

THE ASSESSMENT OF ENTREPRENEURIAL PERSONALITY: THE CURRENT SITUATION AND FUTURE DIRECTIONS

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El espíritu emprendedor de las personas resulta fundamental en la sociedad moderna ya que supone una importante fuente de innovación, empleo, productividad y crecimiento. Si bien los primeros modelos teóricos surgen desde aproximaciones económicas y sociológicas, la psicología proporciona modelos que integran diferentes aspectos centrados en el individuo como los cognitivos, actitudinales y de la personalidad permitiendo así un estudio mucho más detallado. El objetivo de este trabajo es presentar las principales aportaciones de la psicología a la evaluación de la personalidad emprendedora. Para ello se llevó a cabo una revisión de los principales modelos e instrumentos de medida que se han desarrollado hasta la fecha. Los resultados confirman que la personalidad emprendedora tiene una estructura multidimensional pudiendo destacar ocho dimensiones fundamentales: motivación de logro, autoeficacia, toma de riesgos, innovación, autonomía, tolerancia al estrés, locus de control interno y optimismo. Desde un punto de vista metodológico, la Teoría de Respuesta a los Ítems y los Tests Adaptativos Informatizados representan los más avanzados y modernos métodos de evaluación. En la actualidad, se dispone de un amplio número de instrumentos de medida para evaluar la personalidad emprendedora. Las líneas futuras de investigación deberán orientarse hacia la construcción de modelos multidimensionales, así como a proporcionar alternativas que permitan reducir la deseabilidad social y otros sesgos inherentes a los autoinformes.

Palabras Clave: Personalidad emprendedora, Espíritu emprendedor, Teoría de Respuesta a los ítems, Tests adaptativos informatizados, Autoinforme.

Entrepreneurship is fundamental in modern society because it represents an important source of innovation, employment, productivity, and growth. While the first theoretical models arose from economic and sociological approaches, psychology provides models that integrate different aspects such as cognitions, attitudes and personality, which allow a more detailed study. The purpose of this paper is to show the main contributions of psychology to the assessment of the enterprising personality. For this purpose, the main models and instruments developed to date were reviewed. The results confirm that the enterprising personality has a multidimensional structure and eight personality traits can be highlighted: achievement motivation, risk-taking, autonomy, self-efficacy, stress tolerance, innovativeness, internal locus of control, and optimism. From a methodological point of view, Item Response Theory and Computerised Adaptive Tests represent the most advanced and modern methods for assessing enterprising personality. There are currently several measurement instruments available. Future areas of research should be directed at the construction of multidimensional models as well as providing alternatives that facilitate a reduction in social desirability and other biases inherent in self-reports.

Key words: Enterprising personality, Entrepreneurship, item response theory, Computerised adaptive tests, self-report.

Many internationally renowned organisations, such as the Global Entrepreneurship Research Association (GEM, 2015) and the Organisation for Economic Co-operation and Development (OECD, 2014), annually assess entrepreneurial activity in a large number of countries. Currently, governments, organisations, universities and individuals are joining forces to try to understand the process of entrepreneurship, since its promotion is essential for the development of market economies (OECD / The European Commission, 2013). Furthermore, failure as an entrepreneur involves a cost to society in terms of lost opportunities and resources, and it ultimately causes significant consequences for the individual, both economically and psychologically (Zhao, Seibert, & Lumpkin, 2010).

It is important to distinguish between entrepreneurship and business ownership, as the latter is confined to the exclusive domain of the company as one specific example of the many possible manifestations of entrepreneurship. Depending on the objectives to be achieved, it is possible to identify at least three types of entrepreneur in terms of the

objectives they aim to achieve: extra-entrepreneur, intra-entrepreneur and personal entrepreneur. The extra-entrepreneur is a person whose goal is to develop new external projects related to business creation (Rauch & Frese, 2007b). The intra-entrepreneur is a person who is responsible for creating innovation within a business, improving projects that are already underway (Lumpkin, 2007). The personal entrepreneur is characterised by a high level of personal control and initiative, and is able to handle difficult situations, for example, stressors, unemployment or career changes (Frese & Fay, 2001). A particular case of this type of entrepreneur would be those who are oriented towards volunteer work in the community, in non-governmental organisations, or the researcher who proposes a theory or technique that has not previously been explored.

