



Design Thinking versus Lean Startup: do these methods lead to more creative and customer focused ideas?



Master Thesis

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Abstract

This research is, to the best of my knowledge, the first attempt to examine the behavioural consequences of two popular ideation methods - Design Thinking and Lean Startup - on innovators' ideation outputs. It has been conducted to see whether there is a difference in the level of creativity and customer centricity of innovators trained and asked to ideate according to each of these two *Ideation Methods*. In addition, the study examines whether *Time Pressure* also influences creativity and customer centricity. The research has two components, starting with an online experiment. I implemented a between-subjects design, where the participants were randomly assigned to each of the two ideation methods or to a control group, and were also randomly subject to either high or low time pressure. The 127 ideas that were the result of this experiment were judged by 102 students (as students were the target customer of the original ideation task), allowing an objective and unbiased evaluation of the level of customer centricity and creativity of the innovators' output. The results show that any of the two methods is able to enhance the level of customer centricity of innovators. However, the two methods do not differ from each other in terms of the level of either creativity or customer centricity. Next to that, additional findings show that the level of customer centricity has a positive effect on students' adoption intentions, and both customer centricity and creativity have a positive effect on the prospected business value of innovators' ideas. For further research, a more complete use of the methods and more controlled environment is recommended.

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Preface

In the past year, I have been fortunate to study Marketing at the Erasmus University in Rotterdam. During this year of studying I have met new people, and learned more about every aspect that Marketing has to offer. I do not know what the future holds for me, but I do know that I want to be at the cross lines of innovation and marketing, where strategy plays a vital role.

Over the past years, entrepreneurship has become a subject of interest of me. Start-up is a word that has been mentioned a lot over the last years. People like Steve Jobs, Richard Branson and Mark Zuckerberg are inspiring students all over the world to start their own enterprises. Entrepreneurs are the motors of innovation and start-ups are the companies that launch truly revolutionary products. They are the ones that have no pressure from shareholders, and can develop truly remarkable things. In the light of my enthusiasm for entrepreneurship, innovation and marketing, this research came to be.

I have been fortunate to join in a Lean Start-up Machine event organized in 2012 by the company of Eric Ries. The start-up where I was working back then, thought it a good idea for the younger ones in the company to join the weekend. During the weekend I was able to see many inspirational entrepreneurs and learned a lot about *Customer Development* and *Lean Start-up*.

There has been also much attention to the design theory of Tim Brown in this startup; in his method, published in his book *Change by Design* (2009), he describes that innovations can benefit from designers. Both methods focus on innovation, which is one of the key drivers of economic success and one of my main interests.

This thesis would not have come to be without the help of my thesis supervisor Nuno Camacho, he has been supportive and available in guiding me through this process of writing and researching, for which I am grateful. Next to that, I would like to thank my parents, who have always supported me in my studies and can see my study career come to an end. Finally, I would like to thank my girlfriend Corrinke, who has been supporting me the most, with time, advice and love.

1 - Introduction

Innovation has been the force behind industrial development and the rising standard of living throughout history (Abernathy and Clark, 1984). It does not only function to create a competitive edge, but also gives companies the opportunity to contribute to society as a whole (Tewksbury et al., 1980).

The success of innovations is measured by the way customers adopt to the innovation (Hauser et al., 2006). To innovate successfully, marketing efforts like market research are needed to understand the customers' needs. Next to that, creativity is needed to come up with innovative ways to answer to the needs of customers, in technological, industrial and service landscapes.

In the past years, two methods have been used in order to develop and market innovations. These methods, Lean Startup¹ (LS) and Design Thinking (DT) have triggered a heated debate. The two ideation methods try to stimulate and streamline the process of innovation, but differ in certain aspects. These different aspects will be covered in this thesis in order to come to an understanding on how the ideation methods lead to different results.

LS has been developed by Eric Ries as a proceeding on the work of Stanford lecturer Steve Blank. They are both entrepreneurs and have developed a method on the basis of the Lean Principles that Toyota implemented in its production process (Womack, 2003). This means that they want to reduce waste as much as possible. With respect to innovations these can be defined as time and money.

Tim Brown has developed DT. He has a background in design and has made a connection between design and innovation through his network and consulting business IDEO, which was founded 1991. His theory is building on the ideas that different ways of thinking in the ideation process increase the effectiveness of the ideation method, next to that, it is important to understand the problems that your end-user have (Brown, 2009).

¹ For clarity reasons: LS is a continuum by Eric Ries on the theory developed by Steve Blank: Customer Development. Due to the fact that LS encompasses most of the theory of Steve Blank, and this theory is used more widely across the globe, LS is used as the basis for this thesis.

Both theories incorporate customers in their innovation process, and have different ways on how to iterate during the process. Both methods do not mention when to use the methods and how other factors can play a role in the innovation process.

This thesis is going to contribute to the literature on different aspects. Innovation is one of the aspects that are going to be covered. Since innovation is so important to businesses, it has been extensively researched upon (Hauser et al., 2006). Since organisation of innovation (and product development) has become increasingly difficult, methods and tools are being developed in order to speed up this process (Hauser et al., 2006). The creativity that people need in order to come up with innovative ideas has been widely described. But since LS and DT have been published as methods that try to streamline this process and give tools to ideate, research on what these methods really encompass and enhance has not been conducted. These methods are contributing to how ideation plays a role in marketing and innovation, but lack scientific background.

LS reduces waste by getting speed in the ideation process. It works in a circular way building ideas into minimum viable products (MVP) and measuring how they perform. Next to that, it tries to identify the hypothesis on which the innovations are built, and encourages the user of the method to ‘go out of the building’ in order to test the hypothesis on his customers and learn from them. When hypothesis are rejected, it needs its users to pivot. Most of the data used in LS is quantitative.

DT has a more linear approach. Where the ideation process starts at fully understanding the customer, this is done through qualitative research. Focus groups are used to understand the customer and his needs. During the different steps in the process, the user is encouraged to think divergently in order to generate ideas, but then quickly think convergent, in order to identify ideas to work with. These ideas are prototyped and tested, from which the user can learn what his customer wants.

The methods differ on the aspect on the use of the customer, next to that, the starting point is different for the two theories. Where DT starts with the customer, LS starts with an idea. Both theories try to increase the speed by prototyping or creating a MVP, and learning from them in order to pivot (to change) to a successful innovation as quickly as possible.

Roland Müller and Katja Thoring (2012) have proposed a theoretical framework on the differences between the two business-idea generating methods. They saw that both methods have an overlapping factor and could learn from each other. The article of Müller and Thoring (2012) is the only article trying to comprehend the differences and advantages of the different ideation methods. This research is the first and only step in understanding the differences between the methods, but lacks empirical proof to support their proposed model. This is where there is a gap in the scientific literature that this thesis will try to fill. To do this, an empirical experiment will be conducted to see how the different methods generate different results and how they can be used. Next to that, established theories are used and other factors that come into play will be incorporated, to rule out different factors that influence the ideation and innovation process. It will add quantifiable data to the literature, to see whether corporations or entrepreneurs should use a certain way of ideation for generating new business opportunities.

Both LS and DT have been widely spread under entrepreneurs worldwide. Many incubators have used the network of IDEO of Tim Brown and the ideas of Steve Blank and Eric Ries. Companies like Rocket Internet have been known to use the method of Lean Startup in order to generate new successful innovations.

In order to help entrepreneurs and corporations in their ideation process, this research will provide them with an empirical understanding how the ideation methods can lead to different results. As Tim Brown told in a Google Hangout of Google for Entrepreneurs on July 17th of 2014², the combination of the theories usually leads to vague ideation processes and makes entrepreneurs ambiguous in their idea choice. This thesis will try to give them guidance on how the theories can be used best and give managerial implications that will be supported by the research that has been conducted.

The goal of this thesis is to assess the differences between the ideation methods, and how this causes the methods to lead to different results. These results can be different on the level of creativity, speed and feasibility, but also on who used the theory and in what kind of circumstance it is used. There are differences between

² https://www.youtube.com/watch?v=bvFnHzU4_W8

the two methods that will have an impact on the different ways people use and can use the theories. This leads us to the following research question:

Lean Startup versus Design Thinking: which theory leads to more creativity and customer centric innovations? How does time pressure have an effect on this?

2 - Background and Theory

Business has always been about adding value to products or services (Vargo and Lusch, 2004). According to Kotler and Keller (2006), marketing is everything that encompasses the delivering of value to the customer. Innovations are one of the biggest factors that give companies the opportunity to deliver new values over time. Amabile (1996) defines innovations as the successful delivery of creative ideas. Delivering more value through new innovations generates a competitive advantage that is needed to exist in the market. That makes creativity the basis of innovations (Amabile, 1996; 2002a). In this chapter theory of creativity, idea generation and innovation will be linked to DT and LS, in order to have a solid background and to be able to address further research.

Background Lean Startup and Design Thinking

In order to assess the differences between Lean Startup and Design Thinking, we should assess the differences between the two theories. They have different starting points, different processes and use the customers in their process differently. There are a lot of similarities to be found between the two, but the focus lies on the differences.

2.1. Lean Startup

LS is a process in which innovation is steered in a way that it reduces waste as much as possible. Building on the lean principles that were first implemented at Toyota, describing how a company should be redesigned (Womack, 2003; Melton, 2005). In this process, the goal is to aim for perfection as quickly as possible and as scalable as possible (Melton, 2005). This is also the goal of LS.

