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Baby steps towards innovation leaps

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Baby steps towards innovation leaps

Peter Joore

Do I choose idealism or realism? Do I select a training program that allows me to work on undefined dreams, or do I opt for a practical program? Without really knowing what I was getting myself into, in 1985, I went to study Industrial Design Engineering in Delft mainly because, besides the technology, this program also had a creative component. To be honest, back then, a 'higher' design goal to improve the world was unheard of. Designs were aimed at fulfilling a 'function', and ideals were aimed at a smart technical concept, a firm cost price, and a good realization of the ergonomic framework conditions. Of course esthetics also played a role somewhere in the background, although at the end of the day, form always played second fiddle to function.

Form follows function was the adage, and the client's purpose was the deciding factor at all times. That client was almost always an industrial company – the program was named

industrial design for a reason – looking to sell as many products as possible and making as much profit as possible. The research at the faculty was mainly functional and technically oriented at the time, with the researcher dropping a vacuum cleaner a thousand times to determine after how many times the plastic started breaking. Undoubtedly very important, but not something that inspired me personally.

Halfway through the program, I decided to go on a personal quest for idealism. I took a break and did several things, including working in the shanty towns of Bombay in India for several months. After my time at university, I tried to keep going in that direction, among other things through a not very successful attempt to work as a missionary and development worker in Albania, but eventually, I started working as a product designer. One of my most memorable projects was the development of the new Chek Lap Kok airport in Hong Kong and the stations of the new MTRC subway there, in collaboration with NKI Group, Springtime Design, Total Design, and Norman Foster's architectural firm in London. Not very idealistic, but very challenging and exciting.

Innovation Leaps

The next stage in my development came when I switched to a research group at TNO in Delft. There, the Kathalys research group was working on the development of sustainable system innovations.[1] These innovation leaps focused on a factor 4 sustainability improvement, with the underlying reasoning that if we want to cut the environmental impact of used materials and energy by half, while the population grows and possibly doubles, the ecological impact of a product must therefore be reduced by two-times-two-is-four.[2] This factor 4 was later replaced by a factor 10, which required even more radical innovations.

We soon discovered that if you want to achieve such radical innovation leaps, it is not enough to innovate at the product level alone. To have a real impact, it is necessary to innovate at the level of the product-service system, or rather at the level of the socio-technical system, where different actors each fulfill their role and pursue specific interests. In this kind of innovation, it ultimately proved essential to think carefully

about the underlying world vision held by the actors involved. This overarching world view turned out to be a decisive factor for the choices made within innovation projects. This insight provided a direction to connect the idealistic perspective I was still looking for with my work as a designer. This was reinforced by the cooperation with Professor Ezio Manzini of the Politecnico di Milano in the European HiCS research project, which for me was the first time that I met someone who really looked at the design profession from a broader philosophical perspective.[3] [4]

Experimenting with a new mobility concept

One example of such an innovation leap project was a collaborative project where we worked at TNO with partners such as Gazelle, Nike, and Achmea on a mobility concept for individual short-distance transport, called MITKA (Mobiliteitsconcept-voor-Individueel-Transport-op-de-Korte-Afstand, see Figure 1). Our goal was to motivate people to leave the car and to start using a compact electric-driven transport system. At some point, however, it became commercially much smarter to promote the developed vehicle as a trendy off-road cross-vehicle for affluent yuppies. Although that may have been smart from an economic point of view, in terms of our ideals, it was the opposite of what we had intended. Therefore, we soon discarded that option.

Figure 1
MITKA: mobility concept for individual short distance transport.[5]

1. Adrie Beyen, *Kathalys: Vision on Sustainable Product Innovation* (Amsterdam: BIS Publishers, 2001).

2. Ernst von Weizsäcker, Amory B. Lovins, L. Hunter Lovins, *Factor Four: Doubling Wealth, Halving Resource Use* (London: Earthscan Publications Ltd, 1998).

3. Ezio Manzini, Luisa Collina, Stephen Evans, *Solution Oriented Partnership. How to Design Industrialised Sustainable Solutions* (Cranfield: Cranfield Publishers, 2004).

