HOW EFFECTUAL WILL YOU BE? DEVELOPMENT AND VALIDATION OF A SCALE IN HIGHER EDUCATION

ABSTRACT

The literature on effectual theory offers validated scales to measure effectual or causal logic in entrepreneurs' decision-making. However, there are no adequate scales to assess in advance the effectual or causal propensity of people with an entrepreneurial intention before the creation of their companies. We aim to determine the validity and reliability of an instrument to measure that propensity by first analysing those works that provide recognised validated scales with which to measure the effectual or causal logic in people who have already started up companies. Then, considering these scales, we designed a scale to evaluate the effectual or causal propensity in people who had not yet started up companies using a sample of 230 final-year business administration students to verify its reliability and validity. The validated scale has theoretical implications for the literature on potential entrepreneurship and entrepreneurial intention and practical implications for promoters of entrepreneurship who need to orient the behaviour of entrepreneurs, entrepreneurs of established businesses who want to implement a specific strategic orientation, entrepreneurs who want to evaluate the effectual propensity of their potential partners and workers, and academic institutions interested in orienting the entrepreneurial potential of their students.

Keywords: effectuation theory; effectual propensity; causal propensity; entrepreneurship; measurement scales; higher education.

INTRODUCTION

Economic activity is driven by entrepreneurship, making it an essential tool for the creation of jobs and the generation of wealth (Oosterbeek, van Praag, & Ijsselstein, 2010). The need to overcome the economic problems of the last decade has stimulated the idea that the self-employed should take a more active role, not only out of necessity, but because self employment can lead to innovation, employment, and economic and social development (Montañés-Del-Río & Medina-Garrido, 2020; Sánchez García, Ward, Hernández, & Florez, 2017).

Studying the behaviour of the self-employed can explain how they further develop the entrepreneurial process, making it possible to understand how they create and make new companies grow and how they generate economic growth (Fisher, 2012). In studies of the entrepreneurial phenomenon, the explanations for the behaviour of entrepreneurs that effectuation theory offers stand out (Sarasvathy, 2001), and research in the field of entrepreneurship increasingly uses this theory as a conceptual basis.

In Sarasvathy's (2001) effectuation theory, the concepts of effectuation and causation provide a framework for studying entrepreneurial processes in environments with different levels of uncertainty. Effectuation refers to processes that are carried out thanks to the possible results that entrepreneurs can obtain from the available resources. However, the concept of causation has a predictive basis. In this case, starting a business involves selecting the means necessary to create the desired result. In short, the difference concerning the entrepreneurial process is that for causal logic, opportunities are created, whereas for effectual logic, opportunities are discovered (Vaghely & Julien, 2010).

The effectual versus causal logic of entrepreneurs has been studied in the academic literature primarily by examining the behaviour of those people who have started businesses (Brettel, Mauer, Engelen, & Küpper, 2012; Guo, Cai, & Zhang, 2016; Schmidt & Heidenreich, 2014); that is, from the evidence of the entrepreneurs' actions. However, few studies have delved into the individual's propensity towards these logics when the potential entrepreneur has not yet acted. Given this gap, the study of the propensity towards an effectual or causal behaviour gives added value to the literature on entrepreneurship. The only partially similar framework found in the literature is the work of Werhahn et al. (2015). These authors analyse the effectual orientation of managers and workers in the corporate context finding that the strategic orientation of the company towards an effectual or causal logic favours an organisational culture that affects workers' behaviour.

The detected gap presents a dilemma in terms of whether it is possible to measure the causal or effectual propensity of a person before they start a business. This research aims to elaborate and validate a

measurement tool that estimates an individual's propensity towards an effectual or causal behaviour when they have not yet started a business.

This scale would have important implications for the literature on potential entrepreneurship and entrepreneurial intention. It would also be useful for promotors of entrepreneurship, entrepreneurs who wish to implement a specific strategic orientation, entrepreneurs who wish to measure the effectual propensity of their potential partners and workers, and academic institutions interested in developing and orienting the entrepreneurial potential of their students.

To achieve this objective, we first analysed the scales accepted in the literature to measure the effectual or causal logic of entrepreneurs. Then we designed a questionnaire to measure the propensity towards these two logics of people who had not yet started a business, using a sample of university students in their final year of studying for a business administration degree at the University of Cadiz and the University of Seville (Spain). Subsequently, we verified the reliability and validity of the scale. The discussion section analyses the results and presents the theoretical and practical implications of the validated scale for measuring the effectual or causal propensity of potential entrepreneurs.