LS uses an iterative process consisting out of three different parts, First, LS starts with an idea or vision of an entrepreneur or manager. The basis of LS is that

every innovative idea is based on hypotheses on whether customers need a particular innovation. These hypotheses are to be tested on potential customers (*Customer Development; the theory which was coined by Steve Blank*). If the hypotheses are not supported, a *pivot* (change of the idea) is needed.

The second part is to quickly build this idea into a product. This should be a *minimum viable product* (MVP) in order to get customer feedback, and to get it produced as quickly as possible based on the lean principles. One of the quotes used many times on LS is: “if you are not embarrassed by the first version of your product, you’ve launched too late”³.

The final part is data, the customer feedback that has to be gathered and ‘*getting out of the building*’ is stimulated to meet the potential target customer. After it has been gathered it is measured and from this feedback the innovators using LS learn what should be changed about the product or idea. After that, the product is changed and the process starts at the beginning again, thus generating a circle in which a constant innovation process takes place. (Blank, 2013).

Summing up: the starting point of LS is one vision or idea, which is built and changed over time on the basis of testing the hypotheses on (future) customers, whom are constantly involved in the process of building and developing innovations. The data that is gathered from the customers is typically quantitative (Ries, 2009).

2.2. Design Thinking

The DT process also consists out of 3 phases. In contrast with LS, this is a linear process, with one innovation as a goal, but also moving back and forth between the different stages (Brown, 2009). The first part is to *understand* the customer and his or her needs. To build knowledge, focus groups and other qualitative methods are used in order to observe the needs of customers and creating empathy for these needs. From the needs observed, a decision is to be made on which needs to focus, defining the direction of the innovation. On the basis of this definition, part two is *create*, generating ideas on how to solve the problems or fill the needs that have been identified. The last part (3) is *deliver*, in this phase, the ideas are prototyped and

³ This is a quote of Reid Hoffman, founder of LinkedIn, who has been an advisor to Eric Ries.

tested, after that, marketing and launching of the final product or innovation takes place (Brown, 2009).

One of the key features of DT is the focus on *divergent* and *convergent* thinking (Brown, 2009; p 67). In contrast to LS, where the focus is testing self-developed hypotheses, DT tries to encourage creating choices in early stages of the process. (Brown, 2009). Within divergent thinking, creativity is needed in order to come up with different ideas (McCrae, 1987; Silvia et al., 2008). Over half a decade of research has been conducted whether divergent thinking is more creative (Guilford, 1967, Runco, 2007, Silvia et al., 2008). A definite conclusion is not given. However, during the process this divergent thinking step takes place in groups. This may have a negative impact on the number and quality of ideas that are being generated (West, 1990; Paulus and Yang, 2000; Nijstad and De Dreu, 2002).

Subject	Lean Startup	Design Thinking
<i>Goal</i>	<i>Innovation</i>	<i>Innovation</i>
<i>Starting point</i>	<i>Vision/Idea of entrepreneur</i>	<i>Customers' needs and problems</i>
<i>Customers</i>	<i>Used to tailor the idea, on the basis of needs</i>	<i>Used to identify needs and problems to solve</i>
<i>Data</i>	<i>Quantitative; Testing hypothesis and getting knowledge on the product</i>	<i>Qualitative; describe needs/problems and gather feedback on prototype</i>
<i>Iterations</i>	<i>Yes, on the basis of the tested hypotheses "pivot"</i>	<i>Yes, constantly move back and forth on the line to improve the product</i>

Table 1: Lean Startup and Design Thinking

2.3. Creativity and Ideation

All innovations begin with creative ideas (Amabile et al., 1996). Therefore we need to address the history of idea generation itself and how this has influenced the process of innovations over time. In order to be innovative, companies must generate

creative ideas, dismiss the ones that appear useless, and choose the ones that have promise (Amabile et al., 1996)

Amabile (1988) has developed different factors that play a role in how innovative a company can eventually be. All of these factors are influencing the environment in which the teams or individuals work and are being creative, thus generating ideas. Next to that, of course the personal traits of the people or teams that are innovating have a huge impact on how creative the ideas are which they propose (Woodman et al., 1993).

Organizational encouragement is the creativity factor that is broadly described. It is seen as one of the main factors that influence how creative employees can be (Amabile, 1996). When employees are given a license to be free in their creative ideas, those ideas will be more unusual and useful (Parnes, 1964).

Next to that, employees need *supervisory encouragement* (Amabile, 1993; Bailyn, 1985; Kimberley 1981). This means that not only the organisation is giving them the freedom to come up with ideas, their management should be aligned with this idea and encourage them to develop new ideas (Amabile, 1996).

Lastly, *Work group encouragement* is a factor defined by Amabile (1996) as being one of the big factors that plays a role in the creativeness of people within a company.

The above study of Amabile has shown that the environment is very important to employees in order to be creative and generate creative ideas and innovations. Another factor that Woodward et al., (1993) have been talking about is the personal traits that people need in order to be creative. Amabile (1979) has done a study that looks for different motivations that cause different levels of creativity. People can be internally and externally motivated, and Amabile assumed that external motivations would lower the level of creativity. It actually was the basis for exactly the opposite; people who are rewarded for creative behaviour will have a higher creativity level than people who are not rewarded (Amabile, 1979).

In order to generate ideas within companies for innovations, many times brainstorm sessions are being held to come up with ideas (Kudrowitz and Wallace, 2013). Judging ideas has been extensively researched upon to generate metrics that give an indication on how good ideas are and which ideas should be brought into

practice (Dean et al., 2006; Kudrowitz and Wallace, 2013; Girotra et al., 2010; Terwiesch and Ulrich, 2008). Next to that, Girotra et al (2007) fear that many studies define the success of brainstorming sessions by the number of ideas that is produced, not being focused on the quality of those ideas. Especially IDEO (DT) stimulates creating as many ideas as possible by *covering virtually every surface in the room with ideas, generating 100 ideas per hour during a brainstorming session* (Kelly, 2001).

2.4. Customer Centricity

Customer Centricity has become a very dominant focus from marketers over the years. Levitt (1960) developed the theory that firms should not focus on selling products but on solving customer needs. Thus being more externally focused in contrast with the internal product focus. This is closely related to the *get out of the building* concept of LS, where innovators are encouraged to test their hypotheses outside their own peers, but on the customer they are looking for (Ries, 2011).

In the last decade, concepts as Service Dominant Logic (Vargo and Lusch, 2004), customer-led organisations (Christensen and Bower, 1996; Slater and Narver, 1998) and market orientation (Kohli and Jaworski, 1990; Narver and Slater, 1990) have been developed in order to get an understanding why companies perform better when they incorporate a customer centric approach in their marketing and innovation process.

Companies need to change in order to make a more customer centric approach possible (Shah et al., 2006). The focus of managers should be changed, in order to revise metrics and incorporate continuous learning (which is very closely related to the continuous improvement that LS tries to promote) within the company. Customer centricity has been shown to enhance company success by generating more loyal customers and superior financial performance, due to the fact that it creates a sustainable competitive advantage that is hard to counter by the competition (Shah et al., 2006).

2.5. Time-Pressure influencing creativity

Companies are continuously looking for new ideas in order to create a competitive advantage. Within the innovation process, another important factor comes

into play, which is time (Amabile et al., 1996; Baer and Oldham, 2006). Time is scarce, creating Time Pressure for the people that are generating new innovative ideas (Amabile et al., 1996; Amabile et al., 2002a, 2002b).

Time Pressure may enhance creative thinking of people (Amabile et al., 1996; Amabile et al., 2002a, 2002b; Baer and Oldham, 2006). But this is not always the case. When people are on a mission and time-pressure is high, they tend to be more creative. But also people who are more on an exploration, tend to be more creative, although time-pressure is low. On the other hand, people who are on autopilot, tend to be less creative, where time-pressure is low. And people who are in a constant stress of extreme time-pressure tend to be less creative (Amabile et al., 2002a, 2002b). Thus it is highly dependant on the context whether time-pressure is an enhancement or constraint of creativity.

3 - Conceptual Framework and Hypotheses

3.1. Conceptual Framework

Due to a lack of research that has been done on the two ideation theories, their influence on the innovation process is assessed in order to come to conclusions how DT or LS differ. Our main research question is: which theory leads to more creative and customer centric ideas? Although there are numerous variables that are moderating this, like time pressure and teaming diversity. In order to keep this thesis on a workable scale, I incorporate time pressure in the experiment. However, due to scope difficulties, more variables that could be added have not been added, also because of the fact that this thesis is the first assessing the ideas that have been developed by the two ideation methods.

As a basis, the following conceptual framework can be used in order to answer the main research questions:

How do Lean Startup and Design Thinking differ on the level of creativity?

How do Lean Startup and Design Thinking differ on customer centricity?

How does Time Pressure influence the level of creativity and CC?

