SERVICE DEVELOPMENT FOCUSED ON EXPANDING AN ORGANIZATION'S INNOVATION CAPACITY

BACHELOR'S THESIS BUSINESS IT & MANAGEMENT

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Preface

With this thesis, I end my bachelor's studies Business IT & Management, after which I want to work in the field of business development to develop my knowledge on and experience with the subject area.

My time working for Consilience has taught me a lot about working in a new environment, about the Indian culture, and about business development. I had the pleasure of working with such inspirational colleagues who taught me valuable life lessons. I will never forget these people who made my time in India extra special.

I want to thank Dr. Shabbi Luthra, CEO at Consilience, in particular for arranging my internship. Dr. Luthra is a visionary leader who allowed me to experiment and learn through trial and error. Thank you for taking the best care in helping me develop both professionally and personally.

Thanks to Aditya Parashar, co-founder and director at Consilience, for his help and guidance during my internship. Aditya knows how to combine being a manager and a friend and always made sure I was enjoying my India experience.

I want to thank Pauline O'Brien for arranging contact with Dr. Luthra, and for helping me make the best preparations for my stay in India. You provided me with a truly lifechanging experience.

Special thanks to Kristopher 'Linus' Velez. Director of Making at Consilience, and my roommate during my stay in India. Linus and his girlfriend Sheetal taught me a lot about the Indian culture and how to get around in Mumbai which made has made it so much easier for me to adapt and enjoy my experience.

Furthermore, I want to say thanks to all my dear colleagues at Consilience for making my time in India unforgettable.

I also wish to thank my mentors, Anil Manraj and Hamza Soekhai, at The Hague University of Applied Sciences for their help and guidance during this internship.

Special thanks to my parents for always standing by my side, supporting my every decision, and granting me every possibility that helps me get further in life.

I hope you enjoy your reading,

Niels van Dijk
2 juni 2017
Mumbai, India

Executive summary

This internship was commissioned by Consilience, a global innovation consultancy focused on supporting schools to adapt methods, tools and systems for innovation. Two of Consilience's specializations are Making and design thinking. Consilience was founded in 2016 by the directors of the R&D department at the American School of Bombay.

To further grow the organization, and to apply their knowledge and experience to improve the economy and market competition, Consilience seeks to offer their services to non-educational organizations. As the services are currently customized for schools, the research question for this assignment was:

"Which developments need to be made to the services that Consilience offers to schools and school leaders to improve the innovation capacity of non-educational organizations?"

To answer this question, the design thinking process was followed, consisting of a theoretical research and sixteen interviews with the new target audience: organizations in Mumbai that have a need for expanding their innovation capacity. This target audience was determined by the client before this assignment because it is most practical to aim for a target audience that is located in the same city as Consilience. A sample of these organizations was interviewed and based on these interviews four concrete challenge statements were formulated.

Based on the theoretical framework and the empathy interviews four brainstorming sessions were conducted, one for each challenge statement. The most original ideas that were most likely to succeed were filtered using three techniques, and were processed into a prototype. This prototype consists of design thinking workshop programs, presentation scripts, and mockups related to the workshops. These workshops teach organizations new innovation focused methods, and corresponding skills and leadership practices.

The prototype is a workshop, which is customizable for an organization based on eight standardized categories of organizational challenges. These organizational challenges are linked to a design thinking best practice, which is the central theme in the workshop based on the customers' needs.

This workshop was tested with the client and the target audience to collect feedback and to make improvements to the prototype. These tests confirmed that the customizable workshops are a valid solution, and that the participants, once they knew how and why to use design thinking, were convinced of the benefits.

The Maker culture is incorporated in the design thinking workshops by using Maker practices in the prototyping phase. The Maker culture supports the design thinking culture as it is focused on creativity and learning by doing. One of the eight categories of organizational challenges is to encourage a creative culture, which is linked to the design thinking best practice of rapid prototyping. This rapid prototyping workshop focuses on Maker specific materials to make prototypes.

Consilience's knowledge of design thinking and Making and their experience in hosting workshops is used for providing these workshops. The consultants who will be responsible for providing the workshops need to be trained to work with the new target group as they now only have experience in working with students and educators. They must be trained in understanding organizational challenges and how to solve these with design thinking best practices.

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1. Introduction

This thesis was commissioned by Dr. Shabbi Luthra, who is the CEO at Consilience. Consilience is a non-profit startup focused on redesigning education globally by supporting schools and school leaders in implementing methods, systems, and cultures that focus on innovation. Consilience was founded by the director of IT and Research & Development at the American School of Bombay.

The assignment for this internship was to take the current services that Consilience offers to schools and develop these services so that they can be provided to non-educational organizations that want to improve their innovation capacity. The research question that was derived from this assignment is:

"Which developments need to be made to the services that Consilience offers to schools and school leaders to improve the innovation capacity of non-educational organizations?"

1.1 Motive for the assignment

Consilience pursues a global impact on education. Alongside that vision there is a wish to deploy the experience and knowledge that they have to impact the way organizations innovate.

By supporting organizations in being more innovative, Consilience strives for a rising market, better products to be developed, and the general economy to be improved. This extension of Consilience's target group required a further development of their current services. This target audience was determined by the client before this assignment because it is most practical to aim for a target audience that is located in the same city as Consilience

1.2 Project environment and organization

The stakeholders that were involved in this assignment are Consilience and the organizations in the new target group that this assignment taps into. The stakeholder analysis is included in Appendix – K. As this internship was set in Mumbai, India, the cultural and language differences had to be taken into consideration. A cultural analysis was conducted to support the research and understanding of the organization and the stakeholders. This cultural analysis is included in Appendix L.

The new target group consists of organizations in Mumbai that have the need to expand their innovation capacity. These organizations can use Consilience's services at their own initiative.

This assignment was guided by Dr. Shabbi Luthra, CEO of Consilience, Aditya Parashar, director and co-founder of Consilience, and Linus Velez, director of Making. Decisions made during the internship were discussed with these supervisors, hereafter: the client, for support. A Business Model Canvas of Consilience's organizations was composed in consult with the client, that can be found in Appendix N. This business model was made in advance in order to visualize the changes to Consilience's organization as a result of this research.

To analyze Consilience's culture and stance regarding organizational change, a culture assessment survey was sent to in-office employees. The results of this survey provided input for the recommendations regarding implementation of the new services. The remaining relevant information was probed through conversations with colleagues and desk research on Consilience's website.

Most of the research that is described in this thesis took place in Consilience's office, hosting 25 employees. The employees that work at Consilience's office include the CEO, two directors, ten Maker Engineers and supporting staff. The Maker Engineers are consultants who develop and provide the services for Consilience.

For research into the services that Consilience provides, summits and workshops at the American School of Bombay (ASB), the American International school of Chennai (AISC) and the Indian School of Design & Innovation (ISDI) were actively participated in. The Consilience office, ASB, and ISDI are located in Mumbai, India. AISC is located in Chennai, India.
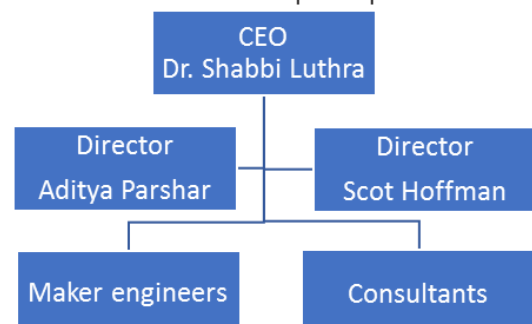
Consilience's mission is to have a global impact on education. Education has hardly changed over the last decades, but because the world around us is changing, the way students are currently taught does not fit their future.

In addition, Consilience's vision is to improve the way organizations innovate to stimulate market competition, leading to a more thriving economy and better products and services.

Consilience's culture was researched by giving the Caluwé questionnaire to in-office colleagues (Caluwé, 2002). The results of this questionnaire can be read in chapter 9.

Consilience uses a self-made database for their administration of materials and equipment for their services. The rest of Consilience's digital products are stored in their Google Drive, to which all employees have access with their Consilience Google account.

Political
Power thinking
Keeping options open
Leverage
Networks

Structure
A deal is a deal
Diagnose
Targets
KPI's

Social
HRM focused
Collaboration
Family feeling
Communication

Philosophical
Responsibility
Choose your own path
Chaostheory
Gut feeling

Learning
Connect
Challenge people
Learning = changing
Processthinking

(Caluwé, 2002)

1.3 Reading guide

The motive for this assignment, the project environment including the organization, the research objective, and research questions related to this assignment are described in this first chapter. The methods that were used in order to complete this assignment are described in chapter 2.

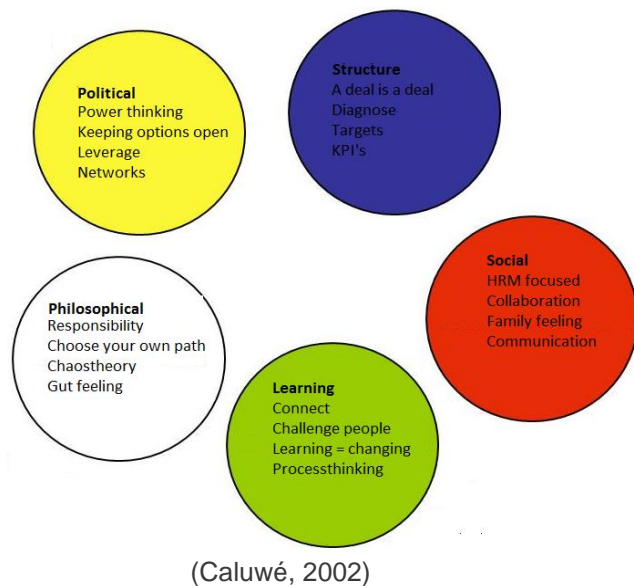The theoretical framework, that was established using desk and field research, is explained in chapter 3. This chapter elaborates on relevant topics which support the research and results.

How the design thinking process was executed, with regard to the phases empathize, define, ideate, prototype and test, is described in chapters 4, 5, 6, 7, and 8 respectively. These chapters describe the methods and techniques that were used for each phase.

The results of the research for each of the design thinking phases are described in chapter 9, followed by the discussion, conclusion, and recommendations in chapter 10, 11, and 12 respectively. The appendices provide supporting information regarding this research.

1.4 Research objective

The target of this assignment was formulated as follows:

> *"To provide insight in the needs of (non-educational) organizations regarding innovation, identify the differences between these needs and the needs of schools regarding innovation, and develop a prototype (first model of how a product or service looks and works) for services that Consilience can provide to organizations in order to expand their innovation capacity."*

This formulation of the research objective differs slightly from the objective described in the plan of action. However, the activities and results related to this target remained the same. The research and results are described in an advisory report for Consilience.

This result of this research is included in an advisory report that provides insight in the new target group, the difference between the needs of the new target group and schools regarding innovation, and a description of the prototype and how this caters these needs. Additionally, there is a description on how to implement the prototype into Consilience's organization. The advisory report contains the results of each of the design thinking phases, a description of how these phases are interconnected, and an explanation of the results. The Recommendations for further research and possibilities are included at the end of the report. This thesis describes the research preceding this advisory report.

1.5 Research questions

To achieve the objective that was stated in the previous paragraph, a central research question was formulated that needed to be answered for a successful development of the services:

> *"Which developments need to be made to the services that Consilience offers to schools and school leaders to improve the innovation capacity of non-educational organizations?"*

To better understand the research question and its meaning, the abstract concepts are operationalized below.

- Developments: All that needs to be removed, changed, or added to the services as they are being provided by Consilience at the moment of writing this thesis.
- Services: Consilience offers a set of services to schools and school leaders to improve their innovation capacity. These services are described in chapter 3.4.
- Innovation capacity: The extent to which an organization, employer, or employee, is able to solve problems by generating, accepting and implementing new ideas, processes, products or services, using the available technologies, competencies and skills.
- Non-education organizations: Every organization that does not offer or support school education.

Sub-questions

In order to answer the central research question, a set of sub-questions has been formulated. The answers to these sub-questions provided input for answering the central research question. How these sub-questions were researched is explained in the research setup in Appendix A.

1. Which needs do organizations have regarding innovation?
2. Which organizational aspects can be changed in favor of innovation?
3. Which knowledge and experience from the services that Consilience offers to schools and school leaders can be applied to the new target group?
4. Which services can Consilience offer to organizations that intervene in the aspects that need to be changed in favor of innovation?

2. Methodology

This thesis describes the exploratory research that was done in the interest of Consilience. This research aimed to develop services that Consilience can provide to organizations in Mumbai to improve their innovation capacity.

The first step in this research was to create a theoretical framework on topics that were relevant to this research. The setup for this research is included in Appendix A. This theoretical framework was used to structure this research as it yielded insights into relevant topics such as innovation and organization.

The method that was chosen for this research is design thinking. This research combines the best practices and experience from Consilience with the best practices that are taught during the last course of the study Business IT & Management (Ongena & Loggen, 2016). The choice for Design Thinking was made based on its holistic, descriptive, and user-centered approach, as explained later in this paragraph.

Other service design methods that were considered are ITIL, System Thinking, Agile Design, and Problem X Design. ITIL (UCISA, 2014) and System Thinking (Arenson, 2000) place the problem central and have a less customer-centered approach than Design Thinking (Clark, Design models, 2012). As this assignment was to increase the fit of Consilience's services to a new target audience, this target audience had to be placed in the center.

Problem X Design follows a similar process to Design Thinking (Clark, 2015). There is however less emphasis on ideation and creativity in between the empathy and creation (prototyping) phases. Problem X Design focuses on releasing and testing small features after each iteration instead of a complete prototype (as is the case with Design Thinking). As Consilience has experience with Design Thinking, this process was chosen over Problem X Design.

Agile Design has less emphasis on customer-centeredness than Design Thinking (Bowles, 2008). However, its iterative approach is attractive for testing the prototype and breaking down tasks into small increments. The latter ensured a more manageable project by scoping the design Thinking process. Agile design was combined with the design thinking approach, as explained in chapter 2.2.

Ideas from the books *The Design of Business* (Martin, 2009), *Design thinking for Strategic Innovation* (Mootee, 2013), and *Solving problems with design thinking* (Liedtka, King, & Bennett, 2013) were used for the structure of this thesis and for the development of the services. The book *LAUNCH* (Spencer & A.J., 2016) was used for structuring the ideate and prototype phases, and the book *Contagious* (Berger, 2013) helped define the communication of the new workshops to the target group.

The services that Consilience offers to schools and school leaders were researched through active participation and observations in order to gain a thorough understanding of the approach (Consilience Learning, 2016). These techniques allowed for experiencing the services firsthand and discovering different situations that Consilience's employees and participants can encounter.

This research yielded an advisory report that describes the results and how these affect Consilience's organization when implemented. Each of the design thinking phases yielded a report on that respective phase for which factors of success were defined which determine whether or not a report was finished. These success factors are included in the research setup in Appendix A. The empathy report illuminates the insights that were gained from the empathy interviews.

The define report elucidates the concrete user needs and the additional research that was done to Consilience's services. The ideate report presents the ideas that were brainstormed and selected, including the concepts of these ideas. The prototype report describes how the prototype came about and how it solves the challenge statements. The test report describes how the test came about and the results of this test.

2.1 Design thinking

Generally, the design thinking process consists of five phases, visualized in the picture on the next page. This is also the process that is taught during the studies Business IT & Management. The design thinking process according to Consilience has renamed the empathy phase as 'discovery', the test phase as 'feedback', and adds reflect and iterate to the process (Consilience, 2016). For this assignment, the iteration and reflection stages were included in the design thinking phases according to Benne, as they are valuable to the design thinking process but do not require separate phases.
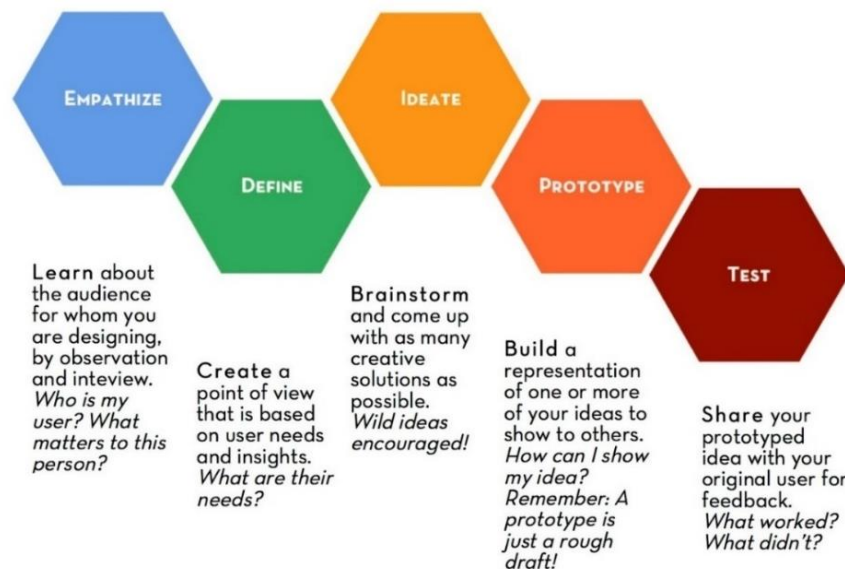
(Benne, 2016)

The design thinking process is a method used to find user-centered solutions to problems, or to ideate new products or services (Harvard Business Review, 2008). User centered design means that during the development (design) of a product or service, the user is actively involved to ensure the best possible fit (validity) of the solution to the user's needs (Sanders, 2002). This process is driven by the five design thinking phases as depicted in the image above.
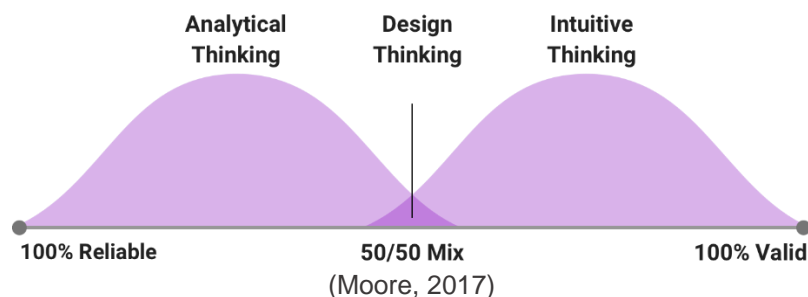
(Moore, 2017)

The difference between design thinking and other service-development processes or methods are that design thinking is descriptive, holistic, and ensures the user-centeredness by interviewing and observing the user in their natural setting. This approach seeks balance between validity and reliability by scaling customer insights. The holistic view is created by using many methods and tools during the phases to gather data from the users. This provides an overall perspective of the most relevant aspects of the users' wishes and needs, as well as the fit of your solution to these wishes and needs.

Design thinking is descriptive as it starts with formulating the problem that needs to be solved, instead of starting with the solution. When starting with focusing on possible solutions before the problem is thoroughly understood, relevant information can be missed and the end-product may not validly solve the user's problem. Thus, during the interviews with users it is important that the interview questions do not direct the thoughts of the user into a specific direction.

The diverging and converging that happens during the process is another aspect that separates the design thinking process from other methods (Stickdorn & Schneider, 2012). During the empathy phase the information that is received from the users diverges. This information converges during the define phase in order to formulate concrete and relevant insights and understandings of the users.

During the ideation phase, there is another diverging practice that is ideating a variety of possible solutions. These ideas are converged in the prototype and test phases where the practitioner finds out what works and what 'wows' the users. In the end only feasible and valuable ideas remain that fit the users' needs. This is known as the double diamond, as visible in the image below.

The next paragraphs explain how the design thinking phases were executed for this research.

(Designthinking, 2017)
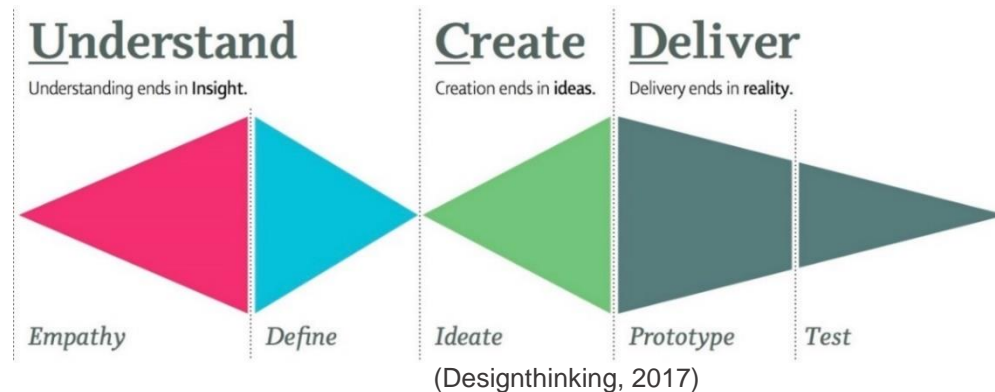
2.1.1   Empathize

The first step to be taken is to understand the target audience in order to develop services that focus on the users' requirements. Design thinking's empathy phase fit this research because it strives to understand the users on an emotional level, allowing the researcher to identify the main issues and how they affect the users. The empathy phase consists of interviews and observations to empathize with the target audience, and to gather information for solving the following sub-questions:

1. Which needs do organizations have regarding innovation?
2. Which organizational aspects can be changed in favor of innovation?

Observing deepens the understanding of the user as what is observed is factual information (Stickdorn & Schneider, 2012). The observations were made of the way colleagues collaborate, the design of the workplace, and the environment, because these reveal more about the company. The organizations differences allowed to compare perspectives.

Each interviewee was interviewed twice. The first interview yielded a general understanding of their needs. The second interview is meant to deepen the understanding of the topics that arise during the first interview. A topic-list was used for the first interview to ensure that all relevant topics were cut into. The interviews were processed in transcripts that were used to compare insights from the interviews. The minutes of the interviews can be found Appendix E.

Design thinking is used to move through the knowledge funnel, from mystery to heuristic (Martin, 2009). The mystery stage is the initial stage in which there is no understanding of the needs and wishes of the target audience.

(Martin, 2009)
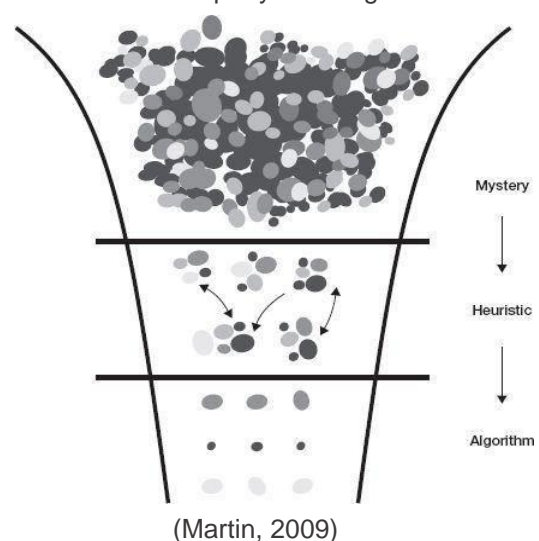
The heuristic phase is entered through understanding the needs and wishes of the target audience and allows for focus of efforts for finding a solution that caters these specific needs. By intensely studying and refining the heuristic a fixed formula can be created in the form of one or more services, that caters the specific needs of the target audience. This formula is the algorithm.

The empathy phase was right for this assignment as the new target group had to be understood. Consilience had no knowledge of this target group prior to this assignment, thus empathy with this target group is the best way to understand their needs. These user-insights were made concrete in the next phase: define, where additional research was conducted that was used for ideating solutions.