BACKGROUND

Entrepreneurs continually make decisions regarding business idea improvements, the creation or identification of new market niches, the resolution of technical problems, and the recruitment and selection of key personnel in the company, among others (Davidsson & Klofsten, 2003). Effectuation theory (Sarasvathy, 2001) differentiates between effectual logic and causal logic in the decisions that entrepreneurs make under situations of uncertainty and risk. Under a logic oriented to causality, entrepreneurs recognise, develop, and evaluate opportunities. Then they identify the resources needed to exploit them and evaluate their feasibility. By contrast, the effectual vision of the entrepreneurial process begins with the resources available to entrepreneurs and the opportunities they create with them (Perry, Chandler, & Markova, 2012). The causal logic assumes that markets and opportunities are objective and pre-existing, the business process is linear and unidirectional, and the known outcome is the desired goal. On the other hand, the effectual logic presumes that markets and opportunities are subjective and limited only by the imagination of the entrepreneur, that the entrepreneurial process is dynamic, interactive, and non-linear, and it considers a set of resources that is already available (Dutta & Thornhill, 2014).

Either approach, effectuation or causation, may be required at different times in the evolution of the company. An entrepreneur can use both logics indistinctly, depending on the uncertainty of the circumstances

(Gabrielsson & Politis, 2011). Therefore, it is common for experienced decision-makers to possess an accumulated knowledge of trial-and-error decision-making, while new entrepreneurs prefer to take the approach of developing a business plan for the business they wish to create (Dew, Read, Sarasvathy, & Wiltbank, 2009), which they learned from the entrepreneurship programmes they attended in educational settings.

Causation

The specific environment in which entrepreneurs operate is critical, as it will influence their perception of what is preferable and most effective. Causal logic is valuable in situations where the existing market is definable and measurable (Gabrielsson & Politis, 2011). Causation is a model for decision-making and problem-solving based on the logic of prediction. The entrepreneurs' knowledge of the available means and the output they wish to obtain drive the selection of resources. It is assumed that the market exists independently of entrepreneurs and that their main task is to capture the largest possible share of that market. Entrepreneurs try to achieve this objective by planning for and gathering the necessary information to see how the strategies materialise according to the plan and also by identifying the possible causes for the result differing from the plan (Sarasvathy, 2001; Sarasvathy & Dew, 2005).

Effectuation

In the creation of new firms, entrepreneurs who follow an effectual approach often begin the process with the sole aspiration of creating a firm. However, as they make decisions and observe the results of those decisions, they use the new information to change course. As the future is unpredictable for them, their effectual logic makes them address the market from different perspectives before deciding on a business model (Sarasvathy, 2001). According to Sarasvathy (2001, 2008), the effectual logic considers five dimensions, namely means, partnership, affordable loss, contingency, and control. Although other authors have considered only four of the five dimensions, which have not always been the same four dimensions (Brettel et al., 2012; Chandler, DeTienne, McKelvie, & Mumford, 2011; Perry et al., 2012), this work will consider the original five dimensions proposed by Sarasvathy.

Means orientation

Sarasvathy (2001) argues that in the effectual process, entrepreneurs use the resources (means) they already have and select a possible output that they can create with those resources. The resources fall into three different categories: (1) who the person is — that is, the entrepreneur's traits, preferences, and skills; (2) what the person knows — that is, the entrepreneur's knowledge; and (3) who the person knows, which results from the

entrepreneur's social relationships. Means orientation implies that the entrepreneur uses all available means to create a business. Thus, effectual entrepreneurs bring their knowledge, social networks, experience, and skills to their project (Werhahn et al., 2015).

Partnership orientation

Social networks contribute significantly to innovation (Granovetter, 1973) and uncertainty management (Krackhardt, 1992). Building alliances can help to control certain situations (Wiltbank, Dew, Read, & Sarasvathy, 2006). The effectual entrepreneur seeks out and identifies partners with whom to start a business and commit in order to achieve a mutual benefit (Read, Song, & Smit, 2009; Rese, 2006). This type of entrepreneur seeks the joint creation of new products or services or any other type of cooperation to take advantage of new business opportunities. Effectual entrepreneurs looking for these opportunities are aware that they depend mainly on engagements with others to share knowledge, ideas, networks, money, or time. (Werhahn et al., 2015). In this way, when partners commit and work together, they better control the future of their business and reduce their uncertainty (Sarasvathy, 2001).

Affordable loss orientation

According to Sarasvathy (2001), entrepreneurs who have an effectual orientation consider affordable losses to be more important than expected returns. This type of entrepreneur determines how much loss can be assumed and focuses on experimenting with as many strategies as possible to achieve success. Affordable loss becomes an important criterion on which entrepreneurs base their decisions. This way, entrepreneurs reject projects that cost more than they can afford to lose in favour of more affordable projects. Therefore, following this approach, each new venture would be seen as a project where the losses are under control. Additional resources would be incorporated only if the results justified it.

Contingency orientation

Companies have to deal every day with unexpected situations that are challenging to predict, particularly when they operate in uncertain environments (Hitt, Keats, & DeMarie, 1998). These surprises, whether positive or negative, give rise to setbacks. Effectual logic embraces these setbacks to pursue new business or market opportunities (Sarasvathy, 2008). The effectual entrepreneur does not see setbacks as obstacles to overcome, but as new resources and opportunities to exploit (Harmeling, 2011). This type of entrepreneur excels at pivoting to take advantage of unanticipated events (Sarasvathy, 2001). The individual must be willing to adapt in order to capitalise on these contingencies when faced with new information, means, or surprises (Read et al., 2009). Thus, a contingency orientation relates to the ability to make fast, creative, proactive, and effective

changes. In other words, the effectual entrepreneur tries to take advantage of unforeseen events continuously and as advantageously as possible. The contingency orientation addresses the question of what the entrepreneur will decide to do about the environment and not how the entrepreneur will adapt to that environment (Werhahn et al., 2015).