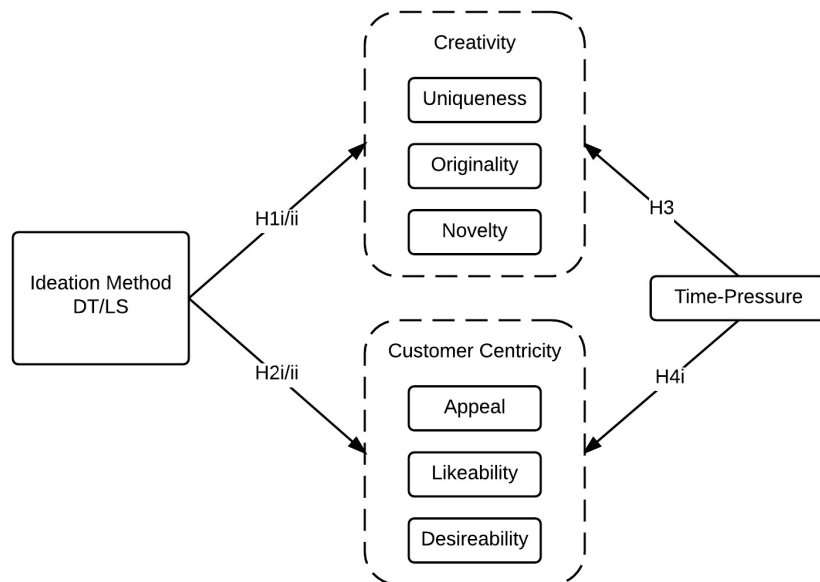


Figure 1: Conceptual Model

3.2. Hypotheses Development

As Lagrosen (2005) has stated, customer involvement is needed in order to come up with successful innovations. This means that customer involvement during the process of innovation is wanted. The use of formal methods like found in the proposed framework by Nijssen and Lieshout (1995), has shown that profitability increases when companies use formal ideas to involve customers in the innovation process. Customers can be involved in different stages of the innovation process. This can differ from the initial idea generation, as used in the process of DT, or during the process in order to come to a more optimal proposition, as used in the process of LS and DT. Because of the fact that many entrepreneurs have a vision, the use of customers to tailor their products or ideas to the needs of those customers is used to come to an optimal execution of their vision. This motivation is usually increasing their level of creativity (Amabile, 1997), due to the fact that they have a high level of intrinsic motivation that is giving them the feeling of autonomy and enhances the level of creativity. Entrepreneurs have been often linked to creativity, and are in the literature viewed as practical innovators (Amabile, 1996, 1997).

On the contrary, DT starts with the customer and focuses on the problems these customers have. This is more a customer-led approach that limits the level of creativity and develops less valuable businesses. (Jaworski and Kohli, 1993; Narver and Slater, 1990). Also, the focus on generating as many ideas as possible, which is used in the DT method, does not enhance the level of creativity (Girotra et al., 2007). Building on this, we have developed the following hypotheses on how LS and DT differ on creativity:

H1i: Lean Startup leads to more creative ideas than Design Thinking.

Both theories focus on customers and propose a structure or process in which innovations are sought after. Although chaos can sometimes enhance creativity (Richards, 2001), it is often better to create a predetermined framework in which creativity is encouraged and guided (Amabile, 1996; Richards, 2001). Also, structuring the 'fuzzy front end' which is often the initial idea generation stage in the innovation process is something that enhances both creativity and profitability (Kim and Wilemon, 2002; Ried and De Brentani, 2004). Next to that, frameworks as such encourage creativity, as they try to tap into resources and areas users of the

frameworks would normally not tap into, (Blank, 2013). As Ward (2004) states that combining different concepts is creating more novel and creative ideas by which entrepreneurs fare well. Both LS and DT encourage learning from both the customer and other fields of expertise (Brown, 2009). This leads us to the following hypothesis:

H1ii: Lean Startup and Design Thinking lead to more creativity than no ideation method.

As stated before, one of the main differences between LS and DT is the starting point. Due to the fact that the customer is the starting point within DT, we can assume that the ideas that are a result of the focus groups with these customers are very customer centric. Addressing the needs that customers have in that very moment, instead of a vision of what is needed in the future that is typical for users of LS. Also the focus on problems, which is used in DT, is something that generates solutions that are very close to the customer. Thus we have developed the following hypotheses regarding customer centricity in the ideation methods:

H2i: Design Thinking leads to more customer centricity than Lean Startup.

One of the main aspects both ideation methods focus on is the customer involvement during the innovation process. These can cause a customer centricity of the products that is not within reach when the customers are not tapped into during the innovation process. The focus on the customer has shown to be more profitable and has become a focus of many companies over the past decades (Shah et al., 2006; Von Hippel, 2005; Lillien et al., 2002). Both ideation methods heavily use the customer in the innovation process to be close to the needs of the customer or tailor their product to the needs of the customer, making use of feedback loops. These feedback loops are there to let the users pivot from their initial idea to get as close to the customer as they can be.

When people are asked to generate new ideas, the customer is not always the main focus, and thus the marketing of the product becomes difficult and often these products fail (Von Hippel, 2005). Therefore the focus of both the methods on the customer in the innovation process encourages thinking customer centric, thus we assume that the ideation methods lead to more customer centric ideas than ideas that are generated without the ideation methods.

H2ii, Lean Startup and Design Thinking lead to more customer centric ideas.

Building on the work of Amabile et al., (1996; 1998; 2002a; 2002b) we can denote Time Pressure as one of the key influencers of creativity. Amabile has used the metaphor that creativity is as a maze, in which time is needed to come to the best ideas (Amabile, 2002b), thus when there would not be enough time available, the ideas tend to be less creative (Amabile, 2002b). Also results from other studies show that time pressure have an impact on the solution focus that we have (Edland and Svenson, 1993). However, also contrary results have been found that Time Pressure may actually increase the level of creativity (Baer and Oldham, 2006). This is due to context, in which people who are generating ideas under Time Pressure and are extrinsically motivated, tend to be more creative than people who are intrinsically motivated. Thus, people who have a need from an external source to come up with creative ideas, tend to be more creative under Time Pressure than people who do not. Next to that, creativity tends to be subject to an inverted U-shape over time, meaning that very high Time-Pressure has a positive effect on creativity. (Baer and Oldham, 2006). Thus, Time Pressure can have a positive and negative effect on the level of creativity. However, since people in DT and LS tend to be more intrinsically motivated, it is hypothesized that Time Pressure has a negative effect on the level of creativity of the participants.

H3i: Time Pressure has a negative effect on participants' level of creativity.

Since Levitt (1960) and the continuum of Narver and Slater (1990) have talked about market orientation, marketing activities have been focused on more than the product. Customer needs and wants should be identified. However, customer centricity goes a step further, and should be able to translate those needs into customer centric solutions (Hauser et al., 1996). It encompasses to focus everything in the product on what a customer needs and wants (Shah et al., 2006).

This process of identifying needs, which is done in both LS and DT, requires time. As Shah et al., (2006) have identified, time spent with the customer is one of the main aspects of transitioning a current product-centric company into a customer-centric company. Not taking enough time to listen to the customer will develop less customer-centricity and therefore will increase the failing and decrease the profitability of the developed product (Brown, 2009; Shah et al., 2006; Vargo and Lusch, 2004). To be as close to the customer as possible, companies should focus on their customers at an individual level (Shah et al., 2006). This creates the need for

time as being one of the important factors that have an impact on the level of customer centricity. Therefore the following hypothesis has been developed:

H4: Time Pressure has a negative effect on the level of Customer Centricity.

4 - Experimental Design

To compare the two ideation methods, I conducted an experiment in which people were asked to generate ideas to improve students' lives. Participants were randomly assigned to use one of the two ideation methods, or no method at all, which would be the control group. The people that were participating were not pre-selected. This has been done because the ideation methods do not focus on a particular set of people. To generalize the findings into reality, this has been copied. The experiment was conducted online. I have tried to manipulate the participants in 6 different ways.

I used a between-subjects design, i.e., the participants were divided into 6 groups: *(2 ideation methods + 1 control group) * 2 Time Pressure levels*. I was aiming for a minimum of 20 participants per cell (so $N > 120$), but ideally 30 participants per cell (so $N > 180$), to ensure sufficient statistical power. I do understand that creativity is also highly dependent on the person participating (Amabile et al., 1998), but by having a bigger number of people per cell, I have tried to compensate for this problem.

The ideas that people had to generate were aiming at student lives. Participants were asked to come up with ideas to improve student lives. Please refer to Appendix I for a detailed look at the instructions. This was done because the ideas had to be judged by students and this specific group was in our reach of asking to rate the ideas. An extra effort has been done to get as many not-students participating as possible, to find out whether the manipulations create more customer centric ideas by people who are not part of the target group.

After the ideas have been gathered, a survey has been sent out in order to let students judge the ideas on their creativity and customer centricity. I was aiming for around 10 ratings per idea.

4.1. Independent Variables Manipulation

Lean Startup: In order to manipulate participants to use, as their ideation strategy, the Lean Startup (LS) philosophy, subjects in the LS conditions had to first see a video⁴ that explained, in 106 seconds, the LS method and how it should be used for ideation. This kind of manipulation has been shown to work in earlier experiments

⁴ https://www.youtube.com/watch?v=_a3s0IXSuxY

like the famed Facebook experiment (Kramer et al., 2014). This video was found on YouTube, and was to the point but covered everything people should know about LS. The people that were in this manipulation were instructed as follows:

You have now seen a video about Lean Startup. Hopefully you have understood that it is an innovation method that has been used all around the world to come up with ideas that are close to customer's needs, and developed quickly. Normally it makes use of customer feedback, but you are not asked to do that.