2.1.2   Define

Several techniques were used to analyze and process the information that was discovered in the empathy phase. Design thinking's define phase matched the explorative nature of this research by making the user-insights concrete, conducting additional research to Consilience's services, and to gather information for solving the three sub-questions below. The information for sub-question one and two was already explored in the empathy phase, the define phase strove to make this information more concrete. The additional research to Consilience's services as to answer the third sub-question.

1. Which needs do organizations have regarding innovation?
2. Which organizational aspects can be changed in favor of innovation?
3. Which knowledge and experience from the services that Consilience offers to schools and school leaders can be applied to the new target group?

According to Martin, the right balance between knowledge exploration and knowledge exploitation needs to be found in order to maximize the value that is gained from research (Martin, 2009). The knowledge that was elucidated during the empathy phase was therefore exploited during the define phase, using several techniques to analyze and refine the mystery.

The insights of the users that were gained during the empathy phase had to be made concrete because the information from the different interviewees varied. The download, saturate, and group technique was the right choice for this exercise as it consists of rereading the transcripts and formulating relevant or surprising insights on Post-It Notes (analysis) and grouping the Post-It Notes according to reoccurring themes (processing). This method made it easier to understand user-insights and to process these insights into concrete needs.

Three personas were made in order to process the information even further. The personas represent a group of users and their characteristics. The characteristics from the target audience that were discovered in the empathy phase are included in these personas, making them reliable representations of the target audience. This representation means that the personas can be used as reference to base the development of the services on.

Four challenge statements have been formulated during the define phase that needed to be solved in order for this research to be successful. The challenge statements are the target group's requirements based on what the interviewees miss, need, or want to change. These challenge statements describe the target audience, the needs that the target audience wants to have catered, and the benefits they wish to gain. The challenge statements describe which needs have to be solved and the desired situation which the target audience wants to achieve by solving these needs.

Challenge statements describe the challenges for which solutions are brainstormed in the ideate phase, and for which prototypes are made and tested. The challenge statements are also a measure for success. These challenges arose during the empathy phase and are based on the users' needs. The format used for challenge statements is, as defined by Consilience: *"Target audience …***needs***… desire …***Because***… benefits.*

The ideas for these challenge statements have to comply with Consilience's requirements in order to make sure that they are valid and that they comply with Consilience's mission and vision. These requirements were gathered through interviews with the client and are formulated as design criteria, as according to design thinking. Design criteria are rules that are formulated for each challenge statement that literally describe the criteria for the solutions to each challenge statement. After brainstorming solutions in the ideate phase, the design criteria are the first filter for selecting the most valuable ideas, because ideas that do not comply with Consilience's requirements are not allowed to be selected.

The empathy phase, the download, saturate, and group technique, and the personas yielded a clear understanding of the target audience. Based on this understanding, the services that Consilience offers to schools were evaluated if they can be valuable for new target audience. These services were chosen because the assignment is to develop these existing services. The chosen services were researched using participant observation. These services were a three-day workshop for students, a two-day summit for international schools and two workshops for a local school. Participants, selected by convenience, were questioned during these services about their experience (Brotherton, 2008). These services formed the basis for the new services.

A questionnaire was created for the service that best fit the target audience's needs in order to understand the most important aspects of this service and how participants experienced those.

A customer journey map was made of these services to map the experience of the users according to findings from observations of and conversations with the users. This customer journey map identifies the appreciation, touchpoints, process, and emotions of the users during the services. These aspects were chosen because they define the entire experience that customers have around Consilience's services. This model was created to rationalize possible pain points and improvements of the services that could be used for the development of the new services.

2.1.3   Ideate

In order to find solutions for the challenge statements that were formulated in the define phase, a large variety of ideas was brainstormed in the ideate phase. By brainstorming and selecting ideas, the input for the third and fourth sub-question was explored. The knowledge and experience from the services that Consilience offers to schools was probed to find connections to possible services for the new target audience.

3. Which knowledge and experience from the services that Consilience offers to schools and school leaders can be applied to the new target group?
4. Which services can Consilience offer to organizations that intervene in the aspects that need to be changed in favor of innovation?

The brainstorming was done using three techniques: Brainwriting, SCAMPER, and the Fast Idea Generator. Brainwriting was executed by formulating one of the challenge statements on paper and one by one writing ideas under the challenge statement (De Innovator, 2016). This is a technique for using one's creativity for brainstorming ideas.

The SCAMPER technique was executed by taking the current services and ideating substitutes, combinations, adaptions, modifications, eliminations and reversals to come up with new ideas (Mindtools, 2016). These ideas helped to look at the problem from different perspectives. And uses existing services to build further on.

The Fast Idea Generator, is also a technique to take Consilience's current services and to ideate an inversion, integration, extension, differentiation, addition, subtraction, translation, grafting and exaggeration to come up with new ideas (DIYtoolkit, 2016). SCAMPER and the Fast Idea Generator focus on existing products or services and building further on these services. This was suitable for this research as Consilience's existing services needed to be further developed.
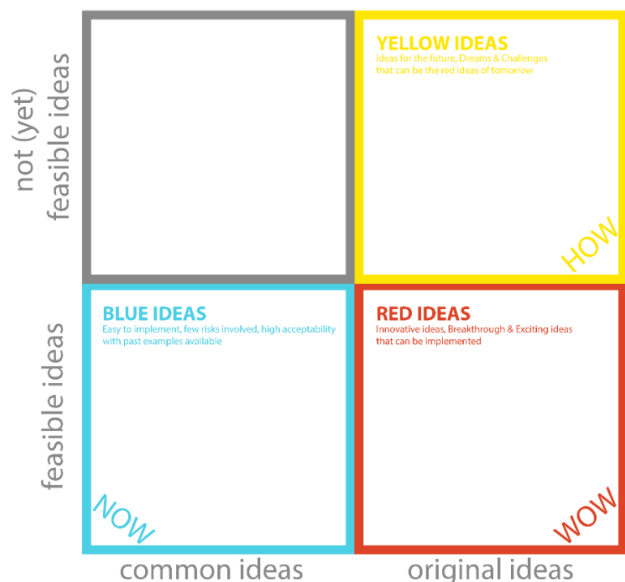
(COCD, 2017)

In order to select the most valuable and original ideas that were most likely to succeed, and that comply with Consilience's requirements (design criteria) the ideas that were brainstormed were selected using three techniques: Design Criteria check, COCD-Box and the Select Promising Ideas technique.

After checking to see if the ideas comply with the design criteria, the remaining ideas were placed in the COCD-Box. The COCD-Box is a technique where the ideas are divided over four boxes that represent the feasibility and originality of the ideas (COCD, 2016). This technique was chosen because the ideas must be feasible in the near future according to Consilience's vision, and must be original in order to appeal to the target audience.

Using the Select Promising Ideas technique, the most original and feasible ideas were selected from the red box in consult with Consilience. Each brainstorming participant chose the idea they thought was most innovative and the idea they thought was most likely to succeed (Plusacumen, 2014). This last selection technique ensured that the final solutions were consciously selected.

The ideas that were brainstormed and selected in the ideate phase were further developed into prototypes which elaborate on the key elements of the idea in order to communicate the idea with the client and the target audience. This prototyping happened in the next phase.

2.1.4 Prototype

In order to see if the ideas that were selected in the previous phase are valid solutions to their respective challenge statements, the ideas were processed into prototypes. Taking into consideration the services that Consilience offers, prototypes were developed to communicate the selected ideas to the client and the target audience. The format of the prototypes depends on the ideas that are brainstormed and was chosen after the ideate phase (Plusacumen, 2014).

The prototype functions as the heuristic, according to *The Design of Business*, that needs to be iteratively tested and refined in order to be refined. A thorough evaluation of the mystery that took place in the define phase and the ideate phase, led to the exploration of this heuristic that caters the needs of the target audience. The prototype is made with the key elements from the idea on which it is based, in order to be tested in the next phase.

2.1.5 Test

The prototype was tested during the test phase of the design thinking process in order to see if the prototyping is valid. This phase started with the development of a test script, which ensures the maximum amount of feedback that was gathered from the test (Ongena & Loggen, 2016). The script also describes different situations and how to respond to these types of situations. The test considered different types of test participants that can be encountered, and how to deal with these types.

The format of this test script ensured that the test is thoroughly prepared. Among the different test participants that give feedback, there are different types of test participants that can be encountered that provide unreliable feedback. These participants that can give unreliable feedback are identified and described below.

The different test participants that are considered were taught during the studies Business IT & Management:

- Pleasers: people who say that they like the prototype regardless of their actual opinion;
  - Pleasers should be dealt with by asking questions about possible improvements and by assuring the participants that the sole reason for this test is to improve the prototype.
- Negatives: people who don't see the value of the prototype, either because they don't understand the use of it or because they think that their situation is already perfect;
  - Negatives should be dealt with by asking questions about their situation that may link to the use of the prototype. These questions can be based on insights that were gathered during the empathy phase.

- Avoiders: people who identify unimportant aspects of the prototype as undesirable and therefore think the prototype is not valuable. (E.g. the shape of the buttons in the prototype for an App). The prototype is subject for discussion and therefore focuses on key elements. Adjacent matters are easily changeable and are no reason for the prototype to fail.
  - Avoiders should be dealt with by emphasizing the key elements and that adjacent matters can easily be changed.

The participants were observed to gather relevant insights that can improve the prototype. Additional interviews enriched the insights that are gained from the observations and describe the participants' emotions and thoughts. The test was done with a presentation that elaborated on all the key elements of the prototype.

2.2 Scrum

Design thinking is an iterative process that requires the researcher to continuously explore new mysteries and refine the prototypes. Furthermore, client contact was preferable for this assignment to align the results with Consilience's mission and vision. The design thinking phases were divided over sprints according to the Scrum project management method. As explained, this was done consciously to break down tasks into small increments as according to Agile design. The Scrum approach also ensured regular contact with the client by giving sprint review presentations at the end of each sprint and by engaging the client during modeling and making decisions.

Opposed to Prince2, a project management method which was also considered, the Scrum method allows for easy processing of changes that occur during a project. New insights gained from research can affect results during the project. For instance, when a new user insight arises, the impact of this change can be processed in the reports of each design thinking phase. This also complies with the knowledge funnel technique of constantly going back to explore and define new mysteries.

Another method is the waterfall approach, where information flows from one phase to the next, but the reversed information flow does not occur. As design thinking is all about discovery and new knowledge can be discovered in each phase of the process, this waterfall approach is inconvenient. Furthermore, even though Prince2 focuses more on monitoring the business case than Scrum, this assignment revolved around a wicked problem, which could not be defined in a business case.

Therefore, Scrum was the better choice. A project according to Scrum is divided into sprints. The length of the sprints for this research was two weeks, as this ensured sufficient time for each part of the process while maintaining a manageable process. An elaboration on how this project was managed is included in Appendix M.

2.3 Impact analysis

As this research sought to understand the required changes to the current services, an impact analysis was conducted describing the impact on Consilience's organization and their services. The SCOPAFIJTH method was used for this impact analysis as this method yields the most complete information about each organizational aspect (Zijlstra, 2014).

Most impact analysis methods, such as the Business Impact Analysis (BIA), are focused on measuring the impact of failure of existing processes. As this assignment regarded the development of new services, these impact analysis methods could not be used.

The SCOPAFIJTH acronym can be reduced by eliminating letters. That being said, by considering each aspect, the method allows the user to discover the depths of the impact from multiple perspectives. This is the reason that all the aspects were considered.

## 2.4 Techniques for data collection, processing and analysis

The data science process from the book *Doing Data Science* (Schutt & O'Neil, 2013) was used during this research. Raw data was collected through desk and field research, processed, and rationalized in models (Lethbridge, Sim, & Singer, 2005). The following techniques for data collection were used:

Using available information: Desk research was conducted on relevant topics in order to use existing information. These relevant topics are described in the theoretical framework in chapter 3. Each heading in this chapter represents one of the topics. There is a lot of existing information on constructs that are relevant to this research. The desk research setup is included in Appendix A. This available information supports each phase of the design thinking process.

Ethnographic interviews were conducted with a sample of the target audience in order to understand their needs. Face-to-face interviews yield the most qualitative information and the best level of empathy with the users, which is required for the first phase of design thinking (Opdenakker, 2006).

Non-participant observations were done at target organizations to gain qualitative additional information that may not be gathered during the ethnographic interviews. These observations are according to design thinking required to see new perspectives of user insights.

Participant observations were done at services that Consilience hosts to illuminate these services. Observations allowed for understanding the followed algorithm for providing the services, and gave information on situations that can occur during the service.
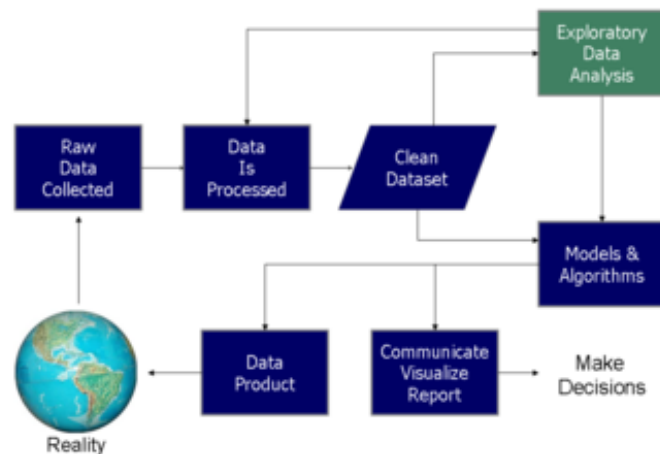
(Kawulich, 2005)

Interviews were conducted with participants at the summits and workshops to collect qualitative feedback that was used to improve the prototype. This was the best way to collect feedback, in combination with non-participant observations, to ensure richness of information.

Questionnaires were presented to the participants that were present at the GSES (appendix H). These questionnaires were to gain quantitative feedback of the GSES to add to the qualitative feedback that was collected from interviews and observations. This feedback was used to improve the prototype. A questionnaire asks the same questions to each of the respondents. Opposed to interviews, these questions can be analytically compared and knowledge is more easily acquired.

The qualitative data was processed with the download, saturate, and group technique for grouping recurring themes to elucidate insights (chapter 5.1). The quantitative data was processed using a survey analytics program (chapter 5.4). This data was processed in models to clarify the data.

A **Business Model Canvas (BMC)** was compiled of the data that was gathered on Consilience's organization, and is included in Appendix N. This business model captures the structure of the organization and was used to understand and visualize the impact of this assignment on Consilience's structure. There are not many alternatives to the business model canvas. The Stähler business model covers the exact same information but is less known, and was therefore not chosen for this research.

Three **personas** were made that represent the behavior and the needs of the target group (chapter 5.2). The personas were chosen because the amount of user insights was too abstract and must be processed into more visual models in order to better understand their needs. A customer empathy map, which captures what users see, hear, feel, say, and do, covers less relevant information than personas, as personas are customizable, and was therefore not suitable for this research.

A **Customer Journey Map** was created based on interviews with participants of the different services that Consilience provides (Chapter 5.5). This customer journey map was made to better understand the services that Consilience offers to schools, and the improvements to these services that should be considered for the development of the new services. This was the best model for visualizing the research on Consilience's services as, opposed to process models, the customer journey map considers subjective information from the participants which is needed to create more empathy.

A **questionnaire** was made and distributed to the participants at the Global Social Entrepreneurship. The answers were analyzed with Microsoft Excel to find the averages and the modes of the answers (Chapter 5.4). This questionnaire was made to analyze and compare participants' answers and to ensure that the same questions was asked to every participant. This questionnaire supported the research on the services that Consilience offers to schools.

The **prototype** of the services includes data from the research that was done in previous phases (Chapter 7). The prototype is part of the design thinking process and communicates the key elements of the ideas that were brainstormed to the target audience. The format for the prototype was determined after the ideate phase because this format must fit the solution.

2.5 Research reliability and validity

Reliability

This research was conducted only for organizations in Mumbai. This research depended on the design thinking process, which in turn depends on abductive reasoning that is done during the ideate phase. Abductive reasoning has low reliability as the results are usually not supported by research. This research strove to increase reliability by interviewing a sample size of the target group and by conducting research on relevant topic on which the ideas in the ideate phase can be based.

Reliability is supported by using triangulation in this research (Golafshani, 2003). The interviews are supported with desk research and tests. This ensured that the solution is more generalizable. This research meant to clarify the conditions in individual organizations that contribute to the problem, giving more insight in the problem domain. The sample size of the target group that was interviewed was determined in regard to the length of the research. The target group consisted of numerous different organizations that may have different needs. The timeframe for the interviews in respect to the time needed to guarantee reliability is insufficient, as the range of the target group is too extensive.

Construct validity

Construct validity assured adequate preoperational explication of innovation and design thinking, taking away biases by interviewing different roles in organizations, and using both ethnographic interviews and observations to collect information. Construct validity is the validity of researched constructs and whether or not the right (and singular) constructs were being researched. This research strove to achieve this by elucidating specific constructs and by notifying all the stakeholders of the constructs in order to make sure that the right constructs were being researched. For this assignment, these were the improvement of innovation capabilities and organizational change.

The questions for the questionnaires were grouped into sets that measured similar concepts, as according to internal consistency (PSU, 2015). This was applicable for the questionnaires for the Caluwé color test that was distributed to colleagues at Consilience, and the GSES-questionnaire that was handed out to participants of the Global Social Entrepreneurship Summit.

The interviews with the Maker Engineers, consultant and directors were half-structured according to the book *Basisboek kwalitatief onderzoek* (Baarda, et al., 2013), as a topic-list was used in addition to the preformulated sub-questions. This structure helped to gain information that might have been missed if a structured setup was used, that uses only preformulated questions. Conclusion and internal validity were not applicable to this research as there was no clear causal relationship being researched. The set-up of the desk and field research are included Appendix A.

Internal validity

Internal validity describes the extent to which the research setup was right for this research. The research required the development of existing services. The design thinking process and the chosen brainstorming techniques allowed to build on these existing services. The design thinking process is a user-centered method for designing products and services. The empathy phase illuminates the problems and needs of the target group. The problem domain consists of organizations in Mumbai that have a demand for expanding their innovation capacity because they are not innovating at a desirable pace. The root cause for this problem is that operating conditions and environments are changing rapidly and these organizations are not adapting to the changes.

The Scrum approach to this research allows Consilience to apply changes to the research. As new insights arise, the results to the research may change. These changes can be applied to the different intermediate products that resulted from each phase of the design thinking process. This research addressed design thinking because Consilience has experience with the method. However, while design thinking is a valuable method for innovation, it is not the only available method. Different methods can be researched in order to find different solutions to the problems pointed out by the target group.

External validity
External validity describes whether or not the results of the research can be generalized. The target group consists of a large variety of organizations in Mumbai and the sample size consisted of only four different organizations. A larger sample size was not feasible for this assignment.

Furthermore, as the environment changes for organizations in the target group, so does it for Consilience. As said by Martin, Consilience must continuously go back to the mystery, being changes in the needs of the target group and environment, and clarify these mysteries for reliability and validity

(Shuttleworth, 2012)

3. Theoretical framework

The sub-questions that were formulated to provide input for answering the research question were supported by conducting desk and field research to elucidate relevant constructs. This chapter explains relevant topics related to the research and the methods that were used for this assignment.

3.1 Innovation

The definition of innovation was researched in order to adapt the research for this thesis to a single understanding of the construct. For the services that Consilience provides to schools and school leaders concerning innovation, the organization uses Rogers' definition of innovation:

"We define innovation as bringing an idea, practice, or object perceived as new to an individual, a team, an organization, or community in order to meet important learning needs." (Feeny & Rogers, 2003)

Because this definition is focused on learning needs, it does not apply to the focus on innovation in non-educational organizations. To ensure a likeminded approach, several definitions were examined and confirmed with the client on the definition that best suited Consilience's approach.

These definitions that were examined each focused on different aspects. This research focuses on innovation in organizations and therefore only definitions that focused on developing products or services (the two possible outputs of organizations) were examined. Thompson and House's approach to innovation best describes Consilience's approach to innovation with regard to the target audience.

"Innovation is the generation, acceptance and implementation of new ideas, processes, products or services." (Thompson & House, 1971)

3.2 Innovation capacity

Consilience's approach to innovation capacity, with regard to Roger's definition of innovation, is:

"The extent to which school leaders, educators and students can bring ideas, practices, or objects perceived as new to an individual, a team, an organization, or community in order to meet important learning needs."

Translating this to Thompson and House's approach gave the following definition of innovation capacity:

"The extent to which an organization, employer, or employee, is able to solve problems by generating, accepting and implementing new ideas, processes, products or services, using the available technologies, competencies and skills"

Influencing factor	Underlying factors	Underlying factors
Leadership focused on innovation	Clear, flexible long term vision	
	Allocating resources for innovation	
	Develop a fertile culture	Encouraging idea supply and creativity
		Employee well-being
		Employee development
		Employee empowerment
		Employee freedom
	Resources allocated for R&D	Employee
Learning from testing and reiterating	Designing tangible prototypes	
Technology		
Human factors	Employee diversity	
	Employee's intrinsic motivation	
	Collaboration	
	Managing knowledge and applying knowledge	Identifying trends

Because different factors apply to the new target group organizations than to schools, desk research was done to seek to understand relevant factors and conditions that influence innovation capacity (Wycoff, 2005). These factors resulted in a longlist as illustrated on the previous page. This longlist contains the different factors that influence innovation in organizations. This research used this longlist to connect the user-insights to these influencing factors. This resulted in a better understanding of which factors currently form pain points in organizations. Furthermore, while brainstorming ideas this longlist was considered as factors that could be improved for improving an organization's innovation capacity.

3.3 Improving an organization's innovation capacity

To improve an organization's innovation capacity is to develop the factors and conditions that influence innovation. Scott Edinger said in an interview with Forbes: *"Don't innovate. Create a culture of innovation".* (Edinger, 2012) By this he meant that simply innovating from time to time does not create the desired outcome. Ideas can only be forced to a limited extent (Kawasaki, 2014). Creating a culture of innovation assures a continuous flow and encouragement of ideas.

By allocating time to experimenting, prototyping, and reiterating, instead of planning, building, and relaunching, we create a culture of innovation (Kander, 2014). Focus on employee trust by presenting leaders as protectors rather than silly motivators. Employees should feel protected and encouraged to regularly suggest ideas for innovations (Wujec, 2015).

Innovation requires a skillset that should be second nature to employees at an organization. The innovation skillset consists of seven categories (Becker, 2016). These are innovation specific skills and do not replace the skills that are required for one's job.

Curiosity: The driver for innovation is to discover new mysteries in order to innovate valid products or services for new or existing customers. The idea that there are no mysteries, or that these mysteries will solve themselves, need to be taken away. Curiosity means:

- An 'everything can be improved' mindset (creative freedom);
- Natural curiosity for causality;

Observation and empathy: New mysteries are explored through actively trying to understand the user. This is done by observing and interviewing the users. Interviewing gives the user's point of view, while observing teaches us about how products or problems are actually managed. Critical skills for observation and empathy are:

- Watching a human process of handling products or services without disturbing the process;
- Engaging with the process when prompted;
- Asking the right how and why questions based on this process;
- Holistic and descriptive approach;
- Human centered understanding.

