Maker Faire Twente 2015: Assessment of entrepreneurial intentions among Makers

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Abstract

It is important to raise the number of entrepreneurs. Therefore we need to understand what drives entrepreneurial intention, particularly for a target group that has the technology to create new things. In this research the entrepreneurial intentions of Makers are assessed by means of the Theory of Planned Behavior (TPB). Based on the Theory of Planned Behavior a questionnaire has been developed that measures entrepreneurial intention and the independent variables attitude, subjective norm and perceived behavioral control. The goal is to find out whether Makers of inventive products intend to commercialize these products by starting a business and how strong the model is in explaining this intention. Data was collected during the Maker Faire Twente 2015 in Enschede. Average entrepreneurial intention among the respondents was found to be neutral. Regression analysis of the model shows significant positive relationship of attitude and subjective norm with entrepreneurial intention. An expanded model also shows age to be a significant predictor of entrepreneurial intention for this group. This research contributes to our understanding of the formation of entrepreneurial intentions and gives insight into how entrepreneurial intentions can be stimulated.

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Keywords

Determinants, entrepreneurship, intention , Inventors, Maker Faire, 'Theory of Planned Behavior'.

Bachelor thesis colloquium, October 12th, 2015, Enschede, The Netherlands.

1. Introduction

As indicated by Reynolds et al. (2001) there seems to be a positive linkage between the level of entrepreneurial activity and economic growth in a country. Zooming in on startup activity, startups foster economic prosperity through their potential to positively influence employment creation and innovation rate (Carree & Thurik, 2003). Therefore, it is in the interest of governments to stimulate business ownership and entrepreneurship. To find out how this should be done, scholars have been focusing on finding the factors that influence the decision to become entrepreneur or not and what characteristics distinguish entrepreneurs from non-entrepreneurs.

Determining the factors that influence the individual's decision to start a business is still work in progress. Research on this topic has been focusing on personality traits and demographic characteristics (Rauch & Frese, 2007), but also a more cognitive approach is gaining ground. An increasing amount of scholars consider entrepreneurial intention to be the best predictor of actual entrepreneurial behavior. A popular approach in assessing entrepreneurial intention and its determinants is the application of Ajzen's (1991) 'Theory of Planned Behavior' in this context.

The majority of research where the Theory of Planned Behavior is applied to measure entrepreneurial intention is conducted among students as a research population. This limits the generalizabililty of the results (Peterman & Kennedy, 2003). Therefore this research aims to apply the TPB on a unique research population, Makers.

The research population of the present study was found at the Maker Faire Twente 2015 in Enschede. Inventors, hobbyists, tech enthusiasts and so on gathered to present their work and share their experiences with one another. Maker Fairs are primarily about inspiring each other with new creations and the fun of making new things yourself. Makers like to learn about new technologies and try to find new real world applications for them. This stimulates innovation in their community. The creation of new products sometimes results in the startup of new businesses ("Makerfaire, a bit of history", n.d.).

A recent example of a Maker successfully becoming an entrepreneur is the inventor of the Pocket Drone. This is a drone that distinguishes itself from the competition by having the ability to fit in the pocket of your jeans and still having the power to handle the weight of an action camera attached to it. The person behind this product was able to design and prototype his invention while on a low budget, because he was part of the Maker community and therefore had access to the necessary knowledge and tools to develop his product. A Kickstarter campaign raised almost 1 million dollars from 1,946 backers in 60 days, making it a very successful startup so far ("The Pocket Drone", 2014).

Examples of inventive products that could be found at the Maker Faire Twente 2015 and for which we want to know if their creators think about commercializing the product are:

- A recumbent bicycle with four wheels and four wheel drive. The front and rear axle are interconnected with two cables in such a way that they can move together, making it possible to take very tight corners. This makes for an extremely stable and maneuverable form of transportation for people with a balance disorder.
- A multiplayer computer game where a group of people is playing as the crew of a spaceship. The team of players can be surprised by real time unexpected threats that can be controlled

by the game master. It is the task of the team to cope with these threats in the best way possible. This product could possibly be of great use for businesses that want to develop team working skills, decision making skills and stress resistance of their employees.
- A 3D printer prototype that can print objects in powder. Materials that can be used to print with are plaster, sand, sugar and ceramics. This 3D printer is printing cheaper and faster than conventional printers, implicating business startup opportunities.
  ("Makers", 2015).

Maker Fairs are a worldwide phenomenon since 2006. They are considered a representation of the 'Maker Movement', the trend where people prefer to build things themselves instead of purchasing them, encouraged by the more easy access to digital modeling and fabrication tools (e.g. 3d printing) in this day and age ("The Maker Movement", n.d.).

Since so much experimentation and creation is going on in the Maker community, one could expect there is a lot of potential among Makers to commercialize their products and to start their own business. Still, Maker Fairs are primarily focused on amateurs/hobbyists. To find out why these people are not entrepreneurs yet, some of the factors influencing the entrepreneurial decision will be explored for this group.

In this study, an assessment of the entrepreneurial intention of Makers is made. The goal is to assess how strong the intention is to commercialize their inventive products and how well the Theory of Planned Behavior model is able to explain this entrepreneurial intention. The relative importance of the independent variables to the dependent variable of the Theory of Planned Behavior will be compared with earlier research to see if the results on entrepreneurial intention research can be generalized to a different population.

The following central research question was formulated:

- *To what extend does the Theory of Planned Behavior explain entrepreneurial intention among inventors?*

2. Literature overview

2.1 TPB in the entrepreneurship literature

The Theory of Planned Behavior (TPB from here) is a methodology that can be used to predict a wide variety of behaviors. Besides the decision to become entrepreneur, the theory is also applicable to other behaviors of interest, such as to quit smoking or to vote for elections. As long as the behavior is voluntary, it can be planned and the performance of the behavior will be the result of a conscious decision. Therefore, the theory shows good results in analyzing and explaining planned behavior in a lot of different fields (Ajzen, 2001; Kolvereid, 1996), becoming an entrepreneur being one of them (Kolvereid, 1996).

Over the years, several methodologies have been developed to identify determinants of the decision to become an entrepreneur. This line of research started with researchers trying to identify specific personality traits that could be related to having one's own business. Examples of such traits are need for achievement (Komives, 1972), locus of control and risk-taking (Brockhaus, 1980). Critics argued that entrepreneurs form a very heterogeneous group of individuals and that it would be hard to identify universal personality characteristics of the entrepreneur (Gartner, 1985).

Focus shifted to a demographic approach, where variables such as gender, age and education level were related to the execution of entrepreneurial behavior (Reynolds et al., 1994). Significant relationships for certain traits and demographic variables have been found, although their explanatory capacity regarding the execution of entrepreneurial behavior has been considered to be fairly limited (Reynolds, 1997).

