The world of the open innovator

Research group Knowledge Transfer in Product Innovation

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Introduction

The new nature of innovation

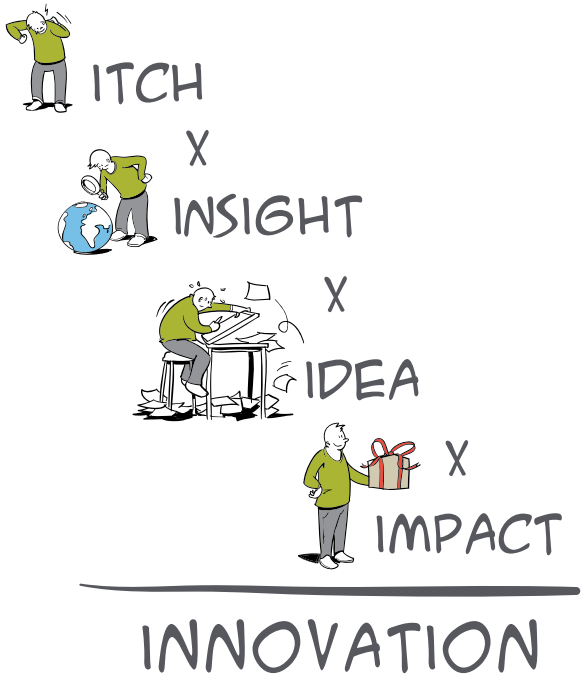
The world keeps spinning and is, at the moment, rapidly transforming. Economical, ecological, and technological developments transcend existing boundaries and incite us to rethink and redesign society. Whether or not to innovate is not the issue. The challenge lies in whether we can innovate fast enough, necessary for realising the transition. Innovators of this transformation move to an approach where research, design and testing are integrated. An approach where stakeholders from government, organisations, companies, and users participate in new ways of collaboration. An approach where solutions are realised that make our society future proof. New innovators redesign the world as it keeps spinning.

Linked to the transformation of society, the field of innovation is going through major changes. This transformation creates new opportunities and roles for innovators. The *open innovator* is at the heart of this change; riding its waves. The end of the journey is not clearly set yet. We are on an expedition and along the way we are exploring its possibilities and meaning. The trip itself has an interdisciplinary character that combines different methods and tools from various (design) disciplines. It is a new way of thinking and looking at the world around us. We are keeping an open mind and improvising to gain an understanding just like the nature of the innovation process.

The world of the open innovator describes the transformation in the field of innovation, some of the backgrounds of the revolution that we are in and the main challenges we face. This will be the world in which you start your professional life. The challenges we face are hard, but also inspiring. *The world of the open innovator* describes the fundamentals for the *open innovator*. It will articulate the transforming role of the innovator and his/hers potential to design a better world to live in. It also describes the necessary attitude and skills to become a successful *open innovator*. We will help you to develop the core skills and abilities you need to become a competent *open innovator*.

Perseverance and entrepreneurship are at the core of your success in innovation.

The success of innovation lies in the realisation. So we also provide a practical approach with the aim that you - the *open innovator* - can come from a question or problem through your own direction towards a sustainable and viable solution. A way of doing this is to act upon the 4i's of innovation: itch, insight, idea, and impact. This will be explained in detail in section 4.



We believe the 4i's approach is a general way to approach breakthrough innovations. That is why we use that same approach to describe *The world of the open innovator*:
The first **i** is the **itch**; this is 'a hunch' that there is something going on. These undefined feelings can indicate a sublime starting point for change. Section 1 describes the itch of the transformation that is going on right now in our society. It opens up the problem to gain a broad overview of the changing context and assumptions and their opportunity to create a better world.

The second **i** is the **insight;** this is the unique starting point to be found to develop into the fundamentals of the breakthrough solution. It aims to frame the problem clearly, putting the user in the middle of the challenge. In section 2 we identify this new insight as a new role for innovators.
The third **i** is the **idea;** combining insights, assumptions and values from the earlier orientation and research and experiment towards potential solutions: this is where the design is created. Section 3 presents our solution for new innovation: the fundamentals of design driven open innovation with a broad view on problems and solutions and a new way of participation of stakeholders.
The final **i** is for **impact**; how to make it happen; to act upon the outcomes of the analytical research and the solution synthesis. Section 4 describes the approach for innovation based upon these same 4 i's. Ultimately section 5 will sum up and draw conclusions from our vision of the future and new approach to innovation towards the competences and curriculum of the *open innovator*.

It is exactly this that we will elaborate in this book. The 4i's approach to innovation as a way of thinking and working as *open innovators* and as a way to describe the world we work in as professional innovators. The 4i's approach to innovation both as a backbone for the entire book as well as a detailed explanation (in section 4) as new approach to innovation in general. This way we practice what we preach.
The way of thinking and approaching the world is illustrated with examples. We use two types of examples throughout the book. General examples, taken from our profession are indicated by a green border. We also include examples of student projects from the first year of the *open innovator*-curriculum. These can be recognised by the purple border.

General examples.

Examples of student projects.

You, becoming an *open innovator* will gain insights, tools and skills to challenge the world and make it a place for better living. We see that this role includes different abilities which are necessary for designers and innovators of the 21st century. However this text provides you with mere words and the real gain lies in the action. So start the experiment, get busy and help us to eventually design this new way of *open innovation* with us.

1 The itch

Our undefined feeling of a transforming society

Innovation happens everywhere. The changing times seem to stimulate some major transformations in our society and these transformations interact and influence each other. We see a world changing in different directions. This chapter describes three major drivers for change that drive the transformation in our society. These drivers nourish a hunch about new challenges and opportunities to create a better world. A world that calls for a new approach to innovation associated with abilities for new innovators.

1.1 Trend: A transformation in people's perception of value towards a focus on intangible goods

In Western countries with a high level of welfare, people are increasingly aware that having more and more goods does not lead to a better quality of life. To feel happier and more powerful, they are not looking for the latest audio set or the newest kitchen equipment anymore. They are materially satisfied. People are re-defining their wellbeing, by rethinking what is important in life. They (implicitly) discover that consumption is just one of the aspects and that health and wellness in relation to personal growth and being in control are more important to them (Green, 2007). What they value instead of what they consume becomes an issue. 'Living better with less' is their motto. They take more social responsibility for themselves, for others and for the environment. Social interaction, social networks and rich experiences provide value of life on a personal level. The label for this way of thinking is the *context economy*.

This societal change has even more impact in non-western countries. Social interaction, enhanced by all sorts of social media, has turned countries upside down. For the first time in the history of the societies, people have easy access to the rest of the world. They can easily interact with other people and read information and opinions.

TWITTER CHANGES SOCIETY

Twitter is an online networking and micro-blogging service that allows people to send and read updates of each other, in messages of no more than 140 characters. Online since 2006, over 200 million users in 2011 and nearly 500 million users in 2012, Twitter has grown to be a widely used communication channel. The real-time information network connects you to the latest news, stories, ideas and opinions about what you find interesting.

Global social networks such as twitter change the behaviour of many people, since in addition to regular social events, people start to communicate about their interests and exchange rich information intensively on a daily basis through personal messages, photos and videos. Communities are created and their reach expands regional boundaries. It allows people to be personally and actively engaged in activities and initiatives.

This combined strength will lead to engagement in initiatives, and eventually movements will grow where more people find themselves comfortable. An example of the strength of Twitter is the rise and growth of the hash tag #daretoask. This specific hash tag originated in The Netherlands as #durftevragen. It is used to ask questions, favours or engagement in initiatives so other people can help you. This is exactly what happens, since people are social beings, and helping each other out is a great way to connect.

Twitter and other social media played a role in the way the Arab Spring unfolded. The revolutions themselves have very complex roots. The protests however were mobilized by a savvy group of young activists who used twitter as a tool to both inspire and reflect the Arab Spring. It was used to inform and activate each other as well as the rest of the world about what was going on. Currently the popularity of Twitter has grown since Arabic is now the site's sixth most common language.

The example of Twitter shows the revolutionary way in which society is restructured, resulting to immense possibilities of communication and connectivity. People have easy access joining communities and movements that can make innovation happen.

The access to these social networks is easy and cheap and therefore the growth of people involved is enormous. Facebook© has more users than any country has habitants. The scale of worldwide social systems and therefore their impact on human lives is enormous.
This openness of society provides other ways of communication, of relationships, of working, of movements, of designing, etcetera. Due to these developments, not only creative solutions are needed for new products and services, but the systems and contexts need to be re-designed at the same time to stimulate different behaviour (Green 2007, Valkenburg 2010).

We live in a unique era. Through internet and social media we cooperate on a scale and in a manner that was not possible before. These opportunities will only grow in the future. We can make much better use of talents, ideas, knowledge, creativity and manpower that are available in our society. Through this 'wisdom of the crowd' we can improve our quality of life, solve societal problems and design better products and services (Kreijveld 2012).

1.2 Trend: A transformation in the driver for innovation from technology and product based towards value based

Design engineering used to be about the creation of new artefacts. However, in the next 10 – 15 years the world of artefacts will change radically (Marzano 2010). Only a decade ago, a design engineer was seen as a developer of mass-produced products. Nowadays, a designer is more often a product innovator who imagines the future and actively creates new value in that future. The scope of design engineering must expand to include innovation. The role of the designer is therefore growing from creating artefacts towards creating future experiences. This role exceeds the scope of the development of a single product and demands a new approach.
The far-reaching abundance of technology has changed our lives drastically in the last century. Technology enabled us to live in comfortable houses, to travel and to communicate with each other. Technology also provided us with consumable products that enriched our lives. The deep structural change from a materially oriented economy towards a context economy in which experiences are more important than products, changes the role of technology.
In this process technology enables, rather than drives innovations. Technologies are needed to fulfil social needs, not the other way around, where people have to adapt their behaviour to technology. In this way design engineering should not be driven by technological possibilities. It should be driven by social issues. Social research to understand people's needs and technological forecasting to understand future applications are both necessary ingredients for meaningful innovations.

There is a strong transformation in innovation where intangible issues and user experiences are taking centre stage, reaching beyond products or technology. This also led to the rise of attention for service design (Stickdorn and Schneider 2010). Services are non-physical, intangible concepts, inciting more emphasis on designing the desired experience for the end users. Articulating and visualising the added value of the experience becomes more and more important (Tackara 2006). This attention for experiences and added value helps innovators to recognise the meaning of the solution and to take more social responsibility for themselves, for others and for the environment.