Control orientation

Like organisations, individuals want to ensure favourable results (Wiltbank, Read, Dew, & Sarasvathy, 2009). The concept of control has particular relevance when the future is uncertain, as it seeks to exert some kind of influence on that future. This control implies believing that actors can proactively create or co-create their environment (Sarasvathy, 2001). From this perspective, the behaviour of companies and markets depends on individuals who do not conceive the future as an inevitable result of economic or technological forces. Thus, effectual entrepreneurs rarely see an opportunity as being out of their control, and what they do is work to discover and create opportunities (Dew, Read, Sarasvathy, & Wiltbank, 2008). Control orientation implies that individuals perceive the environment as endogenous and therefore controllable. In this way, the individual is motivated to influence socio-economic trends and to create new markets. The control-oriented individual can face new challenges successfully, especially in uncertain situations (Werhahn et al., 2015).

EFFECTUAL PROPENSITY

The existing literature has widely validated the measurement of effectual versus causal behaviour for the case of the entrepreneur who has already demonstrated such a behaviour (Brettel et al., 2012; Chandler et al., 2011). However, there is a gap in the literature if the aim is to measure the propensity of individuals to develop effectual or causal behaviours before these behaviours effectively take place. Being able to measure this propensity could have important practical implications. It would allow public, economic, and educational decision-makers to guide and refine these behaviours before they manifest. In this way, the potential entrepreneur will have the capacity to choose to develop an effectual or causal behaviour (or take a mixed position between the two behaviours) depending on the environmental circumstances (Futterer, Schmidt, & Heidenreich, 2018). Adequately training potential entrepreneurs will allow them to consciously consider each of the attributes of both orientations as they develop their entrepreneurial behaviour.

As noted above, the literature does not provide a validated scale to measure this effectual or causal propensity. In the methodology section, we adapted Werhahn et al.'s (2015) effectual orientation scale, which they validated in a corporate context. It was useful for this paper because it captures how an effectual strategic orientation at the corporate level can influence the effectual propensity of employees. Moreover, we validated

a scale to measure the "causal propensity" of individuals that was adapted from the work of Chandler et al. (2011) and Gabrielsson and Politis (2011).

METHODOLOGY

Questionnaire

The questionnaire is one of the methods most widely used by researchers in the field of entrepreneurship (Brettel et al., 2012; Dutta, Gwebu, & Wang, 2015; Estrada, Cruz, Jover, & Gras, 2018; Guo et al., 2016). We adapted a questionnaire from the work of Werhahn et al. (2015), Chandler et al. (2011), and Gabrielsson and Politis (2011) to measure effectual and causal propensity in individuals who had not yet effectively developed such types of behaviour. When the questionnaire used is an adaptation of one developed by other authors, given that the proposed new instrument will not fully reflect the consistency of the original works, it is essential to re-establish its validity (Mendoza & Garza, 2009).

Subsequently, a panel of experts in entrepreneurship and a group of 34 students who fulfilled the profile intended for the questionnaire reviewed the questionnaire. As a result, we developed a well-designed questionnaire which ensured that the students fully understood the questions. Once the refinement process was complete, we structured the definitive questionnaire into two differentiated sections (Lee, Tsao, & Chang, 2015). The first section included five demographic items: gender, age, nationality, employment status, and whether the student came from an entrepreneurial family. The second section included six categories that added up to a total of 25 questions to determine the effectual or causal propensity of the respondent.

Sample and data collection

To validate the new scale of measurement, we selected a sample of university students in their final year of studying for a business administration degree at the University of Cadiz and the University of Seville (Spain). Although they had not yet demonstrated effectual or causal behaviour, they could show a propensity towards the type of behaviour they would embody if they created a business. It was essential to study this propensity before they received specific training in entrepreneurship since this training would condition them. Therefore, the responses to the questionnaire were gathered in the first semester of the academic year before the students took a course on "business creation" in which they would acquire the knowledge and necessary skills to carry out a business plan. Data collection took place in October and November 2018. We created an online questionnaire using Google's Forms application (Hariguna, Lai, & Chen, 2016; Jiang & Wu, 2016; Lian, 2017), which allows the user to access the survey through a web link. This tool funnels the data directly into a spreadsheet, which facilitates subsequent statistical processing.