4. François Jegou, Peter Joore, *Food Delivery Solutions* (Cranfield: Cranfield Publishers, 2004).

5. Peter Joore, Michel van Schie, Eindrapportage MOVE – Mobiliteitsconcept voor Individueel Transport voor de Korte Afstand – MITKA (Delft: TNO, 2001).

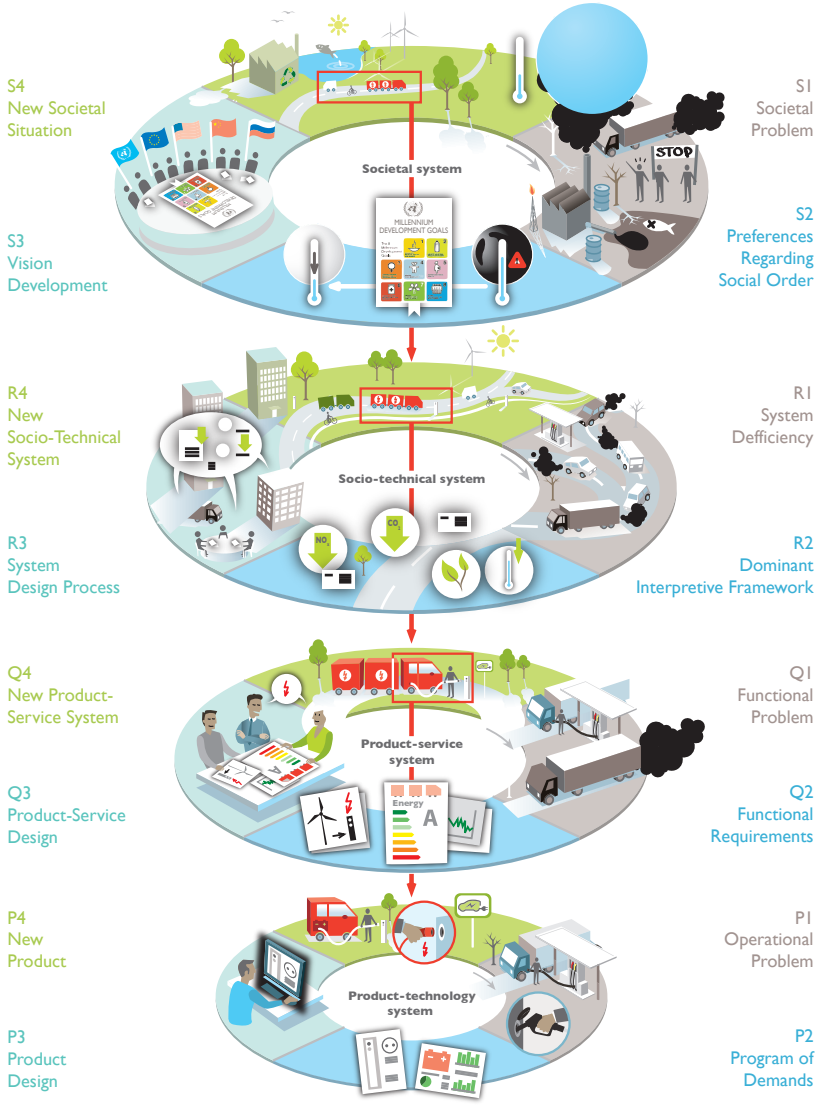

Figure 2
Multilevel Design Model [11]

Finally, we tested the system with the employees at Nike's European headquarters in Hilversum, with participants documenting their experiences in a diary. The new transport system was now used on a small scale, and the lessons we learned from it were to be translated into application on a large scale. This approach is also described as a Strategic Niche Experiment,[6] a Bounded Socio-Technical Experiment,[7] or a Transition Experiment.[8]

Over the years, researchers have worked on this methodology, and started to use different names for somewhat similar approaches.[9] Much of this research applies a more philosophical and sociological perspective; it is not aimed at designers. I tried to establish the connection with design in my dissertation, where I developed a Multilevel Design Model (Figure 2) to describe the relationship between the different system levels at which the design process takes place.[10] [11]