The study of all matters relating to entrepreneurship has grown exponentially in recent years, establishing itself as a multidisciplinary field of research (Rauch & Frese, 2007a; Sánchez, 2011). This consolidation is explained largely by the contribution of models and theories proposed from an economic and sociological approach (Chell, 2008). Psychology has also played a central role in legitimising and even popularising the study of entrepreneurship (Baum, Frese, Baron, & Katz, 2007; Hisrich, Lagan-Fox & Grant, 2007). One possible

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explanation is the tendency of psychology not only to construct theories, but also to construct rigorous measurement instruments that enable us to support such theories empirically (Katz, 2007). In this sense, the psychometric methodology involves the fundamental scientific research tool for the systematic and rigorous study of the phenomenon of entrepreneurship. Three approaches have mainly been used to describe entrepreneurship: the economic, the sociological and the psychological approaches.

THE ECONOMIC APPROACH

The origin of the theories of entrepreneurship emerges mainly from an economic perspective and has its roots in Europe, especially in France (Cantillon, 1756; Say, 1803), the UK (Marshall, 1890) and Austria (Kirzner, 1973; Schumpeter, 1934). Economists tend to develop theories about the decisions that are relevant to the use of resources in order to obtain economic results, such as the performance results of companies, industries and countries. These types of theories tend to give more weight to economic variables (e.g., resources, capital, information or business opportunities) than individual aspects. However, from the beginning classical economic theories have tended to incorporate aspects such as innovation or leadership (Marshall, 1890), to assume that the personal characteristics of the entrepreneur can be acquired (Schumpeter, 1934) and, ultimately, to accept the subjective and individual character of entrepreneurship.

THE SOCIOLOGICAL PERSPECTIVE

In recent decades, different approaches have been emerging, from a sociological perspective, that attempt to provide a more complete picture of the issues involved in the process of entrepreneurship (Chell, 2008). According to these approaches, family background and education are two key aspects in the development of entrepreneurship. Developing in an entrepreneurial environment has a positive and facilitating influence on entrepreneurial behaviour (Altınay, Madanoglu, Daniele & Lashley, 2012). Similarly, the possibility of receiving training on how to be an entrepreneur turns adolescence into a particularly interesting stage (Unger, Rauch, Frese & Rosenbusch, 2011). The main reason is that potentially entrepreneurial students who attend specific training courses would increase their skills, knowledge and abilities to be able to take advantage of the opportunities presented to them compared to those who do not receive such training (Volery, Muller, Oser, Naepflin & del Rey, 2013).

One of the most interesting contributions of the sociological perspective is the emphasis that it places on subjectivity. For example, many of the proposed models highlight the importance of how people perceive the viability of their projects and their perception of control over the resources (Ajzen, 1991; Shapero & Sokol, 1982; Veciana, 1999). This subjectivity depends largely on the culture and context where the person is. The cultural norms and laws and regulations of each individual country have an important influence on the perception and behaviour of entrepreneurs (GEM, 2015; OECD, 2014).

According to the latest GEM Spain 2014 (GEM, 2015), approximately six out of ten entrepreneurs are men; however, the difference between men and women entrepreneurs setting up businesses has declined over the past two years. Of all entrepreneurs, 47.6% have received some sort of higher education or graduate degree, and 43.5% have at some point in their lives received specific training in entrepreneurship. The adults

with higher incomes were the ones that showed a greater propensity to start new businesses. Of all potential entrepreneurs (i.e., people with an intention to create a company in less than three years), 18.2% are aged between 18 and 24 years. Of this same group of potential entrepreneurs, 56.6% say they have no specific training, a percentage that rises to 63.6% for those who are leaving a job at a company. These circumstances lead us to believe that specific training focused on entrepreneurship would facilitate both the development and the consolidation of new projects.

Spain is characterised by a perception of having a lower number of opportunities than other European countries. About 16% of Spaniards perceive that there are business opportunities, while in countries such as Britain and Germany the figure is over 30% (GEM, 2015). However, it is curious that the perception of entrepreneurial knowledge and skills is above the European average. About 50% of Spaniards consider themselves to have sufficient skills and knowledge to start a business, while in countries such as Germany and France the percentage is less than 40% (GEM, 2015). These results suggest that variables such as self-concept, motivation and expectations may play an important role in both the perception of opportunities and the perception of competence. In this regard, educational research has already gone into great detail about the significant weight that such variables have, for example, in academic achievement (Suárez-Álvarez, Fernández-Alonso & Muñiz, 2014).