2.2 Theory of Planned Behavior

The TPB is developed to predict behavior that is planned. In the case of the startup of a business, it is a commonly shared belief that, to a certain level, planned behavior is part of virtually every new business' origination (Krueger et al., 2001; Thompson, 2009). According to the theory, intention is considered to be the predictor of actual behavior. In terms of this research, a strong relationship would exist between entrepreneurial intention and actually starting a business. Their intention indicates how hard an individual will try to perform said behavior (Liñán, 2004).

Figure 1 below shows that attitude, subjective norm and PBC are respectively determined by 'behavioral beliefs', 'normative beliefs' and 'control beliefs'. *Behavioral beliefs* are the result of an individual's expected outcomes of the behavior and his or her judgment of these expectations. *Normative beliefs* are shaped by the individual's beliefs about whether they expect friends or family to be dismissing or encouraging of the target behavior and how motivated the individual is to meet their expectations.
Beliefs about the existence of factors that make the execution of the target behavior easier or harder are called *control beliefs*. The relative strength of these factors is also part of these beliefs (Ajzen, 2006).

Each set of beliefs combined results in the formation of the independent variables of intention, which are:

- *Attitude*, this is a variable that gives insight into the level to which an individual judges the target behavior, in this case starting a business, as positive or negative.
- *Subjective Norm,* this is a construct that gives insight into the perceived pressure from an individual's friends, family and colleagues to perform the behavior, in this case starting up a business. It is about the individual's idea of whether the people close to him would agree with him or her starting a business.
- *Perceived Behavioral Control (PBC from here),* would be circumscribed as the amount of control the individual expects to have over the behavior, in this case over starting a business. This variable also measures how difficult he or she expects the execution of the behavior to be. (Ajzen, 1991; Liñán & Chen, 2009)

These three elements are expected to be positively related to intention, which is "*a person's readiness to perform a given behavior* (Ajzen, 2002b, p. 1)." The definition of entrepreneurial intention is less clear and different definitions of the construct are used in the literature. Thompson (2009) called for a more clear and consistent definition of entrepreneurial intention in entrepreneurship research. Therefore, he discussed previous conceptions of the construct and defined it himself as "*a self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future* (Thompson, 2009, p. 676)." As can be derived from the definition, consciously planning to start a business does not necessarily imply that the individual will act upon his intention.

Intention on its turn is assumed to be positively related to behavior. In the case of business startup, the strength of the relationship between intention and actual behavior is doubted by some. Brännback (2007) argues that the individual is not completely under control due to the complex nature of starting a business.

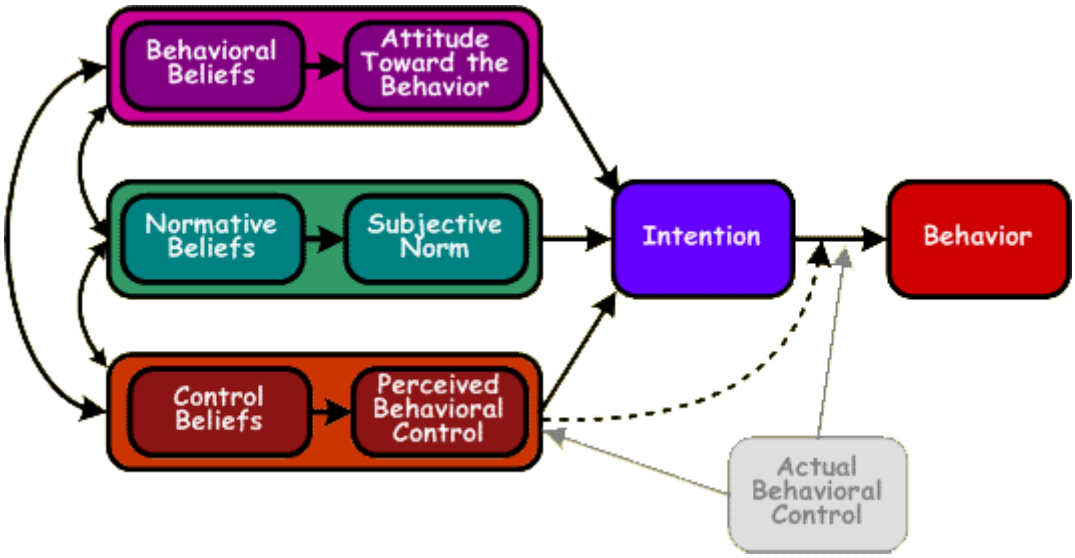

Figure 1: TPB-framework (Ajzen, 2006)

In this thesis the TPB is applied in the entrepreneurial context. Shane et al. (2000) circumscribe entrepreneurship as the discovery, evaluation and capitalization of an opportunity. The specific

target behavior for the application of the TPB in this context is the startup of a business. The relationships shown in figure 1 implicate that the more positive a person's assessment of performing entrepreneurial behavior, the more encouraging of entrepreneurial behavior the person considers their social circle to be and the more competent of executing the behavior the person perceives themselves to be, the more powerful their intention to start a business should be.

Earlier studies in which the TPB is applied on the entrepreneurial decision have demonstrated the model's explanatory power. In general, the three explanatory factors of intention have shown to account for 30% to 55% of the variance in entrepreneurial intention (Tkachev & Kolvereid, 1999; Autio et al.,2001; Liñán & Chen, 2009 Kautonen et al., 2011), with a recent outlier of 59% (Kautonen, 2015).

Besides intention, the actual performance of the behavior is also dependent on the actual control the individual has over starting a business. This becomes of more importance when volitional control is limited. Since this is not a longitudinal research, actual behavior will not be part of the empirical part of this research. Except for the intention and behavior relationship, the TPB model is adopted in its original state, ensuring methodological fit of this research with earlier applications of the TPB, enhancing comparability of the results.

2.3 Background factors entrepreneurial intention

Human capital and demographic factors are called 'background' factors in the TPB and are expected to influence intention indirectly (Ajzen, 2002c). Especially background factors that result in greater knowledge of starting and running a business will lead to a more realistic view on entrepreneurship (Sparks et al., 2002), therefore having an effect on intentions through its antecedents. Some of the background factors that can be expected to influence intention indirectly are:

Gender: significant differences have been found for business startup in relation with gender. Empirical research has shown significant support for the presumption that the majority of new businesses are founded by men (Minniti et al., 2005). Among other things, higher risk tolerance among men is expected to play a role in this (Jianakoplos & Bernasek, 1998). According to the TPB, higher business startup levels among men should show in higher entrepreneurial intention levels for men. Therefore, a significant relation between gender and entrepreneurial intention is expected. Because of the mediating effect of the TPB determinants, gender is not expected to add explanatory power to the model.

Age: Levesque et al. (2006) found empirical evidence that is supportive of the presumption that younger people are more likely to begin their own business than older individuals. Also, nascent entrepreneurs are most common among young individuals. This indicates a relationship between age and entrepreneurial intention when intention is assumed to be a strong predictor of behavior.