Innovation at the cutting edge of industries

This dissertation was the first step toward a position as a professor of Open Innovation at the NHL Stenden University of Applied Sciences in Leeuwarden. In that role, it was my task to link the various professional areas of the university of applied sciences with the idea that innovation takes place at the cutting edge of different fields of work. This is where the Neue Kombinationen (new combinations) are created, as Joseph Schumpeter already mentioned in 1911.[12]

This cross-sector approach is also essential in another ambition of the research group, which aims to develop solutions to the complex societal issues that we face. For example, the northern part of the Netherlands wants to lead the quest for circularity. This, however, requires more than, for example, technical solutions aimed at recycling plastic waste. It requires economic profit models, behavioral change, new policies and legislation, to name a few. In short, the ambition towards sustainability and circularity requires a multidisciplinary, interdisciplinary, or transdisciplinary systemic approach.

Everyone designs

The research group has been around for more than thirteen years now, and NHL Stenden has adopted the design process as a leading educational concept for the entire university. Under the name Design-Based Education, more than 20,000 students from more than 75 different courses daily work on developing new solutions for all different sectors of society.

6. René Kemp, Johan Schot & Remco Hoogma, "Regime Shifts to Sustainability Through Processes of Niche Formation: The Approach of Strategic Niche Management," *Technology Analysis & Strategic Management*, 10:2 (1998), 175–198, https://doi.org/10.1080/09537329808524310.

7. Halina Szejnwald Brown, Philip Vergragt, Ken Green, Luca Berchicci, "Learning for Sustainability Transition through Bounded Socio-technical Experiments in Personal Mobility," *Technology Analysis & Strategic Management*, 15:3 (2003), 291–315, https://doi.org/10.1080/09537320310001601496.

8. René Kemp, Suzanne van den Bosch, *Transitie-Experimenten – Praktijkexperimenten met de Potentie om bij te dragen aan Transities* (Delft: Kenniscentrum voor Duurzame Systeeminnovaties en Transities, 2006).

9. Frans Sengers, Anna J. Wieczorek, Rob Raven, "Experimenting for Sustainability Transitions: A Systematic Literature Review," *Technological Forecasting and Social Change* 145 (2019), 153–164.

10. Peter Joore, *New To Improve: The Mutual Influence Between New Products and Societal Change Processes*, (PhD dissertation, Delft University of Technology, 2010).

11. Peter Joore, Han Brezet, "A Multilevel Design Model – The Mutual Relationship Between Product-Service System Development and Societal Change Processes," *Journal of Cleaner Production* 97 (2015): 92–105, https://doi.org/10.1016/j.jclepro.2014.06.043.

