Entrepreneurial Profile. A Confirmatory Factor Analysis of Entrepreneurial Attitude Orientation Scale (EAO) in Peruvian University Students

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Abstract: - Entrepreneurship is a possible solution that can guarantee labour insertion, but also allows its inclusion in disparate societies. also allows its inclusion in disparate societies. The aim of the study was to validate by means of a confirmatory factor analysis a measurement model to determine the profile of the university entrepreneur that from the constructs proposed in the Entrepreneurial Attitude Orientation Scale (EAO) can be tested in the university context in particular. The study corresponds to a quantitative approach, non-experimental design, cross-sectional, carried out in a private university in Lima, Peru, where 271 undergraduate and postgraduate students were selected. A confirmatory factor analysis was carried out to check the sustainability of the instrument. The proposed model corroborated the main fit indicators of the confirmatory factor analysis, the covariances between constructs are highly significant and positive, so the structure is confirmed by the data. The findings allow us to approve and corroborate the empirical sustainability of the Entrepreneurial Attitude Orientation Scale (EAO) for the entrepreneurial profile model in Peruvian university students.

Key-Words: - Entrepreneurship; effort and perseverance; innovation; planning and vision of the future; confirmatory factor analysis.

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1 Introduction

According to the United Nations Development Program (UNDP) and the International Labor Organization (ILO), Latin American society has been undergoing a process of transformation at various levels and levels, including social, cultural and economic dimensions [1]. However, challenges persist with respect to the still growing vulnerabilities, which become critical, with the exceptional situation left by Covid-19.

The crisis unleashed by covid-19 continues to be notorious and strong, affecting the economies of different countries in the region and the world. According to ECLAC and IMF data taken from ILO [2], there was an economic contraction of -9.1% and -9.4%, respectively, which caused a global unemployment rate of 13% in the region, reaching more than 41 million people. This is where

entrepreneurship appears as a possible solution for such disparate societies.

There is no doubt that entrepreneurship is one of the main generators of growth and employment in the country. Serida et al. report that Peru is one of the countries with a high percentage (39.7%) of youth entrepreneurship, even worldwide, it is in eighth place and fourth in the region with respect to the degree of intention to undertake [3].

From the business perspective, entrepreneurship is configured in those business determinations that are born from the imagination and free and instinctive creation of any person, seeking and taking advantage of opportunities that are built, since they are aimed at the feeling of personal fulfillment and the generation of both employment and income [4]. On the other hand, it is possible to define entrepreneurship as the ability of an individual to identify a set of opportunities in his or her framework of action, seeking to achieve personal benefit and impact on society, which implies facing risks, especially financial risks [5].

In this context, what is the role of universities? Universities are the entities responsible for contributing to the solution of the problems of the region and country, therefore, they should seek to educate each of their students with an entrepreneurial profile and attitude [6]. Some researchers indicate that good business teaching practices play a leading role in the development of entrepreneurial attitudes, skills and competencies, thus encouraging entrepreneurship as a clear option for future development [7].

Defining the profile of an entrepreneur involves, at first, the analysis of personal factors that define whether there is potential; in this set of factors we can mention risk propensity, self-efficacy, locus of control and innovative character [8]. A second set of factors includes the environment, especially the family and the educational level, which finally have an impact on the psychology of the entrepreneur. From another perspective, the entrepreneur's profile integrates a broad set of elements, among which competencies and values are identified, converging with some attitudes, which when analyzed, based on the research of Ibañez (2002) and Krauss (2007) [9], converge with each other. The components of this profile are: effort, innovation, planning and vision of the future, self-esteem, achievement motivation, responsibility, self-knowledge and risk; a scheme developed by Alda (2010) based on the adaptation by Ibañez (2002) of the Entrepreneurial Attitude Orientation Scale (EAO) model developed by Robinson in 1987.