Try to think of something that can improve a students' life. This can be an app or website that helps them in a certain way. This may be study related, but also may focus on their private or social life. You can also choose to come up with an idea for a specific group of students (e.g. business students, female students etc.). You have 3 minutes to come up with an idea. In your idea, think of whom you are helping, what do they need, and how you are filling that need.

Note that in this instruction, the participants are instructed to think of a website or app, trying to getting them to think from a given solution. Next to that, there is a focus on student needs.

On the page where participants had to submit their ideas, a picture was shown of a website to get them thinking from an intended solution as much as possible. On the submitting page the participants were asked to fill in three things: (1) what kind of student are you going to help?, (2) what is the need of such students?, and (3) what is your idea?. The three parts were aiming at (1) letting people focus on a specific target group and focus even more on the students, (2) getting people to look for unmet needs that these people have and (3) what the solution or idea is that they have to solve this need.

Design Thinking: DT was also manipulated by starting with a video⁵, of 114 seconds, that explained how the method worked and what it encompasses. It was similar to the video on LS with respect to what it addressed and how it explained the method and the tone of voice. The participants were instructed as follows:

You have now seen a video about Design Thinking. Hopefully you have understood that it is an innovation method that has been used all around the world to solve small and big problems.

Please try to think of problems that can be solved. Think of trends that can be used to come up with solutions to problems that may be encountered. Maybe you can even come up with some ideas how to prototype your solution. You can tailor your solution to a specific target group. You are free in what you want to develop and what your solution is (this can be for instance a website or an application). In your solution, think of what is really needed and which problems you really solve.

⁵ <https://www.youtube.com/watch?v=a7sEoEvT8I8>

As you can see, this instruction differs on the focus on apps or websites, next to that, it focuses on solutions, a target group and problems that need to be solved. This was supported on the submitting page the participants were asked to fill in (1) what kind of student are you going to help?, (2) what problem do they encounter?, and (3) what is your solution?. This differs from the submitting page of LS, on question 2 and 3, to get people to think from problems and generating solutions from these problems.

Control group: People that were not using a method were not shown a video. They were only shown the following instruction:

Try to think of something that can improve the life of a student. This can be anything you want. The idea may be study related, but also may focus on their private or social life. You can also choose to come up with an idea for a specific group of students (e.g. business students, female students etc.). You have 3 minutes to come up with an idea. In your idea, think of whom you are helping, what do they need, and how you are filling that need?

On the submitting page, they were asked, to also submit 3 questions: (1) what kind of student are you going to help?, (2) what problem do they encounter?, and (3) what is your idea? Where the second question is the DT question and the third question is from the LS manipulation, thus combining the questions from the two manipulations before.

Time Pressure: TP was manipulated by showing a countdown timer when TP was high, giving participants 180 seconds to come up with an idea. Participants that were in the Non TP groups, were not shown a timer at all and had unlimited time. This technique has been used in other experiments like (Dhar and Nowlis, 1999; Svenson and Benson, 1993). Next to that, the people were instructed that they had 3 minutes, or time was not mentioned. The timer was set on 180 seconds, which people found very short. After this timer was at 0 the page would turn red. Please refer to Appendix I for the full overview of the manipulation of the participants.

4.2. Manipulation Checks

After the participants had completed their task of filling in an idea. A set of 12 questions was asked on how the people approached this task. These questions were aimed at finding out whether the participants were thinking from a certain perspective; from student needs, to problems students may encounter. They were also

asked whether the participant decomposed the task into different sections, which is typical for the methods. All these questions were asked on a 5-point scale, ranging from: strongly disagree, to strongly agree. The questions that were asked in the manipulation check can be found in Appendix II.

All questions have been asked to test whether people thought from different perspectives. For example: Q1-Q3 mainly focus on needs/problems and so do the questions Q7-Q9. Together they can be combined in a *Need Focus* variable that is used to do the manipulation check. On the other side, Q4-Q6 and Q10-Q12 were mainly asked with regards to solutions. When the answers are aggregated, the manipulation check variable *Solution Focus* can be computed.

Next to the manipulation check, participants were asked whether they found the task they just completed difficult, complex and effortful. These questions have been asked as a measure of task complexity, which were based on constructs that were earlier used in research conducted by Robinson (2001). Also general demographics like age, how long (ago) participants were students themselves, educational level, income and area of expertise. Please refer to Appendix II for the Manipulation checks.

4.3. Dependent Variables

In the second survey that was sent out to rate the ideas that were submitted, only students could participate. Because we are testing the potential customer of the ideas we focused on only students as judges of the ideas. That gives us the opportunity to test whether the students think the ideas are *creative* to them and whether they think they are close to what they would like (*customer centric*). This is similar to the design that was used in the research conducted by Dahl et al., (1999). To make sure only students would participate, the first question of the survey was whether the participant was a student or not. If they answered negatively, the survey would end immediately. For practicality reasons, the 127 ideas that were submitted were divided into 8 blocks of 14 ideas and 1 block of 15 ideas. Participants in this survey would only see 1 block, to prevent a high dropout rate due to a long list. All students were asked to rate every idea on a 7-point bi-polar scale.

In total, 124 people participated in the survey, of which 22 were not students, resulting in a total of 102 judges for the ideas. Every idea has been rated for an

average of 11 times, ranging from a minimum of 9 and a maximum of 14 times. For all the ideas, all judges were presented with the same items they could rate the ideas on.

Creativity: Creativity was rated on a 3 different items, which are based on the work by Dahl et al., (1999). The 3 items that were asked are: *Uniqueness* “Ordinary” (1) to “Unique” (7), *Originality* “Original (1) to “Commonplace” (7) and *Novelty* “Novel” (1) to “Standard” (7). The first of these questions has been flipped on purpose, to increase the reliability of the answers that are given.

Customer Centricity: Customer centricity was also asked based on the work by Dahl et al., (1999), who were assessing the customer appeal. The 3 items are: *Appeal* “Appealing” (1) to “Unappealing” (7), *Likeability* “Not Likeable” (1) to “Likeable” (7) and *Desirability* “Undesirable” (1) to “Desirable” (7). Also one of these questions was flipped, to increase reliability.

Next to those two dependent variables, *adoption intent* and *business value* were asked based on the work by Luo and Toubia (2013). Adoption intent was measured on a 7-point scale, from “Would use if available” (1) to “Would not use if available” (7). Business value was measured on a 10-point scale, where the judges were asked to answer whether, taking in mind the *novelty*, *technical feasibility* and *potential market demand*, this idea would be worth “Nothing” (1) to “A lot” (10). This is explicitly not mentioned in euros to the owner of the idea, because that would make answering this question a lot harder for the participants. For the full overview, please refer to Appendix III.

5 - Results

5.1. Experiment

In the experiment, 134 people participated. However, 4 people did not finish the experiment. Another 3 did not fill in an idea, and were removed from the data set, to come to a total of 127 ideas. Please note that this comes close to our bare minimum sample size, given our initial “rule-of-thumb” estimate of the sample size needed for comfortable sample size (i.e., a bare minimum of $N > 120$, but ideally $N > 180$). Given this small sample size, to avoid the risk of committing type-II errors in my statistical inferences, I will consider a 10% level as the cut-off for statistical significance⁶. From the 127 ideas, many similarities can be found, whereas people tend to think international students need a website for housing, and students need cheap food and planning aids. Those ideas were all kept in the sample. Of the 127 people who participated, 42 were randomly assigned to the DT manipulation, 38 to the LS manipulation, and 47 to the control group (CG). Next to that, 70 were randomly assigned in a high TP manipulation and 57 were randomly assigned to a low TP manipulation.

	DT	LS	CG
Low TP	19	17	21
High TP	23	21	26

Table 2: Manipulation Distribution

Of those 127 people, 81 were students and 46 were not students. For more demographics, please refer to Appendix IV.

5.2. Manipulation Checks

The manipulation check focused on whether the participants were solution (and thus problem solving) focused and need focused. To test whether this was the case, a one-way ANOVA with Post Hoc has been conducted.

⁶ Please note that both economic and statistical significant will be held in mind. Discussions have risen under econometricians that many economists misuse statistics because they do not look at the practical implications the statistically significant differences have. In this study, both will be looked at and when relevant will be addressed. (Engsted, 2009)

As one would not expect, participants in the DT group (N=42; M=3.23) and the control group (N=47; M=3.62), exhibit a higher level of *need focus* than participants in the LS group (N=38; M=2.94). These differences were, in general, statistically significant at the 10% level ($F_{2,124} = 3.69, p=.028$). I also conducted post-hoc tests to compare the level of need focus between the different groups. Participants in the LS condition had a statistically significant lower level of *need focus* than participants in the control group (which had, on average, a level of *need focus* that is .324 higher than those in the LS group; 90% CI [.06;.59]; $p = .036$), and also than participants in the DT group (which had, on average, level of *need focus* that is .296 higher than those in the LS group; 90% CI [.021; .57]; $p = .070$; which is statistically significant at the 10% level. There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p=.62$). Please refer to Appendix II for full output tables.

In terms of *solution focus*, the situation is more promising. In line with my expectations, participants in the DT group exhibited a higher level of *solution focus* (N=42; $3.14 \pm .51$) than participants in the LS group (N=38; $2.78 \pm .59$), while the control group had a level of *solution focus* in between these two extremes (N=47; $3.09 \pm .65$). Moreover, these differences are again statistically significant at a 10% level ($F_{2,124} = 4.25, p=.016$). There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p=.23$).

