

ANALYSIS OF THE INNOSUISSE START-UP TRAINING IN A THEORY OF PLANNED BEHAVIOR FRAMEWORK¹

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DOI: 10.22163/fteval.2020.468

ABSTRACT

The present paper analyzes the Innosuisse start-up training program in an empirically well-tested socio-psychological model, the Theory of Planned Behavior (TPB). The aim is to answer the question, whether the training modules (aiming at high-tech start-ups) enhance the participants' intention to found a business, and which determinants contribute to a change in this intention. Data has been collected in three consecutive surveys for all courses offered in the years 2016 and 2017. The estimation results indicate that those who feel empowered show a higher intention, while others realize during the course that a business foundation is not what they really want (at that point of time). The largest impact on the change in the intentions to found a business comes from the perceived behavioral control of the participants, i.e. the knowledge about running a business; to a somewhat lesser extent, but

still significantly positive, is the perceived social support. Overall, the Innosuisse start-up training helps student and university members to come to a more informed decision in favor or against a potential business formation and to develop their skills and knowledge.

BACKGROUND

The Innosuisse start-up training aims at supporting students and university members who are interested in setting up knowledge-intensive and technology-based firms. The general program objectives comprise (1) the fostering of an environment that allows young knowledge-intensive firms to develop successfully, (2) the promotion of an entrepreneurial mind-set at Swiss universities and (3) the conduct of practice oriented and interconnected training modules for students, university members and young (student) entrepreneurs (Kägi et al., 2018).

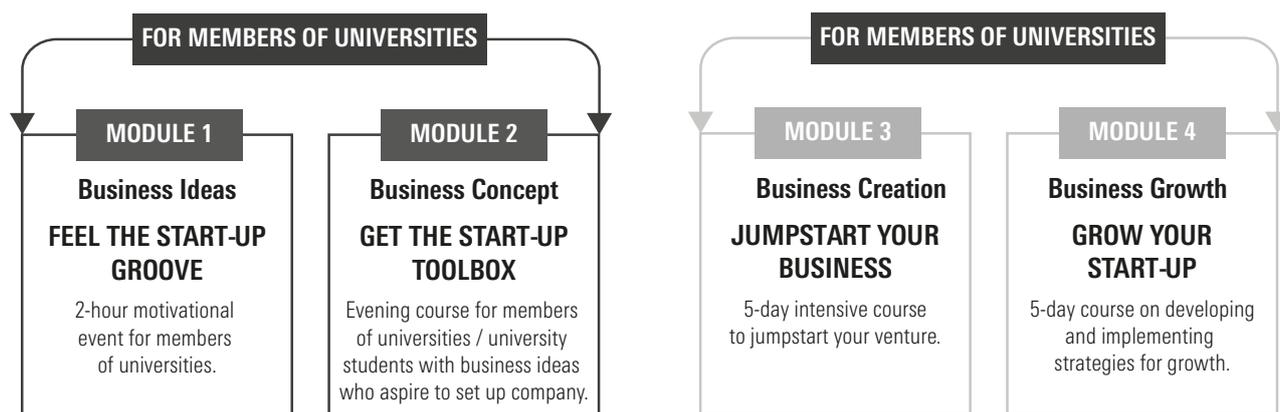


Figure 1: Start-up training modules 1-4

Source: <https://www.innosuisse.ch/inno/en/home/start-and-grow-your-business/start-up-training.html> (16.10.2019)

¹ This paper draws on the evaluation report by Kägi, et al. (2018). We thank our collaborators from BSS Research and Consulting for their contributions during the study, and our client from Innosuisse for constructive discussions. During the evaluation period, the name of the program was 'CTI Entrepreneurship Training Program'.

