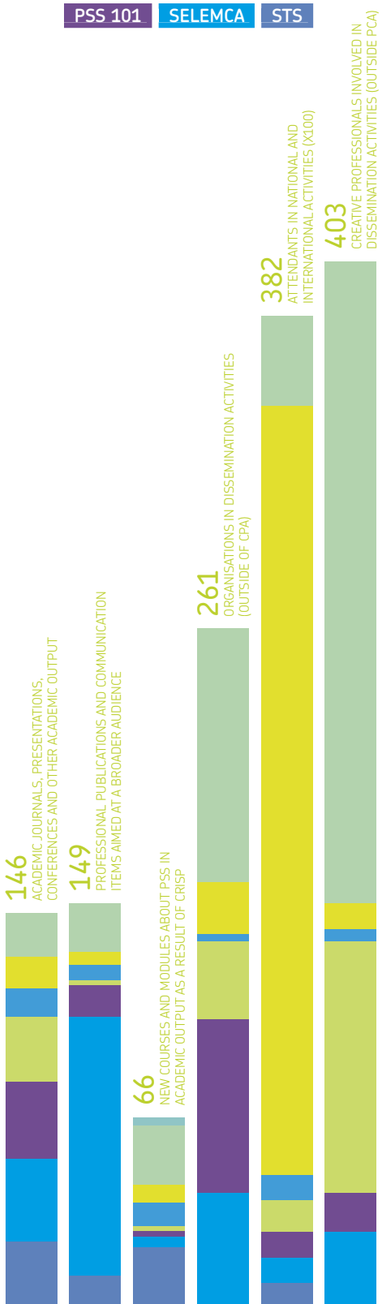
314

CRISP MAGAZINE PRINT RUN



CRISP PROJECT OUTPUT

CASD · G-Motiv · Grey But Mobile · GRIP · i-PE · PSS 101 · SELEMCA · STS



PROJECTS

8

PROJECT MEMBERS

300+

SUBPROJECTS

CASD · G-Motiv · Grey But Mobile · GRIP · I-PE · PSS 101 · SELEMCA · STS

Jeroen Verbrugge
Managing and creative director
at FLEX/ theINNOVATIONLAB

CRISP is a valuable initiative with a number of great project results. A suggestion for a CRISP 2.0: more active involvement of senior researchers and more effective project management.

Aarnout Brombacher
Dean of the department of
Industrial Design at TU/e

The results of the CRISP programme form a solid basis for research and knowledge development in the field of Design. Let's continue!

Annemarie Bos
Director Humanities Netherlands
at the Netherlands Organisation for
Scientific Research

CRISP is a successful programme and as such knits perfectly together with the NWO Creative Industries focus.

Linde Gonggrijp
Director at ClickNL

The creative industry is ambitious, and achieving those ambitions demands an enduring knowledge and innovation system, where it is vital to have a broad perspective on all the moving parts of the creative industry. CRISP has contributed much to such a system.

Geert Christiaansen
Senior Director Design Innovation
at Design Innovation at Philips

Our involvement in CRISP has given us a better way of working with universities.

Bertholt Leeftink
Director-General Enterprise
and Innovation at Ministry
of Economic Affairs

CRISP proves that this inspiring and innovative sector is justly counted among the nine Topsectors of the Netherlands.

PHD GRADUATES ON CRISP PROJECTS

17

POSTDOCTORAL RESEARCHERS

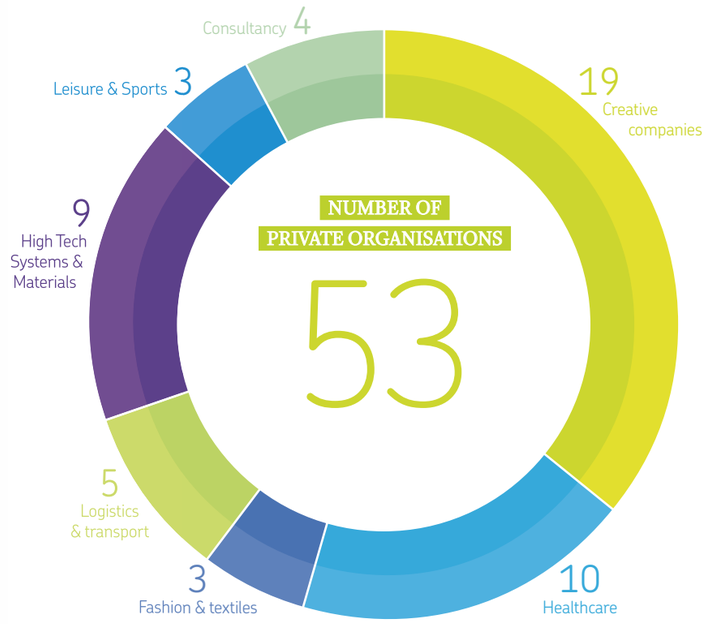
8

NUMBER OF ORGANISATIONS

61

EDUCATIONAL INSTITUTIONS

8



In the last 4 years, they had an average of 12 meetings a year, excluding the design review sessions and lunches and diners with the supervisory board and other very important people. It's no wonder they look like a band that has been on tour for years. A look back.