Research: New customer needs and upcoming trends need to be researched in order to get a complete understanding. Before the empathy phase, a thorough orientation on the context of what you want to know is done through desk research. Relevant researching skills are.

- Understanding that correlation does not imply causation;
- Understanding that demographic factors are not generalizable;
- Trend forecasting and researching technology experiences;
- Researching innovation cycles;

Prototyping: The skill of making your ideas tangible in order to communicate the ideas to you users

- Understanding how to use different tools;
- Creative use of materials;
- Production and storytelling;

Testing: Testing happens after the ideas are made into tangible prototypes. The prototypes are brought to a group of customers which can test the prototype. This phase is not meant to prove that the prototype works, but to collect feedback that can be used to improve the prototype. Useful skills:

- Storytelling;
- Willingness to fail (fast) and openness to feedback;
- Observing how users actually use the product.

3.4 Consilience's services for schools

Over the course of the last four years, seven new methods were implemented in the curriculum at ASB (Consilience Learning, 2016). These methods were developed by the Research & Development department and taught to the teachers during so called Maker Academy courses, who in turn implemented the methods in their classes.

Consilience's services for schools are focused on leadership coaching, systems development, accelerators and essential conditions (Consilience, 2016). The services consist of supporting school leaders in starting, growing and sustaining innovations through Leadership Coaching, Systems Development, prototyping Accelerators and teaching conditions that are essential for innovation. These services were researched as they form the basis for the development of the new services.

- Assess which computer hard- and software can be valuable for the school's curriculum development. Integrate an analytics platform in order to visualize learning patterns that inform action and allow communication of relevant data.
- Develop skills and capacity for identifying relevant trends and opportunities, and make plans accordingly to adapt to the future. To stay ahead of the competition, corporates have to be aware of new trends and anticipate the future. Empathize with clients and employees and define the opportunities and threats that this new trend brings along.
- Growing the Maker culture at schools, integrate Maker into the curriculum and support schools to assess the impact that Maker has (Consilience, 2017). This is done by teaching Maker Academy Courses to educators.
- Teach students, educators and school leaders about social entrepreneurship, and how these social enterprises can benefit society.
- Teach students the knowledge and skills to solve real world problems through three day summits (GSES, 2017).

Global Social Entrepreneurship Summit
The GSES is a three-day summit for 120 students from grade nine to twelve from international schools from Jordan, Dubai, Singapore, Bangalore and Mumbai. The objective of the summit is to teach the children to find solutions for real-world problems using the design thinking process. The children were divided over the following themes:

- Quality education;
- Clean water and treatment;
- Sustainable cities and communities;
- Sustainable agriculture.

The first day, the students were familiarized with the design thinking process by doing a small project. At the end of the first day, the case for the rest of the summit was explained and the children were divided into the four groups. The second and third day the children had to empathize with the target group by asking questions to experts on their assigned theme, define the challenge that they want to solve, ideate solutions, create a prototype, and present the prototype to the other students.

Makeology Summit
The Makeology Summit, that was hosted at the American International School of Chennai (AISC) was a two-day summit for 80 educators from Jordan, Singapore, Dubai, Nepal, Saudi Arabia, New Delhi, Bangalore, Mumbai and Chennai. The target of the summit was to create awareness off the Making movement and taught different Maker skills, competencies and knowledge

Each day of the summit consisted of four workshops that were simultaneously offered on both days. Participants had to enroll for two workshops (one on each day) before the summit, and were assigned to the workshops of their choice. At the end of each day, the participants could choose from several smaller workshops that taught new Making skills.

Consilience also hosts summits on technology, robotics, and artificial intelligence (TRAI summits). This summit was not researched as it did not take place during the period of this assignment. In addition, Consilience teaches educators and school leaders about design thinking and how to integrate this into their curriculum. To support the planning and design of prototypes, ASB has developed accelerators that can help the students (The American School of Bombay, 2015). These accelerators are:

1. Focus on high impact opportunity;
2. Attract and maintain an inquiring coalition;
3. Envision impact and design a prototype;
4. Attract voluntary inquirers;
5. Accelerate by removing barriers to inquiry;
6. Generate and celebrate early impacts;
7. Keep learning from evidence and experience;
8. Institute change.

Consilience offers Maker courses to schools that teach about the benefits of Maker, the different materials that can be used for Making, and how to incorporate the Maker culture into the school's curriculum. What Making is, is explained in the next paragraph. The Maker courses are listed below.

- **Making & Tinkering Philosophy and Pedagogy**
  In this course the importance of Making is being taught and what strategies and techniques are needed for Making.
- **Scratch Programming and Programmable Toys**
  The core concepts of coding are explained in this course and how programming can stimulate student learning and engagement.
- **Small Scale Prototyping for Real World Problems**
  Solve problems that are meaningful to you and create prototypes of solutions.
- **Rapid Prototyping, Basic Circuitry, Beginner Wearable Technology**
  Make prototypes work by using simple circuits and electronics.
- **Arduino Microcontrollers, Electronic Components and Creating Circuits**
  Program electronics using microcontrollers to let prototypes perform (simple) programmed activities.
- **Scratch Programming II and Interactive Prototypes with MaKey MaKey**
  Learning more advanced programming to build interactive programs.
- **Beginning Robotics with the Lego EV3**
  Automation is upcoming in every sector, learning about robotics and engineering will better prepare students for their future.

3.5 The Maker Movement

As previously explained, the Maker Movement is one of Consiliences specializations, and was thus further researched in order to discover possibilities for the new target audience. Making is a way of turning knowledge into prototypes and learning from experience. The method is strongly based on constructionism, a learning-theory that describes that the best way to build knowledge is through building things that have meaning for the learner.

Maker culture is often seen as a fun way to design products, rather than the actual philosophy: learning a Maker mindset that boosts creativity in problem solving and creating solutions (Eha, 2016). This misconception is the biggest barrier standing in the way of the development of the Movement. If you make something that really matters to you, you learn quicker (Edutopia, 2015).

The best-known organizations that have incorporated the Maker Movement are Infosys, NASA, Facebook and Netflix. These organizations host open Maker events to actively involve their customers in shaping their products. Nurses often customize machines and materials for patients. Unfortunately, their ideas rarely leave the patients' room (MakerNurse, 2016). MakerNurse seeks to develop Makerspaces in hospitals where nurses can create customized prototypes for patients.

The most important insight is that these (large) corporations all emphasize the benefits of Maker, but that the adoption of Maker in general is falling behind (Holoubek, 2016).

Maker Faire (Maker Faire, 2017) and MakerCon (MakerCon, 2017) are events where participants can pitch their prototype and collect feedback from the audience. These events also host speakers that debate about topics related to the Maker Movement and how these are shaping our future. Makerspaces provide the necessary equipment and environment for the user to design and develop prototypes in collaboration with their community (Makerspaces, 2016).

3.6 What defines an organization

As this thesis explored the development of services to improve an organization's innovation capacity, the definition of an organization was researched. This clarifies where the changes need to be made in order to be more innovative. McKinsey has developed a model which can be used to define and distinguish an organization (van der Velden, 2011). The model is based on 7 Ss that need to be aligned within an organization.

Structure: The organizational structure communicates how roles, power, and responsibilities are divided. The structure must support the strategy as such that the right roles, power, and responsibilities are allocated within the organization. This structure is captured in the Business Model Canvas.

Strategy: An organization follows either one or balances two or more of the following strategies (de Witte & Jonker, 2015):   (Thirstt, 2016)

- Product leadership: A strategy that focuses on exploring the market and continuously innovating new premium products. The organization flexibly adapts to new chances;
- Operational excellence: Focus on streamlining processes to cut costs;
- Customer intimacy: Managing long-term customer relationships and offer customized products or services. Delegates decisions to employees with the most customer contact;
- Experience: Customer-sensitive strategy where not the product is centralized but the whole experience around it;
- Community building: Building and managing material and non-material connections around a community.

Systems: The alignment between the IT and the business can be achieved by evaluating the business model as the business perspective and tuning this to the application and technology perspectives (Osterwalder & Pigneur, 2009).

Shared values: An organization's shared values are incorporated in the corporate culture (OCAI, 2010). The different types of corporate cultures are described in chapter 3.7.

Skills: Managers' and employees' skills and competencies must be aligned with their roles in the organization. The skills and competencies must contribute to the strategy.

Staff: An organization must maintain a flexible layer of personnel and skills that can be allocated to different projects when the need arises. Managers need to know how to manage such flexibility and must have the skills to determine the correct allocation of resources.

Style: The organization requires a democratic management style that allows employees of different roles to pitch their ideas and explore possibilities (Leadership-toolbox, 2017).
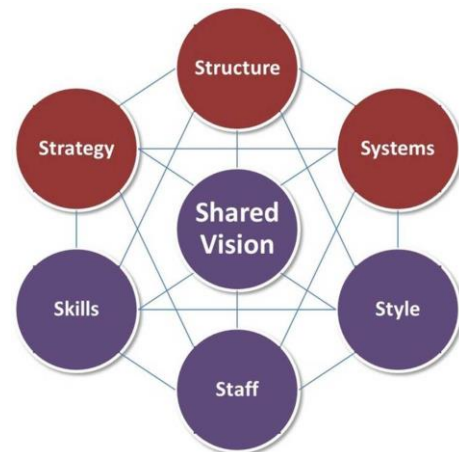
3.7 Organizational culture

As described in chapter 3.2, culture is an influencing factor for innovation. Four types of organizational culture can be distinguished (Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2011). Assessment of an organization culture is done by having employees fill in the OCAI questionnaire (OCAI, 2010).

- Adhocracy: focus on cultures that foster innovations and synergy
- Market culture: focus on making money from the market
- Hierarchy culture: guided by well documented procedures
- Clan culture: culture that cares for people

Of these types of organizations, adhocracy was the most innovative and hierarchy the least innovative (Rose, Kumar, Abdullah, & Ling, 2008). Organizations that are innovative often see an increased productivity and engagement from employees (Fagerberg, Srholec, & Verspagen, 2009).

Flexibility and Discretion

Clan Oriented	**Adhocracy Oriented**
A very personal place; like an extended family; mentoring; nurturing; participation	Dynamic and entrepreneurial; people take risks; values innovation and entrepreneurship
Market Oriented	**Hierarchically Oriented**
Results oriented; getting the job done; values competition and achievement	Favors structure and control; coordination and efficiency; stability is important

Internal Focus and Integration ← → **External Focus and Differentiation**

Stability and Control

(Cameron & Quinn, 1999)

An adhocracy oriented organizational culture is the best enabler and stimulator for innovation. Thus, to transform an organization to be more innovative, the organizational culture needs to be assessed and transformed into an adhocracy culture.

Employee management in an adhocracy oriented culture
In an adhocracy culture, employees are successful if they can be innovative. Therefore, it is needed to thoroughly distribute the vision of the company and to support employees by providing a climate that su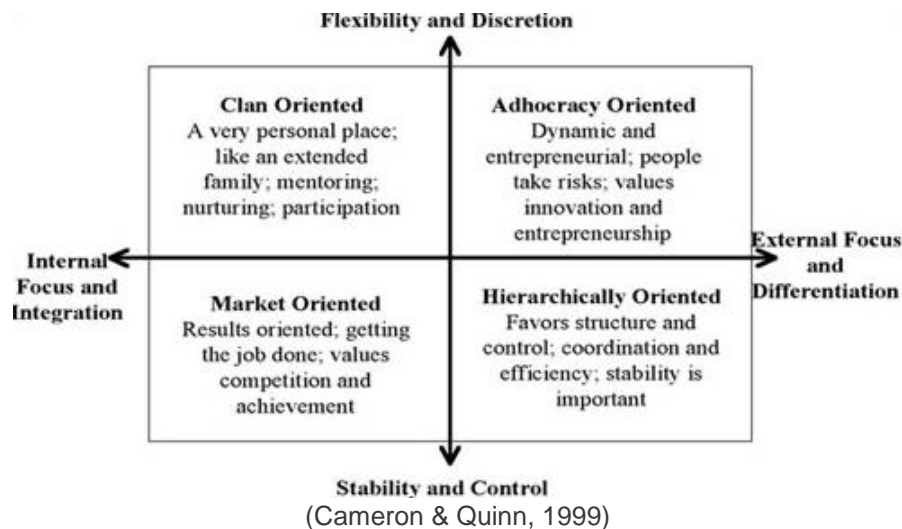pports freedom of ideas and a high commitment to learning (Khurosani, 2013). These practices embrace employee loyalty and commitment, both values that support adhocracy culture.

Leadership practices in an adhocracy oriented culture
The leadership practices related to an adhocracy oriented culture are 'enabling others to act' and 'to encourage the heart' (Pennington, Townsend, & Cummins, 2003). These practices are respectively to foster collaboration, build trust, give power to others and offer support, and to recognize individuals and celebrate team accomplishments.

3.8 Organizational change
Improving an organization's innovation capacity asks for organizational change. Organizational change, in turn, requires an answer to the why, what, who and how of the change (de Witte & Jonker, 2015).

Improving an organization's innovation capacity is a form of organizational change. Thus, research was conducted on organizational change in order to better understand this domain. This was considered during the development of the new services and for marketing these services to the target audience. In the case of an organization's transformation to improve their innovation capacity, the answers to the four questions are as follows:

Why?
Organizations want (and need) to keep up with the change that happens around them (Martin, 2009). Customers' needs and wishes keep changing. In order to not be overrun by the competition, organizations need to clarify the arising mystery that is their customers' needs. Processes need to be structured to add reliable value and explore new methods for creating valid value.

What?

Most organizations, especially strategic managers, find comfort in the reliability of their solutions. To strive for validity is seen as a risk, as this requires abductive reasoning and a new form of budgeting. However, what is presently a reliable product or service, may lack validity in the future as it no longer caters the customers' needs.

The ideal situation is one where reliability is balanced with validity (Martin, 2009). New mysteries are explored and knowledge is exploited. Proven products and services are improved over time, while organizations keep exploring new mysteries, abductively reasoning new valid solutions to their customer

Who?

The whole organization, plus the customers, are involved in the transformation an organization has to go through to be more innovative, as innovations in products and services are based on the customers' needs. The change is effected by the whole organization, with the help of Consilience.

Managers need to support the change, finding value in the new methods and learning to incorporate this into their work. Employees need to accommodate to the change, getting used to new practices and methods. Managers need to manage possible resistance of employees.
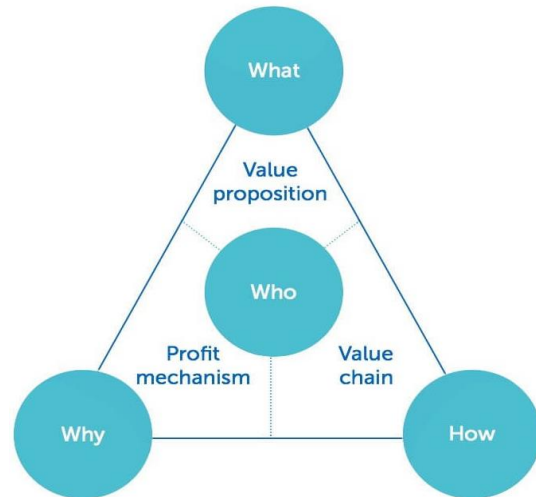
(de Witte & Jonker, 2015)

How?

The answer to the how is described in the results from this research. The results can be found in chapter 9. In organizational transformations, three dilemmas arise. One dilemma is which parts of the organization to change in which sequence to add value to the total change. The second dilemma is how to convey the singular meaning of the change to employees with different opinions towards the change. The third dilemma is how to balance rationality with emotions regarding the change.

3.9 Conclusion

The definition of organization capacity that was used during this research is:

"The extent to which an organization, employer, or employee, is able to solve problems by generating, accepting and implementing new ideas, processes, products or services, using the available technologies, competencies and skills"

The innovation capacity can be improved by teaching leadership practices focused on innovation, teaching organizations about testing and reiterating, implementing innovative technology, and improving human factors such as employee diversity, creativity, and skills. This was considered during the ideate phase where ideas were brainstormed for improving these factors of innovation. Consilience offers services to schools that focus on innovation leadership, design thinking, and Making. The underlying philosophy in these services is learning by doing, and focusing on the actual needs that the users have. These services formed the basis for the development of the new services.

An organization consists of seven elements (7 Ss) that must be aligned in order to operate effectively. The corporate culture that is most focused on innovation is an adhocracy culture, in which employees are encouraged and empowered to experiment with ideas. The corresponding leadership practices are focused on enabling employees to be innovative. For organizational change to be effective, the why, what, who, and how of the change must be clear.

This theoretical framework forms the basis for the research that is conducted using the design thinking process. This process focuses seeks to understand the target group's needs and to develop a prototype that can solve these needs. The results of this research are linked to the theoretical framework in the discussion in chapter 10.

4. Empathize

The empathy phase of the design thinking process is meant to gain a deep understanding of the target group's needs, wishes, and overall experience of the way their organizations are currently innovating. The structure of the empathy interviews is included in Appendix D.

During this phase, sixteen interviews were conducted by interviewing different roles from four organizations. This number of interviews ensured that the empathy phase was feasible as the time for the interviews was just two weeks, while still ensuring richness of information that is gathered from these interviews (see chapter 2.2). The number of interviews also ensured maximum input in the available timeframe in order to improve validity.

The choice for four different organizations was made in order to gather information from different perspectives, while ensuring reliability of this information by interviewing two different roles from each organization. Each interviewee was interviewed twice, as the second interview deepened the understanding of topics that arose during the first interview. Additional observations were done in each organization to contribute to the insights.

The empathy phase took place during the same time as the cultural stress phase according to the PREFLEX student guide (Hernández & Walenkamp, 2012). By acknowledging this phase of culture shock, preparations were made to avoid misunderstandings in order to maximize interview effectivity by adapting to the Indian culture. More about culture shock is described in Appendix L.

4.1 Interview structure

The interviews were semi-structured to ensure openness for new topics that arose during the interviews, while still maintaining the scope of the research. As the interviews were focused on empathy with the potential users of the new services, an empathy focused structure was maintained proposed by Stanford d.school (Stanford, 2010). The interview script is based on this structure.

(Stanford, 2010)
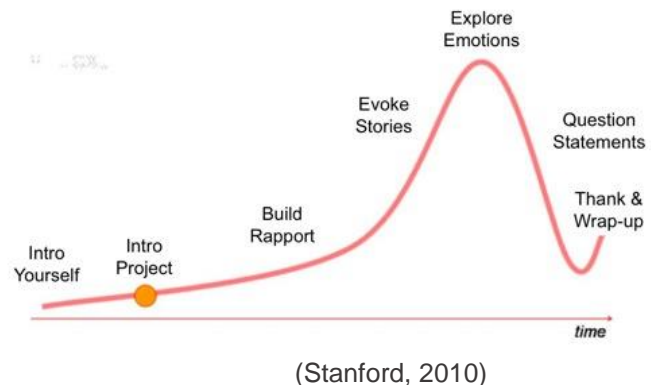
Interview script
An interview script was made in advance of the interviews to ensure that the information that was gained from these interviews is relevant and complete. The questions and topic-list that were used during the interviews are based on the theoretical framework.

The introduction, according to Stanford d.school, aimed to clarify the goal of the research, to operationalize concepts in order to ensure construct validity (chapter 2.5), and to comfort the interviewees. The latter was in the interest of design thinking's holistic approach, as described in chapter 2.1. In this introduction, the concept of innovation capacity as described in chapter 3.2 was explained.

The opening questions were meant to warm up the interviewees, build the rapport, and gain a general understanding of the interviewees' stance on innovation. These questions also probed the general level of innovation in the organization.

The topic-list allowed for diversion in answers and to digress to new relevant topics. The topics are based on the theoretical framework. When the topics are first tapped into, stories are evoked that tap into new topics. Eventually, the interviewees' emotions regarding the topics were explored to get a deeper understanding of how they are moved by innovation and adjacent concepts.

Design thinking was included in the topic-list as this is one of the subjects used in Consilience's services (chapter 3.4). The need to innovate was discussed in order to understand the priority of innovation in organizations. The same goes for innovative culture, which was included in the topic-list to find out to what extent innovation is understood organization-wide.

The need for innovation and knowledge on innovation are measures to understand the division of said concepts. An apparent low priority of these concepts would illustrate the need to create more awareness, while if organizations appeared to highly value the concepts it would be easier to sell the services. The complete topic-list is included in the interview structure in Appendix D.

The questions focus to elucidate how (if at all) certain aspects within organizations are focused on innovation. These aspects are based on the 7S model by McKinsey (Thirstt, 2016). Consilience has extensive knowledge on design thinking and experience in integrating design thinking into curricula (Consilience, 2016). Consilience feels that design thinking is an invaluable method for organizations.

Conclusion
The interview conclusion once again comforted the interviewees by confirming that all details will be kept strictly confidential, and that the interview has great value for the research. An appointment for the second interview was also made after the conclusion.

4.2 Interviews

The insights that were gained from the empathizing interviews were gathered and included in Appendix E. This table functioned as the input for the download, saturate and group technique that was used in the define phase to identify reoccurring insights and group these together. The insights are based on the 16 interviews that were held with interviewees from four different organizations. The anonymity of the interviewees is protected by not including any personal information in this thesis, as described in the plan of action.

The interviews were analyzed by rereading the transcripts and processed by recording the insights in a table. The insights that were chosen from the interviews are chosen because they are surprising, reoccurring, or organization- or sector-specific. These criteria ensured that the results can be compared and organizational challenges and problems can be identified. Analyzing and processing these insights in a table was done to leave out irrelevant information and focus on specific needs.

After each interview, the most important or surprising insights were written down, as the memories of that interview were still fresh. After all the interviews, the minutes were read again and the five most important insights from each interview were selected and included in a table (see Appendix E).

As the target group consists of organizations of any type within Mumbai, the organizations with which the interviews were held did not have to comply with any rule but to be located in Mumbai. The sample size was selected on availability for interviews at the time of this research.

4.3 Observations

Observations were made in four organizations. These observations were made in different organizations in order to see different perspectives. Each observation was done at a different time in order to see different practices at each organization. On average, each organization was observed for thirty minutes.

The observations were analyzed by comparing them to the interview insights in order to verify the information that was gained in the interviews. These observations were important for the verification of the interview insights. The observations are processed in a table that is included in Appendix E.

4.4 Conclusion

The empathy phase consisted of 16 interviews with different roles from four organizations supported by observations that were made in four organizations. These interviews and observations were an exploration of the mystery and yielded input for the define phase, where the information is further exploited to discover concrete needs.

5. Define

The define phase yielded a better understanding of the target group, as the knowledge that was gained during the empathy phase was exploited and processed into understandable models. The empathy insights, that were grouped during the download, saturate and group technique, were included in three personas that represent the most common business strategies and cultures. Additional research into summits and workshops provided by Consilience yielded a better understanding of the service that the organization offers to schools.

5.1 Download, saturate and group

Dividing the insights of all the interviews into groups of reoccurring themes clarified the shared needs of the target audience. By iteratively moving comparable insights towards each other, groups appeared and disappeared, ultimately leaving the most relevant groups that represent the needs of the target audience. The final groups were chosen as they best represent the (most occurring) issues and needs of the target audience. The pictures of the different iterations are included in Appendix P. This technique resulted in a clear understanding of the needs that organizations in the target audience share. Six concrete needs resulted from this technique. These needs are also represented in the personas, that are described in the next paragraph.