In view of the above, it is necessary to have robust instruments to measure the dimensions or constructs associated with this reality of entrepreneurship, which integrate components from various areas and are applicable to the particular university context. The objective of this study is to validate, through a confirmatory factor analysis, a measurement model for the entrepreneur's profile, which from the constructs proposed in the EAO can be tested in this context of university entrepreneurship.

2 Theoretical Background

2.1 EAO Model

2.1.1 Effort and Perseverance

Perseverance is a personal characteristic that stimulates or incites the person to work hard, take on challenges and challenges, maintaining the effort and interest over time, despite the occurrence of adverse events, or failures [10]. Likewise, perseverance can be defined as the condition that implies the maintenance of the originally drawn guidelines, in spite of different obstacles and possible failures that become evident. [11]

2.1.2 Innovation

From the Schumpterian economic notion, innovation implies a new way of doing things; the generators of the same and the same and companies that seeking the satisfaction of the needs demanded by the market wish to obtain a profitability gain and position themselves in the market [12]. Alvord et al (2004) [12], refer that in order to be socially successful, the enterprise will use innovations that not only seek the delivery of resources and services but also the provision of innovation generating assets. Innovation refers to the production of things that adopt different forms to the existing ones or that may well be the same, but adopting a different production method [13].

2.1.3 Planning and Vision

Planning is a substantial process that puts in context both organizations and the people who exercise their leadership in which they have to act in a dynamic, demanding and perfectly changing environment [14]. Strategic planning will then be the tool that guides the way and adapts the managerial style to that environment, creates values, designs a course towards the achievement of an advantageous position with the development of competitive

advantages. Successful strategic planning involves processing information ideally for decision making.

2.1.4 Self-steem

In simple terms, Baumeister (1993) and Rosenberg (1979), indicate that self-esteem refers to the evaluation that each individual has about him/herself [15]. Likewise, they highlight how self-esteem notably influences the behavior of a given subject. Koellinger et al. (2007) and Hayward et al. (2006), highlight the following: an excess of optimism or confidence at the time of undertaking a venture can lead to poor decision making, as well as the formation of companies unable to meet their operating costs [16].

2.1.5 Achievement Motivation

Granero-Gallegos & Baena-Extremera (2014), consider that motivation is an important aspect to be developed in people, since its presence in an individual allows guiding and persisting in the achievement of a certain goal, which can be translated as greater dedication or interest in an activity [17]., motivation stimulates and directs the actions of individuals, which is why it is of vital importance for their development in different aspects of their lives, such as the start of an enterprise [18].

2.1.6 Responsability

Cuadra et al. (2015) consider that responsibility is a value that favors the fulfillment of the tasks set by an individual, so it directly favors persistence when performing activities aimed at achieving a goal [19]. According to Ciavarella et al. (2004), a strong sense of responsibility is capable of fostering dedication and meticulousness in individuals, which can be understood as a feeling or willingness to constantly improve in the activities of their interest [20].

2.1.7 Self-knowledge

Lazos (2008) points that self-knowledge is the understanding of facts about oneself, from both a mental and psychological perspective, which leads to an immediate response [21]. According to Goleman (1999), it is the discernment of internal stages, attitudes, particularities, possibilities, abilities and sagacity, which accompanied by motivational competencies plus initiative achieve an entrepreneurial project [22].

2.1.8 Risk

The entrepreneur is an active person, who manages with self-determination the realization of his dreams. He has to be adventurous, assume decisions in complex contexts, live uncertainty with pleasure, impose himself in the face of personal, family and business resource management adversities; there is thus a position that the entrepreneur is a risk manager (Bermejo, 2013; Peiró, Perdrix & Torruella, 2012; Beck, 1998) [23].

Risk is a factor of entrepreneurship, this translates into the entrepreneur having a reduced hostility towards risk, since if this existed there would be no initiative and effort for the action of entrepreneurship [24].