CRISP HAS BROUGHT MANY WORLDS TOGETHER

The Executive Board reflects on the past four years

Bas van Lier

After four years of CRISP, 'Product Service Systems' is an internationally acknowledged term, the scientific and business communities and the creative sector have found each other, and graduate designers are more inclined to pursue a research career. Thanks to CRISP, the knowledge base for innovation within the Dutch creative industry has been given a huge boost. The Executive Board reflects on four years of CRISP.

"CRISP has made science less introverted. Previously, researchers shared much less about their work. Thanks to the structure of the programme, and aided by the establishment of the Creative Industries Top Sector, they now appear in public much more. Everybody now has a better view of what happens at the various research institutes," says Jeroen van Erp, creative director of design office Fabrique, and one of five members of the Executive Board of the Creative Industry Scientific Programme (CRISP). The other four board members are Paul Hekkert and Pieter Jan Stappers, both professors of Industrial Design Engineering at Delft University of Technology, Berry Eggen, professor of User Centered Engineering at Eindhoven University of Technology, and Yvette Tuin, discipline manager of Computer Science at the Netherlands Organisation for Scientific Research (NWO). In a warm room at the university in Delft, they reflect on the programme that was launched four years ago.

"This extraversion and greatly improved contact between researchers, designers and industry are the benefits of CRISP," says Paul Hekkert, "It has become much more appealing for graduates to continue doing research. Research is now much closer to design practice. You see and feel the relevance of what you're doing. Students come to us because they want to become designers. They never thought research would be so interesting, but now they're queuing up to take a PhD."

Perfect discovery: Product Service Systems

You can imagine the effect this has had on the creative industry as well as on innovation in the Netherlands. And that's why it was all set up in the first place, four years ago, when the Ministry of Education, Culture and Science allocated resources from FES funds. That budget for economic structure improvement was funded by revenues from natural gas. The ministry decided to allocate the resources for research in the creative industry, and they approached Cees de Bont, who at the time was Dean of the Faculty of Industrial Design Engineering at Delft University of Technology. He brought together a group of people from the three universities of technology and Design Academy Eindhoven, joined a short time later by both universities in Amsterdam. This group was asked to set up a programme based on the principle of 'strengthening the knowledge base and thus the pioneering role of the creative industry'.

Hekkert notes — "Cees de Bont deserves credit for his idea to structure the programme around Product Service Systems (PSSs). Cees sensed that we needed a more tightly defined theme around which we could join forces. At that time, the design field was already shifting in that direction. After all, with the advance of digitalisation, you have an increasing number of systems that link products and services. We knew very little about that, even though it was clear that problems of supervision and coherency existed in that domain, as well as problems with user interfaces, for instance. It seemed like a very interesting subject for study."

"This was also a subject that quite naturally brought together all the stakeholders we wanted to involve in the programme," adds Berry Eggen. "With other subjects, it might possibly have seemed forced, but with Product Service Systems you need researchers, designers, commercial parties and government."

Van Erp — "The challenge at the time was to mobilise the field, which hadn't a clue what research could mean for the sector. That was in part the fault of the scientific world, which seldom sought the limelight with its findings. The great thing about PSSs was that it was interesting for researchers to be active at so many levels, and that design practice could benefit from it. Moreover, it was extremely relevant for the business world. There was something in it for everybody." ➜

The CRISP model

Gradually it became clear that as a programme, CRISP had created a model for scientific research in the creative industry. Divided into four more theoretical 'foundational' projects and four essentially practical 'test bed' projects, it offered all those involved in the 'tetrahedron' of science, design, business and government, points of contact through which they could participate. In addition, the constant sharing of information and findings turned out to be crucial for the success of the programme as a whole.

Hekkert — "We realised from the outset that the sub-projects should not be allowed to remain isolated and chart their own course — which often happens in big programmes like this. That's why we incorporated mechanisms to ensure there was plenty of sharing, which encouraged the projects to learn from one another. Biannual review sessions were valuable for that reason, but we also actively linked projects together and pointed out where the overlaps were. The entire governance structure was geared to that end." The board members agree that the governance structure was perhaps somewhat on the heavy side, and in a follow-up programme this could be simplified. "But at the same time the various councils and committees contributed enormously to ensuring that the parties involved engaged in discussion and strengthened one another," argues Pieter Jan Stappers.

"In addition, this structure created opportunities where, on occasion, we could tell one another the blunt truth."

"Our experience at the NWO is that the best programmes sometimes give each other a thorough bashing internally," says Yvette Tuin. "If you can be highly critical internally, you can strengthen one another. If you simply say 'yes' and 'amen' to one another, you never get the feedback you need to improve, so the final result is not just 'good enough', but actually becomes much better than that: that's what happened with CRISP."

Recognising the value of research

Besides the findings of the eight projects, to be presented at the closing conference in Rotterdam in June, the programme threw up a number of surprises.