5.2 Personas

Based on the interviews and observations, three personas were created that represent the target group and its behavior (Atos, 2016). These personas represent the target audience and contain the information that was elucidated in the empathy phase. This concrete representation of the target audience was chosen because the amount of insights is too high and these insights differed from each other which makes them abstract.

The research and interview insights brought forward that there are three distinguishable types in the target group, as stated below. The personas, and an explanation of how they are based on the interviews, are included in Appendix F.

- Organizations and employees that are convinced of the need for innovation but do not yet carry this forward in their structure and strategy;
- Organizations and employees that are convinced of the need for innovation and carry this forward in their structure and strategy;
- Organizations and employees that do not see the need to for innovation and are comfortable in their current environment.

These organizations require a different approach, as they have different needs. The insights are processed in a personal bio and an organization bio, as organization specific insights are to be distinguished. The different organizational cultures are distinguished and derived from the insights from the interviews. These aspects were included as they describe the feelings and thoughts of the organization and employee regarding innovation, which is what the ideas are based on.

Each persona has goals and frustrations based on their role within the organization. These are based on roles that were interviewed and represent the target audience's desired state. The personas' activities are based on the tasks for which interviewees said that innovation can be valuable and are included because they explain how their tasks are focused on innovation.

The personas' skills are derived from the skills that the interviewees rated most important for innovation, and how good they rated their own proficiency regarding these skills. These skills are included to be compared with the (new) innovative skills as described in chapter 3.3. Demographic details are determined by taking the average or most occurring situation from the interviewees.

5.3 Challenge statements

Based on the concrete insights that were explored with the download, saturate, and group method, four challenge statements were formulated. A challenge statement describes which needs must be achieved in the desired situation, and the problems that occur in the current situation. These challenge statements capture the general needs of the target audience to which solutions must be brainstormed.

They are called challenge statements, as the challenge is to go from the current to the desired situation. These challenge statements are formulated to give the right focus to the design thinking process and ensure that the ideas that are brainstormed in the ideate phase are valid. The ideas that are brainstormed in the ideate phase are the means for the target audience to go from the current situation tot the desired situation. Validity of these ideas is further ensured in the test phase, where the prototypes are measured with the challenge statements. The personas provided input for these challenge statements, as the current situation and the desired situation are described in these personas.

5.4 Design criteria

Design criteria were formulated for each challenge statement. Design criteria are general rules with which the ideas that are brainstormed in the ideate phase must comply. These criteria are used for the first selection in the converging stage of the ideate phase. This converging stage is the stage in which all the ideas are evaluated and the best ideas are selected. The ideas are first evaluated with these design criteria, as ideas that do not comply with these criteria are not allowed to be chosen in the following processes.

Furthermore, as the ideation phase is based on abductive reasoning, which is reasoning by leaps of mind, the ideate phase lacks reliability. These design criteria are formulated in order to improve the reliability of the ideas that are selected. The design criteria were chosen as they are specific rules which were to be determined beforehand. By writing these design criteria before entering the ideate phase, they were unbiased by the creativity of the ideas. These design criteria were confirmed with the client to ensure that the ideas comply with Consilience's vision.

Design criteria for challenge statement 1

- The idea must be a solution to challenge statement 1;
- The idea should be realized within six months
    - Consilience's growth and vision require that the services are implemented quickly;
- The idea must reach multiple industries at once to limit the cost;
    - Consilience does not want to focus on a single industry but reach a large audience
- The idea must not be (part of) commercial advertising as Consilience to limit the cost
    - Consilience does not wat to commercially advertise
- The idea must appeal to the recipient.
    - The message must appeal to the different types of organizations

Design criteria for challenge statement 2

- The idea must be a solution to challenge statement 2;
- The idea should focus on convincing managers to engage with Consilience;
    - As suggested by the interviewees, managers must be convinced of the benefits first
- The idea must be adaptable to specific organizations;
    - The range of Consilience's target audience requires an adaptable solution
- The idea must appeal to individual managers;
    - The benefits of the solution must be clear to different roles in different organizations
- The idea cannot implicate competition.
    - Organizations are less likely to be appealed by the solution if this requires them to reveal competitive information

Design criteria for challenge statement 3

- The idea must be a solution to challenge statement 3;
- The idea must be adaptable to specific organizations;
    - The range of Consilience's target audience requires an adaptable solution
- The idea should be executed with Consilience's current (human) capacity;
    - Consilience's non-profit character does not yet allow for hiring more capacity
- The idea must teach organizations the required skills to adapt the design thinking process.
    - Design thinking, as explained in the theoretical framework, requires new skills

Design criteria for challenge statement 4

- The idea must be a solution to challenge statement 4;
- The idea should be adaptable to specific organizations;
    - The range of Consilience's target audience requires an adaptable solution
- The idea should focus on effectively teaching design thinking practices;
    - Not every organization has knowledge on and experience with design thinking
- The idea should be executed with Consilience's current (human) capacity;
    - Consilience's non-profit character does not yet allow for hiring more capacity
- The idea should be applicable to any industry;
    - Consilience does not want to focus on a single industry but reach a large audience
- The idea cannot implicate competition.
    - Organizations are less likely to be appealed by the solution if this requires them to reveal competitive information

5.5 Customer journey map

Consilience offers workshops and summits to different schools. In addition, these institutions can get training to integrate new methods and tools into their curriculum. In order to research how customers experience these services, and which improvements can be made that can be included in the new services, a customer journey map was made. This customer journey map is based on observations and conversations with participants from the services that was participated in.

The customer journey map was made to discover the emotions and needs of the participants regarding the journey they go through before, during, and after attending one of Consilience services. In order to understand the participants' emotions and needs during the actual service, a questionnaire (customer survey) was composed that elaborates on specific parts of one of Consilience's services.

There are different formats for customer journey maps. The choice for one that focuses on the stages awareness, evaluation, purchase, delivery, and after-sales was made as these covers all the stages a customer goes through before, during, and after buying a product or service (Johnston, 2016). The customer journey map is included in Appendix G.

The input for this customer journey map was gathered by observing participants during the services and by conducting conversations with participants. The conversations were held with participants that were encountered by convenience and that were available for a short conversation. The choice for informal conversations was made as the tight schedule of the services did not allow for fully structured interviews. The topics of the conversations were awareness, evaluation, purchase and delivery of the service, and aftercare.

5.6 Customer survey GSES

A part of the field research was to observe and actively participate in summits and workshops that were provided by Consilience. A survey was handed out to participants at the GSES to measure their ratings of certain aspects of the workshop. The GSES was chosen because the contents of this summit best fit the needs of the target audience. This survey was chosen to get a better understanding of how participants experience the summit. A description of the summit is included in chapter 3.4.

The questions about the contents of the summit were answered with a ranking from 1 to 4, 1 representing strongly disagree, and 4 representing strongly agree. The answers to the questions are listed in chapter 6.2, with the average and mode (most given answer) calculated for each question. The analysis of the average scores provided a better insight of how satisfied the participants were on average. The mode provided a deeper understanding of how most participants scored a certain aspect of the service.

The questions probe participants' takeaways from the workshop regarding the goals of the workshop. The goals for the summit were discovered from the website of the summit (GSES, 2017). The workshop's goals are:

- Teach participants about design thinking;
- Teach participants to solve real world problems;
- Teach participants interdisciplinary ideas and perspectives;
- Teach an iterative process that enables participants to learn by doing;
- Teach participants to reflect on their own qualities;
- Teach participants to develop a business model.

Yes-or-no questions were not chosen for this survey because they will not yield the desired result, as the difference between answers will be harder to justify (Boynton & Greenhalgh, 2006). Instead, there was chosen to formulate the questions as statements, to which the participants could grant a ranking from 1 to 4, 1 representing strongly disagree, 2 representing disagree, 3 representing agree, and 4 representing strongly agree.

The choice to leave out neutral answers was made as the statements are factual and either right or wrong. Neutral answers have no valuable information for opinions (Fluid Surveys University, 2014). For each statement, an average result of 3,1 was targeted, as discussed with the client. This average meant that on average, participants agreed with the statement. The statements are formulated below.

1. I gathered information to solve problems;
2. I benefitted from collaborating and working with others;
3. I learned across disciplines;
4. I was inspired by new ideas and perspectives;
5. I tried to make a positive difference in the lives of others;
6. I thought about various possibilities;
7. I transformed failure into new insights and approaches;
8. I communicated and shared my thoughts honestly and confidently;
9. I reflected on my strengths and weaknesses;
10. I learned about how to develop a Business Model.

Additional open questions were asked to yield deeper understandings of what the participants learned from the workshop. The individual answers to these questions were considered in the development of the new services. These questions were formulated to make the respondent think about their learnings and evaluate the value of the workshop. The results indicate similar answers to questions that measured similar concepts, therefore these questionnaires were rated reliable.

1. What did you learn during the GSES workshop?
2. How did your prototype address a real-world problem?
3. After GSES, which field are you more curious and interested in to pursue a possible career in?
4. After GSES, how will you continue your exploration?

5.7 Conclusion

The insights from the empathy phase were further defined to discover the specific needs of the target audience using the download, saturate, and group technique. These insights were then processed into personas that represent the target audience.

Four challenge statements were formulated based on the personas. These challenge statements formed the basis for the ideate phase, which explored solutions for these challenge statements. Design criteria were determined for each challenge statement in order to ensure that the ideas comply with Consilience's vision and that the ideas are feasible solutions to the challenge statements.

Consilience's services were researched to understand the participants' emotions and needs. The participants' emotions and needs before, during, and after the service were processed into a customer journey map. To better understand the participants' emotions and needs during the actual service, a questionnaire was handed out to participants at the GSES. The results bring forward improvements which provided input for brainstorming solutions.

6. Ideate

To solve the challenge statements that were formulated in the define phase, a sequenced brainstorming process was performed to ensure validity of the solution. The sequence is based on the challenge statements, which had to be answered in specific order to generate valuable solutions. This specific allowed that during each process, inspiration could be taken from previous processes. The knowledge from the research that was conducted before the ideate phase was used as input. This knowledge consists of the theoretical framework and the books on design thinking.

6.1 Creating a creative setting

In order to effectively brainstorm a large variety of good ideas, a creative setting had to be created. This setting blocks obstacles that hold back creativity and ensures a maximum number of ideas. *LAUNCH* (Spencer & A.J., 2016), is a book on design thinking that was proposes a set of rules for a creative setting. These rules were used during this phase of design thinking.

- Maintain the rule that there are no dumb ideas;
- Focus on the specific topic of the brainstorm. In this research, the challenge statements formed the specific topic of the brainstorm;
- Include breaks for reflection. During this research, a 30-minute break was held after each hour of brainstorming in order to free the mind and to build on existing ideas;
- Use multiple methods for brainstorming. As explained, this research used three methods for brainstorming in order to explore ideas from different perspectives.

6.2 Brainstorming techniques

First, three methods were for brainstorming to ensure richness of ideas. The choice was made to brainstorm 40 ideas for each challenge statement, as this increased the chance that one of the ideas would be valuable, while maintaining a maximum number of ideas to make sure that creativity was not forced and the quality of the ideas remains satisfying.

The methods that were used are Brainwriting, SCAMPER, and the Fast Idea Generator. After brainstorming, the ideas that did not comply with the design criteria were eliminated. The remaining ideas were filtered with the COCD-box and the Select Promising Ideas method. The ideas that were ideated and filtered for this challenge statement can be found in Appendix Q and R.

The brainwriting technique was executed by writing one of the challenge statements on a sheet of paper and, in three columns, writing down the ideas that were brainstormed (De Innovator, 2016). This is a technique in which the user is free to write any idea, which ensured creativity and originality of ideas.

The SCAMPER technique was executed by taking an existing practice and ideating a substitution, combination, adaption, modification, put to another purpose, elimination, and reversion of that practice (Mindtools, 2016). The existing practices that were used as a reference for this technique were practices that Consilience uses for their services for schools. This process looked at the services from different perspectives which stimulated creativity.

The Fast Idea Generator is just as SCAMPER a technique of taking an existing product or service and following seven steps to ideate an inversion, integration, extension, differentiation, addition, subtraction, translation, grafting, and exaggeration (DIYtoolkit, 2016). The existing practices that were used as a reference were practices that Consilience uses for their services for schools. This process too focused on different perspectives which stimulated creativity. The SCAMPER technique and the Fast Idea Generator also focus on existing services which allowed for development of Consilience's existing services, which is important as this is required as formulated in the central research question.

6.3 Selection techniques

The ideas that were brainstormed before, during the diverging part of this process, are converged using three selection techniques. This ensured that only the most reliable and valid ideas remained and that the ideas comply with design criteria that were preformulated.

Design criteria are rules with which the ideas that are generated should comply (Ongena & Loggen, 2016). The design criteria were formulated in consultation with the client. A longlist of design criteria was composed, after which irrelevant criteria were eliminated and a shortlist remained. These design criteria functioned as the first filter, as ideas that do not comply with these criteria were not allowed to make it through the next to selection rounds. This process consisted of examining each of the brainstormed ideas and evaluating whether the idea complied with the design criteria or not.

The COCD-box is a technique of reiteratively assigning ideas to four squares which represent the originality and feasibility of an idea (COCD, 2016). This technique was included in this research because it results in a clear division of ideas. Feasibility and originality were important for this research as the ideas must be prototypes within the duration of this project and because originality is a driver for innovation, which is the central theme of this research.

The process of the COCD-box was followed by taking each individual idea and placing it in one of the four squares. The ideas are placed in one of the squares by determining how original the idea is and how feasible the idea is. After placing each idea in one of the squares, all of the ideas were evaluated again in order to ensure that they are placed correctly.

Select Promising Ideas is a technique put forward by IDEO in which each participant selects the ideas that they think are most innovative and most likely to succeed (Harvard Business Review, 2008). This was done by proposing the ideas that remained after the design criteria and the COCD-box to the client and allowing the client to choose the best ideas.

The ideas that remained for each challenge statement after the converging stage were described in concepts that elaborate on the key elements of the ideas. The concepts describe the idea and how they would work in practice (Ongena & Loggen, 2016). These concepts were made in order to ensure that the prototypes incorporate the key elements of the idea to effectively communicate this idea.

6.4 Conclusion

Based on the user-insights that were clarified in the define phase, the results from the customer journey map and the customer survey, and the knowledge from the theoretical framework and the four books on design thinking, 160 ideas were brainstormed for the four challenge statements.

The ideas that comply with the design criteria that were most innovative, most original, and most likely to succeed were selected and processed into concepts. These concepts are descriptions of the solutions that formed input for the prototypes phase.

7. Prototype

The concepts as defined in the ideate phase that were most useful, and feasible within the period of the internship, were processed into prototypes. The four challenge statements were combined into groups of two, as the possibilities that were ideated in the previous phase formed powerful combinations that assess two separate goals.

Challenge statements 1 and 2 targeted awareness among organizations regarding design thinking, and to convince senior levels that design thinking can be valuable for them. Challenge statements 3 and 4 focused on teaching the new practices and skills and providing long-term support for organizational change.

7.1 Prototype format

The prototype for challenge statements 1 and 2 focuses on reaching and convincing the target audience. The key element of the ideas is effective knowledge transformation. Therefore, the prototype must focus on an appealing message and how to effectively convey this message. In the test phase, it is made clear whether this knowledge transformation is complete, valid, and relevant.

The prototype for challenge statements 3 and 4 focuses on teaching the design thinking process to organizations (Plusacumen, 2014). The key elements of the ideas are effective knowledge transformation and teaching new practices and skills. Therefore, the prototype must focus on an effective way of teaching design thinking. In the test phase, it is made clear whether the knowledge transformation is complete, valid, and relevant, and whether the new practices and skills are clear and complete.

The prototypes are based on the GSES that Consilience offers to schools. This service was chosen as it also teaches about design thinking. Best practices and aspects of this service that are useful for the new target audience were considered for the design of the prototype.

According to *LAUNCH* (Spencer & A.J., 2016), the prototype should consist of the aspects as described in the acronym PARTS. These aspects provide a clear understanding of the prototype and why this specific prototype is chosen. The PARTS of the prototype that is developed during this research are described in the results in chapter 9.4.

- Product idea: A thorough description of the prototype itself, how it works, and what is needed for it to work;
- Audience: The specific audience for whom the prototype is created;
- Role: The role of Consilience for the working of this prototype;
- Tasks: The timeframe in which the prototype is consumed;
- Solution: A description of how the prototype is a solution to a preformulated problem.

7.2 Conclusion

The knowledge from the theoretical framework and the previous design thinking phases was used for the design of prototypes that effectively communicate the ideas that were brainstormed for the challenge statements.

Challenge statements 1 and 2 and challenge statements 3 and 4 were combined as the ideas that resulted from the ideate phase formed powerful combinations. The prototype must communicate the key element of the ideas. For challenge statements 1 and 2 this was knowledge transformation. For challenge statements 3 and 4 this was knowledge transformation and teaching design thinking practices and skills.

8. Test

The test phase consisted of four tests in which feedback was gathered for the improvement of the prototype. The choice for two tests with each audience was made in order to test if the feedback from the first test was desirably processed.

The first two tests were conducted with the client to ensure that the prototype complies with Consilience's vision and fits the organization. The third and fourth test were workshops with participants from the target group. In consult with the client, eight test questions were formulated. These goals were then included in the plan for the tests. This test plan is included in Appendix I.

8.1 Test plan

A test plan was written to ensure the maximum amount of feedback by preformulating the design questions and possible situations and types of test participants that can be encountered. The script included the presentation of the prototypes and questions regarding these prototypes. The test goal was to get an answer to the design questions that were formulated for the test, as listed below:

1. What are the main elements that the workshop should address?
   - The answer to this question should elaborate on missing or irrelevant elements
2. How many people should be able to attend a workshop?
   - Participants must identify the minimum and maximum number of participants
3. How long should a workshop take?
   - The length of a workshop must ensure that participants learn enough, but that the workshop is not too disruptive for organizations and therefore less appealing
4. Are the breaks as included in the program sufficient?
   - Test participants must be able to pay attention during the workshop and therefore breaks are included to make sure that they can refresh their minds
5. Which skills do you think are important to be taught?
   - The answer to this question shows if the thoughts of the participants are aligned with the theoretical research
6. Is it a good idea to host the workshop at your organization's venue?
   - This question seeks to confirm if it is a good idea to host workshops at their offices
7. Which organizational challenges should be included in the customization options?
   - The answer to this question shows if the thoughts of the participants are aligned with the theoretical research
8. What is the best way to embed something in your organization in order to make sure the workshop yields valuable lasting lessons?
   - This is an explorative question that probes the participants' opinions

The script starts with an elaboration on design thinking in order to get everyone on the same page regarding relevant concepts (as according to constructive validity as described in chapter 2.4). The script proceeds with a presentation of the prototype and to encourage people to write down feedback.

The design thinking process was conducted in a hands-on workshop during the test in order to gather feedback and to observe whether the new practices and skills are clear and complete, as explained in chapter 7.1. In the debriefing the participants were thanked for their feedback in a concluding note.

8.2 Situations

A shortlist of possible situations that can be encountered was compiled in order to prepare for these situations with counteractions. These were not the only possible situations but the riskiest situations and were therefore chosen to prepare for. To identify every possible situation was not feasible within the period of the assignment.

(Someone in) the audience does not see the value of a design thinking workshop

- Ask them about possible challenges or issues in their organization and link them to one of the organizational challenges we distinguish, and explain how the corresponding design thinking practice can solve their challenge or issue;

- Ask them about suggestions to make the workshop more valuable in their perspective.

(Someone in) the audience thinks that there are more important organizational challenges

- Try to link those challenges that they talk about to one of the challenges we distinguish;
- Include the challenge that they talk about in the challenges we distinguish;

(Someone in) the audience does not see any challenges or issues in their organization

- Ask them about possible improvements they see instead and explain how the design thinking practices that we distinguish can help to achieve these improvements;
- Ask them if they have ever encountered a limiting factor in their job, heard a colleague talk about something that bothered them, or think of factors that are holding back the organization, and link these to one of the organizational challenges that we distinguish and their corresponding design thinking practice.

(Someone in) the audience does not dare to give critique on the prototype

- Ensure them that this is only a prototype to collect feedback and not yet the finished product;
- Tell them that feedback is encouraged and the prototype will be improved based on their feedback.

(Someone in) the audience thinks the whole prototype is wrong

- Collect constructive feedback and ask them about what they think will be a good prototype;
- Make them feel understood and explain the underlying purpose of the prototype.

8.3 Types of test participants

As described in chapter 2.1.5, different types of test participants can be distinguished. These test participants were acknowledged prior to the tests in order to prepare for this encounter.

- Pleasers: people who say that they like the prototype regardless of their actual opinion;
  - Pleasers were dealt with by asking questions about possible improvements and by assuring the participants that the sole reason for this test is to improve the prototype.
- Negatives: people who don't see the value of the prototype, either because they don't understand the use of it or because they think that their situation is already perfect;
  - Negatives were dealt with by asking questions about their situation that may link to the use of the prototype. These questions were based on insights that were gathered during the empathy phase.
- Avoiders: people who identify unimportant aspects of the prototype as undesirable and therefore think the prototype is not valuable. (E.g. the background colors of the prototype for an App are not pleasing). The prototype is subject for discussion and should therefore focus on the key elements. Adjacent matters are easily changeable and are no reason for the prototype to not be of value.
  - Avoiders were dealt with by emphasizing the key elements and that adjacent matters can easily be changed.

8.4 Conclusion

Two tests were conducted with the client, and two with the target audience, in order to gather feedback and test whether this feedback was processed as desired. A test plan was composed for these tests in order to effectively prepare for the test and for the different situations and test participants that could be encountered.

The test consisted of a presentation of the prototypes and a hands-on design thinking practice. This ensured that the key elements as determined in the prototype phase, being knowledge transformation and teaching design thinking practices and kills, were effectively communicated.

The goal that was formulated for the tests was to get answers to the preformulated design questions and to observe if the prototypes are effective.

9. Results

The results of this research illustrate how the empathy interviews led to a tested prototype. The prototype consists of a workshop program, brochures to take home, and presentations that elaborate on the design thinking process and specific organizational challenges and corresponding design thinking practices. These prototypes are based on research results as illustrated in this chapter.

On average, the shared values tended to be blue and green (respectively 17,88 and 16,88, in regard to a total average of 16), while the mode shows that some employees had strong white (philosophical) tendencies. The questionnaire is included in Appendix C.
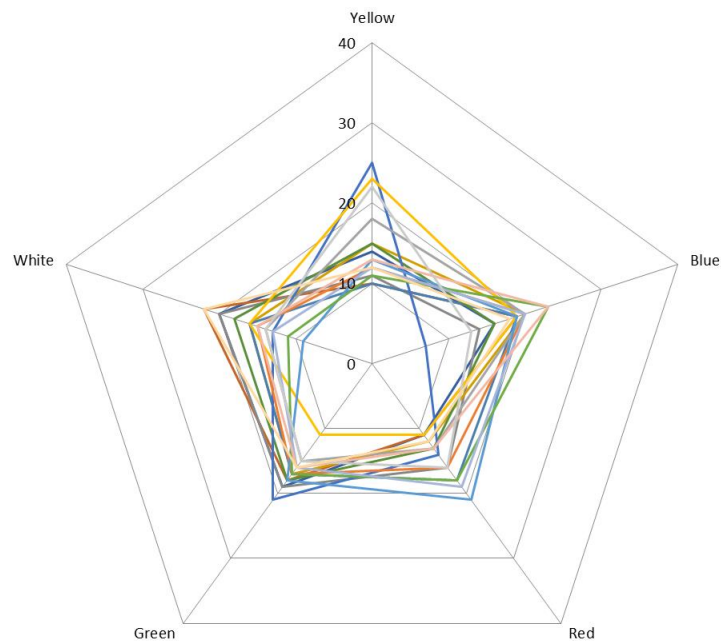
9.1 Empathy

The empathy phase consisted of 16 interviews and additional observations. The five most valuable insights from each of the interviews and ten insights from each of the observations are processed into tables which are included in Appendix E. These results formed the input for the define phase, where the insights were processed with the download, saturate, and group technique. The results of this technique are the concrete insights that are shared among most of the interviewees.