We obtained a sample of 230 completed questionnaires from a total of 463 students enrolled, obtaining a response rate of 49.67%. Of those surveyed, 58.3% were women. Furthermore, 86.1% of those surveyed were between 18 and 24 years old, 11.7% were between 25 and 30 years old, and the rest were more than 30 years old. Students from the University of Seville accounted for 58.3% of the respondents, while the remaining 41.7% were from the University of Cadiz. Moreover, 67.4% of those surveyed were pursuing a business administration degree, while 32.6% were pursuing a double degree in business administration and law. Of those surveyed, 36.1% had parents who had owned or currently owned a business, 43.5% had worked or were working as employees (as compared with 48.3% who had never worked), and the rest either had been or were self-employed or were both self-employed and employed.

Measures

Following Sarasvathy (2001) and Gabrielsson and Politis (2011), we did not consider effectual propensity and causal propensity to be two extremes on the same scale. Instead, we divided the logic of the respondents' decision-making into two different variables. Thus, the construct for effectual propensity was different and separate from the construct for causal propensity, making it possible to detect any combination of the two approaches.

We adapted the items for the construct "effectual propensity" from the work of Werhahn et al. (2015), which contemplates five dimensions: (1) means orientation, measured using three items; (2) partnership orientation, measured using four items; (3) affordable loss orientation, measured using three items; (4) contingency orientation, measured using four items; and (5) control orientation, measured using four items. On the other hand, seven items measured "causal propensity". Items one, three, and six were adapted from the work of Chandler et al. (2011). Items two, four, five, and seven were adapted from the work of Gabrielsson and Politis (2011). Following Dittrich et al. (2005), the above items were measured on a seven-point Likert scale, with one corresponding to "strongly disagree" and seven to "strongly agree". Table 1 shows all the items.

Measurement model analysis

We used SmartPLS software to carry out the analysis of the measurement model. It allows for analysing the relationships between latent variables and their indicators. This analysis shows whether all the indicators represent their corresponding construct or whether some of them need to be removed. SmartPLS evaluates the measurement of variables based on individual reliability, construct reliability, discriminant validity, and convergent validity. This analysis ensures that the indicators are good at representing their corresponding

variable. Reliability ensures that the measurement produces consistent results, and validity ensures that the indicators of a construct measure only their construct and not another.

First, the individual reliability of each item was analysed by simple correlations of the indicators with their respective construct. According to Carmines and Zeller (1979), loads must be $\lambda \geq 0.707$ to accept an indicator. However, some researchers consider that this rule of thumb ($\lambda >= 0.707$) should not be so rigid in the initial stages of scale development (Hair Jr, Black, Babin, & Anderson, 2014). Hair et al. (2014) establish that indicators with loads between 0.4 and 0.7 could be removed from a scale if their suppression leads to an increase in the mean extracted variance (AVE) or composite reliability (CR) above the suggested threshold value (AVE = 0.5; CR = 0.7). In any case, researchers should eliminate indicators with very low loads (i.e., $\leq$ 0.4) (Hair Jr, Ringle, & Sarstedt, 2011). In this study, there were no indicators with loads below 0.4, although there were indicators with loads between 0.4 and 0.7 (see Table 1) that could be eliminated at a later stage.

Second we analysed the reliability of the construct to see how rigorously the indicators measured the same latent variable. For this purpose, the measures corresponding to the composite reliability (Werts, Linn, & Jöreskog, 1974) should be greater than 0.8 (Nunnally & Bernstein, 1995). Dijkstra–Henseler's rho (ρA) is another indicator to determine the reliability of the construct. Its value must be above 0.7 (Dijkstra & Henseler, 2015). In this study, all indicators met this requirement except for the Dijkstra–Henseler indicator in the construct "affordable losses", since its result was 0.691, which did not exceed the established value of 0.7. However, we did not remove the indicator since the value was very close to 0.7, it met the composite reliability threshold (which is a measure of greater acceptance than the indicator ρA), and the loads of the indicators that make up this variable were quite high (see Table 1).

[INSERT TABLE 1 ABOUT HERE]

Subsequently, convergent validity was studied to verify that the indicators represent a single underlying construct. The average extracted variance (AVE) was used as a measure of this validity, requiring values greater than 0.5 (Fornell & Larcker, 1981). The latent variable "Causation" explained less than 50% of the variance of the indicators that comprised it (Table 1). We removed the following two items to solve this problem: "I try to avoid uncertain situations to the greatest possible extent" and "When I set goals to achieve, I analyse my competitors in depth". As a result, the AVE reached an acceptable score above the recommended 0.5.

Finally, we analysed the discriminatory validity before removing the previous items. The discriminatory validity is the extent to which a given construct is different from other constructs. Following Henseler et al. (2016), there is discriminant validity when the heterotrait-monotrait ratio of correlations (HTMT) has values below 0.85 (Gold, Malhotra, & Segars, 2001). Table 2 shows that all values were below this threshold, so we did not need to remove any other indicators.

[INSERT TABLE 2 ABOUT HERE]

After the removal of the two items, we recalculated all previous indicators (see Tables 3 and 4). Individual reliability was met as the loads were within the thresholds defined above. The reliability of the construct was also met as the values of the composite reliability exceeded the limit of 0.8 and the ρA results were also higher than 0.7. Concerning convergent validity, we observed that all AVE values exceeded 0.5, so each item adequately represented a single construct.