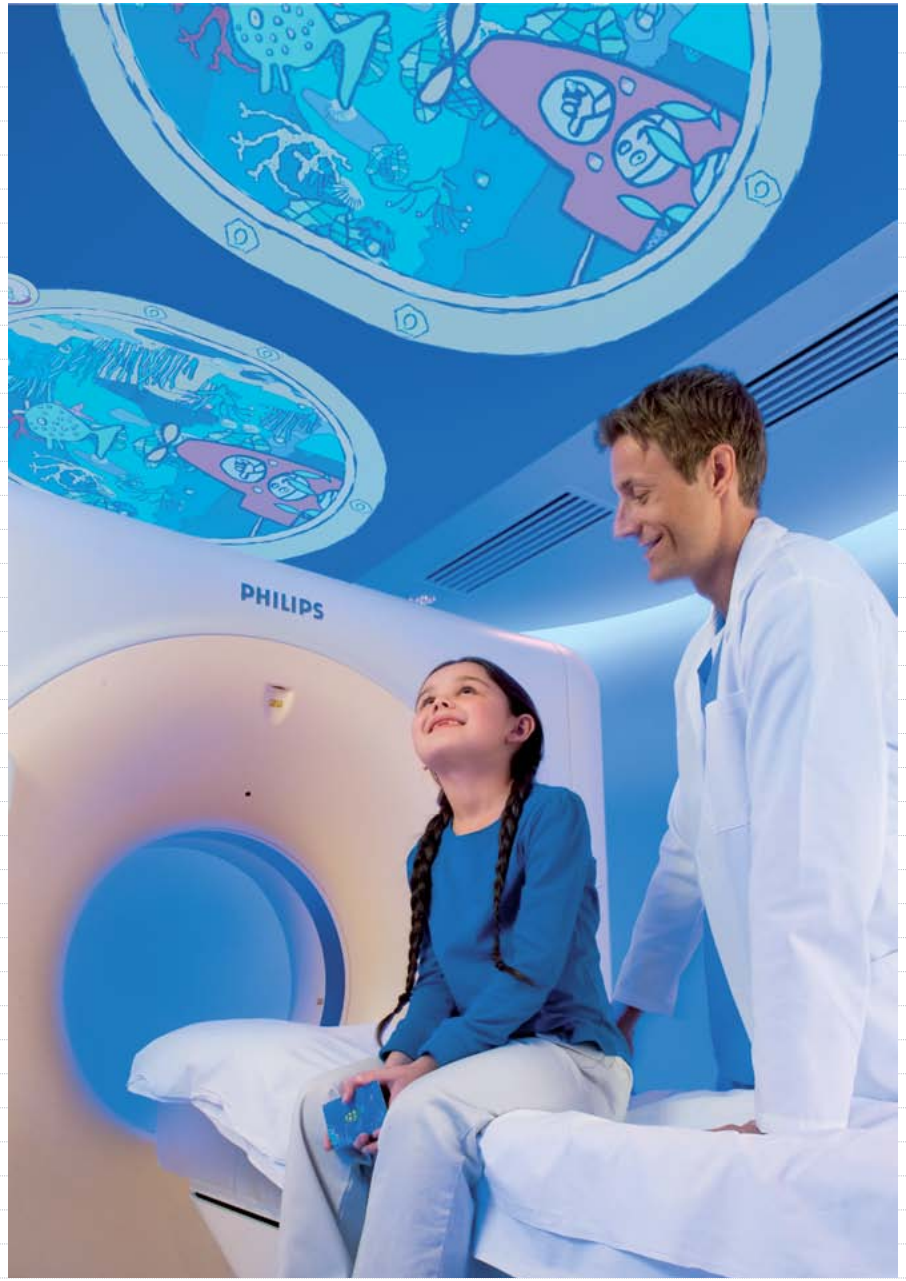
PHILIPS ADDING VALUE FOR CHILDREN

Philips Medical Systems is one of the main players in the market of CT-scanners. Competition in this market used to be driven by technological excellence for a long time. Competitors were beating each other on who could make the highest quality scans in the shortest time for the lowest possible price. To escape the competitive rat race on the best technology, Philips started thinking about how and where to create added value and through it improve the effectiveness of scanning different from raising quality and speed.

PHILIPS
sense and simplicity

In order to find an answer to this question they conducted social research in hospitals. They intensively investigated the processes around scanning and all the stakeholders that were important in these processes, such as doctors, planners, patients, nurses, hospital management etcetera. They found that the medical industry was not really interested in the CT technology itself, rather the produced scans. Since the quality of the scans was more than sufficient, medical specialists valued the effectiveness of making the CT scans. The research also revealed that scanning children is a long and difficult procedure. Children are afraid to get into the CT scan machine and due to that, are not able to lie still during the scanning procedure. This constant movement of the child caused many failed scans and was therefore not only traumatic for the children and nurses, but also time and cost consuming for the hospital.

Philips combined these two insights and radically changed their product. They introduced two new product service combinations. The first solution was the Kitten Scanner, which is a scale model of a CT scanner. Through playful interaction with toys and storytelling it helps children to gain a better understanding of the examination procedure. This reduces their initial fear for the real machine significantly. The second solution that Philips developed was a CT scan experience. They did not only design a machine, but also the atmosphere in the entire room, by adding animated movies and music. Children can choose this atmosphere by themselves. It is not only relaxing, but also functional. In one of the animations for instance, a dolphin appears, that has to hold his breath under water. The child is asked to imitate the dolphin, which created a major reduction of failed scans. In the new situation not only the child and nurses are happy; also the hospital management is happy with the increased efficiency of the CT scan rooms.



In this example Philips created competitive advantage by adding value to the situation, instead of creating the most high-tech product possible. The well-being of the child improved the effectiveness of the scanning procedure. A result that could never be achieved by improving technology as they were used to do. This transition from a product-based company towards a value-based company was not easy for Philips. They had to rely not only on their technological strengths, but also on their social research skills. And by doing so they also redesigned the business model of the CT scan to convince other stakeholders in the hospitals.

1.3 Trend: A transition in innovation towards participatory networks

In this era we face challenges that cannot be solved within the boundaries of existing organisations or systems. To really solve future problems in health care, energy, infrastructure or food supply, creating new products only is not sufficient. As a result, involving stakeholders in early stages of the innovation process is increasingly common.

The time that innovation was mostly an activity that was done inside research and development departments of single companies has gone. Many of today's innovations are not just solitary products, but combinations of products and services within larger systems. In many cases different organisations are involved in these larger systems: profit and non-profit organisations, public and private organisations, businesses and academic institutes, or industrial or regulatory organisations. More flexible value networks replace traditional value chains. In the traditional value chain companies were selecting a number of suppliers, with which they often build long lasting relationships. Over the years trust was gained and the partners could gradually get used to the idea of doing investments and being more interdependent. In the more flexible value networks that are common today, the relations are not as stable and long lasting anymore. Networks evolve dynamically. Some organisations will exit the network at certain points because they feel there is insufficient value left for them. Others may enter at a later stage, bringing in new knowledge and experience and thus influencing the value proposition. These dynamics are an inherent part of the innovation process, and should be regarded as necessary to ensure the highest possible value for all stakeholders.

There is a transformation in collaboration towards networked innovation projects, where stakeholders with different backgrounds participate. The ability to share knowledge and the availability of the knowledge to develop the innovation raise new challenges. At the same time, it is important that the network develops a joint business model that shows the added value for all stakeholders (Osterwalder and Pigneur 2009). Because of their connectedness for successful cooperation, it is important that the co-creating parties all see that the innovation project serves their interests and what they get out of it benefits them (Den Ouden and Valkenburg 2011, Martin 2009). This new way of participation and the focus on a joint business model, beyond the organisations of the different stakeholders, are still in an explorative stage, where innovative pioneers are exploring its possibilities and meaning.

There is a transition in innovation towards participating in networks that transcend existing boundaries of existing organisations. Joint business models for the innovation must be created, to add more value on different levels of the system. This changes the role of the innovator, creating an open and collaborative project, involving more stakeholders and end users to create the innovation together.

1.4 A transforming society

If one thing becomes clear it is that things are changing; our society is going through transformations in different directions. These also influence the field of innovation, concerning:

- Communities and movements that make innovation socially driven. People are creating their own desirable worlds using whatever suits their purpose.
- Added value that is based on intangible issues and user experiences, reaching beyond products or technology.
- Questions and problems that transcend existing boundaries and require a participatory innovation approach, involving more stakeholders.

The right way of answering to these trends is still in its infancy and *open innovator* is at the heart of it. The three drivers for the transformation in our society described in this chapter feed a hunch about new challenges and opportunities to create a better world. The itch we feel is the vision that innovators can make a huge difference for society if only they could see the possibilities and are willing to take responsibility for their creations.

THE BETTER PLACE NETWORK
REALISING ELECTRICAL DRIVING

Due to the growing awareness of energy scarcity and environmental impact of energy use, an ambition to bring electric vehicles to the market has grown. Governments have introduced programs that demand new types of mobility. It is expected that all major car brands will launch an electric vehicle in the coming few years. However, the electric car is only a small part of the entire mobility solution. With the electric car comes the need for long-lasting batteries, charge spots, battery switch stations, new driver services, additional electricity generation, and transmission or communication systems that all have to be designed and integrated for a successful adoption of such a profound new system.

Electro motor technology is not new; it is successfully used in all sorts of house hold appliances and other machines. For the application in mobile products the main challenge is energy storage and charging. The development and realization of the electric car therefore requires a systems approach, where the car, the energy supply system and the driver system have to be designed at the same time. For instance, the decision of the position of the battery switch stations influence the size of the batteries for storage of energy within the car. So decisions on the separate products of services influence each other's designs. And all stakeholders have their own business model and want to gain optimum success.

This involves many stakeholders, each with their own expertise and knowledge. The Better Place network provide services to enable a confident adoption and use of electric vehicles and they are responsible for the infrastructure and the systems to optimize energy access and usage. To enable a successful and, in the end, compelling service, an integrated solution to electric transportation has to be implemented. To realize that the Better Place network works together with governments, businesses and utility companies, such as A123 Systems, Renault and the Automotive Energy Supply Corporation to accelerate the transition to sustainable transportation.

This example shows that implementing electrical mobility is more than just car development. It includes the entire mobility system and there many stakeholders who hold pieces of the puzzle. The whole system has to be designed and values of the different stakeholders need to be taken into consideration to succeed.

better place

2 The insight

The need we see for innovators

The previous section describes the transformation of our society and the nature of innovation. The role of companies changes as well in innovation. In this section we will describe the changes within companies that raise the need for innovators with different abilities.

The imperatives that drove companies into innovation used to be investments, customer centeredness and ideas (Verganti 2009). These are proven to be short-sighted (if not wrong). This is because, on investments, it is no longer only about the money itself, it is about how you invest and the value you add. On top of that, it is important to create more types of value than only money. Reputation, environmental awareness and other 'soft' values are gaining in importance in organisations' strategies. Secondly, ideas on user centeredness are shifting. Experts now argue that new ideas cannot be expected from users, because they are trapped in their circumstances and context. Users cannot tell new directions, so where then can inspiration for new visions be found? And last but not least about the value of ideas; we now see that it is not so much about ideas, but how you act upon them that makes the difference.