9.2 Define

Download, saturate, and group
The download, saturate and group method suggested the following shared insights among interviewees:

- A need for culture development;
- A need for knowledge of right practices;
- A need for personal skill development;
- A need for innovation leadership practices;
- A separate group represented a reluctance to design thinking workshops based on individual concerns. These concerns were taken into consideration when developing the workshop.
- The sixth and last group represented an interest in workshops.

Personas

Three personas were created based on the insights from the empathy interviews that illustrate the target group.

Nitesh Meda is a business development manager working for a startup organization. Mr. Meda looks to expand his organization beyond current boundaries and to explore new customer segments that may be interested in their products. His organization however, focuses on growth through reliable methods and does not allow for creative new (risky) ideas. The corporate culture of the organization for which Mr. Meda works can be described as a market culture with hierarchical characteristics.

Rohana Dayal is a human resources executive with an eye for talent. Mrs. Dayal works for a tech organization that offers services through digital media. The organization focuses on creativity, giving Mrs. Dayal the freedom to discover and develop her own ideas. In the ever changing environment, Mrs. Dayal wants to know more about the skills that are becoming more important to solve present and future problems. Mrs. Dayal's organization has a true adhocracy culture.

Dr. Jain is the proud founder and CEO of an organization that is thoroughly managed through excellent business intelligence and KPI's. His organization is steadily growing but not in a desired pace. Dr. Jain however, is scared that rigorous changes to his organization cause too much risk. He is convinced that through quality employee management and creating a clan culture his organization will achieve new heights.

The full personas are included in Appendix F.

Customer journey map

The customer journey map yielded the following improvements that should be considered for the development of the new services. The term 'schools' in these insights was changed to 'organizations' to consider the insights for the development of the new services.

- Create awareness in schools that are not yet innovating;
- Be the first organization that schools think of for these services;
- Make services easier available to schools;
- Host workshops and summits at our own location;
- Aftercare to help schools use the new knowledge in their curriculum.

GSES customer survey

	1	2	3	4	Average	Mode
I gathered information to solve problems	3	3	37	22	3,20	3 with 56,92%
I benefitted from collaborating with others	4	1	22	38	3,45	4 with 58,46%
I learned across disciplines	2	6	37	20	3,15	3 with 56,92%
I was inspired by new ideas and perspectives	4	3	15	43	3,49	4 with 66,15%
I tried to make a positive difference in the lives of others	3	1	21	40	3,51	4 with 61,54%
I thought about various possibilities	3	3	29	30	3,32	4 with 46,15%
I transformed failure into new insights	5	7	31	22	3,08	3 with 47,69%
I communicated and shared my thoughts	2	5	31	27	3,28	3 with 47,69%
I reflected on my strengths and weaknesses	4	8	31	22	3,09	3 with 47,69%
I learned how to develop a Business model	4	5	18	38	3,38	4 with 58,46%

Challenge statements

The challenge statements are defined based on the download, saturate, and group method. The first challenge statement comes from the insight that organizations think that they are alone in their hunt for innovation. The idea reoccurred for several interviewees, that they have no idea how to start a new change process and where to look for support. Another reoccurring insight was that the essence of workshops is intangible, leaving the target group unconvinced of the benefits.

1. "Consilience needs to reach and convince the target group because awareness leads to more customers which can be helped by Consilience."

The second challenge statement is based on the insights that there is a lack of management support in organizations for innovation. An idea needs management support to be realized, because managers are the decision makers in an organization.

2. "Managers of organizations in the target group need to learn the benefits and possibilities of design thinking because this stimulates a faster innovation pace, leading to more opportunities being tapped into and more market competitiveness."

The third challenge statement taps into the development and hiring of critical competencies and skills for innovation. This is based on the insights that employees did not (know that they) have the skills to execute or manage the design thinking process. This can be solved by training critical skills to current employees and teaching HR-managers to hire employees with these critical skills.

3. "Staff of organizations in the target group needs to learn new skills and competencies because this will lead to better alignment of the staff and skills with the organization's structure and strategy concerning design thinking."

The fourth challenge statement is based on the insight that most managers dare not experiment with new methods and possible transformations because there is a lack of external specialized support. Also, for an organization to adopt a new process, a single workshop will likely be not enough, as arose during the interviews.

4. "Organizations in the target group need long-term support for their aspiration to incorporate design thinking because this supports the effectivity of the change and leads to better strategic alignment."

9.3 Ideate

The ideate phase consisted of diverging by brainstorming a variety of ideas and converging by choosing the most original ideas that were most likely to succeed. Below are the ideas that were chosen by converging in the ideate phase. These ideas are justified by desk research, empathy interviews, and the three personas.

Challenge statement 1

- Communication through the Confederation of Indian Industry;
- Hosting workshops with the Confederation of Indian Industry;
- Providing personalized possibilities to specific organizations;
- Offering a centralized hub for information about Consilience's services;
- Direct emails or phone calls to organizations.

Challenge statement 2

- Workshops with the Confederation of Indian Industry;
- Personalize the benefits for organizations to appeal more to its managers;
- Design pamphlets on design thinking and distribute these to organizations;
- Address the CEO's of organizations directly via LinkedIn;
- Write emails directly to CEO's;

Challenge statement 3

- Host design thinking workshops that are customized to an organization's needs;
- Enable employees to teach skills to colleagues;
- Train Human Resources managers to hire employees with design thinking skills;
- Assign a task force to focus on training and manage personal development;
- Enable organizations to host their own design thinking workshops;
- Determine individual goals and align these with the organization's goals;

Challenge statement 4

- Integrate Making into the design thinking services to leverage prototyping;
- Enable organizations to host their own design thinking workshops;
- Support full organizational transformation in favor of innovation;
- Business model innovation workshop to determine the organization's goals;
- Host workshops at the client's office;

9.4 Prototypes

The prototypes are the final product of this research, which are refined with the feedback from the test phase. Below are the descriptions of these prototypes, which function as the product ideas (the first letter from the acronym PARTS, as proposed in the book *LAUNCH* (Spencer & A.J., 2016)). The remaining letters of this acronym are explained after the prototype descriptions.

Prototypes for challenge statement 1 and 2

Below are the prototypes for challenge statement 1 and 2 explained. These prototypes are focused on both challenge statements as they tackle both challenges when they are combined. The first and second challenge statement were respectively:

"Consilience needs to reach and convince the target group because awareness leads to more customers which can be helped by Consilience."

"Managers of organizations in the target group need to learn the benefits and possibilities of design thinking because this stimulates a faster innovation pace, leading to more opportunities being tapped into and more market competitiveness."

Directly approaching CEO's of organizations with personalized benefits

The concept of directly writing emails to CEO's of organizations was combined with the concept of directly emailing or calling organizations, and personalizing the benefits for organizations to appeal more to its managers, as transmitting a message to a broad range of organizations is to impersonal. Directly approaching CEO's of organizations with a personalized set of benefits is more effective than a general message that is sent to a broad range of organizations. This also creates awareness in organizations that are not yet innovating as according to the results of the customer journey map.

An intangible prototype was created for this concept. A list of 31 Mumbai-based organizations was compiled, and the CEO's of these organizations were searched on LinkedIn. This list is included in Appendix S. The list was tested with the client for approval of the organizations.

Three applications were used to generate contact information from LinkedIn. These applications were RocketReach (RocketReach, 2017), Rapportive (Rapportive, 2014), and Anymail Finder (Anymail finder, 2017). The CEO's contact information was included in the list of organizations.

The organizations were distinguished based their strategy as described in chapter 3.6. The eight categories distinguished by Mootee were linked to the organizations' strategy. The benefits were personalized based on the most occurring organizational challenges for each strategy and to make the 'why' according to organizational change as described in chapter 3.8 more tangible for organizations (Ursey, 2014). The structure was approved by the client.

Five different emails were created and sent to the selected CEO' (see Appendix T). The emails asked the recipient for an appointment to elaborate more on Consilience's services, as this is easier to explain face to face, and the recipients can ask questions. The appointments that followed from these emails elaborated more on design thinking and the anti-disciplinary benefits, and thus address the second challenge statement.

Design pamphlets on design thinking and distribute these to organizations
A pamphlet was designed with a description of what design thinking really is, a short description about Consilience, and the workshops that Consilience offers to teach design thinking. This pamphlet is included in Appendix U. The prototype of this pamphlet is a mockup (Plusacumen, 2014).

The pamphlet gives the readers information that is needed about the workshops. This pamphlet was included in the brochure map that Consilience gives to (potential) customers. For confidential reasons, the brochure was not included in this thesis. The brochures were taken to appointments that were made as a result of the emails.

The pamphlet focused on challenge statement 2 as it elaborates on the benefits of design thinking and the workshops that Consilience can offer to teach design thinking practices. This also included the 'what' and the 'how' for organizational change as according to chapter 3.8.

The collaboration with the Confederation of Indian Industry was not feasible during the period of the internship as the CII was not available for communication or workshops.

Prototypes for challenge statement 3 and 4
Below are the prototypes for challenge statement 3 and 4. These prototypes are focused on both challenge statements as they tackle both challenges when they are combined. The third and fourth challenge statement were respectively:

"Staff of organizations in the target group needs to learn new skills and competencies because this will lead to better alignment of the staff and skills with the organization's structure and strategy concerning design thinking."

"Organizations in the target group need long-term support for their aspiration to incorporate design thinking because this supports the effectivity of the change and leads to better strategic alignment."

Design thinking workshops that are customized to an organization's needs
A workshop to teach organizations about design thinking is an effective way to teach new skills and methods to individuals, and foster collaboration on innovative development. Consilience has experience in including design thinking in summits, as explained in chapter 3.4. This experience can be used for design thinking workshops for organizations and formed the basis for the workshop.

Chapter 2.1 elaborates on the design thinking process and techniques, mindsets, and practices that come with the method. The process as explained in that chapter formed the basis for the prototype. Consilience is specialized in educational methods, and found that the best way to teach something is by making a learner use new techniques to create something that interests them. This mindset comes from Maker education, as can be read in chapter 3.5, and is included in the workshops by assessing real business cases and allowing participants to use their own ideas in the workshop.

This workshop explains design thinking with the help of presentations. Hands-on learning is included by walking through the design thinking process and designing tangible prototypes, a practice that is also recognized as important for innovation as can be read in chapter 3.2. Participants work in cross-functional teams in order to foster collaboration, an important factor for innovation (chapter 3.2). This is according to the insight from the GSES questionnaire that participants are inspired by new ideas, and new ideas come from new people.

The workshop addresses a fertile culture (chapter 3.2) by recognizing employees' ideas supply and creativity, developing and empowering employees, and granting them the freedom to ideate and prototype solutions according to their ideas. This is in line with an adhocracy focused culture as described in chapter 3.7 and to the insight from the GSES questionnaire that it motivates people to work on something that is meaningful for them.

The workshops teach valuable skills and competencies as described in chapter 3.3, and leadership practices that comply with these skills and use the knowledge of the services that Consilience offers on leadership training. Additional skills regard skills that come from Making activities.

In order for Consilience to customize design thinking workshops to an organization's needs, the categories to which different organizational challenges belong need to be identified. Mootee distinguishes eight categories of organizational challenges, and the design thinking practices that best fit these challenges. With offering a design thinking workshop Consilience can strive to offer reliable value to organizations. The customization of the workshop is a more valid solution for organizations, improving the balance between reliability and validity (Martin, 2009).

Consilience should analyze the organization's challenges and link these to one of the categories. The assessment of organizational challenges can be done through a survey on social media which asks organizations about the challenges they face in their daily operations. Another possibility is direct communication with email, calling, of face-to-face conversations. The workshop can be customized to the specific organization, incorporating the right design thinking practices. An understanding of at least the organization's concrete challenge, vision, and value creation needs to be assessed.

This information should be gathered at least a week ahead of the workshop in order for Consilience to effectively customize and design the workshop. Workshops may require (some of) the participants to make preparations for the workshop to improve effectivity, which they should be able to do in a week, taking their working hours into consideration.

The script and programs for the workshops are included in Appendix V. The red text in the programs are the customized activities for the workshop.

Pamphlets for embedding design thinking in an organization
This prototype is also based on the concept for challenge statement 2 to design pamphlets on design thinking. Pamphlets that teach organizations about embedding design thinking into their organization and hosting their own workshops can be long-term support for organizations, which was one of the shared insights that arose while performing the download, saturate, and group technique.

The pamphlets give all the required information for organizations to host their own design thinking workshop on the design thinking practice that they chose. Besides the workshops the pamphlets elaborate on best-practices concerning the alignment of the 7 Ss as described in chapter 3.6. For each of the 7 Ss, the pamphlet describes meaningful systems, tools, methods, and skills.

Offering a centralized hub for information about Consilience's services
It is recommended to include information on the services for corporates on Consilience's website. However, it was not feasible to accomplish this in the period of the internship.

Audience
The audience for the prototypes for the first and second challenge statement are managers and CEO's of organization in Mumbai that have a need for improving their innovation capacity. The audience for the prototypes for the third and fourth challenge statement are employees of those organization, preferably at least 20% of which have a management function.

Roles
Consilience's role for these prototypes is providing the entire service, including marketing these services to the target audience and providing aftercare consisting of maintaining contact for follow-up workshops.

Tasks
The timeframe for each workshop is one day. The plans for the workshop must be announced to the participating organization at least one weak in advance. The tasks that have to be performed around this timeframe are creating awareness among the target audience, discovering an organization's specific organizational challenge, convincing the organization of the benefits of the new workshops, planning the workshop, delivering the workshop, and maintaining contact with the customers for possible follow-up workshops on different subjects.

Solution

The prototypes are the solution to organizations that struggle with at least one of the organizational challenges as proposed by Mootee: growth, predictability, change, extreme competition, maintaining relevance, creative culture, standardization, and strategy and organization.

The prototypes form a solution by providing knowledge and teaching practices that help improve an organizations innovation capacity, and specific practices for tackling one of the organizational challenges as proposed by Mootee.

9.5 Test

Below are the results for each of the four test phases. This table shows the changes that were made to the prototype based on the feedback that was gathered from the participants.

First test with the client

1. Maybe you can include a customer empathy map in the standardization workshop;
2. Include templates for context mapping and scenario development;
3. Speak slower in your presentations;
4. Use less words in your PowerPoint presentations and include pictures of the models that you use in your workshops;
5. Maybe you can make a distinction between one and two day workshops as customer want to have a choice;
6. Lunch should be 45 minutes;
7. There should be a third break in the afternoon because participants get tired;
8. In the closing presentation, talk about which other workshops we offer and maybe even which other services;
9. Include real life pictures supporting the story and your examples;
10. Try to keep your presentation down to 20 slides;
11. Include more textual content in your presentation for people who do not pay attention to what you are saying.

Second test with the client

1. The brochure should start with the design thinking process instead of a description of Consilience;
2. Include a description of the materials that customers can use for the workshops in your brochure;
3. See if you can find a way that one of the participants for your workshops can write a story about their company for the storytelling workshop, as during the rest of this workshop you can use this to build on;
4. Think about which guest speakers you can invite for these workshops;
5. Use more elaborate sentences in your presentation;
6. Include more examples in your presentation to support your story.

First test workshop with the target group

1. Participant observations yielded the insight that the design thinking process is understood during the trial, and that participants have no issue in following the different steps;
2. Based on participant interviews, two workshops could be eliminated as they focus on similar goals as two other workshops.
   a. The workshops on predictability and can be combined. Both workshops teach participants to deal with change, leverage weak signals, and develop a better understanding of the future to make it more predictable. Change is, according to the participants, one reason for organizations to learn to become more predictable.
   b. The workshops on extreme competition and maintaining relevance can also be combined as they both focused on redefining value. Extreme competition is, according to the participants, one reason for organizations to maintain relevance. The workshop on maintaining relevance teaches participants about redefining value for a certain

product or service, while the workshop on extreme competition pursued the same goal by redefining the customer experience around buying a product or service. By combining these workshops, the participants will be taught about both value redefinition and experience design in order to more effectively redesign brand value.

3. In the presentations, put more emphasis on how we can host these workshops ourselves;
4. Divide the presentation on standardization in separate smaller presentations for each activity;
5. The customer journey mapping can be a collaborative exercise where every group focuses on one part of the journey, writes their findings on Post-It Notes and attaches these to the larger customer journey map.
6. Use more examples in your presentation to make the different subjects clearer;
7. Observations of the audience yielded that there is little understanding of the business model;
8. Give a more thorough explanation on 'weak signals' in the workshop on predictability;
9. Change the name of the workshop on predictability to 'change' as this is more appealing;
10. Use a printout (poster) with the different challenges and design thinking practices next to the presentation as participants sometimes lose track of the structure of the presentation.

Second test workshop with the target group

1. The participant observations yielded that omitting the design thinking trial had no influence on participants understanding of the design thinking process and thus was a good move.
2. Include a more thorough presentation on context mapping and scenario development;
3. In the change and predictability workshop, include the context mapping exercise before the prototyping in order to understand the chosen trend or technology better. After prototyping you go to scenario development;
4. Give examples for every organizational challenge and every design thinking practice to make what you're telling us more tangible and to get a good reference;
5. Use more real pictures in your presentation to support your story;
6. Use more everyday words instead of jargon;
7. The business model canvas is now clearer than in the last presentation;
8. Give another example of a design thinking organization in the end presentation to excite the audience.

9.6 Impact analysis

The impact of the new workshops on Consilience and the required changes were analyzed using the SCOPAFIJTH method. The complete impact analysis is included in Appendix J.

Security
With the new workshops Consilience must be cautious about privacy sensitive information while posting pictures or commentary on social media. Safety regarding the use of cutters, scissors, and (hot) glue guns must also be protected.

Commerce and communication
A website regarding the new workshops must contain information about the workshops. The communication regarding the workshops must comply with the STEPPS rules (Berger, 2013), meaning that in order for the information to spread, it must contain:

- Social currency: The information must be exciting and make feel people smart of interesting by sharing the information;
- Triggers: The information must contain triggers that relate to the information;
- Emotions: The information must evoke emotions for the reader;
- Practical value: The information must contain practical value for the reader;
- Public: The information must make private practices public;
- Story: The information must be wrapped in a narrative that is easier for people to remember.

The internal communication within Consilience's organization must be clear. For each service that is planned, it must be clear for which target audience this service is meant.

Organization

The new services expand Consilience's target audience which stimulates the organization's already rapid growth. The Maker engineers are responsible for (further) developing, preparing and providing the new services. The advisory report that resulted from this research functions as a manual for them.

Personnel

Current personnel must be trained in providing the new workshops and must be taught basic knowledge of how organizations operate and how the wicked problems on which the workshops are based affect organizations. New staff is not directly required, but as Consilience grows rapidly this need may arise in the near future. When hiring new employees, Consilience can look for candidates that have knowledge of and experience with business development and design thinking.

Administrative organization

The current database for keeping track of materials and equipment is supplemented with extra materials if necessary. Customer information is recommended to save in a CRM-system.

Finance

Consilience is a non-profit organization. The price for the workshop must be set accordingly. The revenue stream and cost structure do not change, but are supplemented with the new workshops.

Information

The new information consists of information needed to provide the workshops, feedback from participants, and information about the customers as explained in the administrative organization. The knowledge that is required for the workshops is captured in the advisory report for Consilience.

Legal

The new workshops do not have an impact on Consilience's legal organization.

Technology

The new workshops do not have a direct impact on Consilience's technology. That being said, the organization aspires to buy new technologies for prototyping, such as 3D-printers and laser cutters. The expansion of their target audience can make this more easily realizable.

Housing

The new workshops do not have a direct impact on Consilience's housing. That being said, the organization aspires to rent a bigger office as it keeps growing. The expansion of their target audience can make this a higher priority and more easily realizable. Because the workshops are hosted at the participating organization's venue, the materials and equipment that are needed for the workshop must be transported.

The impact on Consilience's business model is visualized below.
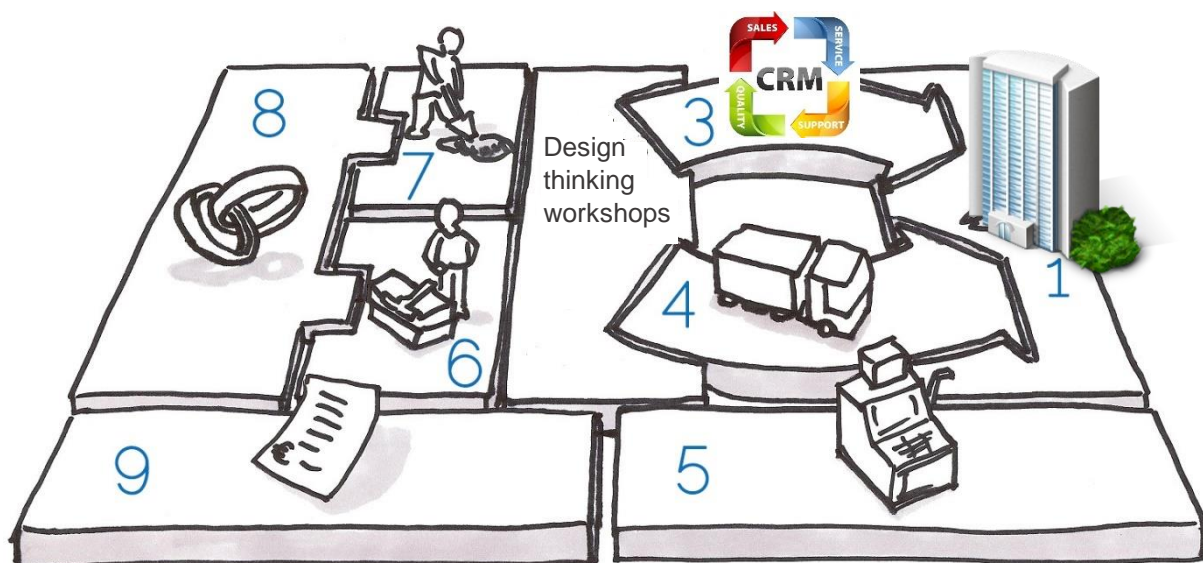
10.   Discussion

This research illuminated insights from organizations in Mumbai that have a need for improving their innovation capacity. These insights eventually led to the creation of a prototype. The results from this research are discussed below in order to discover which relevant information can be concluded from the data. The theoretical framework as illustrated in chapter 3 is used to link these practical results to theoretical approaches.

Caluwé culture analysis

The results from the Caluwé colors questionnaire are blue and green on average, with some employees' scoring high results on the white dimension. As described in chapter 1.2, blue is a structured change culture that focuses on targets and KPI's. Green means a learning environment where people are challenged to develop themselves. White is a philosophical dimension that focuses on freedom and gut feeling, where change is encouraged, and people take responsibility for change.