The four modules are:

- **Module 1:** Awareness raising for entrepreneurship in the knowledge- and technology-based sector; focus on members of universities and universities of applied science: students, doctoral students, postdocs, research fellows; duration two hours
- **Module 2:** Provision of skills for founding a business, identification of promising business ideas, encouragement of the participants to start their own business, promotion of an entrepreneurial spirit; focus on members of universities and universities of applied science: students, doctoral students, postdocs and research fellows with an entrepreneurial idea in the knowledge- and technology-based sector; duration ten evening sessions à four hours (one semester)
- **Module 3:** Assessment of the market potential of business ideas, identifying success factors and common pitfalls, planning and realizing business ideas; focus on business founders (shortly before or after setting up their company); duration five days spread over several weeks
- **Module 4:** Moving from the first clients and partners to a growing company; focus on founders and heads of knowledge- and technology-based companies already operating in the market; duration five days spread over several weeks

On behalf of the Swiss Commission for Technology and Innovation (KTI, since 2018 Innosuisse), BSS Research and Consulting and the Austrian Institute of SME Research were commissioned to perform a program evaluation of the start-up training program “CTI Entrepreneurship” (today “Innosuisse start-up”). The evaluation was carried out in the years 2016 to 2018 and used a mix of qualitative and quantitative methods. It covers the years 2016 and 2017 and analyzes the structure of the participants, the conception, realization and effect of the modules two to four. The training modules were offered by five leading institutions (universities, universities of applied sciences, business parks) and 29 partner institutions in four Swiss regions (Zürich East, Region Central, Region West and Tessin) (Kägi et al., 2018).²

In this paper, we focus on the direct outcome of the courses, which is the immediate behavioral effect on the target group, i.e. whether the course participants intend to take the next steps towards entrepreneurship. We could not observe during this study whether the course participants really set-up a business (impact), because this requires often a longer time horizon. The time from the first business idea to its successful implementation may even take several years and an impact analysis could thus be a fruitful task for future research.

In the following, we introduce the theoretical framework and its incorporation into the program’s intervention logic. Second, we give an overview of the data. In a third step, we describe the regressions and present selected estimation results including its interpretation.

THE THEORY OF PLANNED BEHAVIOR

The empirical evaluation of the effect of the start-up training on the participants builds on the Theory of Planned Behavior (TPB), an empirically well-tested model from socio-psychology (Ajzen, 1991). According to the model, the intention to perform a certain behavior in a specific context can be explained and predicted by the attitude towards this behavior, the individual’s subjective norm (the influence by important others) and its perceived behavioral control (PBC).

Attitude refers to the individual subjective perception, sensation and assessment of a certain behavior and its desirability. In contrast to this inner appraisal, subjective norm accounts for social factors such as the perceived social support, disapprobation or pressure for a specific behavior from the closer social environment (friends, family or peers). Perceived behavioral control, as the third component, refers to the perception of the ease or difficulty to perform the behavior of interest. It describes one’s confidence in the ability to perform a behavior and can be influenced by the individual’s choice of activities and the preparation for an activity, the expended effort, the thought patterns and emotional reactions. On these grounds, the elements of perceived behavioral control can be stimulated through education and training.

As is shown in Figure 2, the three factors attitude, subjective norm and PBC can encourage or discourage the intention to perform a behavior. In addition, the TPB assumes that the PBC not only affects a certain behavior via the channel of intentions, but also exhibits a direct effect on the behavior, which is in our context the founding of a business. Due to this twofold effect, perceived behavioral control is regarded as the most important component of the TPB.

The following Figure shows a part of the overall intervention logic (output to impact) of the program, in which the TPB is embedded. Nationwide coverage, the participation of the target group (i.e. the intended outreach of the program) and the quality of the training are the direct outputs of the program implementation. These outputs should translate into outcomes in the target (treatment) groups. We focus in this article solely on the (measurable) changes in attitude, subjective norm, perceived behavioral control and intentions. The empirical results from other studies show that intentions constitute a reliable indicator for future entrepreneurial behavior (e.g. Heuer and Kolvereid, 2013, Liñán and Fayolle, 2015, Miralles et al., 2016).