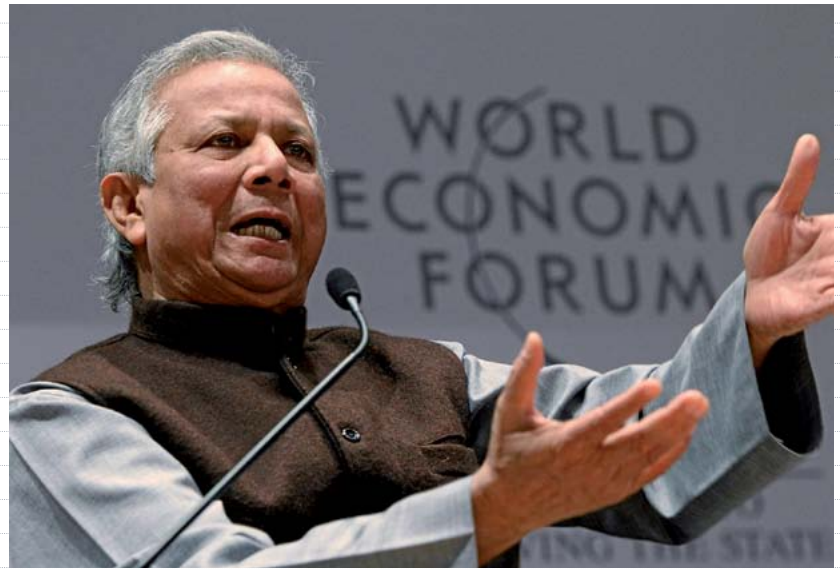
For companies the change of existing values is a huge step. However, more and more entrepreneurs prove that it is possible. Richard Branson reveals how to bring more meaning to our lives and changes the world at the same time. In his book challengedly titled *Screw business as usual*, he states it is time to turn capitalism upside down - to shift our values, from a profit focus to caring for people, communities and the planet (Branson 2011).

Participatory innovation also means that the innovation team changes; expanding beyond the boundaries of the own organisation. As an innovator this changes your role within the team and the project. In participatory innovation three intertwined networks will be built during the innovation process: the core team, the knowledge network and the supplying and enabling network. The core team is the team that takes the lead in the activities in defining and realising the value proposition. The core team creates the shared vision, building on the input of other stakeholders. The core team can be a single entrepreneur, as well as a small team of two or more organisations. The core team is likely to evolve over time: influence of team members may change – they may gain or lose power in decision-making – and members may leave or enter the core team along the way. The core team will build a knowledge network that complements its own knowledge and experience to enrich the value proposition. Depending on the phase of the innovation process other knowledge may be needed, causing dynamics in the knowledge network as well. Knowledge network members may play different roles: some contributing continuously, others playing a role for a short period of time – to provide input to specific decisions. The core team will also create a supplying and enabling network to realise the innovation and launch it to the market.

These changes in companies' and organisations' awareness on innovation changes the role innovators play (Martin 2009). Organisations express an increasing need for professionals who can deal with this complexity and who can create and realise meaningful solutions. There is a need for a new paradigm with a broad view on entrepreneurship and innovation.

The insight we identify is the need for innovators with different abilities. This *open innovator* should play an important role in the needed paradigm shift in innovation. The *open innovator* practices an approach where research, design and testing are integrated. An *explorer*, who will investigate the real underlying needs of people and blaze new trails. A *creator*, who will design the world around him and create solutions beyond products. An *entrepreneur*, who will know how to create belief and will make things happen. An *open innovator* will have a unique set of skills that distinguishes from other design engineers or innovation managers. Skills that combine the capacity to deal with complexity with the practical tools to create and realise sustainable solutions that value people, the planet. It is our ambition to create new designers – *open innovators* – ready for the 21st century. Innovators who act consciously, with a heart for the people and the planet. Innovators that do not only understand the transformation our society goes through, but also really believe that they can make the difference.

ONE MAN IMPROVING WELL-BEING OF MANY



Improving the well-being of larger groups of people through new products and services may seem farfetched and you may very well have the opinion that it is too difficult to make an impact, just being one individual. However, there are quite some interesting examples that do achieve impact on societal well-being.

In 1976 Muhammad Yunus paid a visit to the poorest households in the village of Jobra in Bangladesh, where women made bamboo furniture. To buy the bamboo, these women had to take loans from money lenders at extreme rates, leaving them barely any profit to live on.

Yunus decided to lend US$ 27 to 42 women out of his own pocket, and subsequently got a loan from the government to extend his clientele, and in 1983 founded Grameen Bank. The bank has loaned more than $8 billion to 8.1 million borrowers, of which 97% are women, and changed the lives of 80% of the Bangladeshi families. This improvement is partially economical, by enabling them to have a better income, but it also provided the women that benefited from the microcredit to build their businesses with a sense of accomplishment, family security, freedom, self-respect and social recognition. Addressing these human values on such a scale increases the well-being of a large community: Bangladesh' society (Den Ouden 2011).

The example of Muhammad Yunus shows that starting with an ambition, a small idea and making that happen can eventually create a huge impact.

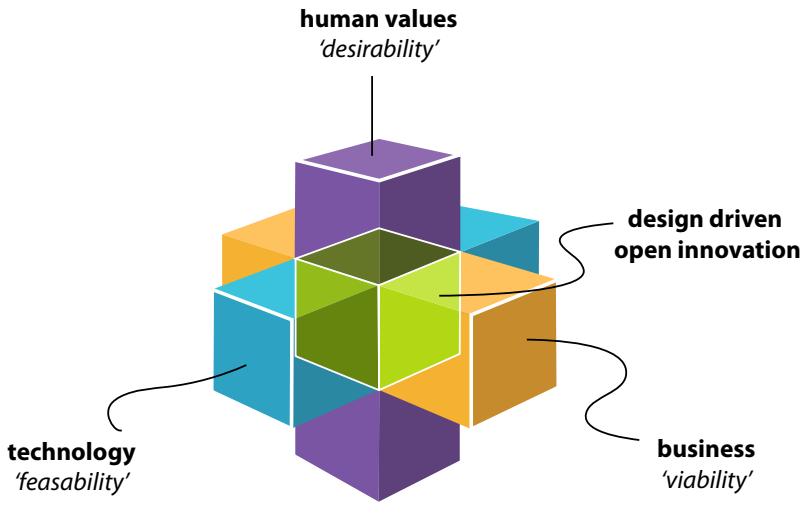
3 The idea

The solution we offer

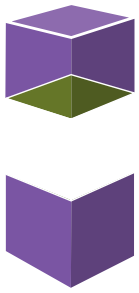
Now that we have gained the insight: a new role for innovators, what will this new role be about? And how do we come up with ideas for this new way of innovation?
We have experimented for over two years in practice, initiating open innovation projects and participating in innovation networks. Now after extensive research on its success and new challenges, we introduce the concept for the new way of innovating as **design driven open innovation** (Valkenburg 2010). Design driven open innovation is a way of looking, thinking and acting towards the world that helps to imagine and realise solutions beyond the boundaries of current possibilities, organisations and systems. Only in this way, can we realise sustainable solutions for real problems.

The building blocks for design driven open innovation are inspired by the three spheres model of breakthrough innovation, developed by the D-school at Stanford University. Scoping an open innovation project requires imagining the future with all accompanying uncertainties and making informed decisions on what fits the scope and what does not. Innovation can only succeed when it is a balanced solution; integrating *society and human values, business and technology* in all stages of the innovation project (Brown 2009).

While innovating, this model is constantly used to evaluate in-between decisions. Reflect whether your knowledge on the idea, solution, concept or problem is balanced over the three building blocks, for only then a full understanding of the problem or the solution exists. In section 4 we will explain how to create meaningful innovations. Firstly, we will shortly explain the three fundaments that eventually determine the meaning.



3.1 Building block 1: Human Values

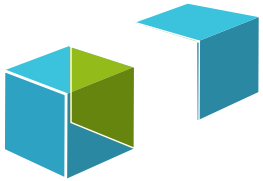


'desirability'

The core of innovation lies in the people that will eventually use, experience and buy the innovation. Therefore understanding the value for society and people is crucial. It is important to consider this from a future viewpoint. Innovation is always about the chances of the future. You have to imagine the future and its opportunities by a thorough investigation of trends, scenario's and people within this future world. A designer should not only connect to the desires of current users, but take into account the future developments that may change the drivers for people, or their behaviour.

Innovation is therefore value driven: how well an innovation complies with the wishes and value of people will eventually determine its success. Additionally the value gained by other stakeholders has to be taken into account. The combination of value for individuals, society, and the planet will eventually lead to more sustainable and meaningful solutions. The way you take society and human values into account as a building block for innovation determines the **desirability** of the solution.

3.2 Building block 2: Technology

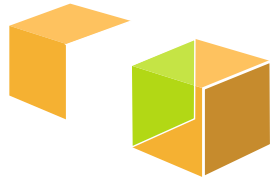


'feasability'

New technologies change societies. The realisation of sewers allowed cities to grow to the important hubs they are nowadays. The introduction of cars extended people's coverage beyond walking distance, introducing many possibilities. The current increase of ICT transforms society in many ways. From sharing information, actively participate in innovation, to taking responsibility for public affairs and social initiatives. But even though important and irreplaceable, technology is considered to be enabling and problem solving. The main crux is therefore to know how technology can be applied in the future context. What are the future applications of technology and when will new technology become available in a feasible way.

This may very well be one of the core competences of a designer, imagining new solutions through new technologies. Users cannot predict new technologies, or their own changing behaviour when adopting them. Breakthrough innovations, like the iPad, require a strong vision on future social needs and a creative imagination of the non-existent. The way you take technology into account as a building block for innovation determines the **feasability** of the solution.

3.3 Building block 3: Business



'viability'

The third fundament is business. When you focus on the creation of sustainable solutions you also need a business acumen. When you are creating new solutions, the business development requires business modelling. This will determine the commercial viability of the solution.

In the case of open innovation this business model should show value gain for all stakeholders within the participating network to be sustainable on the long term. Creating and realising innovation is never done within the walls of one organisation. Networks of organisations and companies have to work together. Acting within an open and collaborative network creates both anxiety and new challenges. The way you take business into account as a building block for innovation determines the **viability** of the solution.

4 The impact

How we will realise this innovation

The ultimate aim is that you as an *open innovator*, when confronted with an innovation challenge can navigate your own course towards a solution. The innovation challenge can be stated by a company, concerning a problem or question, it can arise from a societal trend or be inspired by your own ambition and ideas. A project has to be executed within a scope and set of requirements. You always have to balance the project boundaries (like time, money, investments, or resources) with a client or other stakeholders. Here, we do not want to go into details of project management. Ways of project management can vary immensely between industries, companies and cultures. Instead we will define an approach for innovation, which focuses on the content of the project. It provides guidance regardless of the origin or context of the situation.

We do not suggest a standard step-by-step process, but rather a flow of activities that progresses towards change: an approach that at the same time acknowledges that innovation processes are not purely rational and straightforward in spirit. Being an innovator, remember to constantly:

- **Reflect**: upon content and progress: are you still making a positive change, are you progressing?
- **Iterate**: every step towards the solution will help you to better understand the problem at hand. Do not jump to solutions for other purposes than to learn about the real problem.
- **Balance**: a successful innovation is never built up of mere fabulous new technology, one consumer question, nor a way to make quick money. All tree building blocks: human values, enabling technologies, business and value modelling have to be balanced to make the difference.