User-insights

The user-insights that were discovered in the empathy phase and defined with the download, saturate, and group technique showed a need for development of culture, knowledge, (leadership) practices, and skills that are all focused on innovation. This confirms the research that is explained in the theoretical framework that new skills and practices are becoming more important (chapter 3.3).

Thompson's approach to innovation capacity was defined in chapter 3.2 of the theoretical framework and supports the user-insights. This definition however, illustrates that technologies are a part of innovation, which was not indicated in the interviews. On the other hand, the interviews illustrated a need for an innovative culture, which is not included in Thompson's definition of innovation.

"The extent to which an organization, employer, or employee, is able to solve problems by generating, accepting and implementing new ideas, processes, products or services, using the available technologies, competencies and skills" (Thompson & House, 1971).

According to chapter 3.7 of the theoretical framework, the most innovative culture is an adhocracy focused culture. The leadership practices must be aligned to this culture and focus on enabling and encouraging employees. The knowledge and skills for innovation are, according to chapter 3.3, curiosity, empathy, research, prototyping, and testing.

The prototyping skills include Making and reiterating. Making also focuses on learning by doing and testing the prototypes, as explained in chapter 3.5. That being said, the participants at the GSES gave low scores to the statement that they transformed failure into new insights, indicating that there must be more emphasis on identifying the reasons for failure and learning from failing.

Making also requires intrinsic motivation and collaboration, which are factors for innovation as explained in chapter 3.2. On the GSES questionnaire, participants gave high scores to the statement that they were inspired by others' ideas and perspectives, indicating a preference for collaboration.

The design thinking process, as described in chapter 2.1, incorporates the knowledge, (leadership) practices, and skills for innovation. Design thinking also contains a prototyping phase, which can be enhanced with Maker practices. These methods combined encourage aspects of an adhocracy-oriented culture, as described in chapter 3.7. These insights confirm that design thinking is a valuable method for innovation.

Two groups appeared during the download, saturate, and group technique. One group represents reluctance against workshops and the other group showed interest in workshops. Challenge statement 1 and 2 focused on reaching the first group and convincing them of buying design thinking workshops. The theory on organizational change, which is described in chapter 3.9, explains that in order for change to be effective, the why, what, who, and how should be clarified beforehand.

Prototypes

The prototypes were made based on the theoretical framework, four books, and the ideas that were selected in the ideate phase. These ideas were in turn based on the user-insights that were explored in the empathy phase and exploited in the define phase. The final prototypes are:

- Directly approaching CEO's of organizations with personalized benefits
- Design pamphlets on design thinking and distribute these to organizations
- Design thinking workshops that are customized to an organization's needs
- Pamphlets for embedding design thinking in an organization

The book *Contagious* (Berger, 2013) explains that effective knowledge transformation needs at least one of the following aspects to be successful:

- Social currency: The information must be exciting and make feel people smart of interesting by sharing the information;
- Triggers: The information must contain triggers that relate to the information;
- Emotions: The information must evoke emotions for the reader;
- Practical value: The information must contain practical value for the reader;
- Public: The information must make private practices public;
- Story: The information must be wrapped in a narrative that is easier for people to remember.

The Maker Movement suggests that the best way to teach something is by hands-on learning and creating something that has meaning for the creator (chapter 3.5). The results of the GSES customer survey also showed that the participants gave high scores to the statement that they tried to make a positive difference in the lives of others. In the prototype this must be stimulated by encouraging the participants to develop ideas that make a positive difference in the lives of their customers.

The prototypes comply with the root cause that was analyzed as described in Appendix B. The result of this root cause analysis was that organizations are not adapted to their environment. The user-insights supported this by implying that new skills are becoming more important and that strategies are not focused on the everchanging environment.

Practical implications
This research illuminates the needs of organizations regarding innovation and shows that organizations have a blurred vision of design thinking. That being said, theoretical research and testing the prototype elucidate that design thinking is a valuable method and process for innovation. Interviewees that were questioned in the empathy phase claimed that design thinking requires investments in unproven ideas, thus being a chaotic approach.

However, theory and research suggest that design thinking is proven to be successful. For managers, this means that design thinking must be clearly understood and considered for implementation. Organizations in general can benefit from design thinking as for innovating new products or services.

Most definitions of innovation that were examined during the theoretical research focus on individual skills and leveraging technology. Having said that, a clear preference for cross-disciplinary collaboration emerged in the light of the empathy interviews and the influencing factors for innovation that were probed in chapter 3.2. This requires the definition for innovation to be reexamined.

11.   Conclusion

This thesis describes the exploratory research that was conducted by doing desk research, interviewing a sample of the target audience, and testing abductively reasoned ideas with the target group. The practical results that explored with this research are connected to and supported by the theoretical framework as illustrated in chapter 3. The discussion elucidated how this theoretical framework supports the results of this research. The central research question was:

"Which developments need to be made to the services that Consilience offers to schools and school leaders to improve the innovation capacity of non-educational organizations?"

This research was divided in four sub-questions that needed to be answered in order to effectively answer the central research question. This chapter elaborates on how the results of this research answer these sub-questions and the central research question. The changes to Consilience's organization have to take into consideration the culture as described below.

Consilience's culture
The results of the Caluwé questionnaire showed that employees at Consilience are divided in their preference for how change should be realized.

- Blue: Consilience is a (hierarchically) structured organization that focuses on targets and expects rapid results;
- Green: Employees are constantly challenged to develop their skills and performances. The directors invest time and effort in their employees' development.
- White: Consilience's start-up character causes uncertainties for the future, leaving space for choosing new paths and adapting to challenges. Consilience's philosophy is that everything is a prototype, and can always be improved. This leaves room for experimentation and failure.

1. Which needs do organizations have regarding innovation?
The root cause analysis that is included in appendix B shows that organizations are not adapting to the everchanging environment. The user-insights that were gathered in the empathy phase of this research implied that the reason that organizations are not adapting to their environment is that they do not have the right culture, skills, and (leadership) practices.

The target audience as represented in the personas indicates that organizations require a transformation that should mostly affect human capital. The culture should be more innovation focused, which research suggests requires an adhocracy oriented culture. Employees should learn innovative practices and must be trained to possess skills that support innovation. These skills relate to curiosity, observation and empathy, and developing prototypes of new ideas. Managers should be taught innovative leadership practices in order to sustain the culture and empower employees.

On the other hand, the empathy interviews and observations also demonstrated that organizations have a fear for change and that creativity is often seen as risky. This suggests that in order for an organization to be ready for transformation they should be convinced of the benefits of creative practices and must be taught how to manage the risks that come with creative innovation.

2. Which organizational aspects can be changed in favor of innovation?
Exploratory desk research suggests that the 7S model that defines an organization, as explained by McKinsey, must be aligned in order for an organization for operate effectively and efficiently. The best practices regarding innovation for these 7 Ss were found through desk research.

1. Structure;
2. Strategy;
3. Systems;
4. Shared values;
5. Skills;
6. Staff;
7. Style.

As illustrated in the answer to the first sub-question, the needs that the target group has regarding innovation affects the shared values (culture), skills, staff, and style (leadership practices). However, these factors need to be aligned with the systems, strategy, and structure of an organization in order to form an effective organizational framework focused on innovation.

Besides the operational aspects of an organization, Mootee distinguishes eight (categories of) organization challenges which need to be assessed with innovative counteractions. These challenges were linked to the best fitting design thinking practice. All these aspects were tested with the target group for validity. These tests confirmed that the target audience acknowledge these practices.

organizational challenges	design thinking practices
growth	Storytelling
predictability	Strategic foresight
change	Sense making
maintaining relevance	Value redefinition
extreme competition	Experience design
standardization	Humanizing
creativity	Rapid prototyping
strategy and organization	Business model design

3. Which knowledge and experience from the services that Consilience currently offers to schools and school leaders can be applied to the new target group?

The desk research that is described in the theoretical framework indicated that Consilience has experience in providing services for innovation leadership training, tech integration, trends and forecasting, Maker culture, and design thinking.

Innovation leadership training can be offered to fulfill the needs of organizations regarding new leadership practices. Tech integration and trends and forecasting practices can be taught to organization to align the systems aspect of the 7S model with the rest of the organization. The Maker culture can be taught to organizations to teach new skills and a creative culture.

The design thinking process can be used to innovate new organizational structures (business model innovation) and strategies, which can subsequently be aligned with the rest of the organizational aspects as according to the 7S model. Design thinking also uses the innovative skills of curiosity, research, observation and empathy, and prototyping. Of which the latter can be supported by Making.

Consilience also has experience in hosting presentations, workshops, and summits on different subjects. This experience can be used for planning workshops and using presentation skills to effectively convey messages. The Global Social Entrepreneurship Summit focuses on teaching the design thinking process, which practices can be used in the workshops that were prototyped.

From the results of the **GSES survey** was derived that more attention must be payed to addressing the participants' qualities and ensuring that lessons are learned from potential failures. The fact that participants tried to make a difference in the lives of others is evidence that the workshop motivates participants to develop ideas to make a difference for a certain target group. New ideas and perspectives inspired participants, which supports participants in developing original products.

4. Which services can Consilience offer to organizations that intervene in the aspects that need to be changed in favor of innovation?

Testing the prototype confirmed that workshops that customizable workshops are a valid solution for the challenge statements. These workshops first assess the challenges that an organization faces and links these to one of design thinking practices. The workshop is accordingly, based on the design thinking practice that fits the organizational challenge and the organization's value proposition.

The workshops teach new (design thinking) skills, how to manage creativity and enable and empower employees (leadership practices), how to flexibly employ staff according to the skills that are required for each of the phases in the design thinking process, and how to foster a creative (design thinking) culture. The workshop on business model innovation teaches how to align an organization's structure and strategy to the other Ss as according to McKinsey's 7S model.

The workshop on storytelling teaches how to manage employees' motivation and the workshop on fostering a creative culture teaches how to manage creativity among employees. Consilience's design thinking knowledge and experience form the foundation for the workshops. Making skills are explained in the presentations and tapped into during the prototyping phase. The prototype emphasizes learning from failures by having multiple reflection moments in which the participants define their learnings.

The first presentation that is given during the workshops strives to convince organizations of the benefits of design thinking and how to manage risks that come with creativity. This is based on the first two challenge statements. The presentation proceeds to explain how to use design thinking to solve problems. Two hands-on exercises in which the participants solve problems using design thinking teach the participants the skills as described in the answer to the first sub-question.

Several interviewees claimed that workshops do not yield long-lasting lessons. This illustrates a need for support in incorporating the practices in the organization. A brochure that participants receive during the workshop clarifies best-practices for incorporating design thinking into their organization. These workshops and brochures are an answer to the needs that were discovered for sub-question 1. The closing presentation also elaborates on incorporating design thinking into the participants' organization, as suggested by test participants, supporting the information in the brochures.

These are all results of the four challenge statements that were formulated in the define stage and for which the ideas were brainstormed. These ideas were prototyped and based on the test results from four test rounds, improvements were made to these solutions. After the last test round the participants confirmed that the workshops and brochures are a valid solution.

Answer to the central research question
"Which developments need to be made to the services that Consilience offers to schools and school leaders to improve the innovation capacity of non-educational organizations?"

The current services offered by Consilience that include design thinking are focused on teaching students to develop a meaningful solution for either quality education, sustainable agriculture, clean water and treatment, or sustainable cities and communities.

The workshops developed during this research focus on organization-specific business cases. These business cases must first be assessed through face-to-face communication or email or phone calls. These business cases allow Consilience to effectively assess organization-specific challenges in order to have the highest impact. This justifies Consilience's vision to have an impact on market competition.

The workshops also focus on one of eight categories of organizational challenges as described by Mootee. The programs and presentations for these workshops are created in this research, the business case is based on the specific problem that the participating organization wants to solve and must be implemented in the workshop for the specific organization.

Consilience already has the required equipment for design thinking and Making, such as glue guns, box cutters, cutting mats, scissors, and pencils. Some of the materials that Consilience currently uses for workshops with students are of low quality, such as different types of cardboard boxes. High quality sheets of cardboard show better professionality and allow the participants to make better prototypes. The materials required for the workshop should be transported to the venue of the customer, as the workshop will be hosted at their offices, this requires means of transportation.

The presentations for each workshop must be known by the Maker engineers. These Maker engineers are also required to know information about the customer: their concrete challenge, vision, and how their value proposition. The Maker engineers have to practice to professionally present about the new topics. Consiliences green (learning) culture indicates that directors should put in time and effort to teach the Maker engineers how to work with the new target group.

Consilience's vision for this assignment was, as described in chapter 1.1, for organizations to be more innovative, for better products to be developed, and for the general economy to be improved. The new workshops on design thinking allow organizations to develop better innovative products and services, for organizations to improve their innovation capacity, and for markets to be more competitive which can improve the economy.

12.   Recommendations

The results and discussion of this thesis have led to recommendations regarding the problem domain and solving the problems of the target group.

12.1   Recommendations for implementation

Maker engineers must be taught about organizational challenges and their corresponding design thinking practice. They must understand how design thinking can be used to solve organizational problems, and what the benefits are for an organization's structure, strategy, style, staff, shared values, and skills. Furthermore, the Maker engineers must understand the models that are used for each workshops. Practical examples that arise during the provision of the workshops should be analyzed and processed for better understanding how customers use the models. This is in accordance to Consilience's vision that everything is a prototype and can be improved over time.

Different materials will be used for each workshop. These different materials are mostly models that will be used for the specific design thinking practice of the respective workshop. The materials for the prototyping process can be standardized as these prototypes are low-fidelity. Materials for workshops should look professionally and must be easy to work with. The materials and equipment should be easily transportable.

It is recommended to include information on the services for corporates on Consilience's website. Prospective customers want information, and the first place they will search for this information is on Consilience's website. The most important information must be identified and included on the website.

The workshop can be attended by one department of an organization or cross-department employees. At least 15 people need to participate in the workshop, with a maximum of 40 people. It is recommended that at least 20% of the participants has a management function in order to create support of design thinking among higher organizational levels.

Consilience needs to learn how to work with business professionals instead of students, as this is the new target group. In order to gain experience in working with the new target group, Consilience has to conduct a few workshops and reflect on their experiences. This also justifies the insight that Consilience has a philosophical culture in which everything is seen as a prototype and employees learn by doing.

12.2   Academic recommendations

With regard to the sample size and validity of this research it is recommended to gather a larger sample size that is more representative for the target group: organizations in Mumbai with a need for expanding their innovation capacity. The insights from the new target group must be compared to the insights of this research in order to improve reliability and validity.

Follow-up research should be conducted without the bias of design thinking in order to discover and research other methods that can foster innovation within an organization. Design thinking is a flexible method that can be combined with other methods and techniques, but this should not lead to tunnel vision and hinder research into other potential methods for improving innovative capabilities.

The 7 Ss with regard to innovation were defined by this research. The workshops are designed to teach organizations about these 7 Ss. The brochures are for the organizations to take home and elaborate on practices that the organization can continue in order to stimulate innovation. It is recommended that possibilities for long-term support for the target group are researched in order to effectively transform an organization.

The alignment of the 7 Ss requires that an organization's systems are aligned with the structure, strategy, shared values, skills, style, and staff. Consilience should research systems that best support design thinking. These systems should be explained in one of the presentations during the workshop and a brief summary of the systems should be included in the brochure. New organizational challenges should be identified when they arise. These challenges can be discussed with the target group or discovered through different media. These challenges must be researched thoroughly and linked to a design thinking practice in order to incorporate them into workshops.

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Appendix A – Research setup

The research for this thesis was structured according to the design thinking process. The theoretical framework for this research was constructed using desk and field research. The sub-questions for this research are:

1. Which needs do organizations have regarding innovation?
   This sub-question explores the needs of the target audience. These needs provide input for the development of the new services.
2. Which organizational aspects can be changed in favor of innovation?
   This sub-question explores the organizational aspects which influence innovation. These are the aspects that can be changed in order to cater the needs that were explored in the first sub-question.
3. Which knowledge and experience from the services that Consilience offers to schools and school leaders can be applied to the new target group?
   Consilience's knowledge on and experience with innovation formed the basis for this research, as commissioned by the client. This sub-question results in an answer on how the organizational aspects that were explored in sub-question two can be changed in order to cater the needs that were explored in sub-question one.
4. Which services can Consilience offer to organizations that intervene in the aspects that need to be changed in favor of innovation?
   This sub-question combines Consilience's knowledge and experience with desk research and tests to provide input for the services which can be offered to the new target audience.

Research accountability

Sub-questions	Desk research (*written*)	quantitative Field research (*spoken*)	qualitative Field research (*spoken*)	Abductive reasoning (*brainstorm*)
Question 1	X		X	
Question 2	X		X	
Question 3	X	X	X	
Question 4	X	X	X	X

Below is a short description of how the sub-questions were answered and whether they are time cohort or about a case, written or spoken, and testing or exploratory, as these require a different approach.

Sub-question 1: There are numerous articles on the needs of organizations regarding innovation. These are researched by doing desk research. In order to improve validity, the desk research is combined with empathy interviews, which yield different perspectives on innovation. This sub-question was exploratory as it required exploration of new information and depended spoken opinions about current situations.
Sub-question 2: This question was exploratory as it required exploration of new information, and was researched with both written articles and spoken data about current situations. This required desk research to support the empathy interviews which explored spoken data.
Sub-question 3: This question was testing, as it revolved around existing available data, and was researched through qualitative tests with participants and supported with (written) desk research.
Sub-question 4: This question was both exploratory and testing as it was researched through (written) desk research, brainstorming, and spoken tests with participants.

In order to accommodate the desk research to Consilience's research and vision, interviews were conducted with Consilience's employees on subjects that are defined in the theoretical framework.

Desk research

Desk research was conducted During the first three weeks on the previously described topics, and to create the plan of action for the internship. The sources were evaluated using the CARS-technique in order to ensure validity and reliability of this research (Harris, 2015). Another technique that was considered is the PARCA-technique, which stands for purpose, authority, reliability, coverage, and additional resources. As this technique covers the same information as the CARS-technique the choice was made for the more well-known CARS-technique that is also taught during the studies Business IT & Management.

- Credibility of the author and publisher;
- Accuracy of the source;
- Reasonableness of the source;
- Support of the source.

The literature consisted of five books in addition to scientific and non-scientific articles that were found in Consilience's research database and in digital databases. Literature that was used during the studies was consulted. The sources that were used are included in the bibliography. The books are:

- *The design of Business* (Martin, 2009), to get a deeper understanding of design thinking;
- *Design thinking for strategic Innovation* (Mootee, 2013), for the design of the workshops;
- *Solving problems with design thinking* (Liedtka, King, & Bennett, 2013), for the design of the workshops;
- *LAUNCH* (Spencer & A.J., 2016), to structure the ideate and prototype phases;
- *Contagious* (Berger, 2013), for marketing the new workshops to the target audience;
- *Dealing with the Dutch* (Vossenstein, 2010), to assess cultural differences.

The search terms below were used to search digital databases for topics in the theoretical framework.

Innovation	Innovation
	Innovation AND organization
Innovation capacity	Innovation capacity
	Innovation capacity AND organization
	Innovation AND ability
	Innovation AND factors
Improving an organization's innovation capacity	Innovation capacity AND improve
	Innovation AND enable
Consilience's services for schools	Consilience
The Maker Movement	Making
	Maker movement
	Maker space
	Making AND corporate
What defines an organization	Organization
	Organization AND structure
	Organization AND strategy
	Organization AND type
Organizational culture	Organization AND culture
	Organization AND shared values
Organizational change	Organization AND change
	Organization AND change management
	Change AND resistance

Field research

Employees at Consilience were interviewed to gain knowledge on relevant topics that define the organization. These topics are:

- Mission and vision;
- Future plans;
- Operations and services.

In order to support the information about the services that Consilience provides, a survey was composed to gather feedback for one of the summits that Consilience hosts. This feedback gave the client's perspective on this summit and was used to further develop the prototype.

To test the prototype with the target group and colleagues at Consilience, it was presented to a selected group that is part of the target audience. The insights that were gain during the test sessions were used to improve the prototype. Observations and interviews with participants provide qualitative information.

The sample size was determined at four different organizations, of which different roles were interviewed. This assured that multiple perspectives were examined to prevent a biased view of an organization (Mason, 2010).

Processing and result

The empathy interviews are processed in minutes, in which the key takeaways are captured. An additional table will summarize the key insights of all the interviews and observations. These insights will be structured in groups in the define phase. Based on these insights, personas will be made to represent different target groups.

The description of the prototypes consists of a textual description of the service and relevant products to support the text. During the ideation and prototyping phase, experiments with physical materials were done to stimulate creativity and envision the prototypes.

A PowerPoint presentations that can be used during the services supports the tangibility of the prototype. These PowerPoint presentations will support the message that is being delivered during the services.

Ideation

Diverging: Three brainstorming techniques were used to come up with 150 to 200 ideas. These techniques were Free Writing, SCAMPER and the Fast Idea Generator. These last two techniques were introduced during the last course of the studies Business IT & Management.

Other techniques for brainstorming were reviewed, but these techniques did not fit the situation of the assignment as well as the above-named techniques. Because this research concerns currently existing services, the brainstorming techniques that were used should be focused on this, rather than creating new ideas. SCAMPER and the Fast Idea Generator are both techniques that build on existing products or services. Also, many brainstorming techniques are focused on groups. As this research was done individually, the techniques that were chosen are suitable for both individual and group brainstorming.

Converging: After ideating ideas for my prototypes, I will select the best ideas to further elaborate on and eventually include in my prototypes. To filter the results of the brainstorming phase, I will use three techniques. I will use Design Criteria check, COCD-Box and Select Promising Ideas.

I have worked with Design Criteria and the COCD-box during the last course of Business IT & Management, so I have experience with these techniques. The Select Promising Ideas is technique that lets the user cluster comparable ideas into groups. This is to structure the ideas and subsequently lets the user choose the most favorable ideas or clusters for further elaboration. These techniques fit my assignment because I will ideate a lot of ideas.

Research reliability and validity

To ensure reliability and validity in the quantitative research, which consists of the questionnaires for Consilience's summit and a questionnaire that is handed out at the end of the testing phase, the questionnaires need to be structured to group similar questions together. The answers to these questions tell if the answers are reliable and valid. Construct validity should be ensured by an elaborate desk research on the context to assure that the right questions are asked.

For the qualitative research, construct validity needs to be ensured through adequate preoperational explication of relevant constructs. This means that potentially vague concepts need to be explained to the interviewee to ensure that they answer questions based on the right knowledge of these concepts. For this research, innovation, design thinking, and the types of organizations need to be explained.

The four interviews that were conducted to support the theoretical framework were semi-structured interviews with colleagues at Consilience. This structure was important to gain as much information as possible on a preformulated set of topics.

- Structured: An interview set-up where the interviewer uses a list of preformulated questions. This set-up could limit the information that is gained during the interview. As the topics were unfamiliar before the research, important questions could have been omitted unknowingly.
- Semi-structured: A set-up where the interviewer uses a list of open questions that leave room for in depth questions about topics that arise during the interview.
- Open interview: An interview without a list of questions. The interviewer and interviewee know about the subject of the interview, and ask questions about subtopics that arise.

The interviewees were chosen based on their role within the organization, according to the levels of management within Consilience. (Thuis & Stuive, 2012) One director was interviewed, because he sees the subjects from an overall perspective in a top-management role. The consultant that was interviewed is in middle-management, and functions as a link between the engineers at the operational management level and the directors at the top-management level. The two engineers that I interviewed are in operational management. This set-up provided information on the most relevant perspectives within Consilience.