Van Erp — "We couldn't have predicted how the landscape would change. After CRISP had been running for a year, the creative industry became a Top Sector, CLICKNL was established, and CRISP exemplified how a research programme should be structured. The sudden change to our position in the field was a pleasant surprise. "CRISP also turned out to be a fertile soil that produced a number of excellent people. The collaborative ventures that the programme has spawned between businesses, offices and researchers have created much more dynamism in addition to the content.

There are numerous spin-off effects, and one of the most important for me, from a design practice perspective, is the emergence of a generic awareness that research can contribute greatly to improving, enriching, and developing design practice. Conversely, people in the scientific world have become much more aware of what happens in practice and how they can help. We never predicted that would happen."

Eggen — "I've contributed to many programmes, but what I've never previously witnessed is the community that has emerged here. Generic themes have surfaced across the projects, and they play a role in all Product Service Systems. I'm talking here about 'designing relationships', 'orchestration', 'embracing complexity' and 'strategic value'. You have to address all of these themes to make a PSS a success."

CRISP 2.0

All this has helped turn PSS into a recognised term that even appears on the programmes of international design conferences. The results, taken together, have prompted the CRISP board to consider a follow-up programme, a CRISP 2.0.

Hekkert — "We think it would be a terrible shame if CRISP were to end in June, leading to the loss of the programmatic character and community structure of CRISP. So, six months ago, we started to explore the possibilities of a second CRISP. This time there is no FES funding, but there is an awareness within the scientific world, industry, and government that this is beneficial and needed. An infrastructure has also been established, with the Top Team and CLICKNL, which we can hopefully make use of. As far as possible, we want to keep the structure the same as in the first programme. The only thing that will change is the theme. We have called it *'Design for real life consequences'*, and it looks at the extent to which designers exert influence on the long-term effects of products. People in the world of design are increasingly aware of the long-term effects that products and services exert on people, society, culture and so on. For example, the way the mobile phone has altered how we interact with one another, with appointments and privacy. Can you predict or even influence this type of behavioural change through design and thus help determine what tomorrow's world will look like? That's what we want to look at in CRISP 2.0."

— CRISP 2.0 — CAN WE PREDICT OR INFLUENCE BEHAVIOURAL CHANGE THROUGH DESIGN AND DETERMINE WHAT TOMORROW WILL LOOK LIKE?

THE EXECUTIVE BOARD

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- Partner & Creative Director at Fabrique
- Member CRISP Executive Board
- Member Topteam Creative Industry (NL)
- Chair of the Dutch Creative Council
- Board member of the BNO (the Association of Dutch Designers)
- Board member of LAB Vlieland
- Board member of the Design & Emotion Society

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- Member CRISP Executive Board
- Member CRISP project PSS 101

Gijs Ockeloen approached the editorial team with the notion that at the end of CRISP, we should know all the ins and outs of designing PSSs. He soon turned this idea into the article "PSS for Dummies".

PSS FOR DUMMIES

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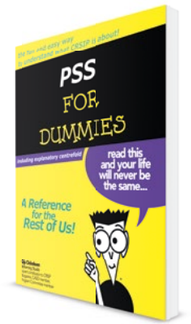
READ MORE!

BACKGROUND INFORMATION

Download the publication at www.reframingstudio.com/publications/pss-dummies



For 4 years CRISP has been investigated how PSSs relates to the creative industry: The question is not whether creatives should embrace PSSs but rather when PSSs will embrace creatives. **If prepared, you may pursue your creative career; otherwise this embrace will surely suffocate you.**

Gijs Ockeloen

★★★★☆
EXCELLENT READ!

★★★★★
SIMPLY SENSATIONAL.

You're no dummy, but there's something about Product Service Systems (PSSs) that makes you feel like one. Understandably! Unlike today's generation of digital natives, you didn't grow up in a world where every kid managed a social network or stored music in the cloud. You are a proud, creative professional who designs REAL stuff: material goods that require top-notch design, classy ergonomics, and sharp marketing. But now people are saying that you're a dinosaur, and on the road to extinction!

When it comes to PSSs, Gijs Ockeloen used to be a dummy too. But participating in CRISP taught him a thing or two, and that's what he'd like share with you. Creative professionals reading this book will no longer feel helpless when their colleagues start acting superior, as if they belong to a chosen few. With the help of this book, everyone can join the PSS conversation.

Much of the talk about PSSs has become filled with hyped-up buzzwords such as design thinking, experience design, and co-creation, all of which has very little to do with PSSs. This book removes the buzzwords and brings out the cataclysmic transition that every creative professional should understand. It explains what a PSS is and why its arrival was inevitable. It anticipates both societal turmoil and an increasing influence of creative professionals who will become more accountable for the course of history than preceding generations. The book's subtitle 'Inject morality into your professional life' warns the reader about the book's moralising tone.

The book does not answer the question of how to design for a PSS. Only a real dummy would expect to learn how to 'design' by leafing through an oversized comic book. But once you start looking through a PSS lens, you will discover that a PSS is nothing new: from the moment the first hominid began chipping spearheads, products have been undergoing processes of servitisation while, similarly, services have been undergoing processes of productisation. Servitisation emerged when someone offered spearheads with some sort of warranty, instructions, or perhaps even a sharpening deal. Services predate products, as hominids must have guarded, groomed, and laboured for each other, whether by force or by choice. When tools became available, guards with spears or knives were actually productising their offering, becoming more effective than guards with nothing but their bare hands.