[INSERT TABLE 3 ABOUT HERE]

Finally, after the elimination of the two items, it was verified that discriminant validity still existed since the values of the HTMT ratio between the different variables were less than 0.85 (see Table 4).

[INSERT TABLE 4 ABOUT HERE]

RESULTS

This research aims to develop and validate a measurement instrument that assesses the propensity of individuals towards effectual or causal behaviour when they have not yet created a company but could potentially do so. We designed a 25-item questionnaire, adapted from the work of Werhahn et al. (2015), Chandler et al. (2011), and Gabrielsson and Politis (2011), that measured six variables — five related to the effectual propensity of the individual (means, partnership, affordable losses, contingency, and control) and one related to causal propensity. After analysing the individual reliability, reliability of the construct, discriminant validity, and convergent validity of these constructs, we obtained a scale with 23 reliable and valid items (see Table 3). From the initial scale of 25 items, we eliminated only two items from the causal propensity construct to increase the

explained variance and improve convergent validity. The items eliminated were: "I try to avoid uncertain situations to the greatest possible extent" and "When I set goals to achieve, I analyse my competitors in depth".

DISCUSSION

The results obtained show how an adequate adaptation of the scales proposed by Werhahn et al. (2015), Chandler et al. (2011), and Gabrielsson and Politis (2011) can be useful to measure the effectual and causal propensity of individuals who have not yet created a business.

This new scale has practical implications for management and the literature on entrepreneurial intention. It provides added value for entrepreneurship research that is interested in analysing the previous and initial stages of the entrepreneurial process. The measurement of effectual propensity will also be of practical use for those public and private agents with the function of promoting entrepreneurship since they will be able to pre-evaluate potential entrepreneurs and orient them towards a better use and fit to the environment of effectual and causal logics (Futterer et al., 2018). This scale will also be useful for the entrepreneurs and managers of already consolidated companies, who will be able to evaluate themselves and the members of their companies in order to implement the strategic orientation they consider most appropriate (Werhahn et al., 2015). Furthermore, effectual entrepreneurs who wish to assess the effectual propensity of their potential partners and workers may also use this scale of measurement before deciding to rely on them.

This tool will be particularly useful for the education system. Those academic institutions interested in developing the entrepreneurial potential of their students (Nowiński, Haddoud, Lančarič, Egerová, & Czeglédi, 2019; Padilla-Angulo, 2019; Ramos-Rodríguez, Medina-Garrido, & Ruiz-Navarro, 2019) will have a validated measurement instrument with which to evaluate the initial propensity of their students towards an effectual or causal behaviour. This starting point will be useful when establishing the content of the training offered, allowing for the development of the logic (effectual versus causal) that is most innate to the students. Once academic institutions have detected and developed the dominant logic of each student, it is also advisable to train them in their non-dominant logic so that they can discern, apply, and combine both logics in order to improve their chances of success according to their entrepreneurial context (Futterer et al., 2018).

CONCLUSIONS

Effectual and causal logics suggest that entrepreneurs demonstrate different types of behaviour when they create and manage their companies and in their interactions with the environment (Sarasvathy, 2001). The literature on entrepreneurship has extensively studied these two types of behaviours (Brettel et al., 2012; Guo

et al., 2016; Schmidt & Heidenreich, 2014). However, we have not found any studies that measure the individual's propensity towards these logics for the potential entrepreneur. Given the gap detected, the study of the propensity towards an effectual or causal behaviour supposes high added value to the literature on entrepreneurship.

In this sense, this research aims to develop and validate a measurement instrument that assesses an individual's propensity towards effectual or causal behaviour before they have started a company. To achieve this objective, we designed a questionnaire adapted from the works of Werhahn et al. (2015), Chandler et al. (2011), and Gabrielsson and Politis (2011). To check the reliability and validity of the items included in the questionnaire, a sample of final-year university students in the business administration programmes at the University of Cadiz and the University of Seville (Spain) was analysed, obtaining 230 valid responses. After analysing the individual reliability, construct reliability, discriminant validity, and convergent validity, we obtained a scale with 23 valid and reliable items (see Table 3).

This scale has important implications for the literature on potential entrepreneurship and entrepreneurial intention that is interested in the stages prior to the creation of a company. Likewise, the measurement of effectual propensity will be of practical use for: (1) entrepreneurship promoters who must guide the behaviour of entrepreneurs in a manner consistent with the environmental context (Futterer et al., 2018); (2) entrepreneurs and managers of consolidated companies who wish to implement a specific strategic orientation in their companies (Werhahn et al., 2015); (3) entrepreneurs who wish to measure the effectual propensity of their potential partners and workers; and (4) academic institutions interested in developing and orienting the entrepreneurial potential of their students.