Education: Entrepreneurial education is expected to make individuals more knowledgeable about the various facets of entrepreneurship, as well as making them more aware of the possibility to become an entrepreneur (Liñán & Chen, 2009). In general, it can be assumed that when more people know about entrepreneurship as a career possibility, more people will seriously consider a career in this direction.

Entrepreneurial role models: Individuals who personally know entrepreneurs may have a higher intention to become entrepreneurs themselves. A family background in entrepreneurship has been mentioned to make an individual more likely to want to start a business (Matthews & Moser, 1996). The presence of the role model itself contributes to the individual's knowledge about owning a business and therefore increases the confidence of the individual in his or her ability to start a business (Minniti, 2005). Summarized, an entrepreneurial role model influences the individual's self-efficacy. This is a concept very similar to PBC. Therefore, role models' effect on entrepreneurial intention is expected to be mediated by PBC.

Self-employment Experience: Past experience in business ownership or work experience in small businesses also provide greater knowledge of entrepreneurial activity (Davidsson, 1995). Therefore, a positive relationship of entrepreneurial experience with entrepreneurial intention could exist.

2.4 Makers' similarity to inventors

Maker fairs are an opportunity for Makers to show what they made and to exchange knowledge and experience. The Fairs are meant to show that people still make new things themselves, whereas this usually happens behind workshop and garage doors. The community broadly characterizes Makers as individuals who:

- enjoy learning,
- like to explore new forms and technologies,
- innovate and experiment in the field of science,
- are motivated by intrinsic rewards,
- explore what new technology is capable of and learn from this process, this stimulates the emergence of new ideas, which can result in new real world applications and eventually new business initiatives (Dougherty, 2013)

These characteristics seem to suggest similarities between Makers and inventors. To explore whether Makers can be considered inventors, both inventors and their inventions need to be defined. Inventors and inventions can be defined along several approaches, which will be outlined below.

Two types of inventors are considered by Amesse et al. (1991). Individual inventors are being described as those individuals that create inventions without being part of an official organization. Professional inventors make inventions in the name of their employer. Usually the individual inventor is described in terms of patents. He or she is someone who officially owns an invention by having one or more patented inventions to his name. This distinguishes them from firm-based inventors, whose inventions are owned by their organizations (Amesse et al., 1991). Defining inventors by means of patent activity would exclude a lot of actual inventors that are just not formally registered. Therefore, inventors may better be defined by their inventions.

A definition of an invention was found in a research report on 'Inventors in the Netherlands' (de Jong, 2011). This is part of the research program SMB and entrepreneurship, financed by the Ministry of Economic affairs. De Jong (2011, p. 13) defines an invention as follows: "*A product, mechanism, production process or method which is new, based on a creative idea or act of insight and which solves a previously unsolvable problem*." Besides being something completely new, inventions can

also be modifications or improvements of existing products. Additionally, for a product to qualify as an invention, it needs to be developed beyond a creative idea so that its viability can be demonstrated. De jong (2011) also argues that inventions are aimed at practical solutions and that creative expressions (e.g. music creation) are not included for this reason.

The Dutch Order of Inventors (NOVU) uses similar criteria to define an invention. They define it as: "*A Creative idea or act of insight aimed at solving a problem, the idea is technically feasible and executable and end users see a need for the presented solution* (de Jong, 2011, p. 14)."

In this paper, inventors will be considered those who produce inventions. Registration of inventions will not be considered part of the definition, because it's more a practical way of identifying a population than a determining factor of being an inventor. The best way to compare inventors and Makers is by means of their invention/product. As long as a Makers' product matches (some of) the criteria of an invention, makers and inventors might be considered to belong to the same group. Both definitions of an invention above identify the same criteria, therefore the definition of an invention used in this paper is a product that is:

- *made to solve a specific problem*
- *based on a creative idea or act of insight*
- *new or an improvement of an existing product*
- *developed with the needs of (potential) end users in mind*

3. Review of the Theory of Planned Behavior in entrepreneurship literature

3.1 Random populations

TPB research in the entrepreneurship literature is focusing on students as a target group, with only a few studies empirically testing the theory among more random populations. Some of the research in the second category is reviewed below.

The first topic of importance in the TPB is the significance of the relationship between the independent variables of the TPB model and intention. Kautonen et al. (2011) applied the original TPB model on a working age population from Finland. Attitude, subjective norm and PBC turned out to be significant antecedents of entrepreneurial intention at the 1% level. The two wave study also found intention and subjective norm to be significant predictors of actual entrepreneurial behavior at the 1% level. The effect of PBC on entrepreneurial behavior was significant both direct and indirect (via intention). In another longitudinal study among a representative Finnish and Austrian adults target population, Kautonen (2015) investigated the robustness of the TPB model and again found a significant relationship between entrepreneurial intention and all of its three antecedents. In this study subjective norm had the strongest effect on intention, where most studies report subjective norm to have the weakest effect on intention.

Another topic of importance in the TPB literature is how much of the variance in intention is explained by the variables in the TPB model. This percentage is reported as the R-squared value of the regression model. Kautonen et al. (2011) found out that their application of the TPB model explained 41% of the variance in entrepreneurial intention. They also did a follow-up study which showed that the variance in actual entrepreneurial behavior that was explained by entrepreneurial intention and PBC was 39%. In his other research, Kautonen (2015) found attitude, subjective norm and PBC to account for 59% of the variance in intention. 31% of the variance in subsequent entrepreneurial behavior was explained by intention and PBC.

3.2 Students

The majority of empirical TPB research in an entrepreneurial context is done among students. The fact that this group has yet to make the decision on what type of employment they prefer after graduation makes it a convenient target group to ask about their entrepreneurial intentions.

As opposed to Kautonen's research, Liñán & Chen (2009) found no support for the subjective norm and entrepreneurial intention relationship in their research among Spanish and Taiwanese students. Further analysis showed that subjective norm did have a significant influence on both attitude and PBC and therefore indirectly influenced intention. Attitude and PBC were found to be significant positively related to entrepreneurial intention. Autio et al. (2001) analyzed how the independent variables of the TPB model are related with entrepreneurial intention among students from Finland, Sweden and the USA. All three antecedents of entrepreneurial intention had a significant positive effect on the latter. The strongest relationship with intention was found for PBC, whereas subjective norm showed a significant, but very weak effect on intention. Further analysis showed that subjective norm did have a reasonably strong relationship with PBC, in accordance with the findings of Liñán & Chen (2009). In their study on self-employment intention among Russian students,

Tkachev & Kolvereid (1999) found attitude, subjective norm and PBC to be significantly related with entrepreneurial intention. A population of university business students was used in Krueger's (2000) application of the TPB model. In this case subjective norm was not a significant predictor of entrepreneurial intention. Attitude ($p < 0.05$) and PBC ($p < 0.005$) were significant predictors of intention, of which PBC had the strongest influence. Regarding the significance of the independent variables, Liñán & Chen (2009) and Krueger (2000) both found subjective norm to be insignificant. Also Gird et al. (2008) applied the TPB on (commerce) students. Attitude, subjective norm and PBC showed statistically significant positive relationships with the intention to start a business. Although all three explanatory variables were statistically significant, attitude had the strongest effect on intention, whereas subjective norm and PBC had relatively weak effects.