Products and services are placed on opposite sides of a continuum, and these extremes have been moving towards each other without anyone taking much notice. What really caught our attention was the moment when computing components became so small and cheap that they were stuck into our day-to-day products. This allowed them to generate and process information and reach out to other products. We could have noticed earlier, when mobile internet became a reality, around the introduction of the Nokia Communicator in 1996, but back then most of us were too busy designing chairs.

The question whether PSSs are good or bad is either pretty dumb or very smart. PSSs are like the weather, an autonomous development that unfolds whether we like it or not. Unlike the weather, though, we have some control over how PSSs will evolve. Some people worry that PSSs might result in a dystopian, unconscionable contract: opaque, gated, and a threat to our privacy. They probably remember how the arrival of the printing press plunged Europe into a century of war and civil unrest. Likewise, PSSs will lead to a multitude of problems because we will have to reinvent all our classic institutions: money, ownership, taxes, citizenship, mobility, and justice. We are living in lawless gold-rush frontier towns, where any local barman can grab the opportunity to bring offenders to justice according to their private beliefs. You and I may end up in jail for starting a public transport company or trading in an unofficial currency.
But as creative professionals, we can make a difference by getting in the driver's seat. PSS for Dummies attempts to engrain a moral obligation into the minds of the creative community in order to make life on this expiring planet a little easier.

PSSs offer several opportunities to make our lives easier. The classic boundary between user and producer will enable an osmotic exchange of responsibilities and power. Asset ownership will soon be an aberration. Managing risk reduction, maintenance, and consumables will become a job for system providers. Accurate feedback on the actual use of a PSS will support a shift from mass production to mass customisation. Producing these tailor-made solutions will require more versatile production methods.

And lastly, PSSs favour a circular approach to business and production. Their proper maintenance and responsible use will be in the interest of all stakeholders. When a product's economic life is over, all matter is expected to return to the factory's doorstep, because the user never paid for it. The greatest benefits offered by PSSs are what they can do for society as a whole.

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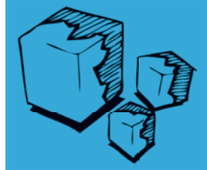
- Co-CEO at Reframing Studio
- Member CRISP Programme Committee
- Member CRISP project CASD

CASD

Foundational project



GIULIA CALABRETTA — *1979*

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·Assistant Professor at Delft University of Technology, Product Innovation Management

Product Service Systems and industrial design providers.

Competitive Advantage through Strategic Design (CASD) is about effectively integrating design professionals, their methods, and tools to enhance the design, the management and, subsequently, the competitive position of Product Service Systems (PSSs) in the market. If design professionals succeed in playing a strategic role, they can help firms to realise (a portfolio of) PSS combinations that are recognisable, legitimate, and coherent for customers, and sustainable for their providers.

Using negative emotions to create richer user experiences and better product impact: Studying how designers can achieve richer user experience and more effective product interaction by creating products and services that evoke negative user emotions.

The design of Smart PSSs: Providing guidelines to designers for the effective creation of Smart PSSs, which are perceived as coherent market offerings, with added value to consumers, companies, and society at large.

Category Spanning Design: Understanding how design contributes to the positioning and market performance of a new PSS by having it perceived as belonging to a new and legitimate category.

Portfolio Management of PSSs: Understanding how the collaboration between design consultants and their clients should be managed to ensure the development of new products, services and PSSs that are highly successful in terms of meeting their financial, market, and process goals.

Enhancing the Strategic Role of Design Professionals in PSS Innovation: Understanding how organisations should structure and manage their relationships with design professionals to best integrate their expertise in strategic decision-making concerning PSS management and design.

Coherent Style Narratives for PSSs: Understanding how narrative arguments about Dutch design and style can support coherence in PSSs.

The Play's the Thing: Using human-centred design research to explore how to improve passenger emotions and energy through stimulating more social interaction in-flight.

Super-Maker: Using 'thinking through making' methodology to find new application opportunities for elevated printing technology.

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G-MOTIV

Foundational project

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·Assistant Professor at Delft University of Technology, Industrial Design, Design Aesthetics

Designing motivation. Changing human behaviour using game elements.

The G-MOTIV project is about researching and applying new approaches to behavioural change based on motivation by using game elements. We conduct research on the motivational effect of game elements for changing behaviour in the domain of mental healthcare, physical healthcare, and social (work-related) healthcare. Our multidisciplinary team of scientists, designers and application domain experts work on developing intelligent PSS prototypes and generating knowledge on persuasive game design.

Persuasive Game Design aims to transport the user to a game world experience in order to facilitate transfer effects of the user in the real world, for example awareness or behavioural change,.

