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The implications of entrepreneurs' previous experiences on using a scientific approach to decision making: Evidence from a randomized control trial

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ABSTRACT

This study aims to investigate if previous managerial or entrepreneurial experiences of entrepreneurs could moderate the use of a scientific approach to decision-making. To test this, we embedded a field experiment involving 132 real start-ups from Italy. We collected data on performances using phone calls for 64 weeks. Using econometrics analysis, we find that previous managerial or entrepreneurial experiences moderate the effect of this entrepreneurial decision-making approach on start-up performances, such as whether they decided to terminate their entrepreneurial idea, the number of pivots and the amount of revenue gained. The moderating effects differ according to the experiences possessed by entrepreneurs.

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1 INTRODUCTION

Entrepreneurs face several issues when starting and developing their entrepreneurial ideas, especially in the early-stage phase, which involves several critical decisions (Gans et al., 2019).

These critical decisions range from deciding to hit the market, changing core parts of their business or whether or not to give up on their entrepreneurial idea (Camuffo et al., 2020; Gimeno et al., 1997). According to previous literature, entrepreneurs can take these decisions using different approaches to decision-making, ranging from more structured approaches to less structured (Dencker et al., 2009; Sarasvathy, 2001; Camuffo et al., 2019). Focusing on critical decisions, previous studies have shown how using a scientific approach to decision-making can influence decisions regarding whether or not to hit the market, to pivot or to terminate an entrepreneurial idea. Entrepreneurs using a scientific approach to entrepreneurial decision-making act like scientists do in developing and testing their hypotheses in labs. More precisely, entrepreneurs using this approach ground their decisions on hypotheses carefully elicited from a theory they build (Felin et al. 2019) and on thoroughly built evidence, thus mitigating the risk of incurring false positive and false negative decisions (Camuffo et al. 2019). Building on this, entrepreneurs using this approach seem to terminate more their entrepreneurial idea, pivot less – i.e. change a core part of their business model - and gain much more revenue than other entrepreneurs (Camuffo et al., 2020, Camuffo et al., 2019).

On the other hand, these critical decisions could also be influenced by human capital of entrepreneurs (Ott et al., 2017). Previous studies show how previous managerial experience can increase the likelihood of carrying on with an entrepreneurial idea compared to other entrepreneurs (Gimeno et al., 1997). In the same vein, previous entrepreneurial experience seems to lead entrepreneurs to gain higher performances and survive more. (Cooper et al., 1994).

Despite the previous knowledge on approaches to entrepreneurial decision-making and entrepreneur's human capital, we have few pieces of evidence on how human capital – like previous managerial or entrepreneurial experience - might influence the use of an approach to entrepreneurial decision making, such as scientific approach to decision making. Entrepreneurs usually rely on their previous experiences to develop strategies and make critical decisions when operating in an unknown market (Hashai

and Zahra, 2021). Similarly, they can leverage an approach to decision-making to gain critical information about the value of their entrepreneurial idea and their customers. Despite this, we still do not have evidence on whether these previous knowledge gained during their experiences might moderate the adoption of an entrepreneurial decision-making approach, improving or not the performances of the entrepreneurs using it. Building on this, this research aims to understand if entrepreneurs' previous managerial or entrepreneurial experience could moderate the adoption of a scientific approach to decision-making and impact start-up performance, such as termination of the start-up, number of pivots, and revenues.

RQ: Do previous managerial experiences or entrepreneurial experiences moderate the use of a scientific approach to entrepreneurial decision making?

This study aims to offer several contributions. Firstly, we aim to shed a first light on how entrepreneurial decision-making approaches – like scientific approach to decision-making – could lead to different outcomes according to entrepreneur's previous managerial or entrepreneurial experience. Secondly, we aim to offer contributions to the entrepreneurial education field. This work shows how both novice and experienced entrepreneur can benefit from learning and using an entrepreneurial decision-making approach. Furthermore, we show how the benefits differ depending on whether entrepreneurs have previous experience or not. Finally, this study might offer governments, policy-makers, and universities interesting results on the impacts of entrepreneurship courses on early-stage start-up's performances. Moreover, it shed light on how teaching the same approach to different entrepreneurs could lead to different outcomes. In this vein, we hope to provide governments, policy-makers, and universities with useful evidence on the effects of the entrepreneurial programs.

2 METHODOLOGY

2.1 Empirical Setting

To study the moderation effect between previous managerial or entrepreneurial experience and the use of a scientific approach to decision making, we replicate the experimental settings presented in Camuffo et al. (2019) and Camuffo et al. (2020).