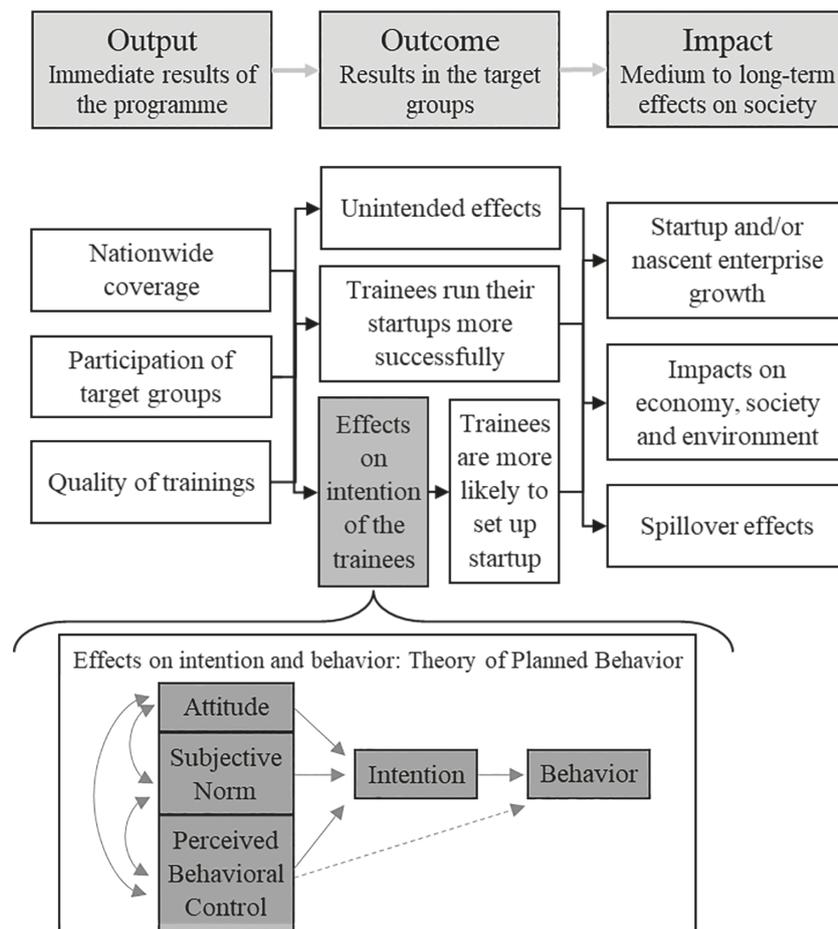


Figure 2: Embedding the TPB to capture the course outcomes in the intervention logic
Illustration by Kägi et al. (2018); TPB: Ajzen (1991)

DATA AND DESCRIPTIVE STATISTICS

Following the conceptualization of the study, the data was collected by BSS Research and Consultancy in specifically designed surveys. For modules two, three and four, the course participants were asked to answer three surveys: the first at the beginning of each course (QI), the second asks the same items after the end of the course (QII) and the third survey six months after completion of the training program (QIII). Five questions relate to the participants' attitude towards creating an own business, three items measure subjective norm, another three items focus on perceived behavioral control. Intention was measured using four items. Additional control variables are gender, age, the parents' entrepreneurial background, previous work experience in a small or newly founded firm and educational attainment.

In this article, we present only the results for module 3; the results for module 2 are qualitatively and quantitatively similar. Due to the low number of participants in module 4, it cannot be analyzed in the structural equation framework.

In the evaluation period 2016 and 2017, all 678 participants of module 3 were invited via email to complete the survey. The first questionnaire at the beginning of the course was answered by 451 participants (67%), the second survey by 402 (60%) and by 201 (30%) in the third wave six months after the course. Due to missing answers, another 30% of the observations were discarded from the sample. Table 1 shows the descriptive statistics of the assessment in QI for the final sample of 347 participants answering the first and the second survey, and 158 individuals answering all three surveys. The values for both samples are very similar, so that we can rule out that our results are driven by the group composition of the respondents.

	QI ∩ QII	in %	QI ∩ QII ∩ QIII	in %
Intention				
Choice: own business vs. employee	6.16		6.24	
Goal: creating a business one day	5.99		5.98	
Readiness: to do anything to become an entrepreneur	5.30		5.28	
Likelihood: Incorporate/register a company in the next 2 years	5.96		6.08	
Attitude				
Disappointing – Rewarding	6.36		6.35	
Bad for me – Good for me	6.22		6.22	
Worthless – Worthwhile	6.46		6.44	
Negative – Positive	6.43		6.46	
Harmful – Helpful	6.18		6.13	
Subjective Norm				
Support of your family	5.60		5.72	
Support of your friends	5.51		5.58	
Support of your colleagues	5.23		5.28	
Support of your entrepreneurial peers	5.59		5.72	
Perceived Behavioral Control				
Decision Making: Decision making under risk and uncertainty	5.34		5.33	
Probability of Success: Probability of succeeding with an own firm	5.05		5.10	
Time Sacrifice: Sacrifice the necessary time and energy to the project	5.97		6.12	
Background/Control variables				
Female	80	23.1%	38	24.1%
Age	34.9		35.3	
Entrepreneurial parents	122	35.2%	58	36.7%
Previous work experience	180	51.9%	85	53.8%
Student Uni	11	3.2%	8	5.1%
Student A.S.	19	5.5%	10	6.3%
Graduate Uni	61	17.6%	40	25.3%
Graduate A.S.	41	11.8%	23	14.6%
Foreign education	22	6.3%	14	8.9%
Other education	24	6.9%	17	10.8%
Education missing	169	48.7%	46	29.1%
N	347		158	