G-Motiv is structured along three major research lines, each with a distinct domain of transfer effects: one to realise effects in the social domain, one in the physical domain, and one in the mental domain. In the social domain we conducted research and designed gamifications to enhance social collaborations among groups of workers ranging from steel factory employees to consultancy professionals. With regard to the physical domain we studied and designed persuasive game design to enhance the physical activity of people with dementia in care homes. And, in the mental application domain, persuasive games were studied and designed in order to increase the therapeutic compliance of youngsters in substance-addiction care programs with regard to filling in their diary. Moreover, in collaboration with Design Academy Eindhoven, we designed prototypes to stimulate personal story telling for people with dementia, and to stimulate personal story sharing for youngsters in mental healthcare programs.

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GREY BUT MOBILE

Test bed project

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Improving care-related mobility services for the elderly supporting them to live independently and stay social connected.

Enhanced Care Service through Improved Mobility for Elderly People (Grey But Mobile) is about improving care-related mobility services for the elderly supporting independent living and social connectivity. Importantly, the quantitative and qualitative effects of these proposed services have to contribute to the improved health of the elderly as well as to the economic efficiency of care.

Today, elderly live in their homes longer, predominantly because of improved home care. For reasons of efficiency and costs, this is considered a good development, but it has a downside too. Elderly often live alone and solitude is regarded to be a main cause of health problems. Keeping elderly socially connected and involved, requires them to remain mobile. However, current mobility solutions do not cater specifically for this group.

Grey But Mobile project consists of three sub-projects
- Strategic user insight through empathic adventure and activity monitoring
- Improving user acceptance of PSS innovation through lost habits
- Co-creating shared values with multi-stakeholder network

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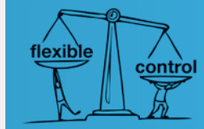
GRIP

Foundational project



EVELIEN VAN DE GARDE — *1975*

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· Postdoctoral researcher at Delft University of Technology

GRIP is about how designers achieve a balance between flexibility and control when designing PSS, leading to the creation of effective and socially responsible value for users and other stakeholders.

When designing from a system perspective, the creative control of design is structurally lower than in product design. The designers have to deal with complex, dynamic environments and need to negotiate decisions with a range of stakeholders. The PSS development process is less formalised and is characterised by a high level of co-creation and co-production. This raises the question: how tight should the designer's grip on the processes and outcomes of design be when working together with end-users and other partners in PSS development?

A first contribution of the GRIP project has been to clarify the role of design in PSS, where human relations take centre stage. For this purpose we first looked at the relations among users and providers of PSS. We demonstrated the importance of making decisions in the design of PSS with regard to how flexible or controlled the system's interfaces should be towards human relations. At the moment, we are attempting to place this finding in a broader perspective, and position our research more generally within healthcare, for example for self-management and person-centred care.

Secondly, the GRIP project has mainly focused on the area of work-related stress, an area where there is already a large amount of expertise in many disciplines. In such a knowledge-intensive domain, an important role of PSS designers is to design data inputs and feedback for people in the system (clients, coaches, doctors, researchers, etc.). From a perspective of data design, the final GRIP design, the 'Room for Inspiration', can be seen as a new opportunity for environmental (bio)feedback, creating data and research output by and for users and providers of the Room.

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I-PE

Test bed project

TILDE BEKKER — *1964*

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for children

Intelligent Play Environments are those in which a playful persuasion approach encourages social and physical play, which in turn contribute to well-being. These environments may partially counter the trend that children are physically inactive and therefore have an increased risk of obesity and isolation.

The Intelligent Play Environments project (i-PE) is about the development of an 'inspirational test bed' to develop fundamental knowledge, insights and guidelines for the design of intelligent, playful environments. This design research includes playful persuasion, emergent behaviour and interaction opportunities that stimulate the social and physical play of various user groups. The project examines how an environment should be designed to sense players' behaviour and create appealing play opportunities. Furthermore, a tool is under development to measure the user experience. The interaction opportunities are designed in an open-ended manner to encourage players to interpret the possibilities in their own manner and improvise during play. Additionally, a decentralised approach has been taken to examine whether we can design a play environment that adjusts to changes in the play context, such as number of players and/or the configuration of play objects.

PSS concepts will be used as vehicles for research, further developing our design philosophy for social and active play. Different play designs have been developed which support a range of forms of play, for example fantasy play and social and physical play. Furthermore, the design approach has been applied to other application domains such as way-finding in an amusement park or in a hospital.

The Lenses of Play tool — The Lenses of Play is a card-based design tool that translates insights from the I-PE project to design knowledge that is understandable and applicable for both designers and students. The cards include five different 'lenses' or perspectives such as emergence and open-ended play, which provide guidance to designers aiming at developing playful interactions. As a tangible tool, the cards can be used individually or in groups during, for instance, brainstorm sessions and discussions.

Glowsteps — A design research platform to examine the influence of different design decisions on children's emergent play behaviour

Simulations of emergent interaction behaviour — Project partner Driessens and Verstappen created eight design explorations of decentralised emergent interaction behaviours of possible play behaviours in real life contexts. Two of those designs will be implemented in the Glowsteps platform.

Professionalisation of prototyping software — Project partners Almende and Unit040 have worked together on improving the quality of the prototyping software used in the Glowsteps concept.