3 Methodology

The research has a quantitative or positivist approach, the research is applied and descriptive, the design is non-experimental and cross-sectional. The group of participants consisted of undergraduate and graduate students of the Universidad Privada Norbert Wiener, in Peru; all of them completed the Entrepreneurial AttitudeOrientationScale (EAO) questionnaire to perform the confirmatory factor analysis (CFA) of the same. CFA is a flexible statistical technique that allows modeling the relationship between observed indicators and underlying latent variables or factors [25]

The EAO questionnaire, under evaluation, consists of 55 items divided into 8 dimensions: effort/perseverance (items 1-6), innovation (items 7-14), planning and vision of the future (items 15-20), self-esteem (items 21-28), achievement motivation (items 29-34), responsibility (items 35-42), self-knowledge (items 43-48) and risk (items 49-55), with a Likert scale of four response options. In addition to the instrument, information was collected on variables such as sex and age. The final "n" (sample size) was 271 with a non-probabilistic convenience sampling. The percentage of women was higher, reaching 57.9%; age representation was 19.6% in the 18 to 25 years age group, 19.2% in the 26 to 33 years age group, 21% in the 34 to 41 years age group, and 40.2% in the 42 and older age group.

4 Results and Discussion

First of all, an inspection of the consistency and quality of the data was made. Three surveys with outlier responses were found using a distance criterion (a larger distance means more outlier), which were removed from the analysis for a good representation of the factor model on the data. Then, a purification of the construct items was done through 2 criteria. The first is that the elements of a

construct covarying with the elements of another construct should be suppressed (cross-loadings) and the second that the elements with less significance should be suppressed. Both criteria are expected to reduce the chi-square considerably. The more the chi-square is reduced, the better the model will fit the data. Finally, we were left with 32 elements that will represent the factorial model, whose particular results will be shown in detail to corroborate its empirical sustainability

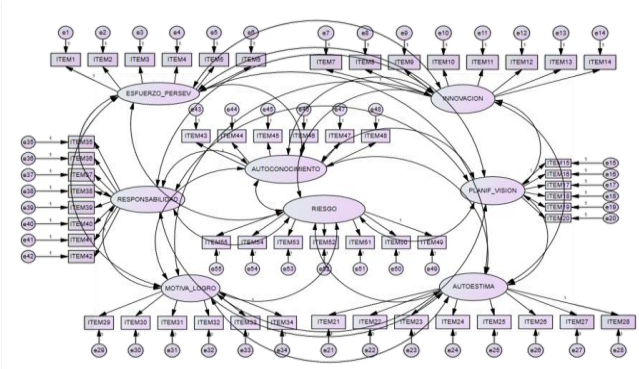

Fig. 1: Initial measurement model to determine the entrepreneurial profile of university students.

Table 1. Indicators of fit of the structural model to determine the profile of entrepreneurship in university students.

Indicator	Favorable reference values	Initial values	Final values
Ratio Chi-square/gl or CMIN/DF	> 2	2.13	1.68
Goodness of fit index (GFI)	≥ 0.90	0.70	0.86
Residual square root (RMR)	< 0.05	0.03	0.02
Adjusted Goodness-of-Fit Index (AGFI)	> 0.90	0.67	0.83
Parsimony Goodness-of-Fit Index (PGFI)	0.50 a 0.70	0.64	0.70
Normalized Goodness of Fit Index (NFI)	≥ 0.90	0.78	0.84
Comparative Fit Index (CFI)	≥ 0.95	0.87	0.99
Tucker-Lewis Index (TLI)	≥ 0.90	0.86	0.92
Parsimony Normalized Fit Index (PNFI)	≥ 0.70	0.74	0.74
Root Mean Square Error of Approximation (RMSEA)	0.05 a 0.08	0.06	0.05

Note: Favorable reference values taken from [26-33]

The model has an acceptable fit if the Chi-square/gl values are 2 to 3 and with limits up to 5. The Goodness of Fit Index (GFI) assesses whether the model should be fitted. The closer it is to zero indicates a poor fit. The Mean Squared Error Ratio (RMR) measures the variances and covariances of the sample and whether they differ from the estimates obtained. If this indicator is close to 0, it can be considered a near perfect fit [28].