Accordingly, we embed a field experiment in a pre-accelerator program by randomly assigning entrepreneurs to either a treatment (being taught how to use a scientific approach when developing a business idea) or a control group (being taught how to develop a business idea). This pre-accelerator program provides training to early-stage entrepreneurs for a short period of time (three months). Inspired by these previous works, we targeted early-stage entrepreneurs. We launched a call for applications at a national level involving both online and offline channels. The call for applications lasted two months and resulted in 149 applications. After the call for application, we excluded seven applicants as they were already in a later stage of the development of their start-up. Our initial sample thus included 142 start-ups admitted to the program. Using STATA software, each start-up was randomly assigned to either a treatment or a control group through simple randomization. We checked using t-tests that treatment (71 start-ups) and control groups (71 start-ups) were balanced on several key covariates, such as previous experience level at both team and leader level, that might affect the absorption of the treatment and subsequent outcomes. Just before the beginning of the program, 10 start-ups decided not to take part in the training. We checked for the balance check and the randomization was still robust on the covariates. The final sample was composed of 132 start-ups, 67 in the treated group and 65 in the control group.

Treated and control teams were trained during seven sessions from October 2018 to February 2019 (21 hours of training for each group). Our pre-accelerator program focused on market validation, a series of activities aimed at testing the desirability of a product or service concept against a potential target market. The content and length of each session were the same for both groups, but start-ups in the treatment group were taught how to take entrepreneurial decisions according to the scientific approach. In each class of the treatment group, start-ups were taught to elaborate a theory behind their choices, articulate hypotheses and test them rigorously. The control group, instead, did not learn about the scientific approach but followed the traditional approach to decision-making used by entrepreneurs. We avoid contamination and other threats to internal validity by following the same approach as Camuffo et al. (2019).

Data collected refers to 132 real early-stage start-ups operating in Italy. We performed a two steps data collection. The first step began before the training, during the call for application. Before enrolling in the program, we asked to the leader of the start-up to fill a pre-survey concerning information about her start-up and the founding team. The information refers to the demographic and human capital of the founding team - such as the years of entrepreneurial experience of each member of the team - and information about the start-up, such as industry, when its development was started and if it has already gained revenue. These data were used to randomize the start-ups between treatment and control groups and create the variables for the econometrics analysis.

As far as post-training data are concerned, data collection lasted approximately one year, involving 18 points of observations. Data were gathered through phone interviews led by the research assistants (RAs). Data collection involved data referred to start-up performances, such as the amount of revenue gained, wherever they had quitted their entrepreneurial idea or they have changed a core part of their business model. Phone interviews were lead using a semi structured approach. The interviews started after six weeks from the beginning of the program. The first four interviews were lead every two weeks, while the remains were performed every four weeks.

2.2 Variables

We use three main categories of dependent variables to test our hypothesis. The three categories of dependent variables refer to the decision of terminating a start-up, the number of pivots – i.e. if they have changed some key components of their value proposition or their target customers- and the amount of revenue gained. Table 2.2.1 reports the descriptions of the three dependent variables.

Table 2.2.1 : Dependent Variables

Variable	Description
Quit	Binary variable equal to 0 until entrepreneurs quit their idea (they abandon the program and cease their start-up), 1 when entrepreneurs decide to exit. Missing after they quit

Number of pivots	Binary variable equal to 1 when an entrepreneur makes a pivot, 0 elsewhere
Revenue Flow	Amount of revenue earned by the start-up

We developed the econometric analysis using four explanatory variables, one related to the use of the scientific approach to decision-making and the remains related to the human capital of the leader of the start-up. The first explanatory variable is the *Intervention*. *Intervention* was used to discriminate between treatment and control group. This is a binary variable which takes the value 1 when a start-up has been taught how to use a scientific approach to decision making, and 0 elsewhere. As far as human capital is concerned, we defined two independent variables to assess whether a leader of a start-up had previous managerial or entrepreneurial experiences. We define these two variables using data related to the experiences of the leader gained in the pre-surveys. The first dummy variable, *No Managerial Experience*, is equal to 1 if the leader of the start-up has no managerial experience and 0 elsewhere. In the same vein, *No Entrepreneurial Experience* is equal to 1 if the leader of the start-up has no entrepreneurial experience and 0 elsewhere. Table 2.2.2 shows the independent variables used in the econometrics analysis.

Table 2.2.2 : Independent Variables

Variable	Description
Intervention	This is a binary variable equal to 1 for start-ups in the treatment group, and 0 otherwise.
No Managerial Experience	This is a binary variable taking the value 1 if the leader of the founding team has no managerial experience, 0 elsewhere
No Entrepreneurial Experience	This is a binary variable taking the value 1 if the leader of the founding team has no entrepreneurial experience, 0 elsewhere

3 RESULTS

All the regressions include control for time and instructors and errors are clustered by firms.