Table 1: Descriptive statistics, Module 3 (means)

Source: Kägi et al. (2018), own calculations

A.S. ...University of Applied Sciences. All variables (excluding background variables) ranked on a 7-point Likert scale with higher values corresponding to a better assessment. The table displays the means of the variables and, where possible, the shares of total.

In general, the participants' intentions to become an entrepreneur are very high – especially the choice for starting a business – while there is less agreement on the readiness to do anything to become an entrepreneur. Also, the attitude towards entrepreneurship is very high and only little variation can be found between the five measured items. The perception of the support from the closer social environment is slightly lower and more heterogeneous. Also the PBC items are assessed quite heterogeneously – while the participants are highly willing to sacrifice the necessary time and energy, they rate their abilities of decision making under risk and the probability of succeeding with his or her own firm lower (but still at a high level).

Between the two surveys QI and QIII (see Table 2), we observe significant and quantitatively large decreases in the intention items on the likelihood of creating a business in the next two years and the trainees' readiness to do everything to become an entrepreneur. For the items of perceived behavioral control, the trainees report a significant increase in their perceived probability of succeeding with an own firm and at the same time a significant and large decline in the assessment of the willingness to sacrifice the necessary time and energy for running a business. These findings already indicate that the training may have caused a somewhat more realistic assessment of entrepreneurship: trainees learned about the required time and effort and that they might not be willing or able to make these contributions; those who still wish to become an entrepreneur now feel a higher probability of succeeding (see also Oosterbeek et al., 2010). This is supported by a significant increase in the valuation that running an own business is worthwhile.

	QI	QIII	Change
Intention			
Choice	6.16	6.17	0.01
Goal	6.00	6.02	0.02*
Readiness	5.38	5.23	-0.15**
Likelihood	6.00	5.36	-0.64***
Attitude			
Disappointing – Rewarding	6.35	6.35	0.00
Bad for me – Good for me	6.22	6.24	0.02
Worthless – Worthwhile	6.44	6.54	0.11**
Negative – Positive	6.46	6.41	-0.05
Harmful – Helpful	6.13	6.12	-0.01
Subjective Norm			
Support of your family	5.72	5.48	-0.24
Support of your friends	5.58	5.44	-0.13
Support of your colleagues	5.28	5.03	-0.25
Support of your entrepreneurial peers	5.72	5.50	-0.22
Perceived Behavioral Control			
Decision Making:	5.33	5.45	0.11
Probability Success	5.10	5.29	0.20*
Time Sacrifice	6.12	5.72	-0.40*

Table 2: Change in the TBP-items between surveys QI and QIII

Source: Kägi et al. (2018), own calculations. N=158; significant differences for p-values<0.1: *...p-value<0.1, **...p-value<0.05, ***...p-value<0.01

ESTIMATING THE TPB IN A STRUCTURAL EQUATION MODEL

We test the Theory of Planned Behavior with a structural equation model (SEM) as in Carr and Sequeira (2007), Lortie and Castogiovanni (2015) or Zapkau et al. (2015), using ordinary least squares regressions. For the estimation, we first aggregate the relevant items of each factor. Applying (standardized) Cronbach's Alpha as a selection criterion, we identify which items should be used. The higher the value of Cronbach's Alpha, the more consistently the items capture the underlying theoretical construct. The measure should exceed 0.7, but as the calculation involves the number of items, the threshold declines in a setting with only few items per factor (Rosendahl Huber et al., 2014).