Success factors empathy report:

- 16 interviews with interviewees from at least four different organizations.
- At least three relevant insights are derived from each interview, with a total of at least sixty different insights;
- Each interview covers all the topics on the topic-list;
- At least 10 relevant insights are derived from my observations at each of the four organizations, with a total of at least sixty different insights;
- Construct-validity is secured by adequate preoperational explication of constructs: the right definition of abstract concepts is clear before the interviews and explained during the interviews.

Success factors define report:

- At least five different recurring themes are identified in the insights from the interviews;
- At least five different recurring themes are identified in the insights from the observations;
- Three personas are created;
- At least three challenge statements are formulated, including the development of the services, identifying and reaching the target group and the current problems with innovation in organizations;

Success factors ideate report:

- At least 120 ideas are ideated, with at least forty ideas per brainstorming technique;
- At least ten, but no more than twenty ideas are selected during the converging stage which solve the challenge statements that were formulated during the define phase.
- The selected ideas are processed into concepts which describe the key elements of the idea.

Success factors prototype report:

- At least one service is prototyped and a description of this prototype and how this prototype solves the challenge statement(s) is included;

Success factors test report:

- A test script with at least a description of how the prototype is tested, with which audience, and which possible situations and types of participants can be encountered;
- The test results are included;
- The changes that are made to the prototype(s) based on the test results are explained.

Appendix B – Problem analysis

The Event Mapping method was used for the analysis of the problem. Event Mapping is a method that is taught during the last course of the studies in Business IT & Management. The method is based on the five why method and supplemented with relevant information. (Trouw, 2016)

The Cause Mapping method is also based on the five why method and supplemented with information. However, the information is less complete than with the Event Mapping method as it leaves out possible barriers that occur in the problem. (Think Reliability, 2017)

Other methods, like the Ishikawa Diagram (Mindtools, 2016) and the Fault Tree Analysis (Vesely, 2013), are based on possible causes for the problem. These methods were not used as this thesis required a deeper understanding of the problem and possible underlying problems before coming up with possible causes.

The first step in mapping the problem is to perform the five-why method. This ensures that the root cause for a problem is found by questioning the answer to the 'why'-question five times. This was exercised in an interview with the client. The first statement for the problem is based on the assignment for my internship.

'*We want you to develop the services that we provide to schools and school leaders, so that we can provide these services to corporates to expand their innovation capacity.*'

1. Why do you want me to develop these services to expand the innovation capacity of organizations?
Because corporates have a demand for expanding their innovation capacity parallel to schools, and right now our services are based on stimulating curricular innovations and teaching schools how to be self-developing. These services are not targeted on non-educational organizations.

2. Why do corporates have a demand for expanding their innovation capacity?
We see that organizations are not yet innovating at a desirable pace. We have the knowledge and experience to support these organizations and develop skills and systems that boost innovation.

3. Why are organizations not innovating at a pace that is desirable?
Organizations don't have the experience, knowledge, equipment or combinations of these assets, to innovate at a desirable pace, or are not investing enough of these resources in actively innovating.

4. Why do organizations lack experience, knowledge or equipment to innovate at a desirable pace?
The methods that were taught to the current working generation were not focused on creative thinking and problem solving as much as on theoretical approach. Thus, organizations are not adapted to the changing, innovative present and future. We are working on reforming the curriculum to teach children relevant competencies and knowledge for their future. Now it is time to develop these skills in organizations as well to adapt to the present market conditions and developments.

5. Why are organizations not adapted to the changing, innovative present and future?
The conditions in which organizations operate are changing rapidly. They way organizations operate is not yet adapted to these changes. In order to adapt to these changes, organizations will have to innovate their processes and products, and maybe even reform their strategies. Faster innovation will encourage competition and benefit the market.

Event mapping adds relevant information to the five-why analysis. This information consists of accelerating circumstances and breached barriers. I gained this information during the interview. My client identified four accelerating circumstances that have an impact on the problem.

The desired pace for an organization to innovate is unknown
Organizations do not know how fast they have to innovate. They lack a sufficient understanding of the market, and present and future trends. One of the challenges that I face during the internship is how to teach organizations to identify their required innovation pace based on relevant knowledge.

Assets for innovation are not available
Most organizations lack either experience, knowledge, equipment or a combination of these. During my internship, I assess this lack of assets, research how organizations can assess their lack of assets and research how to make these assets available to organizations.

Organizational cultures are not focused on innovation
This hierarchical, market focused, or clan focused structure impedes organizations from listening to their employees and the ideas that they put forward. An innovation focused culture is a culture where employees feel protected and their ideas are listed to.

Organizations do not identify changes to the conditions in which they operate
Trends that apply to the target group, the competition or the market are not identified on time, which prevents organizations from acting accordingly. These trends have an impact on an organization's desired innovation pace.
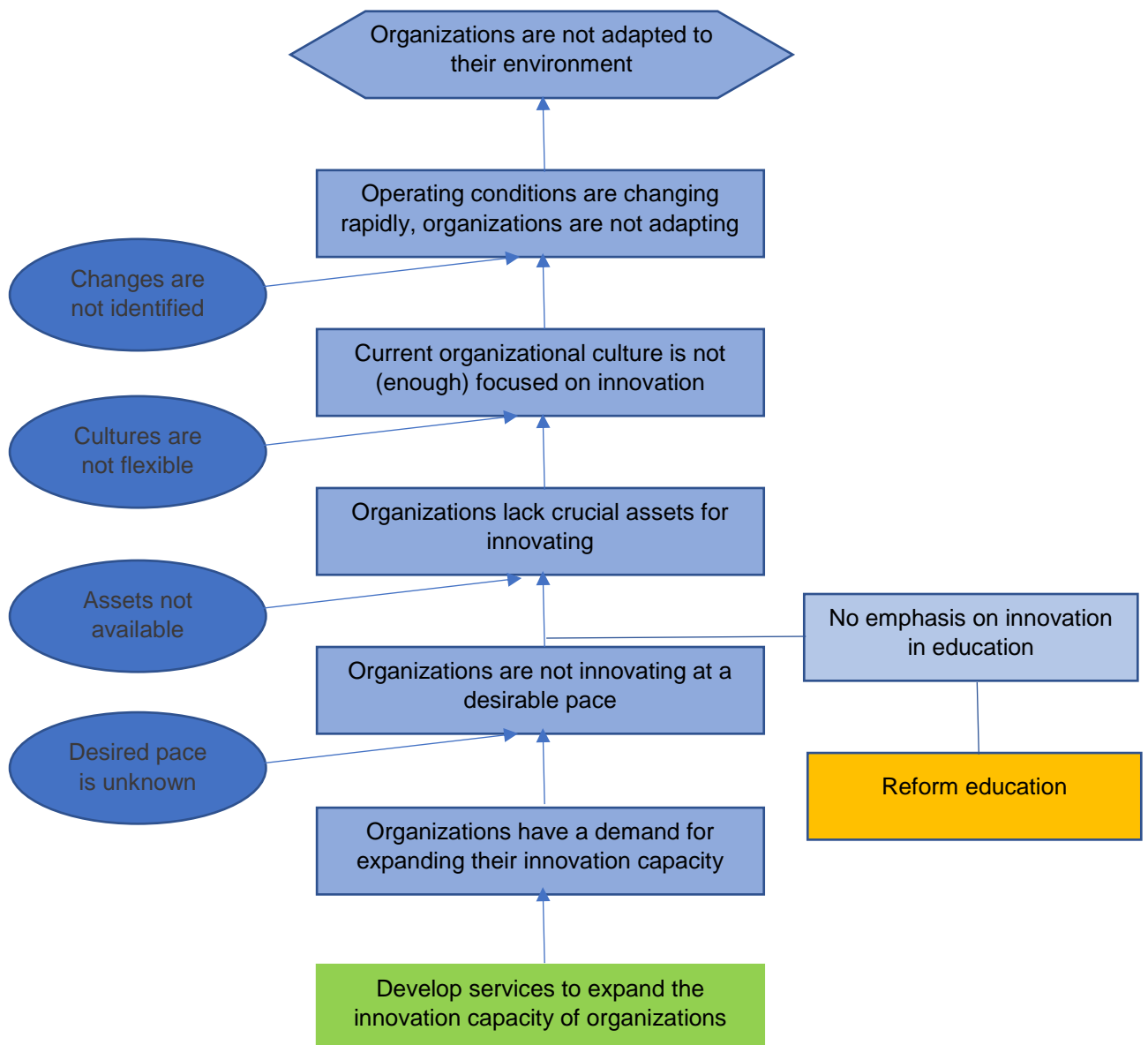
Appendix C – Caluwé colors questionnaire

The Caluwé color test was sent to in-office employees in order to establish the culture regarding change within Consilience. This questionnaire starts with an introduction on the topic and how the questions should be answered. The questions can be found below the introduction.

This test lists a few aspects that affect organizational and human changes. Please divide eight points over the five possibilities of each aspect to represent what you think is most important. You can either divide the points over multiple possibilities or allocate the eight points to one possibility. You have to use all the eight points for each aspect, but you do not have to allocate points to each of the possibilities. See the example below.

1.   Change is only successful if:

   a)   The most important managers support the change
   b)   One can motivate the people who carry out the change
   c)   One sets clear goals in advance
   d)   One helps the stakeholders to jointly gather new insights
   e)   One appeals to the own strength and energy of people

2.   In a change process:

   f)   It is important to alternately let people think and do
   g)   A good ambiance is important
   h)   There must be room for new meanings
   i)   There must be room for negotiation
   j)   One must look to set interim milestones to potentially adjust the process based on these milestones

3.   A change agent:

   a)   Must gather many insights into patterns that maintain the problem
   b)   Must see to it that he/she keeps that change process stable and manageable
   c)   Must primarily be careful
   d)   Must be empathically towards others
   e)   Must ensure that the most important managers change their opinions so that they can coexist

4.   Indispensable in a change process is:

   a)   The knowledge on what one wants to achieve
   b)   A reasonable time pressure to make decisions more quickly
   c)   Drafting a tempting perspective for the stakeholders
   d)   Communication between all stakeholders
   e)   The creation of room for movement, by razing existing power relations

5.   Organizations change happens:

   a)   When one knows what the organizations wants to achieve
   b)   By ensuring that people reflect one each other
   c)   If a dialogue grows between people
   d)   If the policy changes first
   a)   By investing in people

6.   A change agent must:

a) Make sure that people listen to each other and learn from each other
b) Be able to untangle embedded forces behind problems in order to intervene on these problems
c) With the help of their knowledge and experience make sure that all activities add to the desired result
d) Gather many insights on the context and networks around problems
e) Offer chances and possibilities for employees

7.   Change:

a) Goes together with the formation of coalitions
b) Must not rely too much on staffing
c) Happens by exciting people in the right way
d) Happens by appealing to the own strength and energy of people
e) Happens only if people change

8.   A change process is:

a) Creating a win-win situation
b) Finding a dynamic balance using creativity and meaning
c) Learning from each other
d) Finding a better fit between people and the organization
e) The management of people and activities

9.   Important for the success of a change process is:

a) Bringing people to reflect
b) The development of a joint vision
c) The stimulation of the talents of stakeholders
d) Think first then do
e) Making sure that people find meaning in the challenge

10.   The change process is realized by:

a) Eliminating permissiveness
b) Creating a save learning environment
c) Identifying and utilizing conflicts as chances
d) Drafting a tempting perspective for the stakeholders
e) Ideating and realizing the best solution

Appendix D – Empathy interviews structure

The empathy phase consisted of sixteen interviews with employees and managers form different organizations. Additional observations were made at these organizations to gather new insights. The interviews and observations formed the basis of the research, as the follow-up of this research is based on the customer understandings. This ensured validity of the end result.

Thank you for joining me for this interview today. My name is Niels van Dijk and I am conducting a research commissioned by Consilience. The target of this research is to develop services that can be offered to organizations to improve their innovation capacity.

Innovation capacity is the extent to which an organization, employer, or employee, is able to solve problems by generating, accepting and implementing new ideas, processes, products or services, using the available technologies, competencies and skills. So, the ability to innovate.

1. *How important do you think that continuously innovating is for your organization?*
2. *What are the main benefits of innovating for your organization?*

The way an organization innovates depends highly on the culture, knowledge and skills of their employees.

3. *Do you think that your organization emphasizes innovation enough?*
4. *Do you think that your manager listens to the ideas that you and your colleagues put forward?*
5. *Do you think that your organization has the required assets to innovate, such as an innovation focused culture, the right materials and equipment, skilled employees and the right knowledge?*

We at Consilience have identified the most valuable resources for innovation. We have knowledge and experience in implementing innovative systems and innovation focused cultures. This interview is meant to gain knowledge on the needs of managers and employees regarding innovation, and the required resources for innovation.

- *The need to innovate;*
- *Knowledge on innovation;*
- *Innovative culture;*
- *Employee skills;*
- *Intrinsic motivation of employees and employers;*
- *Creativity;*
- *Employees' needs regarding innovation*
- *Innovation leadership;*
- *Methods;*
- *Equipment;*
- *Materials;*
- *Design thinking*

Thank you very much for your time and cooperation. With the knowledge that I gained during this interview I can proceed my research and development of the services for Consilience. All your information will be treated as confidential. I would like to make an appointment for the second interview, could you name dates on which you are available for another interview?

Appendix E – Empathy interviews and observations

	1st interview insights	2nd interview insights
Organization 1 **1st interviewee**	We are doing quite good with our current methods for innovation	Lessons learned during workshop usually don't last
	The most important skills for innovation is thorough research	Most workshops are expensive
	Prototyping is expensive and it is not proven that it works	We can research new methods ourselves
	Customers are actively involved in our operations by distributing surveys	Our main challenge is to see how we can improve products for all of our customers
	We have fixed tasks for employees	How can we enter new markets?
Organization 1 **2nd interviewee**	Innovation is a management task	Innovation is not the first priority
	The way things go around here is not focused on innovation	My boss will be pissed if I do not reach my targets
	I have some ideas about what we can do but I do not talk about them	Managers do listen but they want prove if we have ideas
	I have specific tasks and I do not think I can think of new ideas on the side	I do think that a workshop can teach us new practices
	It is not feasible to talk to all of our customers and see what they want	You have to really convince managers of the importance of innovation
Organization 2 **1st interviewee**	Family feeling is an important driver for organizational operations	Managers regularly speak with colleagues to keep a good relationship
	KPI's are a motivation for innovation	Colleagues take initiative in working together to reach ambitious goals
	Each employee receives trainings to learn about our way of working, which is different for each department	Workshops are excellent as team-building activities but miss their target when it comes to long-lasting lessons
	Skills are developed best through collaborating with peers	We have knowledge sharing sessions to stimulate communication
	I am not afraid to try new options but I want to know exactly how it works	I cannot throw away my values just to integrate a new method
Organization 2 **2nd interviewee**	New innovations usually arise when we just talk about our customers	New ideas usually come when I am away from my desk
	I do not think that the whole organization can be focused on innovation	There are some people with whom I rather not work, as they are too self-centered and push their own ideas
	Collaboration is the best practice to achieve results	We would be happy with your support as long as we are on the same level
	New ideas give energy	I am not really creative, but if I see a good idea, I can take it further
	We have really skilled people who are good at their specific job	New (general) skills can be good as they can unite people
Organization 3 **1st interviewee**	We look for the best way we can reach our customers	I have a good idea about how I can foster innovation
	We are doing quite well when it comes to innovation, but new ideas are always welcome	I come up with new ideas at home and bring them to the office by talking to my employees
	We draft ideas to make them tangible to communicate them to others	We do have quite a lot of contact with our customers
	Different skills are becoming important these days	We need a critical point of view to point out flaws in projects
	The whole organization should support the change	I must support my employees when they do not feel comfortable

Organization 3 2nd interviewee	Innovation is only achieved when everyone can speak about their ideas	I want to develop my innovative skills if that is possible
	I do not know the best way to improve innovation, if there even is a best way	A workshop is interesting when it yields tangible results
	Important skills are not changing, but there are new skills becoming important in addition	The most important skill nowadays is creative problem solving, this is not taught in one workshop
	We know what customers want, we base improvements on that knowledge	A repeated workshop can be valuable if they address problems related to our organization
	Some of my colleagues are not as involved with the organization, and do not try to think of new solutions	We have to align the new knowledge with how we develop new ideas
Organization 4 1st interviewee	My idea of innovation is a new original product for a specific need	How can this method be used for solving hard to understand problems?
	Managers have skills to develop new ideas, most employees do not	We have had knowledge sharing sessions and these are very valuable
	We monitor our customers through business intelligence	We also send out surveys to customers
	We have weekly meetings with heads of departments to discuss our projects	We have interns to look for possibilities with fresh eyes
	It might help if some new skills were taught, training is important	The most critical skills are communication and alignment of knowledge
Organization 4 2nd interviewee	I don't think that everybody agrees on how things are going around here.	I reassigned working booths in order to foster collaboration between colleagues that regularly need this
	I am competent enough to know which ideas can help	Workshops are usually too expensive in respect to their effect on an organization
	If my opinion clashes with the opinion of my manager it is no use	Workshops should be held regularly in order to grow new practices
	I have no idea how to gather the whole organization around the same subject (innovation)	It is not my job to make sure that all the faces are in the same direction
	The thing I like about workshops is the collaborating component	Why is design thinking better than other methods?

Observation insights

	Observation insights
Organization 1	Managers stay in their own offices, rarely checking in with employees
	Employees are not collaborating unless they have a meeting in a separate room
	Managers' offices are located near each other, separated from their employees
	Employees call each other by their first name, but managers by their last name
	Employees rather prevent miscommunications than disagree with managers
	Managers get mad at employees for not reaching deadlines instead of asking for the reason that this employee did not reach the deadline
	All employees were either working on their laptop or with paper documents
	Working hours are 09:30 to 16:00, after which employees instantly leave
	Some employees eat lunch at their desk instead of at the lunch table
	The interviewee looked relieved when she was told that Consilience can teach more about innovation
Organization 2	Employees share laughs at the coffee machine and know each other personally
	The office is decorated with colorful graphs and posters about the organization
	Meeting rooms are transparent and have flip over notepads and large TV's
	An employee was openly confronted about mistakes he had made, and took responsibility for these mistakes
	An employee had made a sketch of his ideas to better communicate his ideas to a colleague
	Some managers have their own offices and some (same level) managers do not
	Some rooms are only for speaking to customers and are located so that the noises of the workplace do not reach the room
	Days begin with a short standup meeting in which the tasks of the day are discussed
	The employees and managers were, on average, relatively young
Organization 3	Large TV's show KPI's related to the organizations' customers
	Managers' offices are located near each other, separated from their employees
	The organization's slogan was written on the wall in some of the working rooms
	Seven higher managers had an appointment in one of the meeting rooms, where only paper files were being used and no digital support
	Office rooms consist of relatively small numbers of employees
	Hallways are crowded as employees keep walking from room to room
	Some models are standing demonstrated around the office
Organization 4	Employees share laughs at the coffee machine and know each other personally
	An employee was overheard saying that his colleague should not have lunch at her desk, but that she should join them in the lunchroom
	Some managers have their own offices and some (same level) managers do not
	Working hours are 09:00 to 16:00, after which employees instantly leave
	Silence was maintained in each in each of the working rooms
	The hallways are decorated with happy colors
	Employees have relatively big desks for themselves
	Posters hang around the office inviting employees for a team training

Appendix F – Personas

Persona 1

Nitesh Meda

"*I see so much potential for my organization.*"

Age: 32
Work: Business Development Manager
Family: Married, 2 children
Location: Mumbai

Job function

Mr. Meda has worked has been working for a startup organization since three years, where he grew to be the Business Development manager, leading a team of five. Mr. Meda is the creative mind of the organization, with excellent skills in planning and communication.

Goals

- Improve products to cater customers' needs
- Find new possibilities to cater customers' needs
- Develop the organization beyond current boundaries
- Be recognized for taking the organization to a new level

Frustrations

- Resistance to change
- Not having the option to try out new ideas
- Figure based KPI's that restrict creativity

Personal bio

Mr. Meda graduated engineering at age 23, whereafter he was offered a job as marketing advisor for a global firm. Mr. Meda found that exploring opportunities markets for opportunities was his passion. After six years, in which he grew to be a marketing manager, Mr. Meda was offered the position of Business Development Manager at a new startup company. In his current position, Mr. Meda is looking to expand the organization beyond current boundaries, exploring new customer segments that may be interested in their products.

Activities

- 30% Trend research
- 20% Marketing planning
- 20% Business planning
- 30% Projects

Organizational culture

Clan culture

Adhocracy culture

Market culture

Hierarchy culture
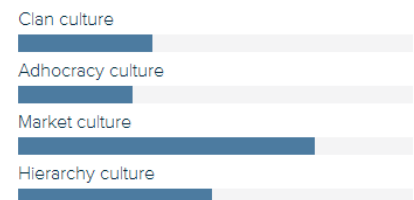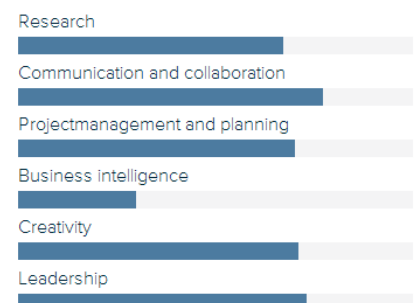
Organization bio

The organization for which Mr. Meda works focuses on growth based on reliable methods. Its products have proven to be successful with its customer segments. The organization is exploring to where these customer segments stretch, in order to expand their customer base. The organization wants to grow fast by exploiting proven products, but its faith in reliability limits the exploration of new possibilities.

Skills

Research

Communication and collaboration

Projectmanagement and planning

Business intelligence

Creativity

Leadership

Persona 1 is based on employees that are convinced of the need for innovation, but is limited by the way the organization is structured and the believes that are embedded in the culture. These types of organizations need to be taught about methods for innovation and how to integrate these into their operations. This persona incorporates the insights that organizations have a need for culture development, leadership practices, and that they are open towards workshops.

Rohana Dayal

"We can achieve so much if the right people work together"

Age: 26
Work: Human Resources executive
Family: Married, no children
Location: Navi Mumbai

Job function

Mrs. Dayal achieved her Business and Management degree at age 22. After that she was hired at her current position as HR-executive. Mrs. Dayal is responsible for attracting new talent and managing employee records. She works in a team with two colleagues.