Table 3.1: Regression Analysis, Dependent Variable = Quit, Number of pivots, Revenue

	(1)	(2)	(3)	(4)	(5)	(6)
	DV = Quit	**DV = Quit**	**DV = Number of pivots**	**DV = Number of pivots**	**DV = Revenue**	**DV = Revenue**
VARIABLES	Linear Probability Panel	Linear Probability Panel	Linear Probability Panel	Linear Probability Panel	Linear Probability Panel	Linear Probability Panel
No Intervention X Has Managerial Experience	-0.024		-0.043		118.213	
	(0.296)		(0.139)		(0.238)	
Intervention X Has Managerial Experience	-0.018		-0.046		469.840**	
	(0.354)		(0.113)		(0.042)	
Intervention X No Managerial Experience	0.053*		-0.053**		174.153	
	(0.094)		(0.029)		(0.327)	
No Intervention X Has Entrepreneurial Experience		-0.018		0.026		21.430
		(0.368)		(0.408)		(0.802)
Intervention X Has Entrepreneurial Experience		-0.018		-0.018		513.186**
		(0.345)		(0.477)		(0.036)
Intervention X No Entrepreneurial Experience		0.052*		-0.017		95.816
		(0.078)		(0.413)		(0.504)
Constant	-0.014	-0.019	0.447***	0.420***	224.132	268.194
	(0.482)	(0.277)	(0.000)	(0.000)	(0.428)	(0.356)
Observations	1,817	1,817	1,817	1,817	1,817	1,817
Number of id	132	132	132	132	132	132
Dummies for mentors	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	-	-	-	-	-	-
Dummies for interviews	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Errors	Firms	Firms	Firms	Firms	Firms	Firms

Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1

Model (1) and Model (2) show the results for the likelihood of terminating a start-up. As far as managerial experience is concerned, it seems that the intervention is more efficacy on start-ups which are led by a leader without previous experience as a manager. Moreover, the moderating effect between intervention and not having

previous experience as a manager has a positive and significant effect on the decision of terminating the start-up. In a similar vein, start-ups led by a leader without previous experience as entrepreneurs and using a scientific approach to entrepreneurial decision-making are more likely to terminate their start-up than the other entrepreneurs in the sample.

Model (3) and Model (4) show the results on number of pivots made by entrepreneurs. Model (3) shows a negative and significant effect of the moderation between not having previous experiences as manager and the intervention. Thus, it seems that entrepreneurs without previous experiences as manager benefit more from using a scientific approach to decision-making, making fewer pivots than other entrepreneurs. On the other hand, the moderation effect among intervention and previous experiences as entrepreneur seems not to affect the number of pivots made by an entrepreneur.

Model (5) and Model (6) show the results concerning the moderating effect of being treated and previous managerial or entrepreneurial experience. As we can observe from Model (6), it seems that treated start-ups with a leader with previous experiences as an entrepreneur benefit more from using a scientific approach to decision making. The moderation between the intervention and previous entrepreneurial experience has a positive and significant effect on the amount of revenue gained by the start-up. As far as leaders without previous entrepreneurial experience are concerned, the moderation shows a positive but non-significant effect on revenue. In the same vein, there is a positive moderation effect between previous managerial experience and intervention. Entrepreneurs with previous managerial experience who use a scientific approach to decision-making seem to gain more revenue than other entrepreneurs in the 18 point of observation.

4 CONCLUSION

Our study shows the results of a field experiment involving 132 early-stage start-ups from Italy. We find evidence that the use of a scientific approach to decision-making is moderate by the previous managerial and entrepreneurial experiences of an entrepreneur.

This study offers contributions to academics, practitioners and policy-makers. At first, this paper gives contributions to the literature regarding the scientific approach to decision-making. Our results provide insights on the use of this approach to decision-making, suggesting that its outcomes are moderated by the human capital of the entrepreneurs. On the one hand, entrepreneurs without previous managerial or entrepreneurial experiences using a scientific approach to decision-making seem to terminate more their entrepreneurial idea. On the other hand, entrepreneurs with previous managerial or entrepreneurial experience seem to benefit more from an economic point of view when using a scientific approach to decision making, gaining more revenue.

Secondly, this work gives insides to the entrepreneurial education field. This work shows how both entrepreneurs with previous experience or without experience can benefit from learning a specific approach to decision making. Moreover, entrepreneurs using a scientific approach to decision-making seem to gain superior performances than entrepreneurs who use a more classical approach to take their decisions. These results give a further understanding on how entrepreneurial education can be effective for entrepreneurs with or without previous experiences and which approach can be more beneficial for them. In the same vein, this work shows that teaching the same entrepreneurial approach could lead to different results based on the human capital of entrepreneurs. Finally, this work gives interesting insights to policy-makers and universities. Entrepreneurs seem to gain different benefits when using a scientific approach to decision making according to their previous experiences. Entrepreneurs without previous managerial or entrepreneurial experience seem to terminate more their entrepreneurial idea when they use this approach, while entrepreneurs with these experience seem to gain a superior amount of revenue. These results might be important evidence for policy-makers and universities involved in creating entrepreneurial education programs. Based on their own goals, universities and policy-makers could set up course on scientific approach to decision making focused on novel or more experienced entrepreneurs to boost the outcomes related to this approach.

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