12. Joseph Schumpeter, *The Theory of Economic Development* (Cambridge: Harvard University Press, 1911).

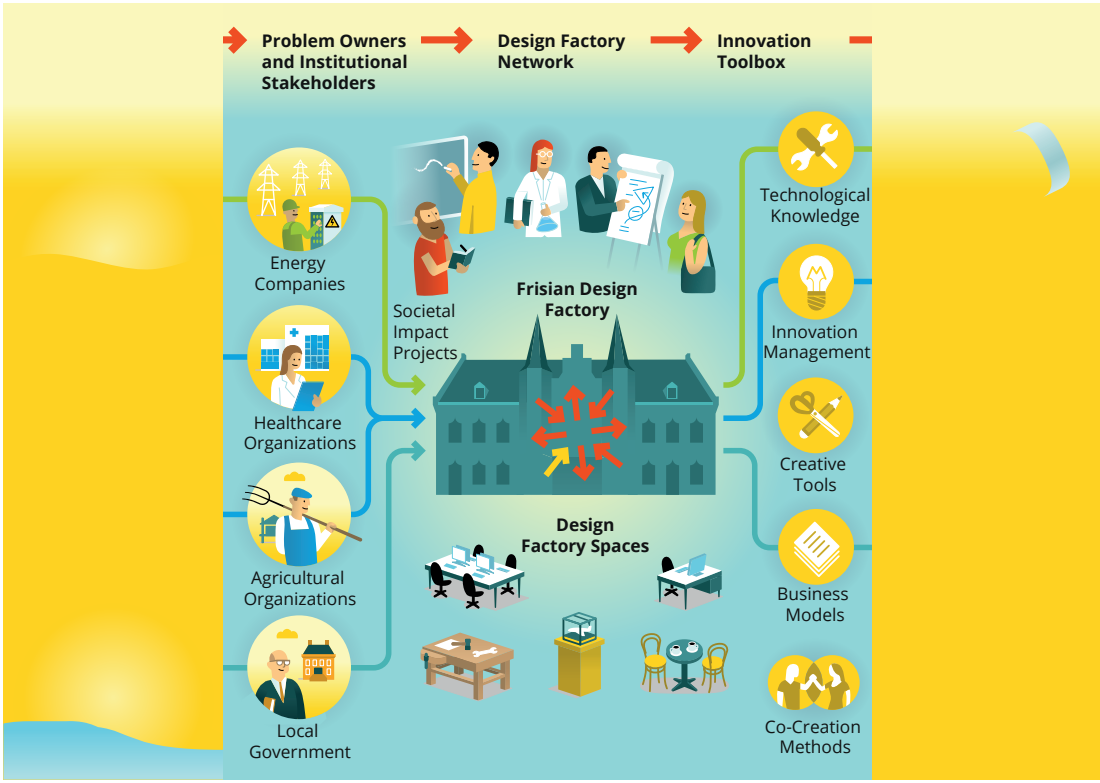

Figure 3
Visualisation of the systemic approach that is used by the Frisian Design Factory to design solutions for complex societal challenges. Illustration by Marc Kolle.

Currently, my university of applied sciences has dozens of design workshops where students design solutions for questions from professional practice. These solutions are certainly not always physical objects or products but can also be in the form of a game, a recommendation, a policy plan, a care protocol, or a business plan. In fact, it means that all professionals are considered designers. This was also described in 1969 by Nobel laureate Herbert Simon. He stated in his book *The Sciences of the Artificial* that '*Engineers are not the only professional designers. Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare for a state. Design, so construed, is the core of all professional training: it is the principal mark that distinguishes the professions from the sciences. Schools of engineering, as well as schools of architecture, business, education, law, and medicine, are all centrally concerned with the process of design.*' [13]

Designing a miniature society

We are now facing the same challenge as I described above in the pursuit of a sustainable society. Although most of the questions from professional practice can be answered with monodisciplinary solutions, a cross-sector perspective is necessary to address the real complex societal challenges. To achieve this, the concept of the strategic niche experiment mentioned above can be translated into a design environment. This could be described as a field lab or a living lab, where we would be working on groundbreaking solutions on a type of 'intermediate scale'. The working level here must be 'large' enough to think at the societal system level. And at the same time, it must be 'small' enough to make the solutions that have been developed concrete and tangible.

We try to apply this approach at the Frisian Design Factory located in the former Blokhuispoort Prison in Leeuwarden. Here, students, lecturers and professionals cooperate on solving complex challenges related to energy, water, food or healthcare, as presented in Figure 3. One of such examples in which we work at the level of the societal ecosystem is a collaboration with various stakeholders on the Frisian or Wadden Islands. Together with local authorities and entrepreneurs in the hospitality industry, students are working on the ambition to make the islands completely plastic-free. Innovations include the use of durable materials such as biodegradable plastics, but the project focuses even more on avoiding the use of plastics altogether. One of the ways we try to achieve this is by using 'nudging': designing the environment so that visitors are more or less seduced to display the desired behavior. We do this, for example, by making reusable products much more accessible compared to the less desirable disposable products.[14]

Another example of applying this systemic design approach is the Inno-Quarter project, where we develop sustainability solutions at and with festivals. For example, we created an environment called DORP (the Dutch word for village) at the Welcome to the Village festival. Here, students design solutions for sustainability issues. Because the entire festival is built from scratch in one week and is taken down afterward, a complete miniature society is built from scratch.

13. Herbert Simon, *The Sciences of the Artificial* , Third Edition (Cambridge, MA: MIT Press, 1996).

14. Marcel Crul, Plastic-Free Tourism and Hospitality on Dutch Wadden Islands: Multi-level Design Approaches and Experiences. *Proceedings of European Roundtable for Sustainable Consumption and Production* (Graz, 2021).