The Adjusted Goodness of Fit Index (AGFI) is an extension of the GFI, which adjusts the degrees of freedom between the two models. Values close to 0.90 or higher show the best model fit.The Parsimony Goodness of Fit Index (PGFI) is an index which is a modification of the GFI and considers the degrees of freedom available to test the model [26].The magnitudes considered acceptable are in the range of 0.5 to 0.7.The Normed Fit Index (NFI) compares the proposed model and the null model considering an acceptable value if it is greater than 0.90 [29].

The CFI (ComparativeFitIndex) was developed by Bentler (1992) from a previous index (BFI) that corrects to avoid taking values beyond the range 0-1 [27]. The CFI compares the $\chi 2$ of two models: an independent model that maintains that there is no relationship between the variables in the model, and the model proposed by the researcher. This comparison is corrected for the degrees of freedom (gl) of one model and the other. CFI = (($\chi 2$ Independent Model- gl)- ($\chi 2$ Proposed Model-gl)) / ($\chi 2$ Independent Model- gl). As the $\chi 2$ of the proposed model decreases, the numerator and denominator become equal, so the ideal situation is that both are equivalent (CFI = 1). That is, the $\chi 2$ of the proposed model should be zero. In general, it is considered that the CFI should be around 0.95 to consider that the model fits the data adequately.

The Non-Normalized Fit Index (NNFI), or Tucker Lewis Index (TLI), overcomes the limitations of the NFI by considering the degrees of freedom of the proposed model, provided that its relationship is weak with the sample size. It ranges from 0 to 1, with values greater than or equal to 0.90 being recommended [30]. The Parsimony Norm Fit Index (PNFI) relates the constructs to the theory that supports them. The closer it is to 1.0, the greater its relationship [33]. The Root Mean Squared Error of Approximation (RMSEA) represents the anticipated fit with the total value of the population and no longer with that of the sample. If RMSEA is less than or equal to 0.05, it indicates an error of approximation of the model with reality.

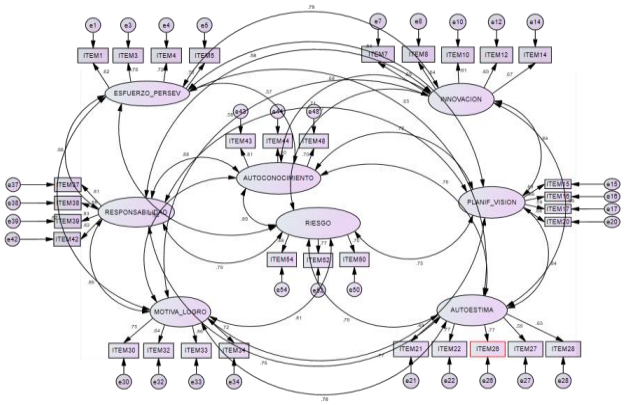

Fig. 2: Final measurement model to determine the entrepreneurial profile of university students.

Table 2. Estimated parameters of the structural model to determine the entrepreneurial profile of university students