Besides the significance of the variables in the model, the variance in entrepreneurial intention that is explained by the variables in the model is important. Liñán & Chen (2009) found an R-squared value of 56% in a model where only attitude and PBC where significant predictors of entrepreneurial intention. 30% of the variance in intention was explained by Autio's (2001) application of the TPB model. Regression analysis in the study by Tkachev & Kolvereid (1999) showed that a significant part of the variance in entrepreneurial intention was explained by the three explanatory TPB variables. They found an R-squared of 45%. Krueger's (2001) regression analysis of the TPB model resulted in an R-squared of 35%, while subjective norm was not a significant variable in the model. Gird & Bagraim (2008) reported that 28% of the variance in entrepreneurial intention was explained by the three antecedents of entrepreneurial intention.

3.3 Background factors

Background factors, such as personality characteristics and demographic variables, are expected to impact entrepreneurial intention and behavior indirectly. Attitude, Subjective norm and PBC act as mediators of the background factors' influence on entrepreneurial intention and subsequent behavior (Ajzen, 2002c). To test this assumption, some scholars add blocks of additional variables to the original TPB model to test these variables for their significance in the model and if more of the variance in entrepreneurial intention is explained by the addition of variables in the new model.

A study that tests this mediating role of attitude, subjective norm and PBC for several background variables is the research of Liñán & Chen (2009). The expected influence of the background variables on the antecedents of intention showed no strong relationships. The effect of gender on PBC was the strongest significant link, whereas role model, self employment experience and work experience showed little and weak significant effects on the antecedents of intention. No significant effect was found for age. No change in R-squared was reported.

A very small, but significant change in the explanatory value of the TPB model was found by Autio et al. (2001). After adding work experience in small firms, employment status, anticipated change in employment and age to the model the R-squared changed positively with 0.018, resulting in a model that explains 31,8% of the variance in entrepreneurial intention. Of these four, employment status was not significant and age was the only background variable with a moderately strong beta coefficient.

Family background in entrepreneurship, gender and self-employment experience were added to the original TPB model by Tkachev & Kolvereid (1999). Regression analysis of a model with these factors included showed no significant results for any of these background factors and also no change in the R-squared of the model.

In their application of the TPB, Gird & Bagraim (2008) also added several background factors to the TPB model to see if they could increase the explanatory power of the model. Blocks of several variables were entered separately into the model. Trait variables (need for achievement, locus of control and tolerance for ambiguity) did not change the model and were not significant. Situational variables (instrumental readiness and social support) did not add significant explanatory value to the model either, although instrumental readiness was a weak but significant predictor of entrepreneurial intention. The only block of variables to add slight, but significant value to the TPB model were the 'previous exposure to entrepreneurship' variables (change in $R^2 = 0.056$). In this block, self-employment experience was a significant predictor of entrepreneurial intention, self-employed parent and self-employed relative were not. Among the demographic variables age, gender and race, only gender was a small, but significant predictor of intention. The demographic variables did not add any significant value to the model.

This literature review, as summarized in figure 2 below, seems to show significant support for the TPB model and its predictive power with regards to entrepreneurial intention. Explained variance in entrepreneurial intention ranges from 28% to 59% in the seven studies that were reviewed. It's interesting that subjective norm has been reported as non-significant in two studies (among students), while Attitude and PBC are significant predictors of intention in every study and one or both often show(s) the strongest effect on entrepreneurial intention. This suggests subjective norm to be a weaker predictor of entrepreneurial intention, although Kautonen (2015) found subjective norm to be a strong predictor (among a general population). It might be the case that norms set by others are of less importance for students than for a random adult population.

The addition of background variables to the original TPB model seems to have no or little effect on the explanatory value of the model. Only the additional variables in the studies of Autio et al. (2001) and Gird & Bagraim (2008) increase the explained variance of the model by 1,8% and 5% respectively. Liñán & Chen (2009) and Tkachev & Kolvereid (1999) found no change in the explanatory power of the model after adding several background factors. This supports the strength of the TPB model and the assumption that background variables are mediated by the entrepreneurial intention antecedents.

Review table

Source	Population	Indep. Var.	Dep. Var.	Results	Background Factors
Kautonen, (2015)	Random sample of Finnish and Austrian population (N = 969)	Attitude, Subjective Norm and PBC Intention	Entrepreneurial intention and subsequent behavior	Intention R^2 = 0.59 Behavior R^2 = 0.31 All relations are positive and statistically significant. Subjective norm strongest predictor of intention.	
Kautonen et al., (2011)	Random sample of Finnish population (N = 117)	Attitude, Subjective Norm and PBC Intention	Entrepreneurial intention and subsequent behavior	Intention R^2 = 0.41 Behavior R^2 = 0.39 All relations are positive and statistically significant.	
Liñán, (2009)	Spanish and Taiwanese (business) students (N = 512)	Attitude, Subjective Norm and PBC	Entrepreneurial intention	Intention R^2 = 0.56 based on attitude and PBC. No significant effect of Subjective Norm on Intention.	Significant (but small) indirect effects on intention for gender, role model, self employment experience and work experience. Age non-significant.
Autio et al., (2001)	University students from Finland, USA and Sweden (N = 3445)	Attitude, Subjective Norm and PBC	Entrepreneurial intention	Intention R^2 = 0.30 Attitude and PBC have the biggest influence on intention	Adding small firm work exp., employment status, change job within 1 year and age in the model results in intention R^2 = 0.318. Only age with moderately strong beta coefficient.
Tkachev & Kolvereid, (1999)	University students from Russia (N = 561)	Attitude, Subjective Norm and PBC	Entrepreneurial intention	Intention R^2 = 0.45 All relations are positive and statistically significant. PBC has the strongest effect on intention.	Self-employment experience is sign. correlated with intention. Adding family background in entrepreneurship, gender and self-employment experience in the TPB model results in intention R^2 = 0.44. All three were non-significant.
Krueger et al., (2000)	University business students (N = 97)	Attitude, Subjective Norm and PBC	Entrepreneurial intention	Intention R^2 = 0.35 Based on attitude and PBC. No significant effect of Subjective Norm on Intention.	
Gird & Bagraim, (2008)	University commerce students from South-Africa (N = 247)	Attitude, Subjective Norm and PBC	Entrepreneurial intention	Intention R^2 = 0.28 All relations are positive and statistically significant. Attitude has the strongest effect on intention.	Adding self-employment experience, self employed parent and close relative in the model results in a statistically significant increase in intention. R^2 = 0.33. Instrumental readiness, gender and self-employment experience were found to be significant.