It is our ambition to create a simple, yet strong approach. That helps to see the similarities between different open innovation projects, and thus creates a backbone to approach all types of complex situations.

VIRGIN GALACTIC DESIGNING SPACE TOURISM

The itch

Many people are intrigued by space, planets and space travelling. However, in the past 50 years only about 500 people have really been into space. These people all agree upon the fantastic emotional experience, and wished everybody could see it. Richard Branson, owner of Virgin and entrepreneur in his entire DNA, believed that travelling into space could be possible and set a rather ambitious goal. Virgin Galactic will put another 500 people in space in the following two years, and around 50.000 people in the coming decade.

The insight

Virgin Galactic soon found out that major breakthroughs in flight and space technology development were catalysed by prizes in the past. They created one, named the X-prize. The organisation that could develop a spacecraft that was able to fly into space and back again two times in a two week period would get 10 million US dollars. It was estimated that it would cost about a 125 million dollars to realize the idea. The main challenge was to get the spacecraft safe back on the ground. The prize was won in 2004 and that's when Virgin started to sponsor the further development. Virgin Galactic also investigated the interest of people and space travelling. Could it be made commercially viable? Research resulted in the knowledge that the main requirements of people to be willing to travel in space were: to experience weightlessness, to view the earth in space, to see the black sky view of space, and the thrill of the ride itself. With the technology available, human values in sight and a viable business model Virgin Galactic set the ambition to develop and realize safe and commercially viable access to space for all people.

The idea

The team that had won the X-prize had built a technologically viable spacecraft, and the potential for space tourism was definitely there. However, from a customer experience focus there was still a lot that needed to be done before this was commercially viable for the public. The technological prototype had to be further developed towards a product that could fly on a regular basis. Virgin Galactic used its knowledge on air transport to develop the prototype into a successful product. The capsule had to be made suitable for at least 8 people, instead of only one test pilot. People had to have enough space to float around and experience weightlessness. In the prototype the engines were positioned on top of the vehicle, which made it difficult for technicians to access. And in order to meet the high demand for travelling the spaceship needed to be flown by commercial aircraft captions and not only by highly trained test pilots.

In addition to the development of the product, the business case was developed in parallel. Virgin Galactic determined the price of a flight on 20.000 US Dollars and started to sell tickets. Around 450 people customers engaged in the project and committed to its ambitions, their deposits exceed over 50 million dollars. A customer retention program was set up to engage them during the coming years of development and testing

The impact

Virgin Galactic created a circle of partners: the innovation network necessary to come to a successful implementation. This network includes a financial partner (an Abu Dhabi company) and an infrastructure and governmental partner (the state New Mexico). Next to this a lot of regulatory compliances are needed, such as export control, or operator licenses. There are many stakeholders involved, such as medical partners, suppliers, aviation companies, state departments, or investors. The continuous focus on the user experience and the business model has been of massive influence on the design process during the development of the spacecraft. Developing this concept opened up many more possibilities for future projects and business. Until a few years ago we may have thought that space flight was a dream for many and only accessible for a happy few astronauts. One entrepreneur saw it as a major challenge and had the drive to approach it as an innovation project. This example of Virgin Galactic shows how an ambition with the right focus, involvement of the necessary partners and continuous testing, evaluating and iterating can eventually grow into a viable business.

Without creating a straightjacket or prescribed process, providing a common language for a vague and undefined part of innovation. Our approach is a free interpretation of Matt Kingdons 4i's of innovation (Kingdon 2011). All four have to be considered, if one is zero then the sum will be zero too:
Itch x **insight** x **idea** x **impact** = **innovation**

4.1 Itch - from a hunch towards an ambition -

Steve Jobs had an itch: he loved computers and built one in his garage just for the fun of it. His itch was that it must be possible for all people to use this great technology!

Every chance for innovation starts with an indefinable feeling: "There is something going on...". This hunch can start in a conversation with someone, or while taking a shower, or while doing some daily activity. It can happen anywhere anytime. It can originate from both a positive and a negative thought. A negative thought or experience is probably the easiest to recognise; for instance when you use a tool and it does not work the way you expected. "Can't that be done better or easier?" But also positive thoughts can stimulate activity, like a sigh: "what if we would ...?"
Most people get hunches like that quite often, however most times we let them pass without acting. But some of these feelings itch; they keep popping up in your head. You cannot really ignore an itch. You have to do something with it because you have got this feeling that it must be possible to solve it. You will probably start to Google: dive into the issue, the problem, or the (insufficient) solution. That is a good start. In this stage you have to name all relevant items in the situation, explore the problem, understand as much as possible from the context and explore existing solutions and stakeholders.

The aim in this stage is to create a rich picture of the developments, trends and context of the whole situation. Try to seek as broad as you can, do not only seek for support for your idea, but let yourself be surprised and inspired. In this orientation explore from different viewpoints, investigate whether your itch is true, whether more people are involved in it and learn who might help you later on.

The main characteristic of this orientation is that it is **future oriented**. If you are really aiming for innovation, then your innovation will not be developed and implemented tomorrow, it will take a while. Many user research methods aim for detailed insights into consumers' needs

and behaviour. These methods provide an overwhelming amount of information on current situations and for improving solutions. However, innovation is always about developing products or services that do not yet exist, so it is always about the future. An innovator has to imagine the future anticipating people's needs and wishes. The better the image of the relevant future context, the better the basis for decisions necessary for further development.
Futurologists and trend watchers have a daily job in predicting the future. They use different techniques and they have different objectives. For instance, one method is to translate developments and patterns from the (recent) past into the future. In that way, slowly changing megatrends are visualised (Bakas 2009 en 2005, Watson 2008). Another method is to take signals from society (the so-called 'weak signals') and use them for surprising conclusions. This results in challenging interpretations of the future, often for the short term. (Roothart 2005, 2008 en 2009).
For designers and innovators it is not always important that the predictions are 'true'. The aim is to use predictions for the future and scenarios to empathise with possible contexts, in which people will eventually use the products and services that will be developed. The aim of such images of the future is generally to make different representations and use these to feed on discussions and to stimulate decisions about corporate governance. (Valkenburg and Rooden 2010). This translation, from general predictions from futurologists and trend watchers to a workable image of the future for designers, is a big challenge for innovations. This is not a linear process where input of the right information leads to output of the right decisions. It is a quest in which the insights produce surprises that can be used to construct visions of the future. In addition to analysis and prediction, imagination is equally important. By imagining different futures that differ radically from the world of today innovation can be inspired.

So aim for the future, and the people that live and act within that future. To indicate needs for the future, you have to do research into trends and developments. And keep in mind to use different viewpoints. Explore visions of the future to identify what drivers for change will influence the context of your innovation. Explore potential users to identify what their needs and wishes could be. Explore technological trends and developments to identify what enabling technologies can be of use for your solution.

Many **tools & techniques** can be helpful in the itch-stage, such as:

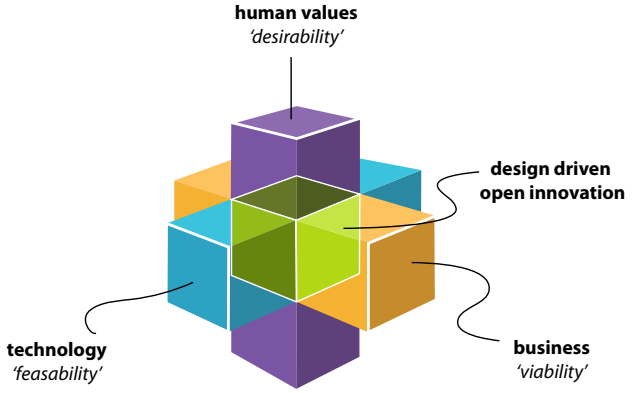
- Future Telling
- Trend research
- Technology roadmapping
- Reversed engineering
- Scenario planning
- Moodboards
- Expert interviews

The participatory network

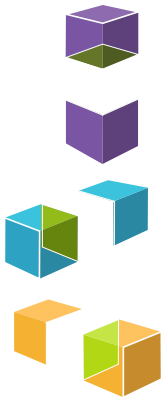
If the itch originates from a business context, this is also the time to include other people. The participation will already start no matter how vague the idea or project still is. In this early stage there is a particularly high uncertainty, which often calls for an iterative process in which the (hidden) user needs will be elicited by 'proposing' innovations and improving them with the feedback. For the actors in the emerging business network, this uncertainty limits their ability to secure a good position in the network right from the start. This often causes the initiators to feel uncertain as to whom they should share their ideas with. Often there is a hesitation to share ideas with others, because of fear that they will run with the idea. This means that initially only people one is familiar with are involved in the process. The initiating innovator often decides on the feedback in these early explorations with whom he will form the core team. The core team is crucial at this stage, as it is guiding the exploration of the idea towards a shared ambition. The ambition is the guiding principle in selecting other members of the core team.
Next to the core team formation, especially the knowledge network is important: identifying who can support the exploration of the idea with the prospected target group of customers. For many innovations it will still be too early to discuss the prospective supplying and enabling network. There could be an exception if the innovation is relying heavily on a technology that is not available in the core team: in that case already in the early stage it makes sense to check whether the supplier of the technology would be willing to participate in the innovation.

Concluding, what you really have to do in this stage is open up the problem and the context. Most times, this leads to a no-go. You will find that it has been done before, that it is much more complex than

you could have imagined, or you just a lack engagement to really dig in (lose your enthusiasm). But it also may very well happen that you do find a motivation to continue. The main concern of the participatory network in this stage is: what can I safely disclose about my innovation?



The itch will come to an end once you can define an ambition. This ambition is the feeling you had from the beginning, but now better defined and founded by knowledge. The result for this stage is a vision on your entrepreneurship. This vision includes all three building blocks:



- Desirability: it consists of the feeling that you or your solution can make a difference for people, which will address human values in a way that matters.
- Feasibility: it also includes a global direction for the solution. Will the solution be a product, a service, what technology will it involve?
- Viability: and there is a business acumen: a space to fill and you have the itch to be the one to act upon it.

This first stage hardly costs anything. Just some time invested. But now that you have engaged with the situation you can decide to go a step further.

4.2 Insight – from an ambition towards an insight

Steve Jobs came to a more specific insight: he wanted to design user friendly devices which support people in their basic needs, like creating new things or communicating with each other. He also defined a very specific target group: the ones that are ready to break the status quo, to 'think different'.

When you decide to go on, then this is the real thing. You have set an ambition and engaged with it. In the ambition you have framed the situation (for now) in a way that suits you and the results of the orientation. Now you have to dig in in order to define where you can make the difference. And although costs in this next step will still be low; this is the first engagement towards a project.

The aim in this stage is to identify a unique starting point to build the innovation on: an insight. Where exactly is the pain and who is feeling it? Insights always relate to the end user: the person that benefits from the actual solution. However, other stakeholders can also play an important role in the context of the solution. The investigation should therefore be broad: explore from different viewpoints.