According to the latest *Entrepreneurship at a Glance* (OECD, 2014), necessity was an important driver in emerging economies such as China and India, but also in Korea, Estonia, Greece and Spain, which partly reflects the economic crisis. In fact, in 2013, 29.8% of Spanish entrepreneurs who started a company said that they did so after considering that it was their only career option (GEM, 2015). The combination of opportunities, capacities and resources does not necessarily lead to entrepreneurial activity if the costs of the opportunity (e.g., lost earnings or poorer health coverage) and the initial costs outweigh the potential benefits. In fact, as noted by the OECD, “the regulatory framework and taxes become a critical factor that affects the business performance of countries” (OECD, 2014, p. 86). In sum, these findings shed light on some of the problems that entrepreneurs are now finding and emphasise the importance of education in the process of entrepreneurship.

THE CONTRIBUTION OF PSYCHOLOGY

The research carried out to date has shown that entrepreneurial behaviour is influenced by numerous factors including economic, social and personal aspects (Chell, 2008; Rauch & Frese, 2007a). Based on these results it seems reasonable to believe that entrepreneurial behaviour is multidimensional. Therefore, developing models and comprehensive explanations that realistically reflect entrepreneurship requires the consideration of various dimensions together. Figure 1 proposes an integral model of entrepreneurship that captures the essence of the main models developed to date (Rauch & Frese, 2000; Rauch & Frese, 2007a; Sánchez, 2011) and incorporates the latest research findings on entrepreneurial personality. It is a comprehensive model that presents the major aspects involved in entrepreneurial activity. The comprehensive model of entrepreneurship (Figure 1) can serve as a preliminary outline on which to base future research. While the model is plausible to the extent that each of the issues separately has



proven to be connected with entrepreneurial activity, more research is required to relate the set of variables as a whole.

The model pays special attention to the dimensions that comprise the area of personal development, which is influenced by the variables that encompass the socio-economic context, such as education, family, culture and the system of rules, laws and regulations of the countries (GEM, 2015; OECD, 2014). Within the area of personal development, the work focused on emotional intelligence deserves special attention (Ahmetoglu, Leutner, & Chamorro-Premuzic, 2011), because of the relationship it has with aspects such as innovation (Suliman & Al-Shaikh, 2007) or achievement motivation and self-efficacy (Muñiz, Suárez-Álvarez, Pedrosa, Fonseca-Pedrero & García-Cueto, 2014). Another key part of this model relates to the cognitive aspects, which include such constructs as cognitive styles (Sánchez, Carballo & Gutiérrez, 2011), creativity (Ward, 2004) and intelligence (Newton & McGrew, 2010). The study of personality has gained particular momentum in recent years and two main approaches can be distinguished: researchers who prefer to use broad personality traits, such as the Big Five (Brandstätter, 2011; Zhao et al, 2010); and those who propose the use of more specific traits that are closer to entrepreneurial activity (Rauch & Frese, 2007a, 2007b; Suárez-Álvarez, Pedrosa, García-Cueto & Muñiz, 2014).

The supporters of using general personality traits argue that these factors (extraversion, emotional stability, responsibility, agreeableness and openness to experience), account for around 13% of the variance of entrepreneurial activity and about 10% of business success (Zhao et al., 2010), and correlate with the activity of business owners and managers (Brandstätter, 2011). Specifically, the dimensions of responsibility and openness to experience are the ones that have a greater relationship with both entrepreneurial behaviour and business performance (Zhao et al., 2010). Also used within this line of research, although much less representatively, are the personality factors assessed by the Eysenck Personality Questionnaire Revised (Furnham, 2002) and the 16 personality factors of Cattell (Chell, 2008).

The specific personality traits that seem to be most related to entrepreneurial personality are achievement motivation, self-efficacy, risk-taking, innovation, autonomy, stress tolerance, internal locus of control and optimism (Baum et al, 2007; Muñiz et al., 2014; Rauch &

Frese, 2007a, 2007b; Suárez-Álvarez et al, 2014; Zhao et al, 2010). The central argument supporting the use of models of specific personality traits rather than broad traits, is that the specific traits would be able to explain more specific aspects of the entrepreneurial personality (Laguna, 2013; Lanero, Vázquez & Muñoz-Adánez, 2015; Tyszka, Cieslik, Domurat & Macko, 2011), so the predictions made based on them would be more accurate. This is a plausible hypothesis on which the first data consistent is starting to be collected, moderate relations being found with regards to business creation and success (Rauch & Frese, 2007a, 2007b). In fact, today there are findings that suggest that the more specific traits of the entrepreneurial personality add evidence of predictive validity of business success to the Big Five personality traits (Leutner, Ahmetoglu, Akhtar & Chamorro-Premuzic, 2014). In other words, the inclusion of both measures during the evaluation process would improve decision making and predictive power. For this reason, the model presented in Figure 1 comprises the two models of entrepreneurial personality together.