Figure 2: Summary of the literature review on previous applications of the TPB and additional variables for explaining entrepreneurial intention.

4. Hypotheses

The theory underpins that attitude, subjective norm and PBC are positively and significantly related to entrepreneurial intention. Earlier applications of the TPB in the entrepreneurial context generally find strong explanatory power for the three antecedents of intention and support the theory. It is remarkable that among some of the student samples, subjective norm is sometimes weakly related or even unrelated to entrepreneurial intention. This could indicate that the subjective norm variable could be a weaker link in the model, at least among certain populations. For now, there is still enough significant support for subjective norm to expect that it will have a significant relationship with entrepreneurial intention in our research among Makers. Therefore:

- H1: The Attitude of inventive Makers is positively and significantly related to entrepreneurial intention.
- H2: The Subjective Norm of inventive Makers is positively and significantly related to entrepreneurial intention.
- H3: The Perceived behavioral control of inventive Makers is positively and significantly related to entrepreneurial intention.

5. Methodology

5.1 Sample

The research population of this study consists of Makers exhibiting at the Maker Faire on May 30th 2015. May 15th 2015 the organizational committee of the Maker Faire Twente was contacted. Permission was asked to carry out empirical research during the Maker Faire and to send out an informing e-mail to all the Makers about the author's presence and purpose during the Faire. Permission to collect survey data was granted on May 21st, whereas privacy policy made sending out e-mails to the participants impossible.

An estimated 80 exhibitors were attending the event. Every one of them was personally approached to participate in the research, excluding commercial exhibitors (promoters, recruiters) or anyone who was not responsible for the product on display. Since this research is on inventors, the identifiers of an invention as outlined in chapter 2.4 were used to distinguish those Makers who actually explore and build new things from those who just like to put things together with their hands. Therefore, the most important condition of an invention is that the product has to be something new that did not exist before. If this condition is not met, it is hard to convince anyone that the product still has anything to do with inventing. Therefore this condition has to be met by all Makers to participate in the research. A higher level of strictness can be reached by meeting any of the three remaining conditions in addition to the first. Participants were considered inventors when at least two of the following identifiers of an invention where answered positively, of which one is the condition in bold:

- *My product is made to solve a specific problem*
- *My product is based on a creative idea or act of insight*
- ***My product is something new or an improvement of an existing product***
- *My product is developed with the needs of (potential) end users in mind*

Strictness	Number of Makers
0/4	65
1/4*	48
2/4	47
3/4	36
4/4	20

Figure 3: Classifying Makers based on their level of inventiveness.
***First necessary condition: My product is something new or an improvement of an existing product.**

Figure 3 shows the amount of Makers that match the conditions of an invention for several levels of strictness. Out of the 65 people that were approached, 47 individuals could be considered inventors in the sense that they were personally responsible for the product they showcased, that their invention was something new and that their invention met at least one of the three other conditions in addition to the first. Unfortunately, 21 out of the 47 inventive Makers were already self-employed or in the startup process to commercialize their product. This left a final dataset of 26 filled out surveys. These respondents' age varied from 17 to 69, with an average age of 33 years old. Respondents' gender was divided in 18 males (69 %) and 8 females (31 %). Regarding their level of education it's interesting to note that 52% of the respondents has a high level of education (HBO degree or higher). The remaining respondent either had a low (12%) or intermediate (36%) level of education.

5.2 Operationalization

For the construction of the survey close attention was paid to the theory on constructing TPB questionnaires (Ajzen, 2002, 2006). Recent efforts on the construction of TPB questionnaires measuring entrepreneurial intentions have been adopted and used in this survey. The TPB questions in this survey hold close similarity with the work of Kautonen (2015), whose measures scored very high on both validity and reliability.
The conscious decision was made to give five-point Likert scale rating options for all TPB items of the survey, to ensure consistency and thus ease of understanding for unprepared participants.
Demographic and personal background questions for education level/type, current occupation, prior entrepreneurial experience, entrepreneurial role model, age and gender were added to the survey.
At the beginning of the survey some questions relating to inventions were added to the survey to see whether Makers consider their products inventions or not. These answers were used to create figure 3.

For measuring the Makers' **attitude** regarding entrepreneurship, Kautonen's (2015) scale was used. Six bipolar scales link six different word pairs to the general statement: "For me, starting a business would be…". To ensure consistency throughout the survey, every word pair could be rated through a five-point scale. Examples of word pairs provided are: "unpleasant….attractive" and "insignificant…important".
Cronbach's alpha's were calculated to measure the reliability of the results for each construct. Cronbach's alpha is an indicator for the extent to which the various items that were used to measure a construct are consistent with each other. As a rule of thumb, an $\alpha > 0.6$ is considered to ensure enough consistency between the items.
The Cronbach's alpha for attitude = 0.858. Therefore, the results for attitude are considered reliable enough to use for further analysis.

The measurement of the Makers' **Subjective Norm** includes two sets of scales. Kautonen (2015) used the same measures as Kolvereid (1996). Various other recent studies of entrepreneurial intention refer to Kolvereid's work for the subjective norm scale construction (Kautonen et al., 2011; Liñán & Chen, 2009; Van Gelderen et al., 2008). Therefore it seems the most reliable measure for the subjective norm.
The first set of scales measures the individual's belief about to what extend his close family, friends, colleagues and people important to him think that he should start a business. The second set of scales measures the extent to which the opinions of these reference groups influence the individual's intention to start a business. A 4th item was added to measure colleagues' opinion, since it was expected that this group is more influential in Makers' social lives, whereas this item is not as necessary among student populations.
The score for subjective norm is calculated by multiplying each belief with its corresponding motivation to comply item and adding up the three scores to form a final index. A high score means that the people close to the individual are supportive about the individual starting a business, and that the individual cares about their opinion.
The Cronbach's alpha for subjective norm = 0.773. Therefore the results for the subjective norm scale are considered to be reliable.

According to Ajzen (2002) a direct **Perceived Behavioral Control** measure should contain both *self-efficacy* and *controllability* items. Self-efficacy is about how difficult it would be to perform the behavior. Controllability should say something about whether the individual beliefs that he has control over the behavior and if limiting external factors are in play.
Respondents were asked to give their opinion on five statements. Three statements measured the individual's self-efficacy beliefs (e.g. "It would be easy for me to start a business"), two measured the controllability beliefs (e.g. "I can control the creation process of a new business"). Four out of five statements were taken from Kautonen (2015). Since Ajzen (2006) advises on using five to six items

per measure, one self-efficacy item from Autio (2001) was added (5th item). Respondents were given the option to rate their level of agreement on a five-point scale.
The Cronbach's alpha for PBC = 0.453. This indicates weak consistency between the items that were used to measure PBC.