Play environment explorations — Project partner PatchingZone has explored the creation of play environments with a design vision similar to ours, but in a public space context with different embedded media.

Experience measurement tool: Inea — An interactive experience measurement tool that can be used on an Ipad platform and is now available from the app store.

PROJECT PARTNERS

Driessens & Verstappen · KOMPAN · Sport Complex Eindhoven Noord · Sports and Technology · THE PATCHING ZONE · TU Delft · TU/e Technische Universiteit Eindhoven University of Technology · UNIT040

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PSS 101

Foundational project

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Understanding the networked nature of PSS development.

Methods for Conceptualising Product Service Networks (PSS 101) is about developing a framework of methods, techniques, and tools that improve the conceptualisation of product service systems in networked collaboration. This kind of thinking asks for a new kind of designer as well as for new tools. The outcomes of PSS 101 help us better understand the highly dynamic network environment and new design and development structures, moving people out of their traditional compartments and thereby meeting the needs of an often diverse and evolving group of end-users.

Networked Collaboration Canvas — Enables designers, when working together with stakeholders, to get a clear overview of the networked collaborations, to identify improvements, and to facilitate stakeholders' interactions towards the intended outcomes (e.g. user insights, concepts, prototypes) in the design, development and roll-out of new products and services.

Value Pursuit — Defining values through collaboration and providing a fundament for aligning expectations and goals amongst stakeholders, thereby making the network more sustainable.

Proximity tools: Helping designers to make sense in the boardroom — Design tools have been created which reduce the distance between decision makers and users/citizens.

Generation Y Interactions: Making the office catch up — New Generation Y interfaces have been developed that facilitate the move from software development to designing future ways of working.

Super Maker — Using 'thinking through making' methodology to find new application opportunities for elevated printing technology.

PROJECT PARTNERS

connect2innovate · Design Academy Eindhoven · = exact And it all comes together. · océ A CANON COMPANY · ..STBY... · TU Delft · vanmorgen · zuidzorg Vertrouwd Dichtbij

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SELEMCA

Test bed project

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Humanising care-droids using creative technological solutions to supplement and replace existing care-services.

Services of Electro-mechanical Care Agencies (SELEMCA) is about establishing a trans-disciplinary design theory of human-android interaction by investigating the human affective system, emotion regulation, and creativity.

The increasing demand for care services for the elderly and those with mental health disorders cannot be solved by productivity improvements alone. Many of this group are hospitalised or residents of care centres and nursing homes.

This target group requires intensive care-giving, administrative care, as well as physical, cognitive and psychological support. A new approach is the use of creative technological solutions to supplement and replace existing care-services. These solutions include agents, robots, ambient and virtual worlds; mechanotronic robots that we call Caredroids — PSS systems that create a better fit between carer and patient. Services of Electro-mechanical Care Agencies (SELEMCA) envisage 3 types of Caredroids, each providing a different service: medical questionnaire and form filling help; matchmaker between carer and patient; and lastly, a robot care deliverer, for example for exercise, medicine coaching and virtual therapy.

STS

Test bed project

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Designing and Selling 'Soft Product' — 'Valuable Service' systems (Smart Textile Services) is about the development of successful methods, platforms, guiding principles and the business models required to understand the multidisciplinary opportunities and challenges of creating Smart Textile Product Service Systems.

Innovation in the form of the combination of soft materials with high technology has led to the development of so-called Smart Textiles. These are of strategic importance for the European textile industry to sustain their competitive edge and to counter threats from low-labour cost producers. Smart Textiles can conduct light, heat or currents; i.e. the textile becomes an interactive product and can now become part of larger product service systems (PSS). This opens up a vast field of opportunities for textile developers and product and service designers to combine their disciplines in the application areas of well being and life style. To develop these complex PSS solutions, manufacturers need to move away from their current fragmented, slow or non-existent knowledge exchange methods and team up with relevant partners. Initial investment in this field has led to the design and development of an inspirational test-bed, called 'Wearable Senses' at TU/e. An inspirational test bed enables textile developers to understand the multi-disciplinary opportunities and challenges of creating Smart Textile Product Service Systems.

Crafting sustainable smart textile services — Applying craft qualities in the design of ecological, economical and social sustainable smart textile services

Designing embodied smart textile services — Supporting a skill based community of practice by means of experiential prototypes in order to design embodied smart textile services.

A designerly approach to enable organisations to deliver PSS — Mapping design skills that can support SMEs in the transition towards developing product service systems.

The social fabric of smart textile services — Exploring the social value of craftsmanship for the transferal of skills and knowledge in smart textiles service design.

