Thank you Dorian for this nice introduction.

The title of my presentation

Rianne Valkenburg and Janneke Sluijs and with the help of Katinka Bergema.

53 people with various backgrounds in different industries.
What they had in common was that they all used a designerly approach during their work.

finally could cluster into six images.

describe the areas in which design thinking is used.
Our current interest in design thinking comes from two angles; an internal one and an external one:

- Our project entitled a designerly approach to networked innovation

- The recent popularization of design thinking in management sciences
The focus of my research

more companies start innovation projects with partners

This formed the topic of a grant proposal

one million euros

set up a project team of ten researchers from TU Delft, The Hague University and The Erasmus University.

Christiane Maurer who will present her study later today,

nine companies.
Second reason to start the study:

Managers and business people adopted *Design Thinking* as the new paradigm

**Martin**

*Reliability* as opposed to *validity*

No new knowledge is generated.
knowledge exploration and exploitation
refining the status quo
integrative thinking
Design thinker as ‘a first class noticer’
unease
uncritical deployment
a fad rather than a real opportunity for exploration

opportunity to broaden their scope
Multiple papers in this conference

However,
shallowness
disapproved the simplified definitions
Designing is described and researched since the 1960’s

Design Thinking Research Symposia since 1991

Focus: How designers think and do

Often laboratory studies
Not many projects have been executed in collaboration with industry

Does not provide insight is applied within the broader organizational contexts
Management books and our project partners
Design thinking is like a friendly monster with multiple heads.

No clear uniform definition that is accepted by the broad design research community.

Entails different ways of thinking

Different application areas

Comprising inductive, deductive and abductive forms of reasoning

Multiple tools and techniques support
In this study we wanted to connect the rich knowledge of design expertise that exists within our community with the way it is used in practice to support our vision on a designerly approach with research.

Therefore we interviewed two groups of people:
- Scientists.
- Practitioners.

Within these two groups we asked persons with various backgrounds that all apply, investigate or teach design thinking.

So the view on design thinking as presented here will not be based upon our vision, it does not come out of the blue, but it is based upon what is already there and known, yet not made explicit yet.
Since there is a proper knowledge base available within the literature on design expertise we started from there.

Design thinking is a difficult term which has a lot of implicit meanings and it is difficult to get in depth stories about it.

We wanted to get rich stories and in order to get these we had to find a level of abstraction.

Within literature multiple categorizations exists like the one on the slide from Lawson and Dorst.

But as you see in the picture a design thinker will not recognize these.
Therefore we adapted this framework à→ Mogens Andreassen.

It comprises three elements that together make sense of the act of designing.

Mindset → understanding proper application

what is missing within those popular books on Design Thinking.

Do not show the complex interplay
In our study the design problem at hand comes from our respondents and we did a literature study to find the elements that comprise tools and techniques and the mindset. To give you a sense of the level of detail we used I give you an example of each of them:

- Tools and techniques: *Clarify thought processes with the use of visualizations*
- Mindset: *Have a research attitude to really understand*

The literature study initially resulted in 119 elements, which we reduced via clustering into 48 elements which formed the base for our study.
What we wanted to know from these elements was:
- Essential
- Unique
- Use

Research questions

What are the **essential** notions of Design Thinking according to our respondents?

What are **unique** notions of Design Thinking according to our respondents?

*How do the respondents use these notions of Design Thinking to support networked innovation?*
48 cards

statement and a drawing

stimulating storytelling.

common language among

level of detail allowed explicitness, but they also provided room for discussion.

We also allowed the respondents to add one or more cards to the card set.
We are quite proud of our sample of respondents. Together Rianne, Janneke and I had a good network to find people with much expertise with the designerly approach.

We interviewed 18 scientists from all over the world, like John Gero, Donald Norman and Larry Leiffer from the United States and Any Dong and Kees Dorst from Australia. A few of the respondents are here in the audience Francois Boujut, Mogens Andreassen, Petra Badke Schaub, Ken Wallace.

In addition to all these design researchers we were also able to interview management scholars like Roberto Verganti and Daved Barry who apply design thinking in business schools.
During the process, we split the group of practitioners into two subgroups; the consultants who have made parts of the designerly approach their core business and practitioners in industry who are doing product/service development on a daily base from start until the end.

For the consultants it’s their daily task to help companies via consultancy to progress in certain parts of the innovation process. Some of them have more experience than others, but all fulfil some important part of the process, such as orientating on the future, or need-finding, creativity, business models or design. They’re field of expertise is as different as their area of design, such as communication, products, services, businesses, customers.

Most of them are less known than people in the other two groups but maybe you know Erik Roscam Abbing who is the author of the book Brand Driven Innovation, or Josephine Green who has been quite influential within Philips Design. She has her own consultancy firm now.
The consultancy industry covered only small parts of the innovation process. The people from the industry provide many insights in how they deal with a changing market, environment and how they are responsible for competitive advantage via a designerly approach.

The industries range from strictly regulated technical solutions, such as Volvo Aero and siemens, to high competitive markets, for example Nokia has to deal with.
In order to get an answer to all three research questions we developed with our cardset the following interview procedure:

- Intro & bio
- Selecting essential Cards
- Selecting 10 unique cards
- Rich storytelling about the application of the elements
Of course we got many reactions of the respondents to our interviews. Most of them were positive and some of them were critical.

On this slide I show you a few opinions.