Five items were used to measure **entrepreneurial intention**. Each item could be rated on a five-point scale, which keeps the rating consistent throughout the survey for all four major TPB constructs. Wording of the items for the behavioral intention scale is kept similar to Ajzen's (2002). In addition to the three items provided, two items were added. Item five was taken from Liñán & Chen's (2009) entrepreneurial intention measure.
The Cronbach's alpha for entrepreneurial intention = 0.987. Therefore, the results for this construct can be considered reliable.

5.3 Methodology (regression)

For the regression analysis of the original TPB model, a multiple regression will be executed in SPSS with attitude, subjective norm and PBC as independent variables and entrepreneurial intention as the dependent variable. This model looks as follows:

Y = B0 + B1Attitude + B2SubjectiveNorm + B3PerceivedBC + Error

Thereafter, the original model will be expanded with the independent variable age, to see whether this background variable has a significant relationship with entrepreneurial intention in the model and if the inclusion of age adds to the explanatory power of the model. The addition of the variable age to the original TPB model is visually represented in appendix B.

Simple Regression model:
Y = B0 + B1Age + Error

Multiple regression model:
Y = B0 + B1Attitude + B2 SubjectiveNorm + B3PerceivedBC + B4Age + Error

The survey results will be used as input for SPSS and Stata software. First, the dataset will be used to produce some descriptive statistics for Makers and their mean scores concerning the variables of the TPB model. Also, the TPB variables are tested for correlation in this part. Thereafter regression analysis will be executed for the original TPB model. It was planned to create an expanded model by adding education level, education type, current occupation, entrepreneurial experience, entrepreneurial role model, gender and age to the original model (see Appendix A for their respective questions in the questionnaire). Unfortunately, the sample size of this study is too small to run regression analysis on such a regression model. Therefore it is chosen to test one additional variable, Age. No dummy variables are needed and this variable has a relatively even distribution.

6. Empirical results

6.1 Descriptive statistics

Table 1 shows the minimum and maximum scores for each variable of the TPB model, the mean score of all the respondents per variable, and the standard deviations for each variable. In this research, all items that were used to measure a specific variable are weighed equally, therefore each respondent's score per variable is calculated by taking the means of its items scores.

The results show that the independent variables of the TPB model, attitude, subjective norm and PBC, score slightly above the neutral value of 3. Since a Likert scale from 1 to 5 was used for all variables, these mean values are just slightly above the exact middle score.

A mean score of 3,493 for **attitude** means that it has the most positive average score of all the TPB variables. This means that Makers have a slightly positive average attitude towards starting their own business in the future.

Subjective Norm has a mean score of 3,274. Because the score is close to the neutral score of 3, the subjective norm of Makers towards becoming an entrepreneur is neither positive nor negative. This means that some of the Makers' family, friends and colleagues are supportive of the inventive Makers' decision to start his own business and that some are not supportive of this decision. The social circle of Makers that were surveyed seems to have a fairly neutral opinion about starting a business. At least, that is what Makers believe their opinions to be.

Perceived behavioral control has a mean score of 3,115. Just as with subjective norm, this is a very neutral score. Makers are not very confident in their abilities to control the startup of a business to a high degree themselves. Of course, the neutral score of 3,115 doesn't suggest that Makers think that the startup of a business is out of their control either. On average, Makers think that starting a business would neither be hard nor easy for them.

The dependent variable, **entrepreneurial intention**, indicates how likely it is that Makers will start a business somewhere in the future. With a mean score of 2,985, their average intention is very neutral. Interesting is the considerably higher standard deviation for intention (st. dev. = 1,218) in comparison with the independent variables. It seems that the average score of 2,985 consists of more distinct high and low scores instead of neutral responses. Further analysis shows that the number of respondents with high intention (≥ 4) is 6, while the number of respondents with low intention (≤ 2) is 9. When looking at moderately high (≥ 3,5) and low (≤ 2,5) intention, there are 11 inventive Makers with moderately high intention and 10 inventive Makers with moderately low intention.

Descriptive Statistics

VARIABLES	N	Minimum	Maximum	Mean	Std. Deviation
Attitude	26	2,00	5,00	3,493	0,862
Subjective Norm	26	2,00	4,13	3,274	0,630
Perceived Behavioral Control	26	2,00	4,40	3,115	0,580
Entrepreneurial intention	26	1,00	5,00	2,985	1,218

Table 1: average scores for the independent variables and dependent variable of the TPB model.

In table 2 the correlations between the variables of the TPB model are shown (N=26). Because it is expected in the TPB that higher scores for attitude, subjective norm and PBC result in a higher score for entrepreneurial intention, significant positive correlations are expected for the three antecedents of intention with the dependent variable. Table 2 shows that intention does correlate significantly with attitude and subjective norm (P = 0.718 and P = 0.692). PBC is not significantly correlated with the intention to start a business, which is unexpected.
Besides their significant correlations with intention, positive significant correlation was found for attitude with subjective norm (P = 0.643).
No significant correlation was found for PBC with attitude and/or subjective norm, resulting in no significant correlations found for PBC with any of the other three variables.

Correlations

VARIABLES	Attitude	Subjective Norm	Perceived Behavioral Control	Entrepreneurial intention
Attitude	1	0,643**	0,004	0,718**
Subjective Norm	0,643**	1	-0,175	0,692**
Perceived Behavioral Control	0,004	-0,175	1	0,037
Entrepreneurial Intention	0,718**	0,692**	0,037	1

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2: Correlations of the independent variables and dependent variable of the TPB model.

6.2 Regression Statistics

The results of the single and multiple regression analysis are shown in table 3 below. The table contains the output of three regression models. For every model the unstandardized Beta coefficients and significance of the variables are reported. Also the R-squared values of each model are included in the table.

6.2.1 Original TPB model

The values under entrepreneurial intention (2) show the results for the original TPB model, with intention as the dependent variable and attitude, subjective norm, and PBC as the independent variables. The adjusted R^2 = 0.564, indicating good predictive value of the model. 56,4% of the variance in entrepreneurial intention is explained by the three antecedents of intention together. Also, the overall model seems to be quite significant, with a low p-value of 0,000. Regarding the ANOVA-results the F-value of the model is 11,801, which means that a significant part of the variance in the model is explained.

When looking at the independent variables in this model, it can be concluded that both attitude and subjective norm are significant at the 5%-level. PBC previously showed no correlation with any of the

TPB variables. Table 3 shows that PBC also demonstrates no significance as a predictor of entrepreneurial intention among this particular research population.
Regarding the unstandardized Beta coefficient of attitude and subjective norm, both seem to have a potent relationship to the dependent variable at the 5%-level of significance, with B = 0.628 and B = 0.823 respectively. As can be expected, both significant independent variables do have a positive slope.