Goals

- Attracting the best people for job openings
- Identifying and translating challenges into job descriptions
- Solving challenges by putting the best people on the job
- Creating alignment between staff, skills, shared values and style through excellent employee management

Frustrations

- Being seen as insignificant for the organization
- Restrictions that limit a person's potential
- Skilled people that turn out to have bad soft skills
- Resistance against (personal) development and growth

Bio

After achieving her Business and Management degree, Mrs. Dayal was looking for a job focused on people management. Her passion is connecting people to challenges. Mrs. Dayal gets happiness from seeing people whom she hired perform well and find their place in the organization. Mrs. Dayal feels that her manager listens to her and gives possibilities to pitch her own ideas and integrate creativity into her work. She feels that the continuously changing environment requires new skills.
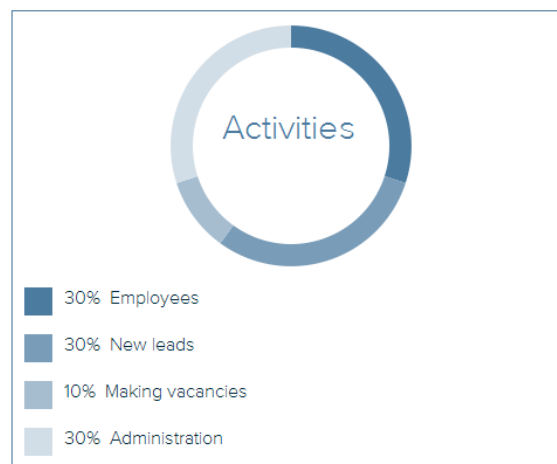
Activities

- 30% Employees
- 30% New leads
- 10% Making vacancies
- 30% Administration

Organizational culture

Clan culture

Adhocracy culture

Market culture

Hierarchy culture

Organization bio

Mrs. Dayal's employer is a startup that envisions quick growth and expansion to new cities. The organization offers services to its different customer segments through digital media. Managers in the organization are looking for new ways to grow the organization to the next level, but have yet to be convinced of the right method to achieve this. This organization endeavors to foster an innovation focused culture.

Skills

Recognizing and attracting talent

Administrative tasks

Communication and collaboration

Employee management

Creativity

Leadership

Persona 2 is based on organizations that are convinced of the need for innovation and stimulate innovation throughout their departments. These organizations can be supported to take on new methods for innovation and are willing to be taught new skills and tools. This persona incorporates the insights that organizations have a need for culture development, knowledge of right practices, and skill development.

Persona 3

Amit Jain

"But what if we fail?"

Age: 52
Work: CEO
Family: Married, two children
Location: Mumbai

Job function

Dr. Jain founded his startup six years ago when he finally decided to take his passion to the next level. He has grown his organization to a recognized name within his community. In his work, Dr. Jain focuses on employee satisfaction, as he feels that employee motivation is the best driver for product quality.

Goals

- Providing the best working environment for his employees
- Growing the organization while maintaining safety
- Everyday employee satisfaction
- Happy customers that create worth-by-mouth

Frustrations

- Employees that disturb the status quo
- Employees who take advantage of the organization's comfort
- Uncertain events
- Experiments with unproven concepts

Bio

Dr. Jain mastered in engineering. After graduating, he worked at a number of organizations, starting as a programmer, working his way up to Chief Information Officer. When Dr. Jain saw an opportunity to take his personal passion to the next level, he took it. He founded his new startup with a trusted partner, sharing the same believes. The main driver for their approach was, and still is, to create and maintain the best working environment and conditions for his employee's skills to thrive.

Activities

- 40% Management
- 20% Marketing
- 20% New projects
- 20% Data analysis

Organizational culture

Clan culture

Adhocracy culture

Market culture

Hierarchy culture
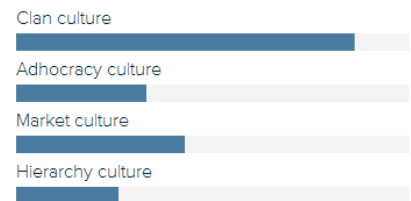
Organization bio

The organization that Dr. Jain founded together with his partner caters four different customer segments. These segments are monitored through excellent business intelligence. New possibilities arise when new patterns are discovered in the data. Customers are regularly questioned through surveys to gain new insights. The organizational culture is focused on optimal employee satisfaction through with quality and KPI's are realized.

Skills

Employee management

Project management

Business intelligence

Communication and collaboration

Creativity

Leadership
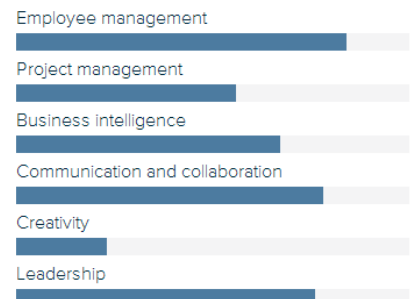
Persona 3 is based on organizations that are comfortable with their current working environment and do not see the need to be more innovative. Innovation is mainly seen as risky and change is seen as scary. These organizations need convincing and long term support to integrate new methods into their operations as they are scared of sudden changes. This persona incorporates the insights that organizations have a need for culture development, leadership practices, and that they have a reluctance against workshops focused on innovation.

Appendix G – Customer journey map

Customer Experience Consilience: Learning reimagined (services for schools)

Appreciation	High appreciation as opportunities for improvements become clear	Medium, as the benefits for the customer are not yet clear	High, as different services ensure affordability for most schools	High, as customers state that they are highly satisfied	Medium, as some customers need help to apply the new knowledge
Touchpoint	Word-of-mouth Newspaper article Website, Via CIS	Website Word-of-mouth Telephone, email	Telephone E-mail	Workshop or summit at a physical location	E-mail Pamphlet Telephone
Customer Journey	**Awareness** New methods for education and the benefits for schools are clear	**Evaluation** Exploring options for services that teach these new methods	**Purchase** The purchase of entry to the workshops or summit	**Delivery** The provision of the workshop or summit to the schools	**After-sales** After-sales services have not been developed yet
Emotions	Confused, skeptic fear	Fear, motivated skeptic	Motivated, happy	Challenged, contented, happy motivated	Motivated, contented, skeptic
To improve	Create awareness in schools that are not yet innovating	Be the first organization that schools think of for these services	Make services easier available to schools	Host workshops and summits at our own location	Aftercare to help schools use the new knowledge in their curriculum

Awareness:

Customers have high appreciation as their awareness of opportunities for improvement grows. Problem become clear while solutions are being presented, skipping the part where uncertainty about the problems arises. The awareness is created via word-of-mouth, a newspaper article, Consilience's website of via the Council of International Schools that promotes the services.

The customer can be confused about how the new information that they encountered may be applied to their situation. Skepticism can occur if the customer is not fully aware of the benefits of the services for their school. If awareness is not created through communication with Consilience but by discovering problems in the (lack of) development of one's curriculum, the customer can encounter feelings of fear that they are falling behind.

Actively approaching schools to inform them about Consilience's objective can improve global awareness and allows for customer interaction which may minimize the evaluation stage of the customer journey.

Evaluation:

Consilience is one of the only non-profit consultancies offering innovative methods to schools, which toughens the evaluation phase for customers as they have little comparisons. Consilience's wide selection of services allows customers to choose the option for their situation. These options that customers have are clarified on Consilience's website or through email or phone calls.

Customers are motivated to find solutions on Consilience's website. Skepticism, however, occurs when the customer cannot compare Consilience's services to other organizations that provide similar services.

By using search engine optimization (SEO) or even advertising on google, Consilience can be the first option that customers will encounter while searching for possible solutions. By getting more media coverage, such as in newspapers, and developing large networks, global awareness will be created that allows customers to link Consilience's services directly to their problems.

Purchase

The purchase of one of the services happens through email or phone calls. The option for different services ensures affordability for most schools. Customers are happy and motivated to have found a solution to their problems and look forward to experiencing the service.

The services should be made available for different types of schools, as low-income schools have a lower budget for the services.

Delivery

Customers state that they are highly satisfied with the services that they make use of. These services are provided at a physical location and rely on interactivity with the participants.

The services challenge the users, making them feel motivated and contended when they understand the message that the services convey.

Appendix H – Customer survey GSES

A survey was designed and handed out to participants at the GSES workshop to measure their ratings of certain aspects of the workshop. The results of this survey were used to derive insights from that were used to develop the new services. The questions are based on participants' takeaways from the workshop regarding the goals of the workshop. The workshop's goals are:

- Teach participants about design thinking;
- Teach participants to solve real world problems;
- Teach participants interdisciplinary ideas and perspectives;
- Teach an iterative process that enables participants to learn by doing;
- Teach participants to reflect on their own qualities;
- Teach participants to develop a business model.

The goal of this survey is to establish if the goals of the workshop were achieved. To do this with yes-or-no questions will not yield the desired result, as the difference between answers will be harder to distinguish (Boynton & Greenhalgh, 2006). Instead, there was chosen to formulate the questions as statements, to which the participants could grant a ranking from 1 to 4, 1 representing strongly disagree, 2 representing disagree, 3 representing agree, and 4 representing strongly agree.

The choice to leave out a neutral answer was made consciously, as the statements are factual and either right or wrong. Neutral answers have no valuable information (Fluid Surveys University, 2014). For each statement, an average answer of 3,1 is targeted, as discussed with the client. This average means that (most) participants agree with the statement. The statements are formulated below.

11. I gathered information to solve problems;
12. I benefitted from collaborating and working with others;
13. I learned across disciplines;
14. I was inspired by new ideas and perspectives;
15. I tried to make a positive difference in the lives of others;
16. I thought about various possibilities;
17. I transformed failure into new insights and approaches;
18. I communicated and shared my thoughts honestly and confidently;
19. I reflected on my strengths and weaknesses;
20. I learned about how to develop a Business Model.

Additional open questions were asked to yield deeper understandings of what the participants learned from the workshop. The individual answers to these questions were considered in the development of the new services. These questions were formulated to make the respondent think about their learnings and evaluate the value of the workshop.

1. What did you learn during the GSES workshop?
2. How did your prototype address a real-world problem?
3. After GSES, which field are you more curious and interested in to pursue a possible career in?
4. After GSES, how will you continue your exploration?

Survey results	1	2	3	4	Average	Mode
I gathered information to solve problems	3	3	37	22	3,20	3 with 56,92%
I benefitted from collaborating with others	4	1	22	38	3,45	4 with 58,46%
I learned across disciplines	2	6	37	20	3,15	3 with 56,92%
I was inspired by new ideas and perspectives	4	3	15	43	3,49	4 with 66,15%
I tried to make a positive difference in the lives of others	3	1	21	40	3,51	4 with 61,54%
I thought about various possibilities	3	3	29	30	3,32	4 with 46,15%
I transformed failure into new insights	5	7	31	22	3,08	3 with 47,69%
I communicated and shared my thoughts	2	5	31	27	3,28	3 with 47,69%
I reflected on my strengths and weaknesses	4	8	31	22	3,09	3 with 47,69%
I learned how to develop a Business model	4	5	18	38	3,38	4 with 58,46%

Insights from this survey were derived by looking at the lowest scores, highest scores, and highest modes. The lowest average rankings were respectively 3,08 and 3,09. The statements that got these scores were also the statements that got the least rankings of 4, and the most rankings of one and two. Participants least agreed with the statement that they transformed failure into new insights, closely followed by the statement that the participants reflected on strengths and weaknesses. These questions are related in the way that they address the participant's qualities and how these were tapped into by the workshop.

The highest average rankings were respectively 3,51 and 3,49. The statements that got these scores were also the statements that had the highest modes of 4 with respectively 61,54% and 66,15%. The statement that got the highest average ranking was that they tried to make a positive difference in the lives of others, closely followed by the statement that they were inspired by new ideas and perspectives.

The relatively high ranking (average 3,45 and mode 4 with 58,46%) for the statement that participants benefitted from collaborating with others should be considered for the development of the new services, as collaboration evidently is important and beneficial for participants.

Appendix I – Test plan

The prototype:

We have developed a design thinking workshop that is customizable for your organization's needs. The design thinking workshop teaches you about the process and skills that are needed to effectively execute the process. Design thinking is not only a process but also a way of thinking that, when embedded in your company culture, makes your organization more innovation focused.

Before the workshop, we assess your organization's needs by asking you a set of questions. We distinguish eight organizational challenges to which we then link your needs. During the workshop, we perform a set of design thinking best practices to effectively tackle the challenge.

My first question to you is whether you think a customized workshop is effective for teaching new skills and practices?

Research target and design questions

9. What are the main elements that the workshop should address?
10. How many people should be able to attend a workshop?
11. How long should a workshop take?
12. Are the breaks as included in the program sufficient?
13. Which skills do you think are important to be taught?
14. Is it a good idea to host the workshop at your organization's venue?
15. Which organizational challenges should be included in the customization options?
16. What is the best way to embed something in your organization in order to make sure the workshop yields valuable lasting lessons?

The prototype
Present the workshop programs to the audience. The programs effectively show the different steps that occur during the day.

The presentation that explains design thinking and the presentations that describe the different challenges and corresponding design thinking practices are presented to the audience. Everyone will be asked to write down any questions or feedback that they have regarding the workshop programs and presentations. A printout with different textboxes in which the audience can write down their questions and feedback regarding the different programs and presentations will be provided in order to stimulate the audience to write something down for every aspect.

Script
Introduction
Good afternoon everyone. Thank you all for joining us today. My name is Niels van Dijk and I work as a Business Development Associate for Consilience. We are a non-profit global innovation consultancy, focused on supporting organizations to adapt methods, tools and systems for innovation.

We offer services to incorporate design thinking into your organization. These services extend from long-term support for structural and strategic transformation to singular design thinking workshops to teach innovation practices.

This workshop is meant to collect feedback on the design of the workshops. Please write down your questions and feedback on the forms we provided you with. You do not have to state your name or any information on the feedback form as this will be confidential.

Design introduction
Design thinking is a process for solving 'wicked problems'. A wicked problem is a problem that is difficult to solve, because it is so interconnected with other constructs that you cannot define a definition of the problem. Every wicked problem can in turn be the cause for another problem. When we look at wicked problems in organizations, for example, we can distinguish some problems that every organization struggles with:

- Growth;
- Predictability;
- Change;
- Maintaining relevance;
- Extreme competition;
- Standardization;
- Creative culture;
- Strategy and organization.

Our workshops help your organization to address specific problems using real examples like your own products, services, or processes. At the end of each workshop is an explanation on how to incorporate the design thinking practices into your organization. We also provide brochures that you can take home that explain more about the incorporation of design thinking into your organization.

Questions to and tasks for the participants
Each workshop starts with a presentation on design thinking followed by a presentation on the organizational challenge and corresponding design thinking practice. I will first give you the presentation on design thinking. Please write down all the questions and feedback you have on the paper that we provided. Think about whether you think the presentations are clear, complete and relevant.

presentation on design thinking

Thank you all for listening. Next I will present to you the different organizational challenges and corresponding design thinking practices. Again, please write down all the questions and feedback you have on the paper that we provided.

presentation on organizational challenges and corresponding design thinking practices

1. Which elements should be included in the workshop?
2. How long should a workshop take?
3. How many people should be able to attend the workshop?

Show the audience the workshop programs

4. Are the breaks as included in the program sufficient?

We will now do a quick run at the design thinking process. We will follow the basic process as this is at the core of every workshop.

Conduct the design thinking workshop with the audience

5. Which skills do you think are important to be taught?
6. Is it a good idea to host the workshop at your organization's venue?
7. Which organizational challenges should be included in the customization options?
8. What is the best way to embed something in your organization in order to make sure the workshop yields valuable lasting lessons?

show the audience the brochures that are included in the goody bag

Please read the brochures that are included in the goody bag. We will be roaming around for questions that you have. Please don't hesitate to ask any question. Also, you can write general feedback on the feedback forms.

Think about whether you think the brochure is complete, clear, and relevant. These brochures should teach you about practices that help you embed design thinking into your organization.

Debriefing
Thank you all for participating in this workshop. Please submit your feedback forms to me. We will use your feedback to improve the workshop, the presentations, and the brochures.

Scenarios

(Someone in) the audience does not see the value of a design thinking workshop

- Ask them about possible challenges or issues in their organization and link them to one of the organizational challenges we distinguish, and explain how the corresponding design thinking practice can solve their challenge or issue;
- Ask them about suggestions to make the workshop more valuable in their perspective.

(Someone in) the audience thinks that there are more important organizational challenges

- Try to link those challenges that they talk about to one of the challenges we distinguish;
- Include the challenge that they talk about in the challenges we distinguish;

(Someone in) the audience does not see any challenges or issues in their organization

- Ask them about possible improvements they see instead and explain how the design thinking practices that we distinguish can help to achieve these improvements;
- Ask them if they have ever encountered a limiting factor in their job, heard a colleague talk about something that bothered them, or think of factors that are holding back the organization, and link these to one of the organizational challenges that we distinguish and their corresponding design thinking practice.

(Someone in) the audience does not dare to give critique on the prototype

- Ensure them that this is only a prototype to collect feedback and not yet the finished product;
- Tell them that feedback is encouraged and the prototype will be improved based on their feedback.

(Someone in) the audience thinks the whole prototype is wrong

- Collect constructive feedback and ask them about what they think will be a good prototype;
- Make them feel understood and explain the underlying purpose of the prototype.

Possible test participants

Pleasers: people who say that they like the prototype regardless of their actual opinion;

- Pleasers should be dealt with by asking questions about possible improvements and by assuring the participants that the sole reason for this test is to improve the prototype.

Negatives: people who don't see the value of the prototype, either because they don't understand the use of it or because they think that their situation is already perfect;

- Negatives should be dealt with by asking questions about their situation that may link to the use of the prototype. These questions can be based on insights that were gathered during the empathy phase.

Avoiders: people who identify unimportant aspects of the prototype as undesirable and therefore think the prototype is not valuable. (E.g. the background colors of the prototype for an App are not pleasing). The prototype is subject for discussion and should therefore focus on the key elements. Adjacent matters are easily changeable and are no reason for the prototype to not be of value.

- Avoiders should be dealt with by emphasizing the key elements and that adjacent matters can easily be changed.

Appendix J - Impact analysis

As the research that is described in this thesis is about the developments that needed to be made to Consilience's existing services, an impact analysis has been executed which shows the impact on the existing service. The service that has been chosen for reference is the Global Social Entrepreneurship Summit (GSES), which teaches students how to make social innovations using design thinking. This impact analysis was performed using the SCOPAFIJTH method, as this yields the most complete description of the impact on each aspect of the organization and the GSES in particular (Zijlstra, 2014). This impact analysis is based on the research that was already conducted on the GSES.

Security

In contrast to what was described in the plan of action, the final prototype requires privacy sensitive information. Not of people, but of organizations. This aspect is currently applicable to the privacy of the participants and the use of the equipment. Consilience makes pictures during the GSES to post on social media in which the privacy of those present should be protected. The safety of the students is also protected as they work with cutters, scissors, and (hot) glue guns.

When Consilience makes pictures during the new workshops they should not only be cautious with the privacy of the attendants, but also consider sensitive organization-specific information that may be present in the pictures. The safety regarding the use of equipment is also applicable to the new workshops. A new security issue that arises is transparency of the participating organization. As the workshops are customized to the organization's specific needs and organizational challenge, the prototypes can reveal competitive information. Every picture that is taken during the workshop must be approved by the participating organization before posting on social media.

Commerce and communication

Consilience maintains a website for the GSES that contains information about the summit (Consilience, 2017). Another means of communication is via social media (Twitter, Facebook, and LinkedIn). The communication contains information about the summit and pictures that are made during the summit.

The communication regarding the new workshops will use the same media. The message, however, should contain information that is applicable to the new target group. In order for the information to spread, it should comply with the STEPPS rules (Berger, 2013):

- Social currency: The information must be exciting and make feel people smart of interesting by sharing the information;
- Triggers: The information must contain triggers that relate to the information;
- Emotions: The information must evoke emotions for the reader;
- Practical value: The information must contain practical value for the reader;
- Public: The information must make private practices public;
- Story: The information must be wrapped in a narrative that is easier for people to remember.

The internal communication also sees a division as the communication should clarify whether planned services regard services for schools or one of the new design thinking workshops. This affects the preparations that must be made.

Organization

Consilience is a nonprofit organization, meaning that the organization cannot make profit from the new (or existing) services. Consilience is growing rapidly and attracting a new target group can boost this growth. The growth should be contained in order not to grow beyond their capacity.

Consilience focus is divided into a focus on schools and a focus on non-education organizations. This requires a strict focus which must be clear in their communication and division of labor. The new target group requires new knowledge of the organizations they cater and experience in providing the workshops. The required knowledge is mostly captured in the results of this thesis.

The Maker engineers who currently work to develop, prepare, and provide the services to schools are with the new services also responsible for (further) developing, preparing, and providing the new design thinking workshops.

The organization change is visible on the Business Model Canvas that is included in Appendix L. The changes start in the customer segment section of the model, where a new segment is added: non-educational organizations. This also led to an additional value proposition:

"Customizable design thinking workshops to solve wicked organizational problems"

The channels to reach the customers remained the same. However, where there were no customer relationships being maintained before, it is recommended to save contact details of each customer in order to provide after care. The revenue stream already contained the entry fees for workshops and summits, the entry fees for the new workshops will be included in the same section.

The new workshop also had no impact on the key resources and activities in the model, as these sections already contained the research and the provision of workshops. The key partners and cost structure also remained the same.

Personnel
Current personnel should be trained in providing the new workshops. The information that is taught to the participants of the workshop is crammed in one day instead of three days, which requires personnel to identify and understand the most important information that should be taught.

The new workshops also require basic knowledge of how organizations operate and how the wicked problems, which the workshops are based on, affect organizations. Consilience's personnel must be familiar with the new knowledge and with providing workshops to professionals instead of students.

The new workshops do not require Consilience to hire new staff with new knowledge and skills as these can be taught to current personnel. That being said, the expansion of Consilience's target audience stimulates the organization's growth, which may require hiring new staff in the future. With hiring these new employees Consilience can focus on candidates with knowledge of and experience with business development and design thinking specific.

The advisory report that resulted from this thesis functions as a manual for the Maker engineers to acquire the required knowledge. The Maker engineers already have knowledge of and experience with design thinking, but should learn from the prototypes that participants make in the new workshops and identify patterns and trends to teach to future participants.

Administrative organization
The current database that is used for keeping track of the materials and equipment can be supplemented with new materials and equipment that may be required for the new workshops.

The information of the new customers (organizations that buy and attend the workshops) must be saved in a customer relationship management system or any other database that can be used to process this information. This is in order to provide the right aftercare and to approach existing customers for new workshops.

Finance
Consilience cannot make profit from the new workshops as they are a non-profit organization. The price for the workshops must be set accordingly. The revenue stream does not change with the implementation of the new services but is simply supplemented with new transactions. The same goes for the cost structure as this is similar to that of currently existing services.

Information
New information consists of information needed to provide the workshops, feedback from participants at the new workshops, and information about these customers as explained in the paragraph on the administrative organization. The required knowledge for the workshops is captured in the advisory report for Consilience. The feedback from organizations can be acquired through a customer satisfaction survey and can be included on Consilience's website.

(Potential) customers provide Consilience with information about their organizational challenge. This information must be kept confidential. Contact information must be saved as explained in the paragraph on the administrative organization.

As Consilience treats all their services as a prototype that can be changed at any moment, the information which the changes to the services are based must be maintained in a document. The workshop on change requires Maker engineers to research emerging signals, technologies, and trends to present during the workshop. This information must be saved in a document for future use.

Legal
The new workshops do not have impact on Consilience's legal organization.

Technology
The new workshops do not have a direct impact on Consilience's technology. That being said, the organization aspires to buy new technologies for prototyping, such as 3D-printers and laser cutters. The expansion of their target audience can make this more easily realizable. Furthermore, the new target audience has a higher appreciation for these technologies making it a higher priority to acquire.

Housing
The new workshops do not have a direct impact on Consilience's housing. That being said, the organization aspires to rent a bigger office as it keeps growing. The expansion of their target audience can make this a higher priority and more easily realizable.

Because the workshops are hosted at the participating organization's venue, the materials and equipment that are needed for the workshop must be transported. Consilience has experience in and the right means for transporting materials and equipment for workshops and summits abroad. These means (boxes to store materials and additional materials for protection) and experience (transporting the materials and equipment with taxi's or airplanes) can be applied to the new services.