Profound insights can be found through research. The main characteristic of the research in this stage is that it is **people oriented**. You have to investigate future possibilities, values, needs and wants of the potential end users and other stakeholders.
Identifying values and needs of people is never a straightforward process (Valkenburg and others 2008). People have multiple, divers and complex needs, and they are often not able to articulate them. Research into peoples' lives and behaviour, through observation and interviews, is one of the key resources. A good starting point is to go out into the world and observe the actual behaviour of people as they improvise their way through their daily lives, and do the 'thoughtless acts' that they have become accustomed to. People are rarely aware

of what they are doing, and what to do to improve it, but their actual behaviour can provide valuable clues about their unmet needs. This type of research requires you to really empathise with the people: 'Watching what people don't do, and listening to what they don't say.' (Brown 2009). Only observation is not enough; you can see only actual behaviour, but gaining insights into the rationale behind it is also needed: why is someone acting in a certain way? Observations should therefore always be supplemented by interviews. In this way you can validate what you see with why people act the way they do and you will not make your own interpretation. When users are around, just ask them and do not think for them, because you will probably make wrong assumptions (Valkenburg and others 2008).
Who and where are you going to observe? When observing regular users, it is likely that nothing new will be found. Looking for new needs and insights, it helps to look at 'extreme' users or 'extreme' situations of use.
It can also help to investigate current solutions and initiatives: why do solutions fail? Why was it not solved before? Learn from others and enrich your knowledge upon the problem and possible solutions. "All it takes", according to Dave Pollard (2008): "is time, patience, skills at asking the right questions, and paying attention to the answers, and wearing out a lot of shoe leather."

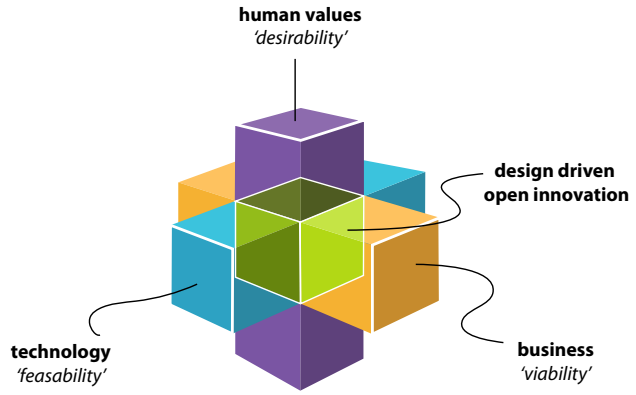
Many **tools & techniques** can be helpful in the insights-stage, such as:

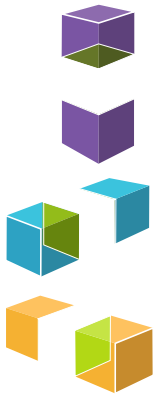
- User research
- Observational research
- Interview techniques
- Focus group discussions
- Infographics
- Experience flows
- Persona's

The participatory network

Because of the complexity of the unmet needs and therefore of the future solution, you may not be able to solve this all by yourself. This stage is also the moment to identify possible stakeholders and connect with their interests. This can help to give support to the foundation of the idea and to define the boundaries of the possible solutions: what will you take into account and what will be left alone? Try to spot a position where other stakeholders can also see a benefit and a challenge. Who can help and support you in the further development and realisation of the innovation? The innovation network is growing to ensure that the right knowledge is available to make a good investigation of the value for the target group(s) of the innovation. In this stage the core team is being formed that combines the different inputs into a shared vision of the project. The core team is essential at this stage, as it guides the other network members from a shared ambition towards a common understanding of the value of the innovation. Around the core team, the knowledge network is being extended, to ensure that the team has access to all relevant knowledge.
Building the knowledge network covers three activities. It starts with creating an understanding of which knowledge is needed to translate the ambition into a validated insight. The network of required knowledge is plotted to gain understanding of which parties could contribute with relevant knowledge of the users, the market, the business system, technology options or regulatory arrangements. Secondly, the team looks how it can gain access to the people or organisations that are needed in the network. Sometimes the team has direct access, in other occasions they will need to find a way to get connected to right people. Thirdly, the people or organisations are approached and invited to take part in a process of collective exploration. The mindset of the participants in this process should be flexible enough to prevent a lock-in of certain parties, and allow for the inclusion of alternative scenarios or ideas. Together with the knowledge network, the core team explores the potential of the initial ambition and enriches it with insights that underpin its value.

Concluding, although hard work, doing research and collecting information is not really difficult, the main trouble lies in the translation of the research results. Your new insights must be translated into a challenge: a design brief. This design brief – the actual assignment to designers – includes a profound insight, where you validate that you can make a unique difference! The main concern of the participatory network in this stage is: who can help us to realise the value proposition?





The result for this stage is founded insight, tested with research results on its:

- Desirability: is there a real unmet need; and what is the actual added value of the solution for people?
- Feasibility: is the problem solvable through feasible solutions or enabling technologies?
- Viability: is there a possibility for a viable business model; can you earn money through it?

But maybe the most important result of this stage for you as an innovator is that you do not just understand the insight and the context, but that you also believe that you can really make the difference for the user!

IDENTIFYING TARGET GROUPS AND THEIR EXPERIENCES WITH ORAL HEALTH AND BEAUTY

The following example follows from a first year project carried out and written down by students of the open Innovator at The Hague University of applied sciences cohort of 2011. The starting point for this project is a consumer trend. The aim is to elicit starting points for innovation by conducting qualitative research and empathising with a target group. These gained consumer insights must be specified in a design brief. In the next project the design briefs are input for a design project. However, that project is not described here. The company with an interest in the question and the solutions, in this case Philips, is only introduced to the students after their first trend and user research.

Introduction

Philips is a Dutch multinational electronic company founded by Gerard Philips and his father in 1891 and has three main divisions, Philips Consumer Lifestyle, Philips Healthcare, and Philips Lighting. This project helps Philips with their Healthcare division, as our theme for this project is Oral Health and Beauty. The oral health industry is a large and everlasting market and the theme covers both the essentials (brushing teeth), as well as luxuries (teeth whitening).

The Itch

As a starting point, we focus on the essentials of oral health care, being brushing teeth. Firstly because we feel that oral health is a habit and therefore overlooked, and secondly because luxuries of the oral health industry cannot be enjoyed if basic oral health cannot be maintained. Initial discussions illustrate that teeth brushing is a robotic act, performed because we were taught to do so. We believe this should change because people should be aware that oral health has an influence on the overall health of an individual. To change habits involves the undoing of years of practice, which ultimately led us to a target group of children aged 10 to 12 years old as their habits are still being formed and can be influenced. With this target group, our research objective is to get a better understanding of children and their experiences with oral health.

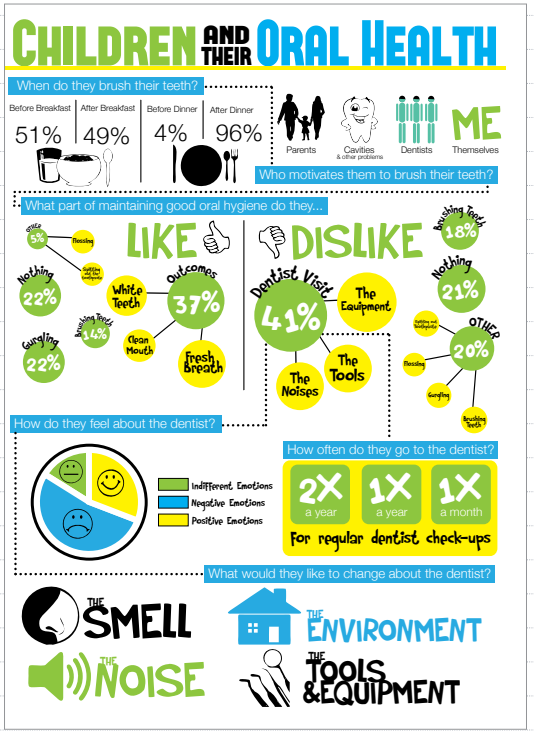
The Insight

We stated two research questions:

1. What are children's experiences with oral health and beauty?
2. What would they like to change?

We asked a range of questions that relate to our main research questions and reached four different respondent groups using four different research methods. We collected data from 26 children through questionnaires, 28 ex-children through interviews & online questionnaires, 3 parents through a focus group session, and 10 dentists through questionnaires. We also conducted a focus group session with children, ex-children and parents.

To make sense of all this data we used tables/charts, personas, infographics, a user experience flow and written summaries. The analysis leads to many insightful conclusions. The personas created illustrated our target group (children) and the



dentists. This helped us get a better understanding of their mental motivations and provided useful insight for possible directions for solutions. A user experience flow helped illustrate and visualize all activities leading up to and after the dentists visit, which helped identify opportunities for improvement.
The infographics were created to summarize the statistics gathered from the numerous data collection methods in an inspiring way.