However, some limitations must be kept in mind when interpreting these results. More empirical work is needed to increase the validity and generalisation of the established measures. Another limitation to consider is that we have used a sample with students from two universities in the same country. Future research should contrast this scale in different segments of the population in other countries and cultures. Another future line of research that would also fill a gap in the literature on entrepreneurship is the study of the moderating role of "effectual propensity" and "causal propensity" in entrepreneurial intentions (Arranz, Arroyabe, & Fdez. de Arroyabe, 2019; Dutta et al., 2015; Jeger, Sušanj, & Mijoč, 2014; Nowiński et al., 2019; Padilla-Angulo, 2019; Valliere, 2014, 2015).

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REFERENCES

Arranz, N., Arroyabe, M. F., & Fdez. de Arroyabe, J. C. (2019). Entrepreneurial intention and obstacles of undergraduate students: the case of the universities of Andalusia. *Studies in Higher Education*, *44*(11), 2011–2024. https://doi.org/10.1080/03075079.2018.1486812

Brettel, M., Mauer, R., Engelen, A., & Küpper, D. (2012). Corporate effectuation: Entrepreneurial action and its impact on R&D project performance. *Journal of Business Venturing*, *27*(2), 167–184. https://doi.org/10.1016/j.jbusvent.2011.01.001

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Beverly Hills: Sage Publications.

Chandler, G. N., DeTienne, D. R., McKelvie, A., & Mumford, T. V. (2011). Causation and effectuation processes: A validation study. *Journal of Business Venturing*, *26*(3), 375–390. https://doi.org/10.1016/j.jbusvent.2009.10.006

Davidsson, P., & Klofsten, M. (2003). The business platform: Developing an instrument to gauge and assist the development of young firms. *Journal of Small Business Management*, *41*(1), 1–26.

Dew, N., Read, S., Sarasvathy, S. D., & Wiltbank, R. (2008). Outlines of a behavioral theory of the entrepreneurial firm entrepreneurial firm. *Ournal of Economic Behavior & Organization*, *66*(1), 37–59. https://doi.org/10.1016/j.jebo.2006.10.008

Dew, N., Read, S., Sarasvathy, S. D., & Wiltbank, R. (2009). Effectual versus predictive logics in entrepreneurial decision-making : Differences between experts and novices. *Journal of Business Venturing*, *24*(4), 287–309. https://doi.org/10.1016/j.jbusvent.2008.02.002

Dijkstra, T. K., & Henseler, J. (2015). Consistent Partial Least Squares Path Modeling. *MIS Quarterly*, *39*(2), 297–316.

Dittrich, R., Francis, B., Hatzinger, R., & Katzenbeisser, W. (2005). A Paired Comparison Approach for the Analysis of Sets of Likert Scale Responses. *Statistical Modelling*, *7*(1), 3–28. https://doi.org/http://dx.doi.org.bibezproxy.uca.es:2048/10.1177/1471082X0600700102

Dutta, D. K., Gwebu, K. L., & Wang, J. (2015). Personal innovativeness in technology, related knowledge and experience, and entrepreneurial intentions in emerging technology industries: a process of causation or

effectuation? *International Entrepreneurship and Management Journal*, *11*(3), 529–555. https://doi.org/10.1007/s11365-013-0287-y

Dutta, D. K., & Thornhill, S. (2014). Venture Cognitive Logics , Entrepreneurial Cognitive Style , and Growth Intentions : A Conceptual Model and an Exploratory Field Study. *Entrepreneurship Research Journal*, *4*(2), 144–166. https://doi.org/10.1515/erj-2012-0004

Estrada, M., Cruz, D., Jover, A. J. V., & Gras, J. M. G. (2018). Influence of the entrepreneur ' s social identity on business performance through effectuation. *European Research on Management and Business Economics*, *24*(2), 90–96. https://doi.org/10.1016/j.iedeen.2017.11.003

Fisher, G. (2012). Effectuation, causation, and bricolage: A behavioral comparison of emerging theories in entrepreneurship research. *Entrepreneurship Theory and Practice*, *36*(5), 1019–1051. https://doi.org/10.1111/j.1540-6520.2012.00537.x

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39. https://doi.org/10.2307/3151312

Futterer, F., Schmidt, J., & Heidenreich, S. (2018). Effectuation or causation as the key to corporate venture success? Investigating effects of entrepreneurial behaviors on business model innovation and venture performance. *Long Range Planning*, *51*(1), 64–81. https://doi.org/10.1016/j.lrp.2017.06.008

Gabrielsson, J., & Politis, Æ. D. (2011). Career motives and entrepreneurial decision-making : examining preferences for causal and effectual logics in the early stage of new ventures. *Small Business Economics*, *36*(3), 281–298. https://doi.org/10.1007/s11187-009-9217-3

Gold, A. A. H., Malhotra, A., & Segars, A. A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, *18*(1), 185–214. https://doi.org/10.1002/ceat.201000522

Granovetter, M. S. (1973). The Strength of Weak Ties. *American Journal of Sociology*, *78*(6), 1360–1380.