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GOVERNANCE

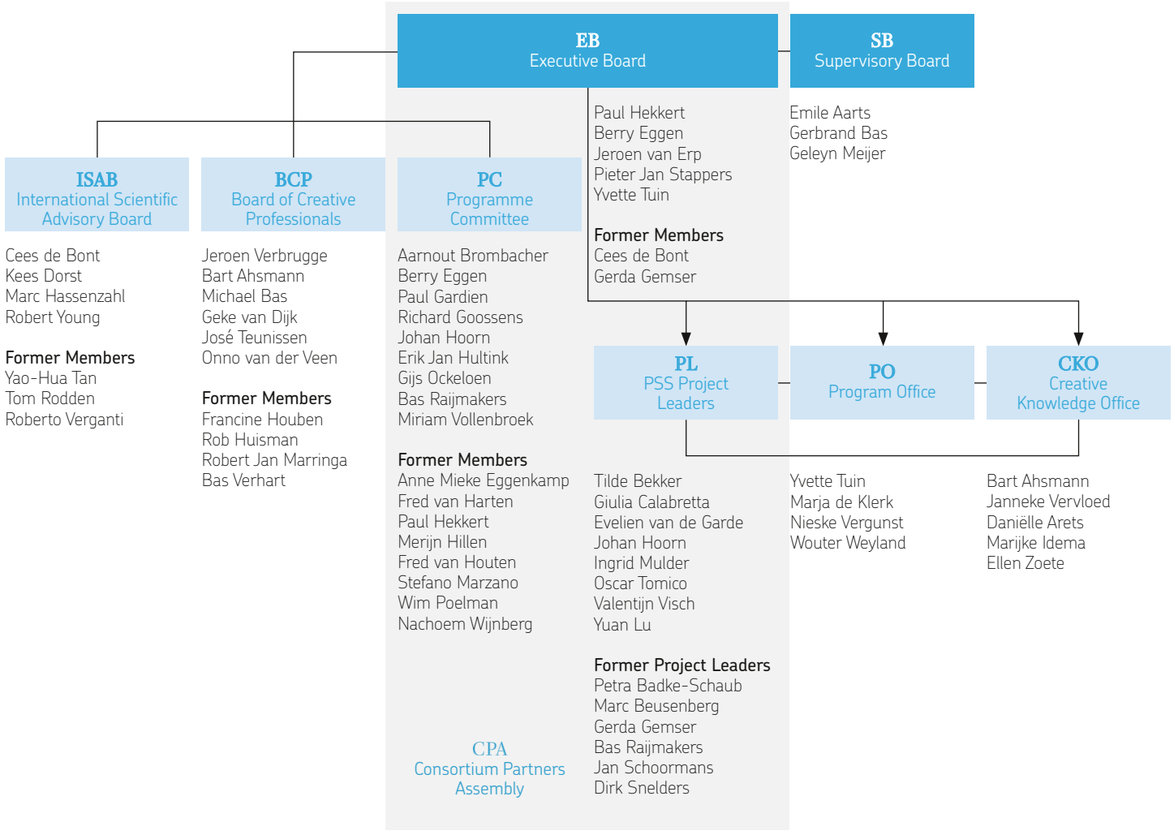
For an effective and efficient governance structure, CRISP implemented functions as:

Responsibilities and liabilities for monitoring, financial, programmatic and operational management; Decision making among involved organisations; Internal and external review mechanisms, evaluation and monitoring. With the requirements of:
— Flexibility in execution
— Giving the creative industry influence on results and interaction
— Clear access point for main external stakeholders

This has been realised by a governance structure as shown, with the bodies:

Executive Board for operational management of the programme
Supervisory Board for strategic decision-making
Programme Office for operational support
Creative Knowledge Office for knowledge dissemination and programme communication
Program Committee for evaluation of the projects' results

International Scientific Advisory Board for engaging and retrieving feedback of leading scientific representatives
Board of Creative Professionals for engaging and retrieving feedback of leading creative industry representatives
Eight PSS projects with their respective project leaders, responsible for the actual research and the **Consortium Parties Assembly** as a community for all participants, anchored in a Consortium Agreement.



In addition to the people mentioned above, the following people have contributed to CRISP's establishment: Anne Mieke Eggenkamp, Daan van Eijk and Peter Paul Verbeek.

GENERAL INFO

CRISP

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In collaboration with: Almende, Amstelring, Berenschot, Brijder Verslavingszorg, Careyn, Connect2Innovate, Connexxion, Contactgroep Textiel, Delft University of Technology, De Wever, Design Academy Eindhoven, Divaco, Driessens & Verstappen, Eindhoven University of Technology, Exact, Fabrique, FLEX/the INNOVATIONLAB, Gemeente Eindhoven, Germansmedia, IC3D media, Ijsfontein, Indes, InHolland, Keydocs, KLM, Kompan, LBi Netherlands, Mentrum, Metatronics, Modint, Monobanda, Novay, NPK design, Océ, Parnassia, People Creating Value, Philips, QBMT, RANJ, Reframing studio, Roessingh Research and Development, Saxion, Scope, Sportcomplex Eindhoven-Noord, Skyteam, Sport and Technology, STBY, Stichting Vrienden van de Thuiszorg, Studio Dumbar, Tellens, TextielMuseum, The Patching Zone, Trivium Meulenbelt, Unit040, University of Twente, University of Amsterdam, VanMorgen, V2_, VU University Amsterdam, Waag Society, Waaijenberg, Zeeno, Zuidzorg. Special thanks to: Ministry of Education, Culture and Science and the Netherlands Organisation for Scientific Research (NWO).