Hence, from the above, we can conclude that the manipulation made people in the LS manipulation the least *solution focus*, and people in the DT manipulation the most solution focused, so they tried to understand problems students could have, and tried to think of solutions that would overcome these problems.

Next to that, people in the control group focused more on the needs than people in the LS manipulation. People in the DT group focused as much on needs as the control group.

Thus, the manipulation failed to make people in the LS manipulation focus on the needs students have. It succeeded in making people try to understand the needs of students before thinking of a solution in the DT manipulation. Not to confuse with the starting point of LS, where people are taking the solution as a starting point. In the DT method, people are problem focused, and thus need to focus on a solution that they

can give. People in the LS manipulation should be thinking from the solution (a website or app) as it was mentioned in the instruction.

Because the manipulation of LS failed, conclusions can only be made with this restriction in mind. The failing of the manipulation can have multiple explanations, which will be addressed in the limitations section. Due to the fact that the DT manipulation did work, the results are still valid, but less reliable.

5.3. Hypotheses Testing

For the ideas, a total of 1438 ratings from 102 student judges were gathered, which means that each idea was evaluated by a minimum of 9 and a maximum of 14 judges. The ratings per different item per idea were averaged, meaning that there were 127 ideas left with an average scores per the 8 items that were asked. These scores will be used in the analysis of the hypotheses.

	LS (N=38)	DT (N=42)	CG (N=47)
Uniqueness (U)	M=4.24; SD=1.01	M=4.08; SD=0.84	M=4.23; SD=1.02
Originality (O)	M=4.18; SD=0.91	M=4.14; SD=0.79	M=4.12; SD=0.90
Novelty (N)	M=4.16; SD=0.86	M=4.05; SD=0.64	M=4.07; SD=0.85
Appeal (A)	M=5.03; SD=0.80	M=5.17; SD=0.55	M=4.74; SD=0.73
Likeability (L)	M=4.98; SD=0.78	M=5.20; SD=0.59	M=4.70; SD=0.63
Desirability (D)	M=4.95; SD=0.85	M=5.11; SD=0.56	M=4.60; SD=0.70
Adoption Intent (AI)	M=4.78; SD=1.06	M=4.92; SD=0.84	M=4.41; SD=0.93
Business Value (BV)	M=5.71; SD=1.10	M=6.18; SD=0.95	M=5.48; SD=1.14
Creativity (U+O+N)	M=4.20; SD=0.91	M=4.08; SD=0.73	M=4.14; SD=0.90
Customer Centricity (A+L+D)	M=4.99; SD=0.78	M=5.16; SD=0.53	M=4.68; SD=0.64

Table 3: Scores per item per group

H1i: Lean Startup leads to more creative ideas than Design Thinking. To test this hypothesis, multiple Independent Samples T-Tests have been conducted. First a T-Test has been conducted to look at the different items *Uniqueness*, *Originality* and *Novelty* separately. There were no outliers found and equal variances have been assumed. There were no significant differences to be found in the three items (all p -values > 0.10). Please refer to Table 3 for the different means. However, we do see that people in the Lean Startup manipulation (M=4.20; SD=0.91) have been a little more creative than people in the Design Thinking Manipulation (M=4.08;SD=0.73). Nonetheless, since the difference was not found to be significant ($p=.53$) this hypothesis is not supported.

H1ii: Lean Startup and Design Thinking lead to more creative ideas than no ideation method. To test this hypothesis, another Independent Samples T-Test has been conducted. Again, the differences between the 3 items were tested prior to the test on the creativity. These differences did also not show any significance. Participants in the control group (M=4.14;SD=0.90) were slightly more creative than in the LS+DT group (M=4.13; SD=0.82). However, this difference was also not significant ($p=0,97$) and the hypothesis is not supported.

H2i: Design Thinking leads to more customer centricity than Lean Startup. To test this hypothesis, an Independent Samples T-Test has been conducted. First the three items *Appeal*, *Likeability* and *Desirability* were tested. Please refer to table 3 for the general overview. On all the different items, Design Thinking tends to have a slightly higher mean. These differences were not significant (all p -values > 0.10). There were no outliers found and equal variances have been assumed. Looking at the customer centric level as a whole, participants in the Design Thinking manipulation (M=5.16; SD=0.53) were more customer centric than in in the Lean Startup manipulation (M=4.99; SD=0.78) with a p -value of .248. Therefore, the hypothesis is not supported.

H2ii: Lean Startup and Design Thinking lead to more customer centric ideas. To test this hypothesis, another Independent Samples T-Test has been conducted. It was first conducted for the three different items. The differences between all the items were found to be significant: *Appeal* ($p=0.005$), *Likeability* ($p=0.002$) and *Desirability* ($p=0.001$). There were no outliers and equal variances have been assumed. When we look at customer centricity people in the control group (M=4.68;

SD=0.64) were significantly less customer centric than people that were using the ideation methods Design Thinking and Lean Startup (M=5.08; SD=0.66). This difference is significant at a p -value of .001. This hypothesis is thus supported.

H3: Time Pressure has a negative effect on the level of creativity. To test this hypothesis, a linear regression was run. This showed that there was no significant influence of Time Pressure on creativity. However, when we group the people into 4 groups on how much time they spent on ideating, we see the following figure, which looks strikingly similar to the inverted-U that has been proposed by Amabile (1996) and Baer and Oldham (2006):

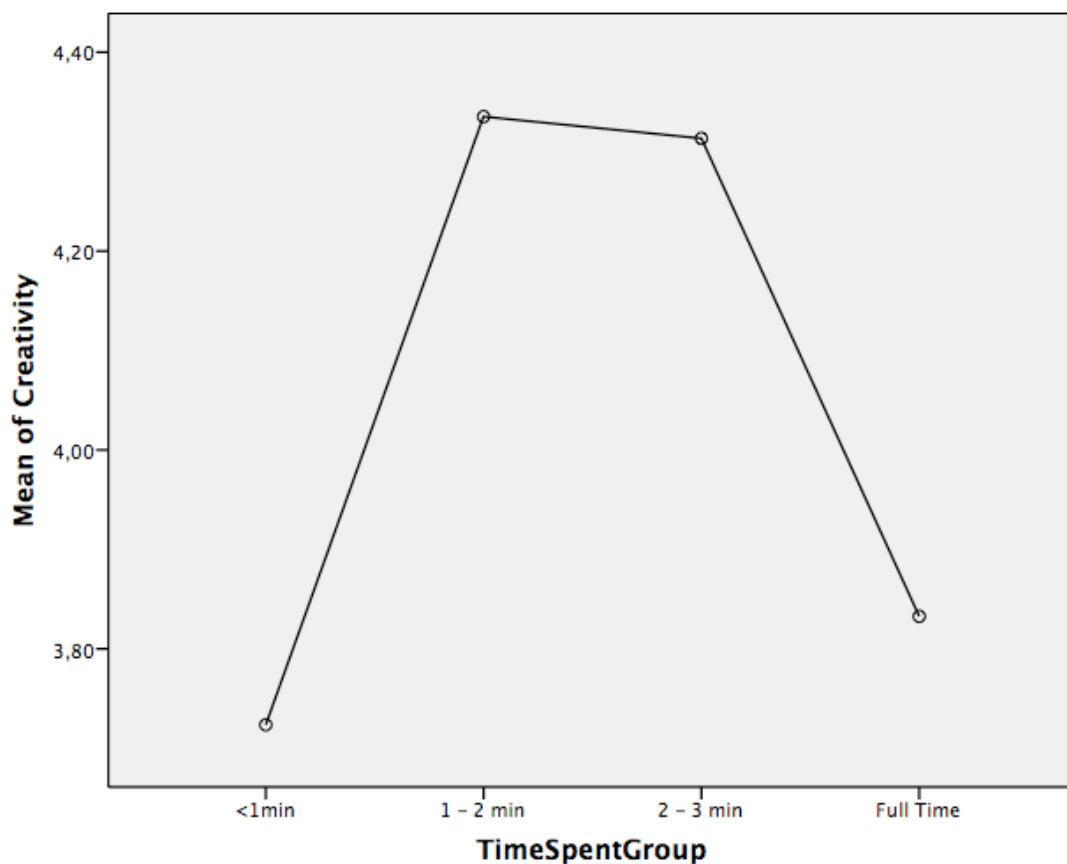


Figure 2: Level of creativity against the time spent

H4: Time Pressure has a negative effect on customer centricity. To test this hypothesis, a linear regression was run. This regression showed that Time Pressure negatively influenced the level of customer centricity, but this was at a non-significant level ($p=.419$).