Guo, R., Cai, L., & Zhang, W. (2016). Effectuation and causation in new internet venture growth: The mediating effect of resource bundling strategy. *Internet and Higher Education*, *26*(2), 460–483. https://doi.org/10.1108/IntR-01-2015-0003

Hair Jr, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis (Pearson new internat. ed)*. New Jersey: Essex: Pearson.

Hair Jr, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM : Indeed a Silver Bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–151. https://doi.org/10.2753/MTP1069-6679190202

Hariguna, T., Lai, M.-T., & Chen, S.-C. (2016). An Empirical Study on the Impact of Information System Quality on Software as a Service. *Global Business and Management Research*, *8*(3), 43–54.

Harmeling, S. (2011). Contingency as an entrepreneurial resource: How private obsession fulfills public need. *Journal of Business Venturing*, *26*(3), 293–305. https://doi.org/https://doi.org/10.1016/j.jbusvent.2009.10.003

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, *33*(3), 405–431. https://doi.org/10.1108/IMR-09-2014-0304

Hitt, M. A., Keats, B. W., & DeMarie, S. M. (1998). Navigating in the new competitive landscape: Building strategic flexibility and competitive advantage in the 21st century. *Academy of Management Perspectives*, *12*(4), 22–42. https://doi.org/10.5465/ame.1998.1333922

Jeger, M., Sušanj, Z., & Mijoč, J. (2014). Entrepreneurial intention modeling using hierarchical multiple regression. *Croatian Operational Research Review*, *5*(2), 361–373. https://doi.org/10.17535/crorr.2014.0019

Jiang, S., & Wu, C.-T. (2016). Utilization of cloud computing APP for homestay operation-desing and analysis. *International Journal of Organizational Innovation*, *9*(2), 201–213.

Krackhardt, D. (1992). The strength of strong ties: The importance of philos in or- ganizations. In *Networks and Organizations: Structure, Form, and Action* (pp. 216–239).

Lee, C.-Y., Tsao, C.-H., & Chang, W.-C. (2015). The relationship between attitude toward using and customer satisfaction with mobile application services An empirical study from the life insurance industry. *Journal of Enterprise Information Management*, *28*(5), 680–697. https://doi.org/10.1108/EL-01-2014-0022

Lian, J.-W. (2017). Establishing a Cloud Computing Success Model for Hospitals in Taiwan. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *54*, 1–6. https://doi.org/10.1177/0046958016685836

Mendoza, J., & Garza, J. B. (2009). La medicion en el proceso de investigacion cientifica: Evaluacion de validez de contenido y confiabilidad. *Innovaciones de Negocios*, *6*(1), 17–32. https://doi.org/10.1017/CBO9781107415324.004

Montañés-Del-Río, M. Á., & Medina-Garrido, J. A. (2020). Determinants of the Propensity for Innovation among Entrepreneurs in the Tourism Industry. *Sustainability*, *12*(12), 5003. https://doi.org/10.3390/su12125003

Nowiński, W., Haddoud, M. Y., Lančarič, D., Egerová, D., & Czeglédi, C. (2019). The impact of entrepreneurship education, entrepreneurial self-efficacy and gender on entrepreneurial intentions of university students in the Visegrad countries. *Studies in Higher Education*, *44*(2), 361–379. https://doi.org/10.1080/03075079.2017.1365359

Nunnally, J. C., & Bernstein, I. J. (1995). *Teoría Psicométrica (3ª ed)*. México, D.F.: McGraw-Hill Latinomericana.

Oosterbeek, H., van Praag, M., & Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review*, *54*(3), 442–454. https://doi.org/https://doi.org/10.1016/j.euroecorev.2009.08.002

Padilla-Angulo, L. (2019). Student associations and entrepreneurial intentions. *Studies in Higher Education*, *44*(1), 45–58. https://doi.org/10.1080/03075079.2017.1336215

Perry, J. T., Chandler, G. N., & Markova, G. (2012). Entrepreneurial Effectuation: A Review and Suggestions for Future Research. *Entrepreneurship Theory and Practice*, *36*(4), 837–861. https://doi.org/10.1111/j.1540-6520.2010.00435.x

Ramos-Rodríguez, A. R., Medina-Garrido, J. A., & Ruiz-Navarro, J. (2019). Why not now? Intended timing in entrepreneurial intentions. *International Entrepreneurship and Management Journal*, *15*, 1221–1246. https://doi.org/10.1007/s11365-019-00586-5

Read, S., Song, M., & Smit, W. (2009). A meta-analytic review of effectuation and venture performance. *Journal of Business Venturing*, *24*(6), 573–587. https://doi.org/https://doi.org/10.1016/j.jbusvent.2008.02.005

Rese, M. (2006). Successful and sustainable business partnerships: How to select the right partners. *Industrial Marketing Management*, *35*(1), 72–82. https://doi.org/https://doi.org/10.1016/j.indmarman.2005.08.009

Sánchez García, J. C., Ward, A., Hernández, B., & Florez, J. L. (2017). Educación emprendedora : Estado del arte. *Propósitos y Representaciones*, *5*(2), 401–437.