Something similar takes place at the Into the Woods festival in Sweden and the Northside festival in Denmark. We recently described our working method in the Festival Experimentation Guide (Figure 4).[15] This 326-page manual contains dozens of examples of innovations developed or tested at the festivals, ranging from the Semilla Sanitation Hub (which converts urine into drinking water), the Comp-A-Tent (a compostable tent based on bioplastics, hemp and cardboard), KlimaKarl (a CO_2 reduction game by a startup in Bremen) and SaruSoda (an organic post-mix lemonade). The challenge is still to really innovate at a systemic level, but the foundation has been laid.[16]

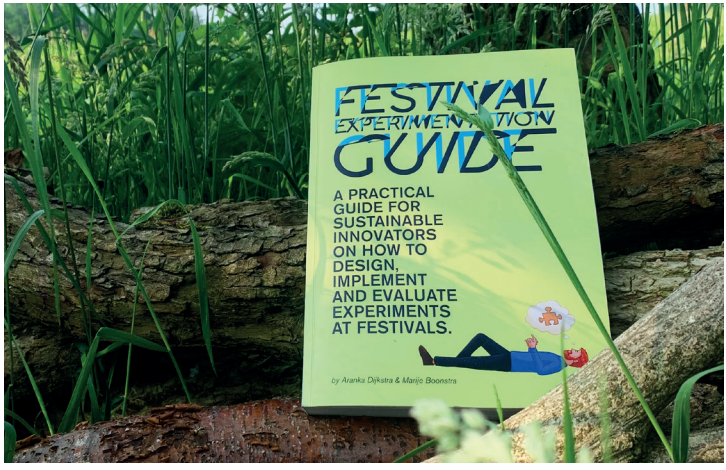

Figure 4
Festivals as a breeding ground for innovation, the Festival Experimentation Guide.[15]

Idealistic visions and realistic solutions

Finally, what about applied design research and all the related definitions? I have to say that design research has evolved considerably, when I look back at the bouncing vacuum cleaners I mentioned at the beginning of this article. Nowadays, we emphasize the difference between research 'for', 'into' and 'through' design, while also still using the difference between the 'designer' who wants to change the world, and the 'researcher' who wants to understand the world. These roles seem to be increasingly intertwined. After all, to change the world effectively, you must first understand it properly. And to understand the world properly, it is actually essential to work with it in a practical environment.

15. Aranka Dijkstra and Marije Boonstra, *Festival Experimentation Guide,* (Leeuwarden, NHL Stenden Publishers, 2021).

16. Aranka Dijkstra, Sybrith Tiekstra, Gertjan de Werk, Peter Joore, "Festivals as Living Labs for Sustainable Innovation: Experiences from the Interdisciplinary Innovation Programme DORP," *Proceedings of European Roundtable for Sustainable Consumption and Production (*Barcelona, 2019).

In this sense, I feel least connected to the 'pure' researcher, who studies the world remotely without actively entering the playing field. Although this is the most neutral and objective approach from a scientific point of view, it does not appeal to me as a designer. At the same time – but perhaps that has something to do with age – I find that in recent years, I have been using an increasingly more reflective perspective, trying to truly understand the innovation ecosystem. Perhaps with the idea that only if you understand a situation properly can you design effective interventions. Precisely that is what has been the consistent factor in the more than 35 years that I have been working in design. And that is what makes design and designers so interesting and relevant, as far as I am concerned. It is ultimately about developing a better and more beautiful world, in which idealistic visions of the future are translated into realistic solutions in the here and now. This seems to have finally bridged the apparent contradiction between realism and idealism that I once struggled with as an 18-year-old student.

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Dr.ir. Peter Joore focuses specifically on design processes in which different types of actors, across the sectoral boundaries, work together to solve complex societal issues in a living lab environment. He was trained as an industrial designer at TU Delft, where he also obtained his PhD in 2010. After graduating in 1991, he worked as a designer at several companies. He started working at the Netherlands Organisation for Applied Scientific Research (TNO) in 1999. In 2008, he switched to higher education, working as a professor of Open Innovation at the NHL Stenden University of Applied Sciences in Leeuwarden.