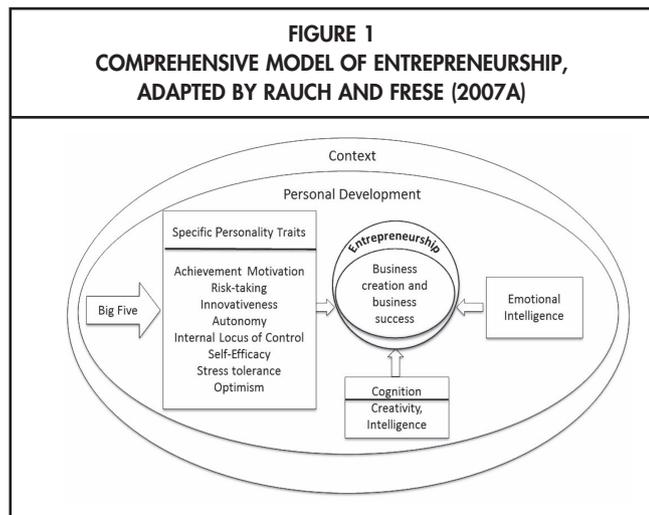
ASSESSMENT OF THE ENTREPRENEURIAL PERSONALITY

To date, several measuring instruments have been developed to assess the various personality traits involved in entrepreneurial behaviour, such as achievement motivation (Suárez-Álvarez, Campillo-Álvarez, Fonseca-Pedrero, García-Cueto & Muñiz, 2013), locus of control (Suárez-Álvarez, Pedrosa, García-Cueto & Muñiz, in press) or self-efficacy (Moriano, Palací & Morales, 2012) to name just a few of them. Additionally, there are numerous tools that have been developed based on the construct of entrepreneurial orientation (Covin & Wales, 2012) and that assess dimensions such as risk taking, proactivity, innovation, autonomy and competitive aggressiveness. However, the number of instruments is significantly reduced when the aim is the joint evaluation of the entrepreneurial personality traits in one single instrument with methodological consistency, and the number of instruments developed in Spain is even more scarce (Muñiz et al., 2014; Sánchez, 2010).

In recent years, significant contributions have been made to the assessment of the specific traits of the entrepreneurial personality. In Table 1, we present the main instruments for assessing entrepreneurship that have been developed to date. Some of these scales have been translated and adapted to different languages (Almeida et al, 2014; Caird, 2006, Liñán & Chen, 2006) and are aimed at evaluating different groups such as adolescents (Muñiz et al, 2014), university students (Caird, 2006) and workers (Almeida et al., 2014). Another aspect to note is the tendency to develop methods using self-report instruments, usually measured by Likert scales.

In Table 2, we present an overall assessment indicative of the quality of the measuring instruments. This is determined according to the criteria established by the European Federation of Psychologists Associations (EFPA) for the evaluation of tests (Evers et al., 2013) and the Standards for Educational and Psychological Assessment (American Educational Research Association, American Psychological Association and National Council on Measurement in Education, 2014). The information shown in Table 2 corresponds mainly to the information provided by the authors in the original document in which the development of the instrument is shown. This information is completed with scientific papers indexed in international databases. This excludes the possible existence of documents that are not indexed in these databases which provide

**FIGURE 1
COMPREHENSIVE MODEL OF ENTREPRENEURSHIP,
ADAPTED BY RAUCH AND FRESE (2007A)**



information on aspects that are not covered in this table. First, it is striking that while some authors mention content validity, few provide data based on expert judgment and quantitative indicators (Pedrosa, Suárez-Álvarez & García-Cueto, 2013). Clearly, another great omission is the study of DIF, which identifies whether there are items that systematically harm certain groups of people such as, for example, men or women (Sandilands, Oliveri, Zumbo & Ercikan, 2013).