The first one is from John Gero who stated that the card: *Iterate effectively*, is a nonsense question because the alternative would be to iterate ineffectively.

After this statement he started a whole story about iterations. So his initial irritation of the in his eyes wrong statement on the card resulted in a rich story.

Donald Norman liked our cards, yet he thought that the strict interview procedure was not so designerly so he decided to follow his own path while selecting the cards, which many others did as well. This shows that the rigid approach left some room for own interpretation.
I have shown the background and set up of our research. I will continue the presentation with the data analysis and the results.

Some parts of the data analysis were very straightforward and some were really iterative and designerly.
The first thing that we did was making an overview of the essential cards, the non-essential cards, and the ten most unique ones.

This resulted in this scatter plot of colors and we asked someone with a lot of knowledge on statistics to make sense out of this but there was no significant finding in the table. The opinions were too diverse and we had too little respondents and too many cards to say something valid.

However, this table provided us with some insights.
We could give an answer to the question what are essential elements of Design Thinking. Our respondents showed that no card was (de) selected by all respondents. This means that the question essential/ non essential is not an objective judgment, but it is dependent of another variable and later we found out that this was the third element of our conceptual model of design thinking; the design problem at hand.

The card that was selected by almost all our respondents was ‘make ideas tangible with the use of prototypes’ and I think that none of you would fight heavily against this statement.

The card ‘create committed team members by challenging on their personal goals’ was only chosen as essential 17 times. The unpopularity of this card could be explained by the reactions of the respondents of the cards and is two sided. First the tern challenging does not have the positive connotation in English as it has in Dutch. Therefore, some respondents deselected the card. The other reason for the respondents to deselect this card was that they saw it as a management tool and not as a
The second research question to answer was which cards are the ten most unique ones?

To answer this question we looked at the top three of our three sub groups.

First the scientists. They are mainly interested in the cognitive processes of design thinking and the more abstract concepts behind it. Therefore its is not such a surprise that these three cards were the most popular ones.

Co-evolvement is a popular term in many articles. Also switching between different levels of abstraction is seen as one of the main strengths of a design thinker.

Since designing is always about the creation of something new imaging the non existent is a logical choice too.
Also the top three of the consultants could be explained.
They all sell a research process in order to enable their client to create meaningful solutions.
The research that they sell involves often user research that they translate into wished and demands, so they make sense of user needs.
What all our respondents within companies had in common was that they were all very entrepreneurial. They had to take risks to set up innovation projects. They had to convince their management and other team members that they were on the right track and that the direction set was the route to success. In order to define this route they had to get everyone on board and they had put effort in the integration of the different disciplines or stakeholders. Due to their broad knowledge of the different aspects of the innovation process they were able to do this integration. They often use visualizations to communicate their concepts that are the result of this integration.
I just presented the answers to the first two research questions, which are straightforward and logical. Yet they do not provide much depth about the application area of the designerly approach. They show that the respondents provided us with selections that could be explained, which shows something about the validity of the rich stories the respondents provided us with and which together form the answer to our third research question.

To make sense of the last research question:
*How do the respondents use these notions of Design Thinking to support networked innovation?*

Was not an easy job. We had 53 interviews in which each respondent told their unique story that was connected to the cards, but just analysing the opinions of the respondents on the cards selected did not bring us anywhere because it put the stories out their contexts.

We looked at the data from different angels and on different levels of detail and from these analyses and through mana many hours of discussions between Rianne, Janneke and me, patterns arose.
This triangle show the elements of an image → explain the three.

Two images in more detail. I chose to describe the two that are most different from each other.
Design engineering = Teamwork! Many disciplines involved → a common goal should be placed above everything.

**Tools and techniques**

Visualize to communicate: It all starts with a sketch, a lot of sketching is happening during meetings

Clarify thought processes: individual work is explained through sketches

Make ideas tangible with the use of prototypes: within an engineering environment there is a lot of testing going on

Make sense of user needs: if you know the customer well, you’ll be able to make a good offer for your client, because you are able to transfer his demands into added value
Value driven design focus on positive system/organizational change for contextual complex problems.

pioneer attitude to be able at all to make new things

creating value for all stakeholders.
defining the stakeholders
defining what could be of value

hypotheses of what is not existing.
rethinking the system.
if everyone stays within his role, the real problem will not be addressed.
This is the way our respondents translated the card ‘have a research attitude to really understand’
Unfortunately there is no time to discuss all images in detail. Therefore I give you a brief overview of the other four images.

Explain the focus of the images.

I started this presentation with the fact that we wanted to study how design thinking could be used to improve collaboration. Within the six images we found different ways of collaboration.

The two images that I explained in detail showed already two different forms of collaboration and they also showed how the different elements of the designerly approach were used to enable collaboration. The other four forms of collaboration that we found are:

Explain the collaboration in each image.
I hope that you became interested in the details of this research because we will make a book that describes the six images in detail. For each image we will show you the picture and a rich description as I showed from the design and solution driven image and the design as value driven image. Furthermore each image is illustrated by extensive summaries of the interviews given by our respondents that belong to that particular image.

Furthermore
So this study showed six images in which design thinking played a role

These roles differ

These are not our descriptions but they are based upon the interviews

Together these images set the boundaries of the field of design research
It is a descriptive study without normative conclusions

So what does that mean for us?

**Where are we now?**
What does this mean for design research & design education?

I want to thank you all for listening and invite you to start the discussion