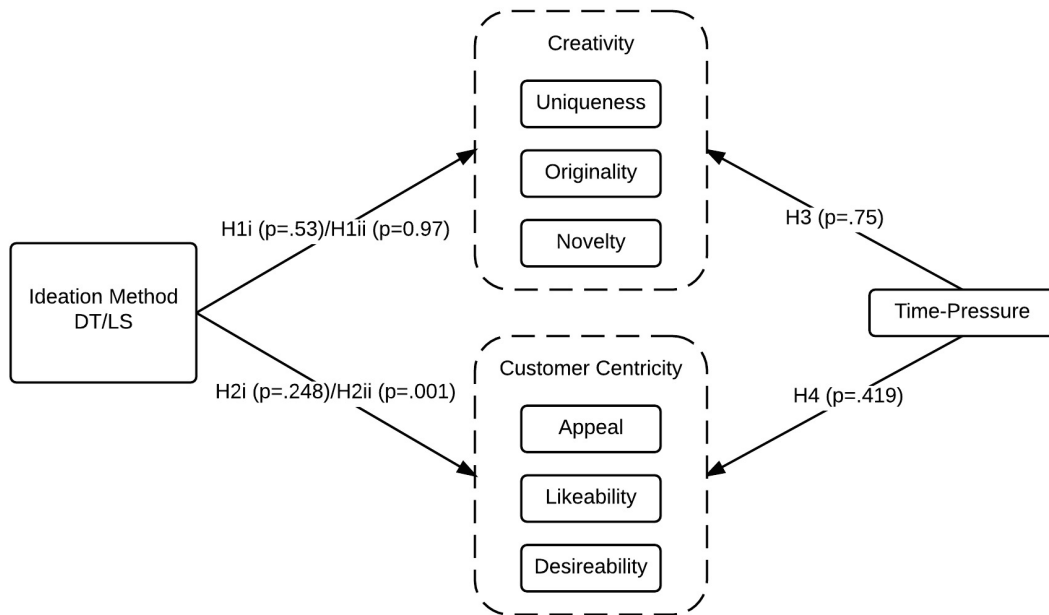


Figure 3: Conceptual Model with significance levels

5.4. Additional analysis

Adoption Intent (AI): People could rate ideas whether they would use the product/service when it would be available. A One-Way ANOVA was conducted to determine whether there is a difference in AI between the different methods. There was homogeneity of variances, as assessed by Levene's test for equality of variances ($p=0.431$). There were no outliers. The AI ($M=4.69$; $SD=0.96$) differs significantly between Lean Startup and Design Thinking ($F=3.476$; $p=0.034$) and the control group. A Tukey Post-Hoc test revealed that the AI in the Lean Startup manipulation ($M=4.78$; $SD=1.06$) is lower than in the Design Thinking manipulation ($M=4.92$; $SD=0.84$; $p=.169$). There was a significant difference found with regards to the control group ($M=4.41$; $SD=0.93$) and the Design Thinking manipulation ($p=.033$). See figure 4 for an overview of the different means of Adoption Intent. A linear regression revealed that the difference in Adoption Intent is highly predicted by the level of Customer Centricity. In the linear regression, Creativity, Customer Centricity and the dummy variables of the ideation methods were included ($F_{4,122}=58.170$, $p<0.005$ with $R^2=.656$). Resulting in the following regression equation:

$$AI = -0.724 - 0.055Creativity + 1.145CC + 0.027LS - 0.043DT$$

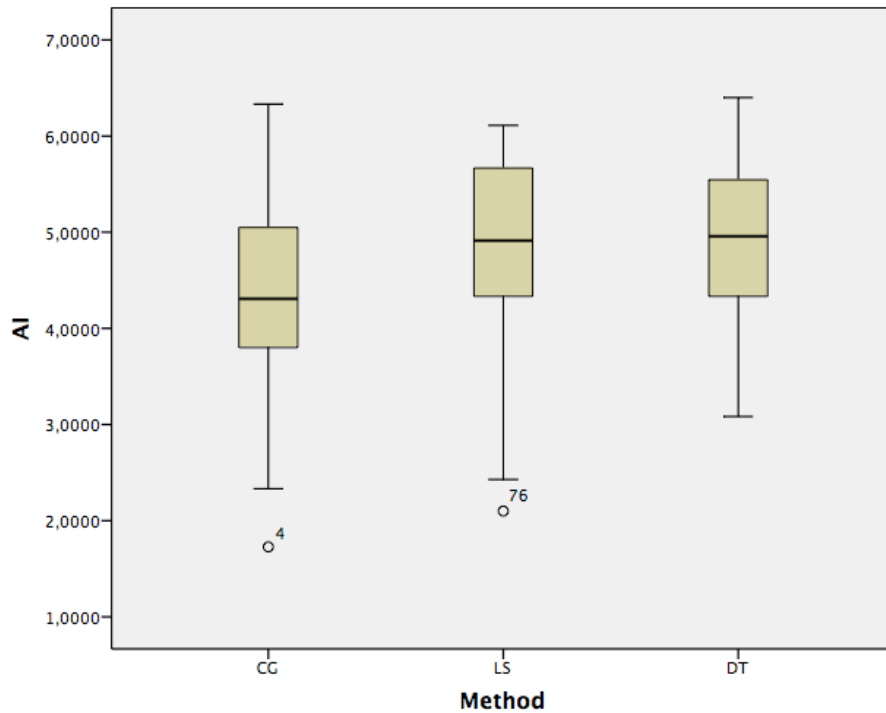


Figure 3: Boxplot of the Adoption Intent for each ideation method.

An Independent Samples T-Test revealed that there were no significant difference in AI between High TP and Low TP.

Business Value (BV): A One-Way ANOVA has also been conducted to find out whether there was a difference in BV between the different methods. It revealed that there were differences significant differences between the means of Design Thinking (M=6.18; SD=0.95) and the Control Group (M=5.48; SD=1.14) at a significance level of .007, which was revealed by the Post Hoc Tukey test. Equal variances have been assumed, as the Levene's test revealed equality of variances ($p=.845$). There was no significant difference between the means of Design Thinking and Lean Startup. A linear regression revealed that BV was highly predicted by the level of creativity, customer centricity. Also dummy variables of DT and LS were included in the model ($F_{4,122} = 27.351$, $p < .005$ with an R^2 of .473). The regression equation looks like this:

$$BV = -.946 + 0.400Creativity + 1.019CC + 0.238DT - 0.098LS$$

The influence of Creativity and CC were significant ($p < .005$). The influence of DT and LS were not significant. An Independent Samples T-Test revealed that there were no significant differences in BV between High TP and Low TP.

Task Complexity (TC): An Independent Samples T-Test has been conducted to investigate whether there was a difference in the level of TC between the two ideation

methods. It revealed a small difference between Lean Startup ($M=2.98$; $SD=0.93$) and Design Thinking ($M=3.10$; $SD=0.76$) that was not significant ($p=.524$). Additional tests have been run testing whether there were differences between male and female participants, students or non-students and level of education, but no significant differences were found. This results in the following model, with supported relations:

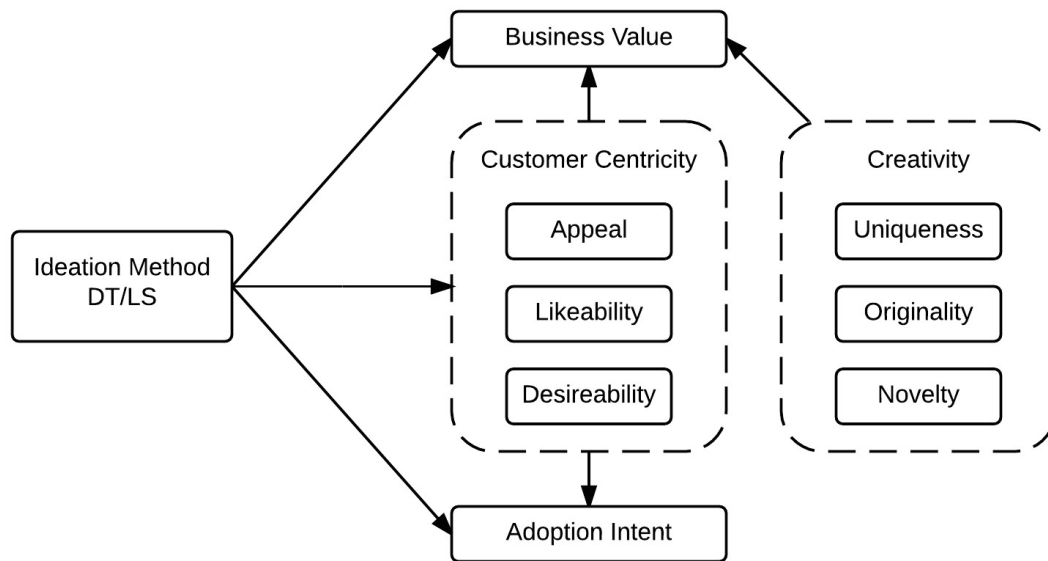


Figure 4: Supported relationships with additional findings

6 – Further Theorizing

This research has been conducted to find whether there are differences between the ideas that have been generated with the help of Lean Startup and Design Thinking. The results from the experiment have to be taken with care because both the statistical power and the failing of a part of the manipulation have a negative impact on the reliability of this research. Because of the exploratory nature of this research, many of the hypotheses that have been generated were based on a combination of the given literature on the dependent variables. However, the connections with LS and DT have never been made in any form. To come to better understanding of where these methods fit in the literature and how they differ, a more theoretic approach is taken in this chapter, based on the TETE-model as was developed by Bass and Wind (1995). In the TETE-model, the normal scientific process of Theorizing and Empirical research is expanded with another series of Theorizing and Empirical research.

Because of the exploratory nature of this research, additional variables have been added in order to find out whether there were additional differences to be identified. The main focus for this was the level of Adoption Intent and the Business Value. Ideally we would have people in VC's or MBA's rate the Business Value of the ideas (as used by assessing the BV in former research conducted by Luo and Toubia, 2013), but because that would mean conducting another survey, the ratings on business value has been done by the students judges, which has also shown some interesting results.