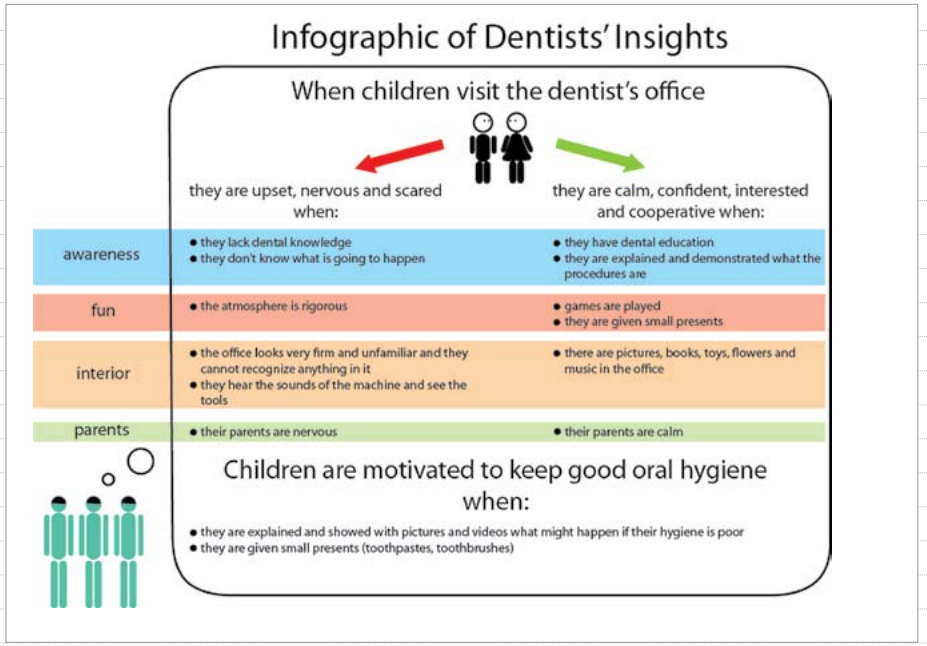
The Idea

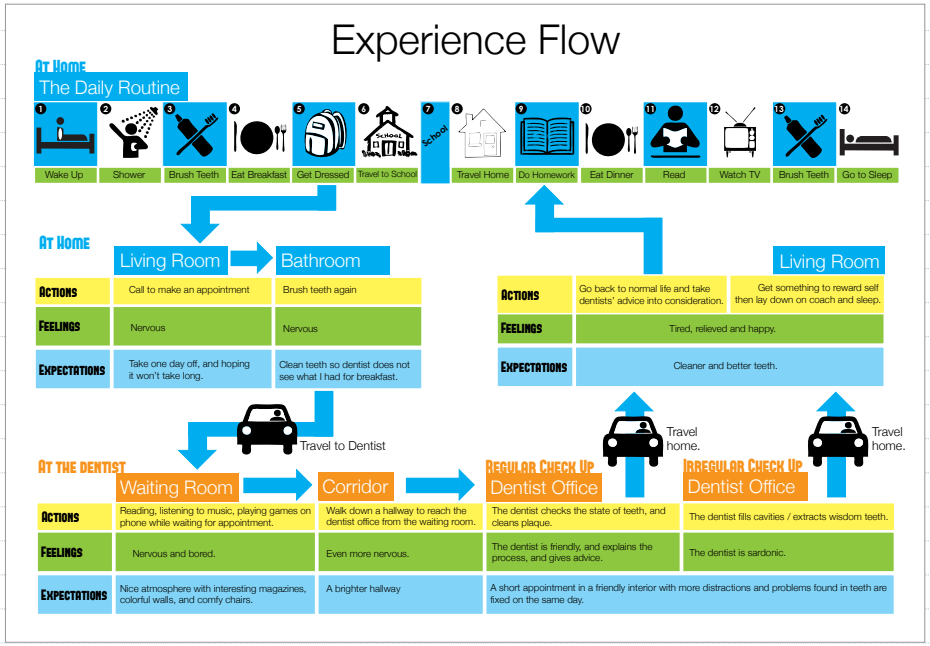
The analysis of the data collected resulted in two different conclusions, hence two design briefs. Our first design brief is on children and their experiences during the dentist visit and is based on the conclusions found from the questionnaires and interviews with children, ex-children and dentists. We found that children have negative emotions associated with the dentist because they are afraid of the tools, the atmosphere and the smell at the dentist.

This unmet need will make use of Philips' Ambient Experience. Our second design brief focuses on children's oral health experience at home. Parents brought up this focus during our focus group session. The main issue is that parents are not able to recognize if their children have brushed their teeth regularly and properly. This design brief can take advantage of Philips' Sonicare product line as these toothbrushes aim for child use.

The Impact

The two design briefs created can be used by future designers to develop new products or services to help bridge the gap between the current situation and the aspired situation which are based on actual unmet needs from real people reached during this project.





4.3 Idea - from an insight towards an idea

Steve Jobs' ideas where really 'outside the box'. He was able to think beyond the actual products. With the iPod, Apple not only designed a beautiful MP3 player, but also, through the realisation of iTunes and iStore, an innovative way to share and listen to music. The same applies for the iPhone and iPad. Besides their primary function – being a phone and a small computer – they also enable a platform for services (Apps). Services that Jobs could never have thought of up front that people would want them, but he did realise that a platform was needed to support the development of these services. He innovated the entire system to add more value to the actual product.

Now you know what the problem really is and who owns it, the pitfall is to jump to solutions too fast. Look at possible ideas on different levels and from different angles. To really be successful the solution has to have an instant appeal to all the stakeholders involved. All stakeholders must have an instant recognition that this is the solution to the challenge they face.

The aim in this stage is to come to the actual design of the solution. This may very well be the most complex stage, for it actually includes the entire design process (Cross 2008). The first step is to get the core value proposition right, and to address valuable complementary offerings as well. It is important that the partners in the network can create synergistic value.

The main characteristic in this stage is that it is **creativity oriented**. From all your research results you combine insights, assumptions and values and imagine and envision these into a product, service or business concept. Creative thinking involves opening up; let yourself be surprised. Diverge on different aspects of the problem and the solution, wander around all possibilities before sticking to one solution.
Divergence can be stimulated by framing and reframing the problem. Problem framing is stating a problem to clarify and create explicit choices for direction. Because design problems are complicated, ill-structured or wicked problems, this is not a clear-cut thing, but an important part of creative process. It involves selectively viewing the situation in a particular way ('seeing as ...'). This selective focus enables you to handle the massive complexity and the inevitable contradictions, by giving structure and direction to thinking while simultaneously temporarily suspending some issues. To stimulate creativity it helps to state the framing as an open question.
'How to ... ?' – questions invite people to think along and on solutions, rather than more requirements. The skill to create and manipulate frames is a central one in determining how the project will unfold. (Schön 1983, Valkenburg 2000, Dorst 2003).
Also viable in this stage is trying things out. Creativity is not a verbal activity; it involves holistic, visual and experimental thinking (all originating in the right side of your brain). Experimenting with the ideas; rapid prototyping, through paper prototyping or modelling, helps to get a quick and rough idea of the solution and its fit. Trial and error help you to iterate effectively, and by acting upon all small solutions you learn to understand the problem and the solution spaces very quickly.
Visualisation and prototyping also help to create a dialogue. Keep in touch with the stakeholders and future users. Use their feedback, knowledge and experience to really understand. In order to explain, communicate and convince stakeholders, visuals are stronger than words (Roam 2009). And models or prototypes are even stronger.
In this stage you gradually shift towards being solution oriented. You come to understand the problem at hand and through a process of framing, experimenting, reflecting, and reframing, you create the best suited solution. Of course this also involves the evaluation of

your ideas. Two main questions are important for evaluation. The first involves the testing of ideas on the original foundation: are you still acting in the strength of the trends and developments that were the core of the itch? In other words what are the opportunities and strengths of the idea? The other one evolves the network of stakeholders: who do you need to realise and implement the solution? What did you miss and can that be solved with a new partner? In other words what are the strength and weaknesses of the idea? If done in a profound way this results in SWOT-analysis (strengths, weaknesses, opportunities and threats), that can help to identify weak points and enable you to strengthen the solution while developing it.

Many **tools & techniques** can be helpful in the idea-stage, such as:

- Creativity techniques (e.g. brainstorming, brainwriting, analogies, synectics)
- Cocreation sessions
- Usage research
- Visualisations
- Business model generation
- Stakeholder analysis
- SWOT analysis

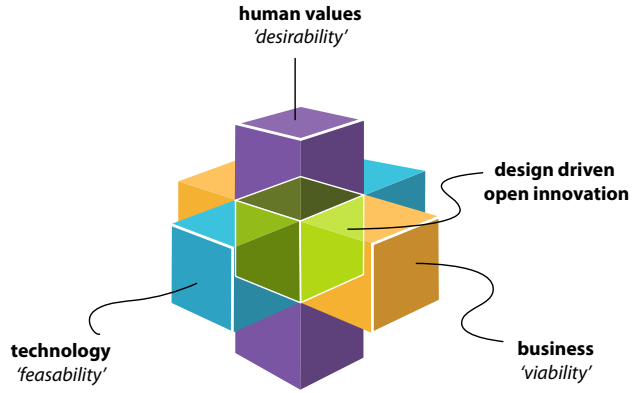
The participatory network

Developing the problem includes designing the business model for the solution. Who is going to make money out of it and how will they do that? And, maybe more important, is money the only added value of the solution? Without a sustainable business model an innovation will not survive on the long term. (Den Ouden and Valkenburg 2011).
In this stage the emerging business network is centered on the insight in the market. The network becomes the means to create more value by integrating offerings or competences from different organisations into better solutions for the target customers. The core team plays an important role in orchestrating the network of partners, and instilling a unifying vision. Interesting new partners will need to be invited to the network, and the network needs to be nurtured to minimize the tension between partners. There is a balance in top-down and bottom-up decisions, based on a deep understanding of the matter at hand. Individual and collective interests should be aligned, and a 'win-together' approach is used.

The network is formed by negotiations of interests and positions. This is a dynamic process in which the actors are trying to gain an understanding of who can contribute what kind of resources and capabilities. This is a not an easy process due to potentially unaligned interests of the organisations involved.
This stage is also important for the definition of the supplying and enabling network. The main activity is to identify the key resources needed to deliver the value proposition to the customer, including: people, technology, products, equipment, information, channels, partnerships, alliances or brands.

A team will only function well if the member's expectations of each other are clear. A workshop to explicitly voice the expectations of member's own involvement and what they expect from others can be helpful. It will highlight incompatibilities early in the process, when there is still time to adapt or to find new partners to fill in gaps. To provide network stability and flexibility at the same time, all partners have to agree on the aims of the innovation project in advance and clarify where and when the partnership starts and ends for them.
It is also at this stage that a check has to be made if there is a balance in investments and revenues for all members in the network. The innovation will only create a sustainable success if all parties can have a sound business in the network. So next to understanding the overall business model of the value proposition, also the business models of the various partners have to be defined. The best process to do this is to make the value network explicit: identify all the stakeholders and their stakes. By mapping the value network and the value flows in a joint effort a dialogue is taking place and all members get a much clearer picture of the whole, and the position of the various partners in the network.

Concluding, this stage may very well be the most extending one. Starting from a design brief, covering het entire design project, including idea generation, concept development, finalisation and eventually ending in the design of the solution. Whether the solution is a physical product, service, interface or environment, the evaluation of the solution still depends on the three building blocks. The main concern of the participatory network in this stage is: building the consortium of parties that are really going to realise the innovation.



The result of this stage is a design that:

- is desirable; tested with users it is suited as a solution and people are willing to buy and use it.

- is feasible: we know how to make the solution happen, and technologies and support are available and tested.

- is viable: there is a sustainable business model and partners are committed to join in execution.

Now that the solution is designed and agreed upon within the innovation network, you may think the work is done. However implementing the solution still requires a lot of time and effort. The decisions you make in this stage can can make all the difference with a successful outcome.

DESIGNING A VISION OF THE FUTURE AND A ROADMAP TOWARDS A DYNAMIC PORT

The following example follows from a first year project carried out and written down by students of the open innovator at The Hague University of applied sciences cohort of 2011. The starting point for this project is a company with a challenge for the future. Key to the assignment is research into trends and developments influencing the context and thus future of this company in order to create realistic future scenarios and a clear roadmap towards this preferred future. In this case the students worked for and with The Port of Rotterdam and their challenge for the future.

Introduction

The port of Rotterdam, located in The Netherlands, is an important industrial cluster, stretches over forty kilometres of land and is a vital element in the global transportation system. The port heavily influences the image of Rotterdam itself and therefore also has the large responsibility of maintaining a good reputation for the city. The port of Rotterdam authority, the people in charge of the whole port area, constantly research current trends and developments such as energy, transportation, and technological developments, so that they are able to sustain a clear vision of the port in the coming years.