N°	Item	Dimensions	Estimate	S.E.	C.R.	P	Standardized RegressionWeights
ITEM 1	I have always worked hard to be among the first.	EFFORT/PERSEVERANCE	1				0.621
ITEM 2	If I want something, I work hard to get it.	EFFORT/PERSEVERANCE	1.022	0.109	9.352	***	0.750
ITEM 3	I spend a considerable amount of time to make the things I'm committed to work better.	EFFORT/PERSEVERANCE	0.912	0.1	9.096	***	0.719
ITEM 4	When something is going to affect me, I learn as much as I can about it.	EFFORT/PERSEVERANCE	0.968	0.108	8.937	***	0.700
ITEM 5	I get excited about doing new and unusual things.	INNOVATION	1				0.689
ITEM 6	What really motivates me is thinking of new ideas that stimulate my work as a student.	INNOVATION	0.925	0.1	9.27	***	0.636
ITEM 7	I enjoy looking for new approaches to familiar ideas.	INNOVATION	0.87	0.098	8.892	***	0.607
ITEM 8	I have more fun trying new tasks than routine tasks.	INNOVATION	0.957	0.109	8.808	***	0.601
ITEM 9	I feel good about new challenges.	INNOVATION	0.929	0.095	9.748	***	0.672
ITEM 10	It is necessary to spend time planning work.	PLANNING AND VISION	1				0.695
ITEM 11	To be successful it is important to spend time exploring new opportunities.	PLANNING AND VISION	0.83	0.086	9.655	***	0.659
ITEM 12	To solve a problem it is important to rethink the starting situation.	PLANNING AND VISION	0.78	0.089	8.735	***	0.591
ITEM 13	It is important to have clear objectives and then evaluate the results.	PLANNING AND VISION	0.828	0.083	9.979	***	0.683
ITEM 14	I am satisfied with my contributions to the projects I am involved in.	SELF-STEEM	1				0.654
ITEM 15	I feel well valued by others.	SELF-STEEM	1.146	0.137	8.385	***	0.585
ITEM 16	I consider myself a competent person.	SELF-STEEM	1.117	0.106	10.523	***	0.771
ITEM 17	I am confident in my own ideas and abilities.	SELF-STEEM	1.277	0.121	10.548	***	0.773
ITEM 18	I feel confident when I am with people who are very capable.	SELF-STEEM	0.935	0.131	7.117	***	0.487
ITEM 19	Realizing what I am achieving is an encouragement to move forward.	ACHIEVEMENT MOTIVATION	1				0.715
ITEM 20	Achieving what I set out to do motivates me to work.	ACHIEVEMENT MOTIVATION	1.28	0.097	13.21	***	0.865
ITEM 21	Making mistakes in the process is an opportunity to improve on the way to the goal.	ACHIEVEMENT MOTIVATION	1.003	0.102	9.849	***	0.637
ITEM 22	If I am interested in achieving something, I am enthusiastic and I get involved to achieve it.	ACHIEVEMENT MOTIVATION	1.083	0.094	11.552	***	0.748
ITEM 23	Asumo mi grado de responsabilidad en cada situación.	RESPONSABILITY	1				0.822
ITEM 24	Reconozco mi parte de responsabilidad en los errores.	RESPONSABILITY	1.016	0.065	15.66	***	0.828
ITEM 25	I comply with the tasks and deadlines assigned to me by my teachers.	RESPONSABILITY	0.897	0.077	11.671	***	0.665
ITEM 26	I assume the roles and tasks that correspond to me when working in a group.	RESPONSABILITY	1.014	0.066	15.305	***	0.814
ITEM 27	I am aware of my main strengths and weaknesses.	SELF-KNOWLEDGE	1				0.812
ITEM 28	I am open to evaluation by others in order to improve.	SELF-KNOWLEDGE	0.936	0.065	14.423	***	0.803
ITEM 29	I am realistic about my capabilities.	SELF-KNOWLEDGE	0.767	0.063	12.136	***	0.701
ITEM 30	I face situations I fear rather than avoid them.	RISK	1				0.701
ITEM 31	Risk is part of life and must be taken.	RISK	1.016	0.09	11.334	***	0.774
ITEM 32	I like risk.	RISK	0.944	0.132	7.181	***	0.476

Note. Values obtained from the model ***p < 0.000

Table 2 presents the estimated parameters of the university entrepreneur profile model, the standard error and the critical value. If the appropriate distribution assumptions are met, the statistic follows a standard normal distribution, under the conception that the null hypothesis of the parameter has a value of zero [34]. Observing the results, all critical values are large, thus fulfilling that all parameters are significant (***p < 0.000). In addition to this, the regression weights are greater than 0.50 (with the exception of item32), reaching more than 0.80, which highlights the robustness of the model.