First, when looking at the Adoption Intent, we have found that the ideas that were generated in the Lean Startup manipulation had a lower level of Adoption Intent than the ideas that were generated in the Design Thinking manipulation. Because of the fact that the ideas were on customer centricity rather similar, this could be because of the fact that some of the ideas that were generated in the Lean Startup manipulation were the international housing idea, which is focused on people looking for rooms abroad. Since the student judges may not be in this position, they might be judging the idea as being customer centric, because they see a need around them, but would not use it when it was available.

But especially the ideas of Design Thinking and the control group differed on Adoption Intent. This might be due to the fact that the people in the Design Thinking manipulation have been thinking about problems that students encounter (which is supported by the manipulation check), and have come up with solutions that are close to what students need (the customer centricity of those ideas is the highest among the groups).

When looking at the results from the regression, we can conclude that adoption intent is highly predicted by the level of customer centricity. This is supporting the idea that customer centric ideas will increase the profitability of the company. It also supports the idea that marketing research conducted on the customer should be the core of companies, in order to come to propositions that are delivering value to the customer and thus creating a profitable company (Verhoef and Leeflang, 2009; Vargo and Lusch, 2004; Shrivastava et al., 1999).

Second, we have added a question on which we could base the potential Business Value. It was asked to the student judges have tried to identify this on the basis of the novelty, technical feasibility and potential market demand. When looking at the regression model, we find that the business value of the ideas is heavily influenced by creativity and customer centricity. From the literature we know that a high level of creativity and customer centricity is both profitable and generates value, which is supported by this research (Shah et al., 2006; Vargo and Lusch, 2004; Amabile, 1996; Jaworski and Kohli, 1993).

Third, we have asked the participants in the experiment to rate whether they found the task they had to perform complex. However, we did not find any difference between the different tasks. This implies that the videos that were shown as a manipulation were at a similar level of explanation. There were also no differences to be found on demographic differences.

7 - Conclusions

7.1. Research Questions

Research question 1: How do Lean Startup and Design Thinking differ on the level of creativity? When we look at the results of the experiment, there is no difference in the level of creativity. There are no significant differences to be found between DT and LS, nor are there significant differences to be found between the ideation methods and the control group. One of the main explanations for this could be that many ideas were rather similar. This might have been caused by a lack of interest of the people that were participating in the experiment, which tends to happen more often in online experiments (Lefever et al., 2007). One of the things supporting this is that many people have copied the idea that was supposed to be the manipulation for their thinking (a website/app/online platform where international student could find housing which was shown in the picture on the submission page). Another thing that might have caused creativity to be on a similar level is that, since the statistical power is rather low due to a low number of participants, the problem of creativity being highly dependent on personality traits is not overcome. Finally, due to the fact that there was no extra incentive to participate in the experiment, people may have had a lack of interest or might have not been able to think about something that quickly.

Research question 2: How do Lean Startup and Design Thinking differ on customer centricity? Based on the results of the experiment, there were no differences in customer centricity to be found between the two ideation methods. Due to the fact that both the ideation methods heavily rely on the customer as someone that has to be consulted, focussing on needs and problems customers have. This is supported by the fact that the methods were found to be more customer centric than the control group, indicating that people that were in the ideation manipulation did both have the customer in mind when thinking of an idea (supported by the tests found when testing hypothesis 2ii).

How does Time Pressure influence the level of creativity and customer centricity? Based on the results that have been found we cannot say that there is a difference in the level of both creativity and customer centricity that is caused by Time Pressure. This could be due to the fact that people that participated did not feel a

time pressure, but maybe found it either very hard to come up with an idea, or came up with a very straightforward idea. When looking at the time spent on the submitting page, we see the inverted-U shape when looking at the level of creativity of the ideas, supporting this assumption. Though this inverted-U might not have a statistical explanation, it does indicate that there was difference.

7.2. Conclusion, Limitations and Future Research

Over the past decades, the focus of marketing in general has been shifting away from the product, aimed at the customer. (Vargo and Lusch, 2004; Jaworski and Kohli, 1990). It has been a step that has been caused by the shifting of our economies to a service-dominant economy. (Vargo and Lusch, 2004). The two ideation methods fit perfectly in this new focus, establishing customer centric ideation processes in which the customer is used as a proxy within the ideation method. This has been a focus at many different levels, trying to introduce open innovation processes, lead-user innovation methods and co-creational methods (Vargo et al., 2008; Prahalad and Ramaswamy, 2004; Urban and Von Hippel, 1988). Based on the results, there are no significant differences between the ideation methods Lean Startup and Design Thinking. They are however both methods that focus on the customer and come up with ideas that are customer centric. This means that the goal that both the methods try to aim for is accomplished. As a result of this, the adoption intent of the customer is increased and the Business Value of the ideas that have been generated by the people using the ideation methods are significantly higher than the ideas that been made by the people in the control group.

As found in the literature, customer centric products are one of the main drivers of value to the customer (Vargo and Lusch, 2004). Although it had been hypothesized that the different approaches that the ideation methods have, lead to a difference in the level of customer centricity, this is not supported. Meaning that both the ideation methods lead to more customer centric ideas.

When we look at the additional findings, we can see a difference in the level of adoption intent and the business value. This is caused by the differences in creativity and customer centricity, which is in line with what other research has shown previously. The methods do therefore enhance business value of companies, by creating customer centric ideas that increase the adoption intent. Design Thinking

seems to lead to the highest value for both the customer and the company that is using the ideation method.

7.3. Academic Contribution

This research has tried to contribute to the field of innovation and marketing as it is the first attempt to find empirical evidence to show differences between the ideation methods Lean Startup and Design Thinking, and how they have an impact on how the users of these ideation methods think. The methods have been widely spread as innovation methods throughout the world have now gotten an empirical assessment on how they differ. It has added new knowledge on how these methods differ on their outcomes, which can be used in both the innovation literature and the marketing literature as a basis for further research.

This research has supported the fact that the two ideation methods are enhancing the customer centricity of the ideas that are generated with them. As both the ideation methods do not differ on the level of customer centricity, we can state that they both have this as a strongpoint. Next to that, with respect to the existing theory it has added another finding that customer centric ideas lead to both, a higher level of adoption intent, and a higher business value.

7.4. Managerial Implications

For managers that are looking for methods that can streamline their innovations we have found that it is to be advised to use either Lean Startup or Design Thinking. The methods will help them generating a customer centric solution that is close to the needs of their customers. Both the theories have an overlapping factor in the fact that they try to incorporate and use the customer as proxy to generate and tailor new business ideas. The focus on problems and needs seem to be rather similar and can be more or less interpreted as the same thing.

Looking at the two different ideation methods, it seems that Design Thinking is the best method to use. It has the highest mean for business value, customer centricity and adoption intent (table 3). However, the practical circumstances should suit the use of this theory. For starters, the user should be able to come up with solutions to the problems that have been identified. Next to that, the understanding

part of the method tends to be time consuming, implicating that time (and money) must not be the highest constraint, and innovations are the main focus for the user.

When looking at Lean Startup, we can identify the fact that it is more suited for people starting with an idea that needs to be tailored to needs of customers. It does enable the user to create customer centric ideas, which will enhance both adoption intent and the business value.

7.5. Limitations and Future Research

Since this is the first attempt to understand the differences between Lean Startup and Design Thinking, when looking back at the research as it has been conducted, limitations that we have found or that have been identified before will be addressed in this section.

One of the main limitations of this research is the fact that the experiment lacked the feedback loops that are emphasized in the ideation methods. When looking at table 1 (page 6) we have only been able to test the customer centricity and the starting point of the users of the methods. Next to that, a limitation can be identified in the users of the methods, who were not in an actual business setting. Since random people have been asked to generate an idea that could maybe improve the lives of students, this creates a lower level of engagement. Another limitation is the fact that it is not known how people approached the online experiment, in future research this should be overcome by conducting an experiment in a controlled environment. Another limitation is the fact that the manipulation partly failed, and thus it was difficult to assess whether there was a difference between the different methods, as we do not know for sure that the participants have been thinking the way that they were intended to think by the manipulation. This might have been caused by the videos as a manipulator; it could have been better to approach every step in the ideation methods separately. Another shortcoming is that the ideation methods in reality use feedback loops and iterations, but that this was for practicality reasons not realizable in an online experiment, meaning that a vital part of the methods has been left out of the experiment.

In the future, research should focus on innovations in a real business setting. For example organizing a weekend like *the Lean Startup Machine*⁷ weekends, but then one with the Lean Startup method, and one with the Design Thinking method. During these weekends the participants get to use every aspect of the ideation methods. Next to that, participants should not know they are participating in an experiment, but should be real entrepreneurs and managers that are looking for innovative ideas and how to execute them, being able to look for feedback and reaching out to customers.

⁷ I have been fortunate to join on one of those weekends that are a subsidiary of the company owned by Eric Ries, trying to inspire people all over the world to use the method and training people in using the method. (<https://www.leanstartupmachine.com/>)

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Appendix I – Manipulation

Manipulation Lean Startup

Page 1: Introduction

First of all, thank you very much for participating in this experiment.