Ministry of Education, Culture and Science

NWO
Netherlands Organisation for Scientific Research
Chemical & Physical Sciences Division

COVER STORY

SPECIAL THANKS

Special thanks to Rutger Prins from Regime (regime.nl) who photographed our cover using pure pigments and high speed flash photography. Rutger's got a knack for things explosive and his entire studio is dedicated to bold imagery: in order to create something beautful, things need to get messy!

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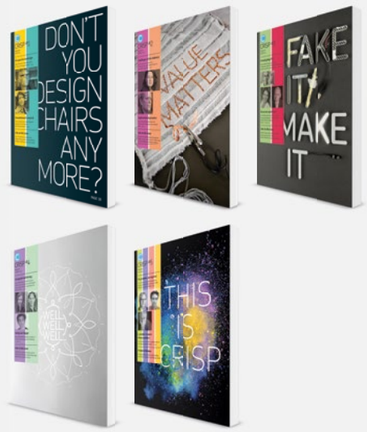

It's a wrap! We intended to publish 5 issues and we kept our promise. No more afterburners or tricks up our sleeves. For the printed versions: check eBay. The PDFs will be downloadable for the next 5 ages.

COLOPHON

Crisp #5
This is Crisp

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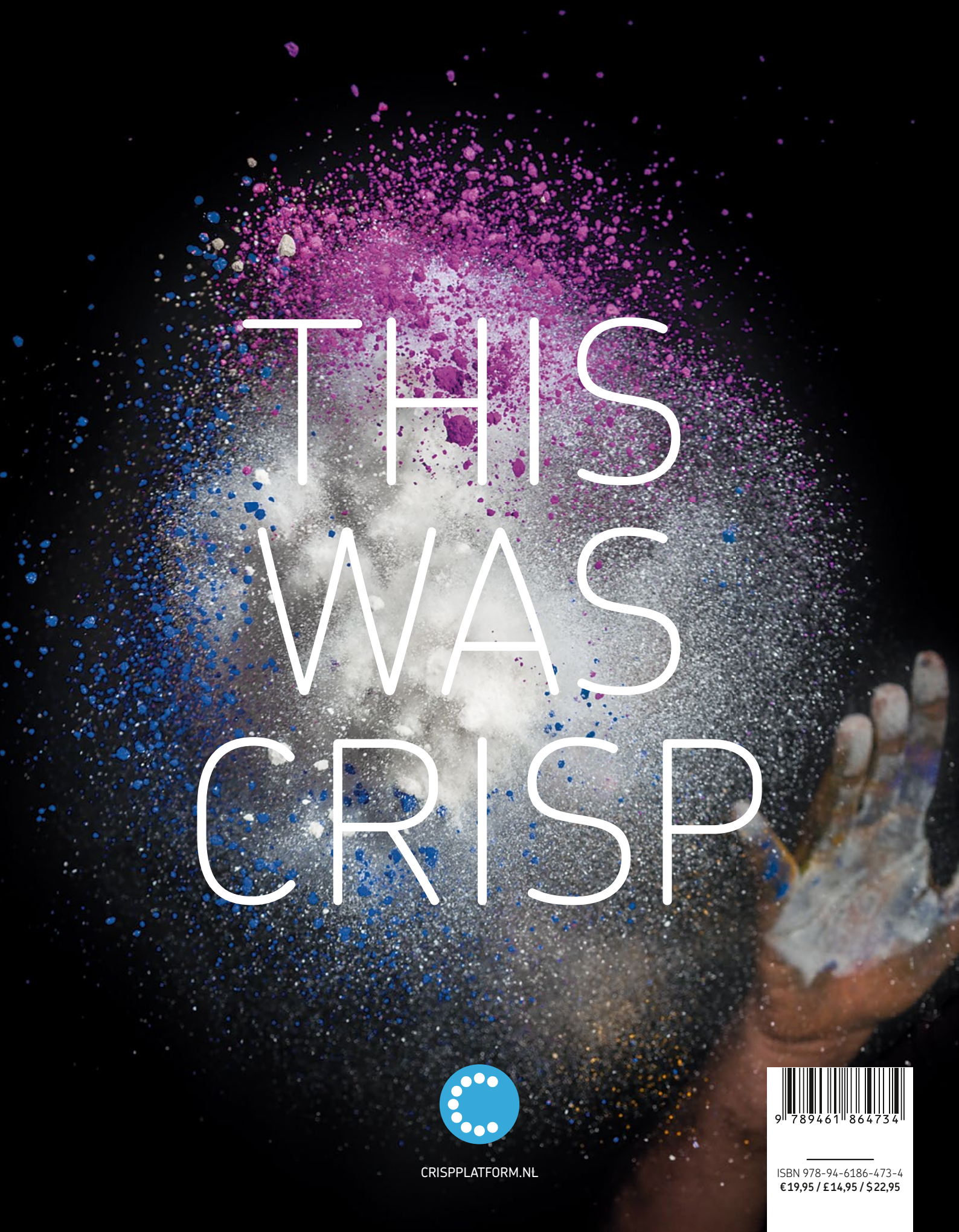

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