MEASUREMENT INSTRUMENTS IN SPAIN

At present there are at least four measurement instruments to assess the entrepreneurial personality in Spain: EIQ (Liñan & Chen, 2006); COE (Sánchez, 2010); META (Almeida, Ahmetoglu & Chamorro-Premuzic, 2014); and BEPE (Muñiz et al., 2014). It is important to note that EIQ, COE and BEPE were originally developed in Spain while META was originally developed in the UK. Although the latter can be answered in Spanish on its website (<http://www.metaprofiling.com>), it should be noted that there is no information available on the psychometric properties of the translation and adaptation of the instrument to the Spanish context to date. Therefore it is not possible to assess the suitability of the instrument for use in Spain by international standards

(Muñiz, Elosua & Hambleton, 2013). On the other hand, the main limitation of the instruments developed in Spain is the lack of criterion validity evidence (Table 2). While the use of these measurement instruments for research may be suitable for certain purposes, their use would still not be adequate for making important decisions that affect people based on their score on entrepreneurship. To do this, it would be necessary to accumulate more evidence of validity in relation to external variables and test their predictive ability. In sum, although significant progress has been made in the assessment of the entrepreneurial personality in Spain, there is still a long way to go.

DISCUSSION AND CONCLUSIONS

The figure of the entrepreneur is central to the economy of any country, as it constitutes an important source of innovation, employment, productivity and growth. The interest in this figure has evolved over recent decades maintaining, as a common denominator, the person as central to the entrepreneurial process (Baum et al., 2007). Economic and sociological perspectives have contributed substantially to the theoretical development of the entrepreneurial process, while psychology has taken the lead in recent years, being noteworthy for its

**TABLE 1
MAIN MEASUREMENT INSTRUMENTS FOR ASSESSING ENTREPRENEURSHIP**

Name	Reference	Dimensions
Skills Confidence Inventory [SCI]	Betz, Borgen & Harmon (2005)	Realistic, investigative, artistic, social, enterprising and conventional
General Enterprising Tendency [GET2]	Caird (2006)	Need for achievement, autonomy, determination, creativity and risk taking
Entrepreneurial Aptitude Test [TAI]	Favretto, Pasini & Sartori (2003)	Goal orientation, leadership, adaptation, achievement motivation, personal development, innovation, flexibility and autonomy
Entrepreneurial Intention Questionnaire [EIQ]	Liñan & Chen (2006)	Featuring professional, social value, entrepreneurship and entrepreneurial intention
Cuestionario de orientación emprendedora [COE, questionnaire of entrepreneurial orientation]	Sánchez (2010)	Locus of control, self-efficacy, risk appetite and proactivity
Measure of Entrepreneurial Talents and Abilities [META]	Almeida, Ahmetoglu & Chamorro-Premuzic (2014)	Creativity, opportunism, proactivity and vision
Batería de Evaluación de la Personalidad Emprendedora [BEPE, Battery for the assessment of the enterprising personality]	Muñiz, Suárez-Álvarez, Pedrosa, Fonseca-Pedrero & García-Cueto (2014)	Achievement motivation, risk taking, innovation, autonomy, self-efficacy, stress tolerance, internal locus of control and optimism.

**TABLE 2
PSYCHOMETRIC ASSESSMENT OF MEASUREMENT INSTRUMENTS FOR THE ASSESSMENT OF ENTREPRENEURSHIP**

Test	Reliability	Validity evidence: content	Validity evidence: construct	Validity evidence: criteria	DIF	Available in Spanish
SCI	✓	✓	✓	✓	-	-
GET2	✓	-	✓	✓	-	-
TAI	✓	-	✓	✓	-	-
EIQ	✓	-	✓	-	-	✓
COE	✓	-	✓	-	-	✓
META	✓	-	✓	✓	-	✓
BEPE	✓	✓	✓	-	✓	✓

Note: DIF = Differential Item Functioning; SCI= Skills Confidence Inventory; GET2= General Enterprising Tendency v2; TAI= Entrepreneurial Aptitude Test; EIQ= Entrepreneurial Intention Questionnaire; COE= Cuestionario de Orientación Emprendedora [Questionnaire of Entrepreneurial Orientation]; META= Measure of Entrepreneurial Talents and Abilities; BEPE= Bateria de Evaluación de la Personalidad Emprendedora [Assessment Battery of Entrepreneurial Personality]

contribution to the evaluation of the entrepreneurial personality. While the existing instruments represent an important advance in terms of measurement, there is still a long way to go. For example, in spite of the boom of Item Response Theory (IRT) in recent years, it is remarkable that only one of the instruments was developed based on this methodological framework (Muñiz et al., 2014). The implementation of IRT in this area would enable us to increase the number of computerised adaptive tests, taking advantage of the many benefits associated with them in terms of effectiveness and efficiency (van der Linden & Glas, 2010). Moreover, there is a notable lack of information provided in the instruments that have already been developed in relation to the analysis of items, evidence of predictive validity, test-retest reliability and especially both differential item functioning (DIF) and bias analysis, deficiencies which are also commonly found in other measuring instruments (Hernández, Tomás, Ferreres & Lloret, 2015).