For the trainees of module 3 answering all questionnaires, Cronbach's Alpha ranges between 0.62 and 0.87 in QI, with the lowest values for the items of intention and highest for the attitude items. For the data collected in QIII, Cronbach's alpha increases strongly for the intention items and decreases for those of PBC, especially decision making under risk and probability of success. Overall, the consistency of most of the items increases after the course, such that we use all items for the calculation of the factors attitude, subjective norm and perceived behavioral control for the estimation of the structural model.

Figure 3 shows the share of participants with changing assessments between the surveys in QI and QIII for the aggregated items of attitude, subjective norm and PBC, and separately for the items of intention – the dependent variables of the subsequent regressions. Interestingly, the determinants of intentions show a larger variation between the beginning of the course and six months later than the measures of intention; especially the choice to become an entrepreneur is very stable. Taking into account the level of change as reported in Table 2 it appears that for the items of subjective norm and attitude, the positive and negative changes outweigh each other.

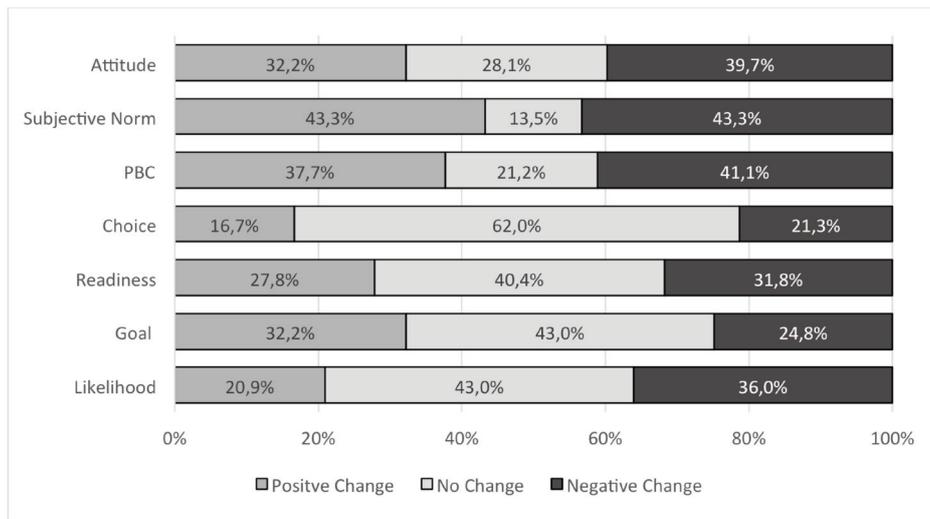


Figure 3: Percentage of respondents changing their assessment (QI-QIII, Module 3)
Source: Kägi et al. (2018), own calculations. N=158

The data allows us to perform an innovative approach in the TPB framework. To our knowledge, the analyses usually apply the TPB approach by using the absolute levels of the relevant items and factors. Our panel data structure allows us to use the relative change over time in the estimation. Thereby, we can observe the dynamics in the TPB, e.g. whether an increase in perceived behavioral control causes an increase in the intention to become an entrepreneur instead of looking at the determinants of entrepreneurial intentions in levels. In this sense, the model combines a before-after comparison with a structural equation model.

For the explanatory variables, we aggregate the change for each item and respondent between QI and QIII for the factors attitude, subjective norm, perceived behavioral control, and take the mean (average change per person). Further control variables (measured in levels) are the entrepreneurial background of the parents, work experience in a small or newly founded firm, age, gender and the region (serves as a university-dummy). Due to missing values due to the different survey applications across the Swiss regions, we are not able to properly control for the educational background.

Table 3 shows the regression results from OLS estimation with heteroscedasticity-robust standard errors for the intention items “my professional goal is to create a business someday” (panel 1) and “I am ready to do anything to be an entrepreneur” (panel 2). In panel 1, all three TBP-factors exhibit a significantly positive effect on the intention to create a business with the quantitatively largest effect for perceived behavioral control. Even when we include all three TPB-factors in the regression (column 4), the coefficient of PBC remains unchanged and is still significant. In columns 3 and 4 that control for the change in subjective norm, the dummy variable for females turns significant. This could indicate that once we take into account the perceived support from the close environment, females have less often the goal to become an entrepreneur (even among those who participate in the courses; their share is only about 25%). The effect of previous work experience is significantly negative in all regressions. An explanation is that a potential positive impact of previous work experience runs indirectly via the TPB-variables and that the remaining effect on intention is negative (Miralles et al, 2015).