Regression analysis

VARIABLES	Entrepreneurial intention (1)	Entrepreneurial intention (2)	Entrepreneurial intention (3)
Attitude	-	0,628** (0,246)	0,436* (0,245)
Subjective Norm	-	0,823** (0,343)	1,013*** (0,329)
Perceived Behavioral Control	-	0,229 (0,285)	0,189 (0,264)
Age	-0,031* (0,017)	-	-0,025** (0,012)
Adjusted R-squared	0,086	0,564	0,627

Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

Table 3: Simple and multiple regression analysis with age as additional variable.

6.2.2. TPB model with the additional variable age

Table 3 also shows the outcomes for both a simple regression analysis where age functions as independent variable and entrepreneurial intention (1) as the dependent variable, as well as a multiple regression analysis where age is an additional independent variable in the original TPB model (see entrepreneurial intention (3) in table 3).

The ANOVA-results of this expanded TPB model present a F-value of 11,506, with a p-value of 0,000. These values are more or less similar to those of the original TPB model and therefore the part of explained variance in the model is significant .The variance in entrepreneurial intention explained by this model is 62,7% (adjusted R^2).

The multiple regression shows that in the expanded model, age is significant at the 5%-level. Its Beta coefficient is -0,025, which means that age is negatively related to entrepreneurial intention in the model. In the expanded model subjective norm is still significant and PBC is still insignificant. Unfortunately, Attitude has become less significant due to the addition of age in the model. This is probably due to inter-correlation between the variables.

6.3 Statistical conclusion

The hypothesis that were formulated at the end of chapter 3 were:

- H1: The Attitude of inventive Makers is positively and significantly related to entrepreneurial intention in the original TPB model.
- H2: The Subjective Norm of inventive Makers is positively and significantly related to entrepreneurial intention in the original TPB model.
- H3: The Perceived Behavioral Control of inventive Makers is positively and significantly related to entrepreneurial intention in the original TPB model.

Regression analysis of the original TPB model shows that two of the three independent variables of the TPB model are significant (attitude and subjective norm). One independent variable is not significant (PBC). All three beta coefficients were positive, indicating positive relationships with the dependent variable. Therefore, support is found for H1 and H2. Although positive, PBC's relationship with entrepreneurial intention is not significant. This means not H3 is not supported. In conclusion, H1 and H2 are accepted, whereas H3 is rejected.

7. Conclusion

7.1 Discussion

The central research question formulated at the beginning of this thesis was:

- *To what extend does the Theory of Planned Behavior explain entrepreneurial intention among inventors?*

The results showed that the inventive Makers who did not start a business yet, have a neutral average intention to start one in the future. The acceptance of hypotheses 1 and 2 implicate that within the original TPB model, attitude and subjective norm are the two determining factors of this intention score. The rejection of hypothesis 3 suggests that for these Makers, PBC is not influencing their entrepreneurial intentions significantly. The TPB model explains 56,4% of the variance in entrepreneurial intention.

7.1.1. Entrepreneurial intention of inventors

As described in chapter 4.1, 21 of the 47 individuals who were identified as inventors already started their own business and commercialized their own product, or at least were in the process of setting up a business. This means that a large proportion of the inventors at the Maker Faire already acted on eventual entrepreneurial intentions from the past and turned them into entrepreneurial behavior. However, this group may also contain 'accidental entrepreneurs' (Shah & Tripsas, 2007) or entrepreneurs who 'storm the castle' in an unplanned manner.

The 26 inventive Makers that were not entrepreneurs yet, scored fairly neutral on the various variables of the TPB model. Only their attitude towards starting a business was leaning somewhat stronger towards positive with a mean score of 3.493. The entrepreneurial intention score of 2,985 is neutral, but the considerably higher standard deviation for entrepreneurial intention indicates a clearer distinction between those with high and low intention. 6 Makers had very high intentions to start a business in the future, while 9 Makers had very low intention to do the same.

The empirical results indicate that attitude and subjective norm are the most important variables when it comes to stimulating entrepreneurial intentions among inventors. Both relationships are positive, which means that the entrepreneurial intentions of inventors increase when the attitude and subjective norm towards starting a business become more positive. Intentions are assumed to be the best predictor of actual behavior. Therefore, the best way to stimulate inventors to commercialize their creations is to try and positively influence both of these determinants of entrepreneurial intention. This means that efforts on stimulating this group to become entrepreneurs should be focused on reducing negative associations with starting one's own business and increasing or strengthen one's positive associations with becoming an entrepreneur. The direct environment of these people should be part of these efforts. The insignificant relationship of PBC and entrepreneurial intention means that although inventors might feel like they have a high degree of control over the startup of a business, this does not result in a higher intention to carry out this behavior and vice versa.

7.1.2. Robustness of the TPB model

The regression data of the 26 inventors who were not entrepreneurially active yet, show interesting outcomes. Multiple regression analysis resulted in 56,4% of the variance in entrepreneurial intention explained by the three independent variables. This is score is relatively high, considering the literature review that shows an explanatory power of the model ranging from 28% to 59%. Only Kautonen (2015) found a higher R^2 among his random adult population. With inclusion of the cross-cultural study by Liñán & Chen (2009), who found the same explained variance of intention (R^2 = 56%), the aforementioned studies show the strongest support for the TPB model in explaining entrepreneurial intention of the studies reviewed in this paper.

Regarding the independent variables, attitude (B = 0.628) and subjective norm (B = 0,823) look like they have a fairly equal effect on entrepreneurial intention. Compared to the other studies reviewed earlier in this paper, the significance of subjective norm is noteworthy. Earlier studies among student samples have shown to sometimes result in insignificance of subjective norm in the model, whereas both reviewed studies on random adult populations show significant influence of subjective norm on entrepreneurial intention. The fact that subjective norm was also significant among inventors at the Maker Faire might indicate that subjective norm is less of a predicting variable among students compared to other populations.

The addition of age in the original TPB model causes some interesting results. In this expanded model subjective norm and age are significant on the 1% and 5%-level respectively. Attitude is now only significant at the 10%-level and could therefore be considered non-significant. The fact that the addition of age also changes the level of significance of other variables (attitude specifically) means that these variables inter-correlate with each other. Age in general is a variable where a lot of other variables cohere with. The explanatory power of the model increases with 6,3% when adjusted R^2's are compared. This is not particularly large, but also not negligible, considering that it's a higher increase than was found by any of the studies in the review chapter.

As opposed to the other independent variables, age has a negative relationship with entrepreneurial intention in the expanded model. This means that an inventive Maker's entrepreneurial intentions will decrease when he or she becomes older. This is a very general conclusion, because it is derived from the Beta coefficient -0,025, which is a negative slope. In practice, entrepreneurial intention of Makers could still increase in a certain age range, but generally decrease when Makers become older.