By checking the model under study, it is possible to highlight the importance of updating the entrepreneurship curricula, and also for the formation of entrepreneurship centers in the

Universities that take into account these robust dimensions of the model

Table 3. Estimated parameters of covariances and correlations of the factorial model

DIMENSIONS			Covariances (estimates)	S.E.	C.R.	P	Correlations
EFFORT/PERSEVERANCE	<-->	INNOVATION	0.189	0.029	6.516	***	0.786
EFFORT/PERSEVERANCE	<-->	PLANNING AND VISION	0.152	0.026	5.915	***	0.641
EFFORT/PERSEVERANCE	<-->	SELF-STEEM	0.141	0.024	5.936	***	0.655
EFFORT/PERSEVERANCE	<-->	ACHIEVEMENT MOTIVATION	0.105	0.019	5.415	***	0.516
EFFORT/PERSEVERANCE	<-->	RESPONSABILITY	0.134	0.023	5.904	***	0.559
EFFORT/PERSEVERANCE	<-->	SELF-KNOWLEDGE	0.146	0.025	5.846	***	0.565
EFFORT/PERSEVERANCE	<-->	RISK	0.132	0.025	5.366	***	0.544
INNOVATION	<-->	PLANNING AND VISION	0.182	0.026	7.079	***	0.836
INNOVATION	<-->	SELF-STEEM	0.136	0.021	6.354	***	0.689
INNOVATION	<-->	ACHIEVEMENT MOTIVATION	0.107	0.018	5.993	***	0.575
INNOVATION	<-->	RESPONSABILITY	0.127	0.02	6.29	***	0.579
INNOVATION	<-->	SELF-KNOWLEDGE	0.161	0.024	6.837	***	0.681
INNOVATION	<-->	RISK	0.171	0.025	6.787	***	0.766
PLANNING AND VISION	<-->	SELF-STEEM	0.162	0.023	6.95	***	0.837
PLANNING AND VISION	<-->	ACHIEVEMENT MOTIVATION	0.141	0.02	7.004	***	0.767
PLANNING AND VISION	<-->	RESPONSABILITY	0.154	0.022	7.109	***	0.711
PLANNING AND VISION	<-->	SELF-KNOWLEDGE	0.168	0.024	7.059	***	0.721
PLANNING AND VISION	<-->	RISK	0.166	0.025	6.73	***	0.754
SELF-STEEM	<-->	ACHIEVEMENT MOTIVATION	0.13	0.019	6.908	***	0.777
SELF-STEEM	<-->	RESPONSABILITY	0.147	0.02	7.172	***	0.749
SELF-STEEM	<-->	SELF-KNOWLEDGE	0.162	0.023	7.151	***	0.764
SELF-STEEM	<-->	RISK	0.157	0.023	6.784	***	0.79
ACHIEVEMENT MOTIVATION	<-->	RESPONSABILITY	0.159	0.02	8.048	***	0.856
ACHIEVEMENT MOTIVATION	<-->	SELF-KNOWLEDGE	0.157	0.021	7.637	***	0.785
ACHIEVEMENT MOTIVATION	<-->	RISK	0.153	0.021	7.2	***	0.811
RESPONSABILITY	<-->	SELF-KNOWLEDGE	0.207	0.024	8.668	***	0.878
RESPONSABILITY	<-->	RISK	0.175	0.023	7.534	***	0.789
SELF-KNOWLEDGE	<-->	RISK	0.214	0.027	7.923	***	0.893

Note. Values obtained from the model ***p < 0.000

In Table 3, and regarding the estimation of the factor model (estimation of the factor loadings of the items in each construct and the covariances between constructs), it can be seen that they are highly significant, which indicates that there is sufficient evidence in the data to support the factor structure of the measurement instrument. It can be seen that the estimated factor loadings are of the same positive sign in all constructs, which means that the items in each construct are additive, that is, they contribute in the same direction to determine the level measured by the constructs. The covariances between the constructs are highly significant and positive as expected. Therefore, the structure is confirmed by the data.