In this experiment, you are asked to come up with an idea that can improve the life of students. All the information you share is completely anonymous. It is not needed that you have studied or that you are a student. All people can come up with good ideas. It will take about 10 minutes. Let's first look at a video, in order to understand a method that can help you to come up with an idea. Please look at it carefully in order to make sure that you understand how this works. Good luck!

Page 2: Video

Page 3: Instruction

You have now seen a video about Lean Startup. Hopefully you have understood that it is an innovation method that has been used all around the world to come up with ideas that are close to customer's needs, and developed quickly. Normally it makes use of customer feedback, but you are not asked to do that.

Try to think of something that can improve a students' life. This can be an app or website that helps them in a certain way. This may be study related, but also may focus on their private or social life. You can also choose to come up with an idea for a specific group of students (e.g. business students, female students etc.). You have 3 minutes to come up with an idea. In your idea, think of whom you are helping, what do they need, and how you are filling that need.

Page 4: Submission page with following picture



0250

Your Idea

What kind of student are you going to help?

What is the problem they encounter?

What is your idea?

Manipulation Design Thinking

Page 1: Introduction

First of all, thank you very much for participating in this experiment.

In this survey, you are asked to come up with an idea that can improve the life of students. All the information you share is completely anonymous. It is not needed that you have studied or that you are a student. Anyone can come up with good ideas.

The whole survey will take about 10 minutes of your time. Let's first look at a short video, in order to understand a method that can help you to come up with an idea. Please look at it carefully in order to make sure that you understand how this works. Good luck!

Page 2: Video

Page 3: Instructions

You have now seen a video about Design Thinking. Hopefully you have understood that it is an innovation method that has been used all around the world to solve small and big problems.

Please try to think of problems that can be solved. Think of trends that can be used to come up with solutions to problems that may be encountered. Maybe you can even come up with some ideas how to prototype your solution. You can tailor your solution to a specific target group. You are free in what you want to develop and what your solution is (this can be for instance a website or an application). You have 3 minutes to come up with a solution. In your solution, think of what is really needed and which problems you really solve.

Page 4: Submitting page with the following picture



Your Solution

What kind of student are you going to help?

What is the problem they encounter?

What is your solution?

Control Group

Page 1: Introduction

First of all, thank you very much for participating in this experiment.

In this experiment, you are asked to come up with an idea that can improve the life of students. All the information you share is completely anonymous. It is not needed that you have studied or that you are a student. All people can come up with good ideas. It will take about 10 minutes. Good luck!

Page 2: Instruction

Try to think of something that can improve the life of a student. This can be anything you want. The idea may be study related, but also may focus on their private or social life. You can also choose to come up with an idea for a specific group of students (e.g. business students, female students etc.). You have 3 minutes to come up with an idea. In your idea, think of whom you are helping, what do they need, and how you are filling that need?

Page 3: Submitting page

Your Idea

What kind of student are you going to help?

What is the problem they encounter?

What is your idea?

Appendix II – Manipulation Checks

Reflecting on the task you just completed, please indicate to what extent each of the following statement reflect the strategy you used to create your idea.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I spent considerable time trying to visualize and understand the need of students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought about the problem from the perspective of the student	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I decomposed the assignment into different needs of students to obtain a better understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spent considerable time trying to visualize how my proposed solution would work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought about the problem from the perspective of a solution that could solve the problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I decomposed the assignment into different features of my proposed solution to obtain a better understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I looked for connections with the needs of students in diverse educational contexts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I generated a significant number of potential student needs I could solve before choosing my final solution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to focus on a student needs that move away from established ways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I looked for connections with solutions used in diverse educational needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I generated a significant number of alternative solutions before choosing my final solution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to come up with potential solutions that move away from established ways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a general understanding of what students want and need in their life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Statistics Manipulation Check:

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
SolutionFocus CG	47	3,0851	,64725	,09441	2,8951	3,2751	1,67	4,33
LS	38	2,7807	,58780	,09535	2,5875	2,9739	1,50	3,83
DT	42	3,1349	,50772	,07834	2,9767	3,2931	2,17	4,33
Total	127	3,0105	,60120	,05335	2,9049	3,1161	1,50	4,33
NeedFocus CG	47	3,2624	,63583	,09275	3,0757	3,4491	1,67	4,50
LS	38	2,9386	,57790	,09375	2,7486	3,1285	1,67	4,00
DT	42	3,2341	,55223	,08521	3,0620	3,4062	2,17	4,83
Total	127	3,1562	,60449	,05364	3,0500	3,2623	1,67	4,83

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
SolutionFocus	1,502	2	124	,227
NeedFocus	,486	2	124	,616

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Solution_Focus	Between Groups	2,918	2	1,459	4,245	,016
	Within Groups	42,623	124	,344		
	Total	45,542	126			
Need_Focus	Between Groups	2,585	2	1,292	3,687	,028
	Within Groups	43,457	124	,350		
	Total	46,042	126			

Multiple Comparisons

Dependent Variable	(I) Method	(J) Method	Mean Difference (I-J)	Std. Error	Sig.	90% Confidence Interval		
						Lower Bound	Upper Bound	
SolutionFocus	Tukey HSD	CG	LS	,30440*	,12790	,049	,0395	,5694
			DT	-,04981	,12449	,916	-,3077	,2081
		LS	CG	-,30440*	,12790	,049	-,5694	-,0395
			DT	-,35422*	,13126	,021	-,6261	-,0823
		DT	CG	,04981	,12449	,916	-,2081	,3077
			LS	,35422*	,13126	,021	,0823	,6261
NeedFocus	Tukey HSD	CG	LS	,32381*	,12915	,036	,0563	,5913
			DT	,02828	,12570	,972	-,2321	,2887
		LS	CG	-,32381*	,12915	,036	-,5913	-,0563
			DT	-,29553*	,13254	,070	-,5701	-,0210
		DT	CG	-,02828	,12570	,972	-,2887	,2321
			LS	,29553*	,13254	,070	,0210	,5701

*. The mean difference is significant at the 0.10 level.

Appendix III – Idea Rating Survey

The 127 ideas were divided into 9 blocks, of 14 or 15 ideas each, so people would only have to rate a small portion to overcome dropouts. Next to that, the participants were chosen to have as minimal information upfront as possible, to capture their judging the best. The build of the survey was as follows:

Q1: Are you currently a student? Y/N (when No, survey would end)

Instruction: You will get 14 or 15 ideas on which you are asked to answer 8 questions. Those ideas have been generated by people to increase the quality of life of students. Rating this will cost you about 6 minutes. Please read the ideas carefully in order to be able to give answers that are as closely to reality as possible. Thank you for your participation!

The ideas would all be rated in the following way:

Create small groups of students that will meet once a week with an assigned counslor that will guide them throughout their study and fiding a job.

Please indicate for the above idea whether you think this is:

Ordinary	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unique
Appealing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unappealing
Original	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Commonplace
Not Likeable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Likeable
Would use if available	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Would not use if available
Undesireable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Desireable
Novel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Standard

Considering the technical feasibility, novelty and potential market demand, when this idea would be executed in a business, it would be worth:

Nothing A lot

Appendix IV – Demographics

Statistics

	Gender	Education	Student	Expertise	Annual Income	Age
N	Valid	127	127	127	126	127
	Missing	1	1	1	2	1

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	77	60,2	60,6	60,6
	Female	50	39,1	39,4	100,0
	Total	127	99,2	100,0	
Missing	System	1	,8		
Total		128	100,0		

Annual Income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<€15000	80	62,5	63,5	63,5
	€15000-€30000	14	10,9	11,1	74,6
	€30000-€45000	19	14,8	15,1	89,7
	€45000-€60000	6	4,7	4,8	94,4
	>€60000	7	5,5	5,6	100,0
	Total		126	98,4	100,0
Missing	System	2	1,6		
Total		128	100,0		

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<18	1	,8	,8	,8
	19-23	47	36,7	37,0	37,8
	24-35	65	50,8	51,2	89,0
	35-50	7	5,5	5,5	94,5
	>50	7	5,5	5,5	100,0
	Total		127	99,2	100,0
Missing	System	1	,8		
Total		128	100,0		

Student

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	81	63,3	63,8	63,8
	No	46	35,9	36,2	100,0
	Total	127	99,2	100,0	
Missing	System	1	,8		
Total		128	100,0		

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School	3	2,3	2,4	2,4
	Associate/MBO	5	3,9	3,9	6,3
	Bachelor	35	27,3	27,6	33,9
	Master	80	62,5	63,0	96,9
	Post Master/PhD	4	3,1	3,1	100,0
	Total		127	99,2	100,0
Missing	System	1	,8		
Total		128	100,0		

Expertise

		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Accounting, Finance or Banking	11	8,6	8,7	8,7	
	Consulting	6	4,7	4,7	13,4	
	Sales/Marketing	39	30,5	30,7	44,1	
	Health Care	15	11,7	11,8	55,9	
	Education	3	2,3	2,4	58,3	
	Arts/Design	2	1,6	1,6	59,8	
	Law	4	3,1	3,1	63,0	
	Politics	1	,8	,8	63,8	
	Management	20	15,6	15,7	79,5	
	Engineering/Agriculture	2	1,6	1,6	81,1	
	Other	24	18,8	18,9	100,0	
	Total		127	99,2	100,0	
	Missing	System	1	,8		
	Total		128	100,0		