The Itch

The port of Rotterdam has an interest in a research into the future possibilities of the port when:

a) Fossil fuels such as oil run out,
b) The size of products in general decreases resulting to a fall in container traffic,
c) The transparency of information regarding the type of goods in containers was increased.

Because of its sheer size and worldwide influence ultimately, we decided to concentrate on the actual port itself and the surrounding area, the city of Rotterdam, as this is what the port of Rotterdam authority had direct influence over. Looking at the past and present situation of the port of Rotterdam through desktop research and visiting the vast port itself, we gained a better understanding of the situation, and based on our findings, we created a moodboard. The moodboard illustrates the current situation of the port of Rotterdam and we clearly saw things that could be improved. The overall tone of the images used was dull and grey, and depicted a lack of excitement and life and with this; we concluded that their overall image needed to be improved for the future.

The Insight

We also gained insights through analysing current trends; energy, technology, environmental, and economic. The increase in automation and dependency on computers for efficiency was one very important trend to consider as well as the decrease in fossil fuels and the increase in use of sustainable energy.
With the information of the trend research we created a future vision and used the scenario planning method to come up with relevant drivers for the future of the port and four plausible scenarios of the future. The future vision for the port of Rotterdam is: a dynamic port.

The Idea

We identified two relevant drivers that will help determine the future of the port and we put each on an axis to create a matrix. The first driver is the type of infrastructure the port will use (existing versus new), and the other driver is the focus the port has (industrial versus social). With these two axes, four possible future scenarios are created and developed.

With these two axes, four possible future scenarios are created and developed:

- Scenario 1: Bring Me Back To Life (Top-Left)
  The port brings life back to the existing oil pipelines by using it to distribute and transport biomass to other part of Europe, making the oil to biomass transition slightly easier for The Netherlands & Europe.
- Scenario 2: Modernized Marina (Top-Right)
  The port authority invests in new industrial infrastructure to meet the ever-growing demands of the economy. This includes investing in the new Vacuum Tube Transportation System and a floating port and makes the port high tech and much modernized.
- Scenario 3: New Community, Old Facilities (Bottom-Left)
  In this scenario, the port authority creates jogging and biking tracks by using the existing views and land area. This makes the port more inviting to both the local and international communities changing the focus from industrial to social.
- Scenario 4: The Sport Port (Bottom-Right)
  A marathon that runs around and through the port of Rotterdam area is created and piezo-electric tiles are placed on the ground so the physical energy can be collected to generate electric energy.

The Impact

To eventually reach the desired future, steps have to be made in the present. A roadmap helps to identify the relevant and future proof decisions. These four scenarios make up the short and long-term roadmap for the port of Rotterdam. The short-term roadmap is based on scenario 3 and 4 and will be accomplished by 2020. The long-term roadmap, consisting of scenario 1 and 2 will span thirty years, between 2021 and 2051. Steps to how these scenarios will happen can be seen in the roadmap.

Our roadmap puts emphasis on the overall development of the port instead of just one aspect. In turn it will be more beneficial for the port of Rotterdam authority to consider and possibly use our roadmap in the coming future to help adapt to the ever-changing world and stay ahead of their competition. Our three-word vision, a dynamic port and the roadmaps will help the port of Rotterdam authority prepare for the future.

4.4 Impact – towards implementing the solution

Steve Jobs made a big change to our society. Through his products and services he transformed the way we communicate, listen to music, design new services, and own services. From being the underdog fighting the main stream, Apple became a large company, addressing many people. The transformation of 'think different' towards mass products will be Apple's next challenge. Personally, Jobs became an inspiration for many people, as a token of our transforming world (Isaacson 2011).

Of course implementation is not only done now in the last stage. It is something you grow during the whole project. You are already in touch with all stakeholders, involving them, creating belief amongst them and letting them experience the change by testing and prototyping. The definition of innovation according to Buijs and Valkenburg (2005) is "a successful implementation of something new". The proof of the pudding is in the eating; here it becomes clear whether all previous assumptions were right decisions. Now it becomes clear what the impact of the innovation will really be.

The aim in this stage is to ensure the success of the solution. This implies taking care of implementation in the market, in the innovation network and in the organisation. The context of the solution often has to be taken into account to enable success. Here it can be helpful to depend on the findings of the orientation in the itch-stage. Now you can involve influencing aspects that you have identified earlier.

The main characteristic of this first finalisation is that it is **entrepreneurial oriented**. Here the new business has to be realised.

You cannot do this all by yourself, you will need others to produce, distribute, sell or organise your solution. Besides the solution itself, you will need to develop plans for marketing, selling and launching the idea.

Activities lie on three levels: the market, the network and the organisation. The market introduction is a key to success. You cannot save a bad product with a splendid implementation, but you can surely kill an excellent product with a pour implementation strategy. This requires you to make a few strategic decisions: on the marketing strategy and maybe launch events. There is no second chance to a first impression, so rather think before you act. Once the solution is 'out there' in the market, users and buyers and other stakeholders will act upon it. They will be the main measure for success. Do they like what they get?

The innovation network is the backbone to success. This provides for the back office where the solution is produced, distributed and sold. The partners involved must have a shared vision on the solution to maintain the chosen business model. Sustainability on the long term will only be there if the business model is profound and has added value for all partners.

If the organisation is an existing one you work for, this is the transition from an idea or a project into the real process of the organisation. Transference is not an easy process. It includes a lot of verbal and visual communication, presentations and plans, and many things can still go wrong. If you are the entrepreneur yourself, transferring may seem easier. However the danger is exactly in this perception. You still have to document a lot.

Realisation is a huge phase. It will also cost a lot, especially when making a tangible product and production investments have to be made. But this is also where the gain is.

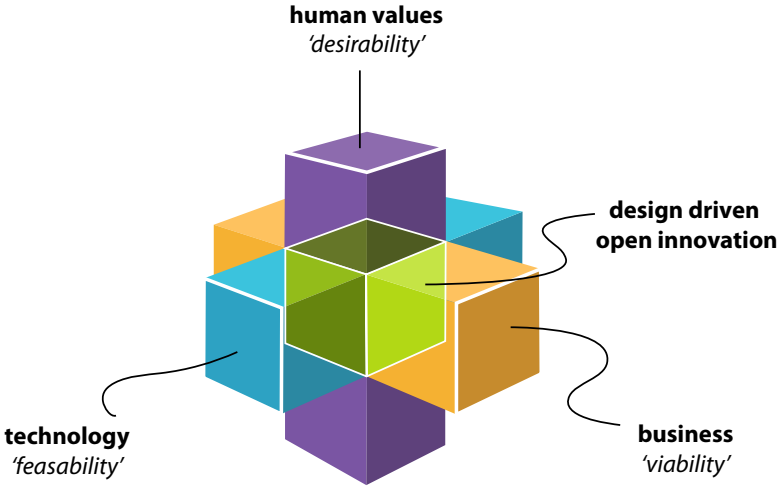
Many **tools & techniques** can be helpful in the impact-stage, such as:

- Value flow modelling
- Business plan
- Marketing plan
- Production plan
- Launch strategy
- Brand identity

The participatory network

When making the shift towards the actual realisation, the development of the goods and services will need to be executed. Likewise, production facilities, infrastructures and distribution channels will need to be set up. When all positions in the value network for the realisation are filled, it is important to check if there is a sound balance of value in the network: do all the parties perceive the total system to be fair, and is there a sufficient level of reciprocity. All actors have to be better off, despite that the investments may differ. The larger the investments required for the commercialisation of the innovation, the tougher the management challenges in the network will be. It may even be necessary to compensate companies that are worse of in the new business network. Specific arrangements may be needed in the network to ensure that all parties have a sustainable position both at the start-up of the network and in the longer term. The revenues and values generated by the total solution will have to be divided and distributed among the various members of the network.

Concluding, the result in this stage is the final design implemented into the market and that sounds easier than it is done. Evaluating in this stage is done by checking your initial entrepreneurial vision. The main concern of the participatory network in this stage is: next to the total business model, the business models between the parties in the network will have to be defined and balanced to ensure a sound position for all.



The result of this stage is a solution which includes a business model and end product that is:

- Desirable: does your solution really make a difference for people?
- Feasible: can your solution be implemented in quantities and qualities in a reliable and feasible manner?
- Viable: is the business model you and your partners created viable, is there gain for all on the longer term.

Hopefully it results in making money to earn back the development costs and blood, sweat and tears. If so, enjoy the kick of having made the change! You can be proud!

CO-DESIGNING A NEIGHBOURHOOD

The following example follows from a first year project carried out and written down by students of the open innovator at The Hague University of applied sciences cohort of 2011. The starting point for this project is a consumer trend. The aim is to elicit starting points for innovation by conducting qualitative research and empathising with a target group. These gained consumer insights must be specified in a design brief. In the next project the design briefs are input for a design project, as also described in this example. The company with an interest in the question and the solutions, in this case Human Involved Architecture, is only introduced to the students after their first trend and user research.

Introduction

Human Involved Architecture is an initiative by two Dutch architects (studio Ginko and Kiemkracht) passionate about investigating the bottom-up approach to valuable urban planning – one where the residents and their specific needs are closely involved in the reforming, modifying, and preservation of their neighbourhood. During the past few months, the Global Architects have been focused on improving the neighbourhood of Mariahoeve, The Hague. Therefore, our mission as a team was to help explore the unmet needs of the people living there, and eventually contribute to building a meaningful design solution to their current problems.

Itch

Mariahoeve is a post-war neighbourhood situated at the periphery of The Hague, and although it was once a desirable place to live in, nowadays it has lost a lot of its primary attractiveness. Due to the high number of people from different cultural backgrounds and the separation between generations, the biggest problem faced by the habitants is the lack of efficient communication.

A huge cultural barrier exists, resulting in less unity and cooperation. Keeping in mind the growing impact of online interaction, we identified the opportunity to enhance face-to-face communication between people as a way to improve the overall image of Mariahoeve, stimulate a proactive approach towards public place making, and create a vibrant and powerful community of people sharing one neighbourhood.