The main objective of this study was to confirm the factorial structure that from the constructs proposed in the EAO already studied in other contexts, being able to be verified in a sample of male and female Peruvian university students, affirming coherence and consistency with the studies of Ibañez (2002), Krauss (2007), with some atingences to the original model of 55 items [9], being confirmed only 32 of them, distributed as follows: effort/perseverance (items 1-4), innovation (items 5-9), planning and vision of the future (items 10-13), self-esteem (items 14-18), achievement motivation (items 19-22), responsibility (items 23-26), self-knowledge (items 27-29) and risk (items 30-32). If we analyze the dimensions of the construct in detail, we can observe that there is a high correlation between the dimensions effort and perseverance and innovation (0.786), therefore there is agreement with Alvord et al, (2004), where it is indicated that the venture to be socially successful will use innovations that not only seek the delivery of resources and services but the provision of innovation-generating assets [12].

The dimension of planning and vision of the future correlates strongly with self-esteem (0.837), which is connected with the ideas of some authors [16], where he refers that an excess of optimism or confidence at the time of undertaking a venture can generate poor decision making, as well as the formation of companies unable to meet their operating expenses, therefore strategic planning, according to Burdiles, Castro and Simian (2019), will involve processing information appropriately for effective decision making.

Achievement motivation and responsibility correlate strongly (0.856) this makes sense with what authors stated [18], who referring to

motivation, indicate that this stimulates and directs the actions of individuals, therefore it is of vital importance for their development in different aspects of their lives, such as the start of a venture, so [20], indicate that it can be understood that responsibility, in this context, can reduce the rate of business failure.

Self-awareness and risk are highly correlated (0. 893), self-knowledge is the understanding of facts about oneself, from both a mental and psychological perspective, which leads to an immediate response [21], the entrepreneur is an active person, who gestate with self-determination the realization of his dreams [23], because he knows himself, and is adventurous, able to assume decisions in complex contexts, and live uncertainty with pleasure, thus existing a position that the entrepreneur is a risk manager.

On the other hand, from the analysis of the adjustment indicators of the structural model to determine the profile of the entrepreneur in university students, it is observed that most of them are fulfilled (6 out of a total of 10, see Table 1); however, there is some instability in some indicators, the collectivity of the adjustment indexes is not particularly stable when the sample size factor and its distribution cannot be controlled [35], so he suggests taking into consideration the root mean squares error approximation index (RMSEA) as it is relatively the most stable adjustment index, which does meet the favorable criteria (RMSEA=0.05). 05).

5 Conclusion

The findings obtained, reflected in each of the results of the confirmatory factor analysis, allow us to approve and corroborate the empirical sustainability of the Entrepreneurial Attitude Orientation Scale (EAO) for the entrepreneurial profile model in Peruvian university students; the data set presented evidences a defensible and sustainable factorial model, the covariances between the constructs are highly significant and positive, therefore, the structure is confirmed by the data. This scale has adequate properties that allow it to be considered a valid and reliable measure in future research, even adding other sociodemographic variables that may be of interest to the entrepreneurial profile evaluated.

Universities should be very aware that they need to strengthen the entrepreneurial profile of their students, this study gives clear evidence of which aspects should be measured and evaluated (the 8 dimensions of the EAO) in greater depth than the one shown here, leading to plans or models of entrepreneurship centers that finally result not only in a comprehensive training but also in clear evidence of social responsibility with their community

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-Jorge Vargas and Judith Yangali conceived the study and were responsible for the design and development of the data analysis.
-Jorge Vargas wrote the first draft of the article.
-Judith Yangali reviewed the first draft of the article and provided supervision.
-Marilé Lozano and Miguel Vásquez were responsible for data collection and editorial review.

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