7.2 Limitations

The sample size of this research can be considered very small to use for statistical analysis, which raises the question to what extend the results found in this research truly reflect the total population of inventive Makers. As a result of the small sample size of N = 26, each respondent's answers weigh relatively strong in the results, which increases the margin of error. As a consequence, the results of this research need to be regarded as highly explorative. This research is representative for the inventors found at this specific event and generalization of the results requires additional research.

The low Cronbach's alpha for the PBC items raises concerns for the validity of this constructs measure. Also, PBC turned out to be the only non-significant independent variable in the original TPB model. Therefore, the low Cronbach's alpha for PBC might indicate that the questions for this construct were wrongly interpreted by the participants of the research and as a result influenced the

outcomes for this variable. Another explanation for the low alpha value is that the mix of self-efficacy and controllability questions for this variable results in a decreased applicability of the Cronbach's alpha measure, because self-efficacy and controllability are not necessarily expected to have similar outcomes. Kautonen (2011) experienced similar validity issues for this PBC index. To overcome this issue, future research on this topic should consider using only self-efficacy items to measure PBC. This is supported by Armitage & Conner (2001), who concluded that self-efficacy correlates stronger with intention and is a better understandable concept as well.

Another limitation is the uncertainty about how entrepreneurial intentions have to be valued. Although entrepreneurial intentions are considered the best predictor of actually starting a business, little effort has been done to underpin this assumption.

7.3 Recommendations

7.3.1. Practical recommendations

This paper started by mentioning the importance of new business creation for a healthy economy. The population that was researched in this paper shows a lot of potential for new businesses, because they already have the technology to produce new things. The research showed that attitude and subjective norm determine this group's intentions to commercialize their inventions. Thus, initiatives that change the way inventors and the people around them view the startup process in a positive matter are helping to bring more innovative products of these people to the market. One way to do this might be to bring inventive Makers in contact with inventors that successfully made the transition to business owner. Success stories might change some of the negative beliefs they have about being an entrepreneur.

7.3.2. Scientific recommendations

As mentioned in the limitations the sample size of this research was small. Therefore, the most obvious recommendation for further research is to replicate the study on a larger sample of inventors. This yields more reliable results and can validate the findings of this research. De Jong (2011) estimates that there are 9.900 active individual inventors in the Netherlands who realized an invention in the last 5 years (excluding aspiring and organizationally employed inventors).
A longitudinal study in which multiple Maker Fairs in the Netherlands are used to gather data on a larger scale is suggested. Besides increased reliability of the outcomes, this also brings the possibility to expand the original TPB model with additional variables and check for their effect on entrepreneurial intention. A longitudinal design is suggested, because of the lack of research on the assumed relationship between entrepreneurial intention and actually starting a business. By demonstrating the strength of entrepreneurial intention in predicting new business startup, the relevance of determining the antecedents of entrepreneurial intention becomes more convincing.

As argued by Liñán & Chen (2009), subjective norm is generally considered the weakest variable in the TPB when measured for various target behaviors. With respect to entrepreneurial intention, subjective norm shows some weakness with student populations. Among random adult populations or in this study among Makers, subjective norm shows to be a strong variable in the model. Therefore, further research on entrepreneurial intention should be less focused on student populations and target a wider variety of populations.

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9. Appendices

Appendix A: Questionnaire

Questionnaire: “The entrepreneurial intention of Makers”

Thank you for participating in this research! This survey is part of a bachelor thesis project on the topic of entrepreneurship. I am a International Business Administration student at the University of Twente. During this Maker Faire I ask as many Makers as possible about their entrepreneurial intentions, which is the topic of my project. Filling out the survey only takes a few minutes. All results will be processed anonymously.

Please indicate your opinion on the following statements by circling the correct answer
(Invention)

My product is made to solve a specific problem:	Yes / No
My product is based on a creative idea/act of insight:	Yes / No
My product is something new or an improvement of an existing product:	Yes / No
The product is developed with the needs/demands of end users in mind:	Yes / No

Please indicate your opinion on the following statements (on a scale from 1 to 5; 1 = strongly disagree, 5 = strongly agree)

(Intention)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I plan to start a business	❑	❑	❑	❑	❑
I have the firm intention to start a business	❑	❑	❑	❑	❑
I will try to start a business	❑	❑	❑	❑	❑
I am looking forward to start a business	❑	❑	❑	❑	❑
I have seriously thought of starting a business	❑	❑	❑	❑	❑

Please indicate your opinion on the following statements

(Subjective Norm)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My closest family members think that I should start a business	❑	❑	❑	❑	❑
My best friends think that I should start a business	❑	❑	❑	❑	❑
My colleagues think that I should start a business	❑	❑	❑	❑	❑
People who are important to me think that I should start a business	❑	❑	❑	❑	❑

How much would you care about what these people think, if you wanted to start a business

(Subjective Norm)	Not care at all	Not care	Neutral	Care some	Care a lot
Your closest family	❑	❑	❑	❑	❑
Best friends	❑	❑	❑	❑	❑
Colleagues	❑	❑	❑	❑	❑
People important to me	❑	❑	❑	❑	❑

Please indicate your opinion on the following statements

(Perceived behavioral control)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
If I wanted to, I could start a business.	❑	❑	❑	❑	❑
I can control the creation process of a new business	❑	❑	❑	❑	❑
It would be easy for me to start a business.	❑	❑	❑	❑	❑
No factor that I cannot influence myself, would prevent me from starting a business	❑	❑	❑	❑	❑
I know the necessary practical details to start a business	❑	❑	❑	❑	❑

Please rate the following statement based on the word pairs provided: 'For me, starting a business would be … (scale from 1 to 5; 1 = very negative, 5 = very positive) (Attitude)

unpleasant	❑	❑	❑	❑	❑	attractive
useless	❑	❑	❑	❑	❑	useful
foolish	❑	❑	❑	❑	❑	wise
negative	❑	❑	❑	❑	❑	positive
insignificant	❑	❑	❑	❑	❑	important
tiresome	❑	❑	❑	❑	❑	inspiring

Please answer the following question by circling the correct answer. (Demographics/Background variables)

Highest finished education: LBO / MAVO / VMBO / MBO-1 / AVO-ONDERBOUW / HAVO / VWO / MBO-2-4 / HBO / WO bachelor / WO master / PhD

Educational category: Agriculture / Engineering / ICT / Economics & Business / Healthcare / Behavior & Society / Education / Language & Culture / Law & Public order / Transport & Logistics / other:…….....

Current occupation: unemployed / self-employed / organizationally employed / retired / student / homemaker / other…….. . _____

Have you ever or are you currently actively involved in running or starting a company: Yes / No

Are any of your close family members running their own company: Yes / No?

Gender: M / F // age: _____ years

Nationality: _____

End of survey. Thank you very much!

Appendix B: Expanded TPB model