Panel 1	My professional goal is to create a business someday			
	(1)	(2)	(3)	(4)
Female	-0.362	-0.464	-0.899**	-0.779**
Age	0.021	0.019	0.003	0.013
Entrepreneurial Parents	-0.032	0.053	0.143	0.089
Previous Work Experience	-0.457*	-0.490*	-0.737**	-0.651**
Perceived Behavioral Control	0.152***			0.151**
Attitude		0.074**		0.026
Subjective Norm			0.063*	0.033
N	133	134	92	86
Adjusted R2	0.114	0.071	0.141	0.251
F Statistic	3.432***	2.462**	3.137***	4.162***
Panel 2	I am ready to do anything to be an entrepreneur			
	(1)	(2)	(3)	(4)
Female	-0.091	-0.217	-0.366	-0.239
Age	0.011	0.008	-0.007	0.010
Entrepreneurial Parents	-0.071	-0.0001	-0.147	-0.186
Previous Work Experience	0.099	0.025	-0.192	-0.209
Perceived Behavioral Control	0.236***			0.200***
Attitude		0.135***		0.065
Subjective Norm			0.096***	0.040*
N	135	136	94	88
Adjusted R2	0.169	0.132	0.064	0.306
F Statistic	4.881***	3.922***	1.907*	5.256***

Table 3: Structural equation model of Module 3

Source: Kägi et al. (2018), own calculations

All TBP-variables are measured as the average sum of changes between QI and QIII; significant differences for p-values<0.1: *...p-value<0.1, **...p-value<0.05, ***...p-value<0.01 with robust standard errors. All regressions include regional dummies and a constant term.

In panel 2, only the TBP-factors have significant effects on changes in the intention to do anything to become an entrepreneur – the estimated coefficients are qualitatively and quantitatively similar to those in panel 1. Attitude and subjective norm exhibit, as in panel 1, as significantly positive effect when included separately in the regression but turn insignificant (less significant, panel 2) in column 4 due to multicollinearity. Overall, regarding the size and significance of the estimates as well as the share of explained variation, the estimation works best for the intention item readiness that shows the largest change between the two measurement points (the same holds for the intention-item likelihood, not reported in the table). Finally, robustness checks limiting the sample to those observations included in the regressions in column 4 show that the results are not driven by the sample size and composition. Using data collected in QII rather than QIII leads to smaller and largely insignificant estimates; this is plausible as the QII survey was conducted right after the course and the descriptive statistics show that the (full) change in the participants' assessments only appears with a time lag.

SUMMARY AND CONCLUSIONS

The paper presents the estimation results of a structural equation model using the Theory of Planned Behavior, performed in course of the impact analysis of the Innosuisse start-up training program (Kägi et al., 2018). The start-up training (called "CTI-Entrepreneurship Training Program" during the evaluation period) aims at supporting students and university members interested in setting up knowledge-intensive and technology-based companies by offering four different course modules. For modules two to four, the participants completed three surveys, the first at the beginning of the course, the second right after the course and the third six months after the course.

The panel structure of the data allows us to relate the change in the intention to become an entrepreneur to the changes in attitude, subjective norm and the perceived behavioral control of the course participants. The estimation results confirm the hypotheses of the Theory of Planned Behavior. The structural equation models show that an increase in the perceived behavioral control (i.e. the necessary skills) leads to a statistically significant increase in the intention to become an entrepreneur. This is particularly visible for Module 3, where participants already have tangible business models in their mind or are already in the process of setting up their business. Thus, they benefit from this five-days-course mainly by training their (perceived) skills. While also their attitude and the perceived support from the social environment change over time, these factors are at this stage less important for the formation of intentions.

Overall, if the course participation causes a change in the Perceived Behavioral Control, and these changes relate to the intention to become an entrepreneur, then we can conclude that the training program successfully contributes to the participants' being able to make a more informed choice about them becoming an entrepreneur, to enhance the entrepreneurial spirit for those who decide in favor of it, and to progress on their way toward fulfilling their intention by equipping them with the necessary skills. However, as the analysis does not involve a control group and thus is not able to account for unobserved heterogeneity between participants and non-participants, the results have to be interpreted with care.

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KEYWORDS:

Entrepreneurship training, Theory of Planned Behavior, structural equation model