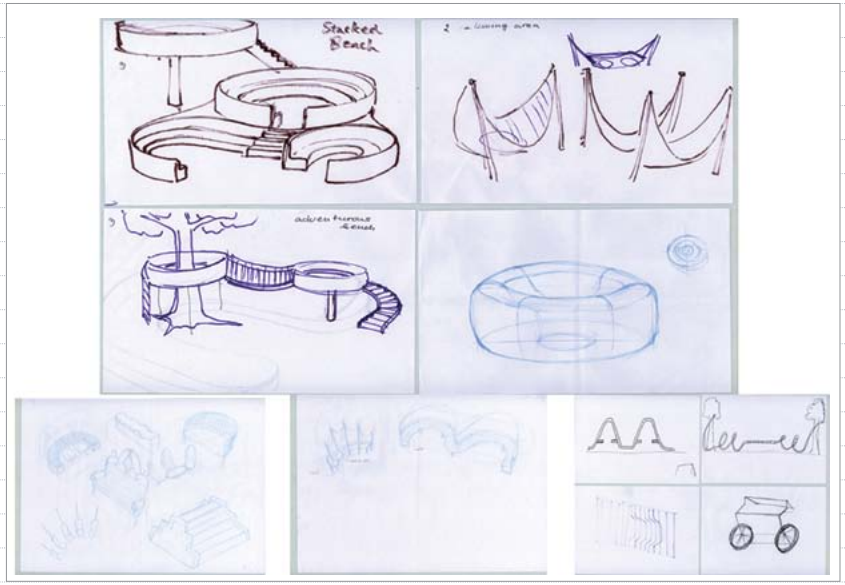
Insight

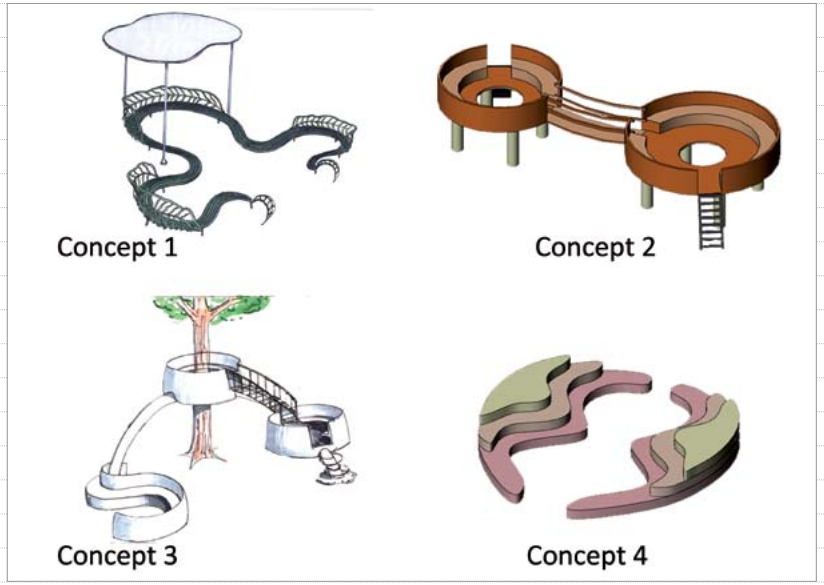
Inspired by the idea that children are one of the most important segments of any society, we embraced the possibility of exploring their point of view. We saw playgrounds as the best opportunity for both children and their parents to interact and used them as a central point of our research process. Through a number of observations, open interviews, and a co-creation session with drawings from and with schoolchildren, we came to the conclusion that the way playgrounds were currently designed did not stimulate social interactions neither between children, nor between their parents. The main insight we based our further project on was the need to create better playground areas that are unifying, social, and fun for everyone. We found out that children from different nationalities did not experience any difficulties in their interactions, but they all shared the desire of having at least one bigger playground where they can all come together to play. Parents, on the other hand, shared the opinion that they did face some communication problems, and it was clearly observed that the bench arrangement in the playgrounds did not support interaction, but rather solitude and privacy.

We developed two final design briefs targeted at each group: One brief to create a big playground where children can experience more fun and social activities together, and further involve them in the design process. The second design brief to stimulate communication between parents by designing better, more appropriate and unifying bench areas. Eventually, the second one was chosen and we continued with the mission to enhance neighbours' interaction and enable parents to spend more pleasant time together while their children are playing.

Idea

Based on the unmet need stated in the chosen design brief, we came up with a list of requirements for our future design. The sitting area we were about to design had to bring sense of co-creation; had to enhance the communication between the people





from Mariahoeve, to be easy for maintenance and to fit with the design of the neighbourhood.
Having these requirements in mind, we started generating ideas. In the beginning, it was really hard to let go of all assumptions we had, but thanks to a lot of visual stimulation and brainstorming we managed to overcome this and to come up with large variety of ideas for creating not just a bench but a sitting area.

With all of the ideas in mind, we had to select only one for further development. The selection was done in few stages: first from all of the ideas only 4 were selected according to the list of requirements.

And in order to select only one, we interviewed 5 random people from the neighbourhood, almost all of them parents. The two most important questions we asked were: “Which concept does you like the most? Why?” and “What didn’t you like in the others?” The participants were genuinely interested in the project and provided us with a lot of useful insights. Based on the interviewee’s responses and the client’s wish, one final concept was selected for further development.

Impact

The impact of the concept we have developed can be measured in two main aspects: emotional and economical. First, we created a place where people can communicate and organize social events together and most importantly, an area that people got very keen about, offering us their help and support. And second, by bringing the sense of co-creation, which was the main goal of our client, it will eventually lead to rise of the market share of the real estate in the neighbourhood.

5 Conclusion

What is in this for you?

The world of the open innovator describes the background of the transformation we face and the consequences for the field of innovation, changing towards **design driven open innovation**. We reframed innovation to meet new needs and address values of companies and organisations in our work field. In this last chapter we will draw conclusions from our future vision and new approach towards the competences and curriculum of the *open innovator*.

Our ambition to not only develop a new bachelor curriculum – the *open innovator* - , but at the same time transforming the vision on industrial design engineering, may seem pretentious. We do not take this light-heartedly. We know the field of innovation and used our experience to start a conversation with stakeholders to come up with the insight of the *open innovator*. What strengthened us were reactions from companies and organisation we asked to co-create or participate. There seemed to be an instant recognition and appeal to our vision and approach. But we also realise that we are in a prototyping stage and we need you, as our lead users, to be critical and to trust us.

You, being an *open innovator*, will do great wonders, because you will be taught to deal with this uncertainty and dig in new, unknown situations or problems. You will learn the tools for research, for communication and for visualisation. You will become a cooperative, open-minded problem solver. You will be able – with all the skills and tools we will provide you – to make the difference.

The curriculum follows the three building blocks of design driven innovation: human values, technology and business. Each year has adopted one block as its theme.

We created persona's for each year to help us focus on the people we are designing the curriculum for.

The *open innovator* curriculum aims at curious, motivated young people who strive to make a positive change.

Who: *Nora, (Dubai, Saoudi Arabia) 20 years old*

Characterized by global citizenship and living in a modern world. Because of her very socially active Saoudi-Arabian father and Dutch mother, she traveled a lot during the summers to support local communities. With friends and connections all over the world, she uses social media to keep in touch with them.
Enjoys the people around her and helping them make the right choices.
Aspires a world where wealth is equally distributed among its inhabitants. She sees there are many people willing to help but don't really know how to. She is inspired by initiatives like KIVA which provide help suited for specific cultures.

Year one focusses on **society** and **human values**. You will learn the methods, tools and abilities to become an excellent researcher on the future, society and people. At the same time you learn to use research results to design sustainable solutions. Being an **explorer**, you will investigate the real underlying needs of people and blaze new trails.

Who: *Mandy (Leipzig, German), 22 years old.*

Characterized by passionate curiosity. With an open mind she explores new situations, trends, but also cultures, contexts and different people only to find more questions. Sincerely curious and keen to learn more about how the world works.
Enjoys being headstrong and slightly rebellious to provoke the status quo.
Aspires to make the world a better place.

Year two focusses on **technology** and **design methods**. You will learn the methods, tools and abilities to become an excellent designer of products or services. Being a **creator**, you will design the world around you and create solutions beyond products.

Who: *Kim, (Shenzhen, China) 23 years old.*

Characterized by optimism and guts. Through last year's study he is gaining confidence in his role as a designer and his vision on innovation. He engages with large projects and challenges the rest of the team to enjoy to complexity.
Enjoys creating tangible results and being in the action. He enjoys collaborating and is a friendly and supporting team player.
Aspires to play a crucial role as an innovator to solve societal problems.

Year three focusses on **business**. You will learn the methods, tools and abilities to become an excellent entrepreneur, either inside a company or being independent. Characterized by an authentic and passionate personality the **entrepeneur** is still headstrong, yet enjoys the confidence to get things done.

Who: *Joost, (Haarlem, The Netherlands) 26 years old.*

Characterized by authenticity and confidence. He is a socially involved entrepreneur since he started his own company aimed at children's health.
Enjoys working hard and seeing results from his hard work. He also enjoys raising the bar for organisations and companies and pushing their ambitions as well as his own.
Aspires a world where every individual and groups of individuals take responsibility for what they bring to the table.

However, innovation can only be learned by doing! And innovation can only be tested through experimenting. Innovators have to redesign the world as it runs by. Start cracking, start experimenting, start having fun. Welcome to your future, that has just started.

Literature

All references in The world of the open innovator arise from profound books and readings on related views and topics and therefore provide a good start for further reading on and understanding of open innovation.

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Biographies

Cheron Huskens is a driven second year student *open innovator* (IDE) at The Hague University of applied sciences. She received her first year certificate with honours. Cheron wants to minimize the impact we have on the natural environment by promoting green design.

Dr. ir. **Maaike Kleinsmann** is assistant professor in innovation management at the faculty of Industrial Design Engineering at Delft University of Technology. Maaike's research focuses on collaborative design in industry; she published several articles on collaborative design and design communication.

Kamelia Lazarova combines two studies at The Hague University of applied sciences. She is a third year student International Communication Management (ICM) and a second year student *open innovator* (IDE). Kamelia wants to inspire others and make the world a little better (or a lot).

Prof.dr.ir. **Elke den Ouden** is full professor Business Process Design at the faculty of Industrial Design at the Eindhoven University of Technology (TU/e). She is also founder and strategic director of LightHouse /solution partner of the Intelligent Lighting Institute (ILI) at the TU/e. Elke is specialised in the creation of meaningful innovations and the design of ecosystems that create value for the various stakeholders of innovative solutions.

Jan-Jaap Rietjens is teacher visualisation and communication at the *open innovator* at The Hague University of applied sciences. He is also founder of design agency Splinter. Jan-Jaap is a designer with excellent drawing abilities.

Janneke Sluijs is researcher on design driven open innovation in the Research group Knowledge Transfer in Product Innovation at The Hague University of applied sciences. She also teaches at the *open innovator*, amongst other tasks she is responsible for the minor Collateral Value.

Niya Stoimenova is a second year student *open innovator* (IDE) at The Hague University of applied sciences. Niya is interested in philosophy and psychology and is starting up a consultancy business together with four fellow students.

Dr. ir. **Rianne Valkenburg** is professor Knowledge Transfer in Product Innovation at The Hague University of applied sciences. She is also co-founder and value producer of LightHouse /solution partner of the Intelligent Lighting Institute (ILI) at the TU/e. Rianne practices design driven innovation, which is designed and tested in years of experience in innovation, both in scientific research as well as in practice.

We would like to warmly thank the entire team of **teachers** of the *open innovator*, the partner **companies** that cooperated in development and in projects of the first year, and all **students** of the first cohort 2011 for their inspiration, comments, discussions and trustworthy believe in what we are creating.

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The world of the open innovator

Research group Knowledge Transfer in Product Innovation

Rianne Valkenburg and Janneke Sluijs in co-creation with Maaike Kleinsmann, Elke den Ouden, Jan-Jaap Rietjens, Cheron Huskens, Kamelia Lazarova and Niya Stoimenova

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