Internationally, META is probably the measurement instrument that has shown the most validity evidence in recent years, which makes it a suitable tool for evaluating entrepreneurship in adult workers (Ahmetoglu et al, 2011; Almeida et al, 2014; Leutner et al., 2014). Moreover, it has been translated and adapted into ten languages, including Spanish. In the case of Spain, the Battery for Entrepreneurial Personality Assessment (BEPE, Muñiz et al, 2014; Suárez-Álvarez et al, 2014) is noteworthy. This measurement instrument stands out because it offers the joint assessment of the specific characteristics of the entrepreneurial personality as well as being oriented towards adolescents, which enables the early detection of potential entrepreneurs. It also facilitates the assessment of entrepreneurship using 87 items, and has demonstrated adequate psychometric properties including content validity evidence by experts (Suárez-Álvarez et al., 2014) and DIF according to sex (Muñiz et al., 2014). However, it would be necessary to gather more evidence of validity to support the predictive ability of BEPE. Additionally, the recent development of a computerised adaptive version is worth mentioning (BEPE-A; Pedrosa, Suárez-Álvarez García-Cueto & Muñiz, 2015). This instrument, based on the methodological framework of IRT, allows the progressive selection of questions depending on the answers that the participant has given to the preceding items, resulting in a test adapted to the individual (De Ayala, 2009). Using this methodology, the results have shown the ability to assess entrepreneurship accurately with an average of ten items. Adding to this short, effective and rigorous assessment, the fact that it is available in a computerised version opens the possibility of on-line assessment with the benefits that this entails in terms of geographical

scope, ease of implementation, and the savings in human, material and financial resources.

Another aspect to highlight is the frequent use of self-report methods. This methodology involves assuming the risk that the person will misrepresent their own answer to fit a certain profile (i.e., social desirability). This type of response bias would directly affect the validity of the decisions that are made based on the scores obtained in the measurement instruments, particularly in personality tests and with significant consequences for people. To solve this problem, various alternatives have been proposed including forced-choice items, where people must choose between two items with similar social desirability (Brown & Maydeu-Olivares, 2012). Good examples of this type of measurement instrument in the context of personality could be WorkFORCE (Naemi, Seybert, Robbins & Kyllonen, 2014) which assesses fit to the work profile and TAPAS (Stark et al., 2014) for selecting personnel in the military context, both developed by the Educational Testing Service. Moreover, as an alternative to self-tests there are situational tests (Olea, Abad & Barrada, 2010) and implicit association tests (Greenwald, Poehlman, Uhlmann & Banaji, 2009). Another interesting alternative is the one currently being conducted by the Psychometrics Centre at the University of Cambridge. Their recent findings include that personality assessment based on computers (i.e., indicators obtained through social networks such as Facebook or Twitter) is more accurate and valid than that obtained by humans (Youyou, Kosinski & Stillwell, 2015).

Future directions in the evaluation of the entrepreneurial personality should be oriented towards improving measurement at different levels (Table 3). First, the use of models to estimate IRT would improve the psychometric properties of the measurement instruments in terms of accuracy. Second, thanks to the use of IRT, computerised adaptive tests could be developed, increasing the effectiveness and efficiency of evaluations compared to the classic format. Third, developing measurement instruments using forced-choice items from IRT would reduce the effects of social desirability in the responses. Fourth, it would be interesting to supplement the data obtained from self-reports with other sources such as implicit association tests or situational tests.

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**TABLE 3
CURRENT SITUATION AND FUTURE DIRECTIONS IN
THE ASSESSMENT OF ENTREPRENEURSHIP**

	Now	Future
Psychometric Models	Classical Test Theory	Item Response Theory
Measurement Instruments	General Tests	Computerised Adaptive Tests
Scale	Self-report	Implicit Association Tests, Situational Tests, Forced Choice Items..



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