Sarasvathy, S. D. (2001). Causation and Effectuation : Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency Authors (s): Saras D . Sarasvathy Source : The Academy of Management Review , Vol . 26 , No . 2 (Apr ., 2001), pp . 243-263 Published by. *The Academy of Management Review*, *26*(2), 243–263. https://doi.org/10.5465/AMR.2001.4378020

Sarasvathy, S. D. (2008). *Effectuation : elements of entrepreneurial expertise*. Edward Elgar.

Sarasvathy, S. D., & Dew, N. (2005). New market creation through transformation. *New Market Creation*

through Transformation, *15*(5), 533–565. https://doi.org/10.1007/s00191-005-0264-x

Schmidt, J., & Heidenreich, S. (2014). Investigating Organizational Antecedents of Effectual Corporate Entrepreneurship. In *ISPIM Conference Proceedings; Manchester* (pp. 1–33).

Vaghely, I. P., & Julien, P. (2010). Are Opportunities Recognized or Constructed ? An Information Perspective on Entrepreneurial Opportunity Identification. *Journal of Business Venturing*, *25*(1), 73–86. https://doi.org/10.1016/j.jbusvent.2008.06.004

Valliere, D. (2014). Purifying entrepreneurial intent: proposition of a new scale. *Journal of Small Business and Entrepreneurship*, *27*(5), 451–470. https://doi.org/10.1080/08276331.2015.1094225

Valliere, D. (2015). An Effectuation Measure of Entrepreneurial Intent. *Procedia - Social and Behavioral Sciences*, *169*(August 2014), 131–142. https://doi.org/10.1016/j.sbspro.2015.01.294

Werhahn, D., Mauer, R., Flatten, T. C., & Brettel, M. (2015). Validating effectual orientation as strategic direction in the corporate context. *European Management Journal*, *33*(5), 305–313. https://doi.org/10.1016/j.emj.2015.03.002

Werts, C. E., Linn, R. L., & Jöreskog, K. G. (1974). Intraclass reliability estimates: Testing structural assumptions. *Educational and Psychological Measurement*, *34*(1), 25–33. https://doi.org/10.1177/001316447403400104

Wiltbank, R., Dew, N., Read, S., & Sarasvathy, S. D. (2006). What to do next? The case for non-predictive strategy. *Strategic Management Journal*, *27*(10), 981–998. https://doi.org/10.1002/smj.555

Wiltbank, R., Read, S., Dew, N., & Sarasvathy, S. D. (2009). Prediction and control under uncertainty : Outcomes in angel investing. *Journal of Business Venturing*, *24*(2), 116–133. https://doi.org/10.1016/j.jbusvent.2007.11.004

Table 1. Convergent reliability and validity before eliminating indicators

Constructs/Indicators	Loads	Composite Reliability	ρA	AVE
Means		0.868	0.773	0.686
I use my personal knowledge and experience in the best possible way.	0.825			
I pursue those initiatives for which I have great motivation and interest.	0.814			
I pursue those initiatives for which I personally have the relevant competencies.	0.845			
Partnership		0.812	0.708	0.524
When I work with others, I aim to ensure that gains and risks are shared fairly.	0.608			
I approach potential partners very early on in order to jointly co-create new things.	0.811			
I enter into relationships with partners who are willing to commit (e.g. invest time) from the onset.	0.816			
When new actors appear in my environment, I perceive them as potential partners.	0.634			
Affordable Loss		0.819	0.691	0.601
I would only invest in a business what I can afford to lose.	0.823			
In a business, I would try to limit the potential loss of initiatives to an acceptable degree, although it could be that by investing more, I would finally obtain benefits.	0.726			
I would only invest in my business if the loss of the investment would not ruin the company, although it could be that by investing more, I would finally obtain benefits.	0.775			
Contingency		0.880	0.826	0.649
I regard surprises to be new opportunities that I could take advantage of.	0.784			

I exploit contingencies as effectively as possible.	0.888			
When I have new information, I try to take advantage of it.	0.737			
I use setbacks as new opportunities to take advantage of.	0.805			
Control		0.835	0.744	0.561
I attempt to shape the environment I operate in.	0.810			
I attempt to proactively design my environment with others.	0.816			
In a business, we must attempt to create with others new needs for the market.	0.603			
I attempt to influence trends.	0.748			
Causation		0.835	0.786	0.424
I usually design a long-term plan to organise myself in my tasks.	0.689			
I prefer to have predetermined goals and to strive to achieve the results of these goals.	0.748			
I analyse long-run opportunities and select what I think would provide the best returns.	0.732			
I try to avoid uncertain situations to the greatest possible extent.	0.488			
When I set goals to achieve, I analyse my competitors in depth.	0.624			
I usually implement control processes to make sure I meet the objectives.	0.640			
I think my relationships with those who can influence my future should be long term and goal oriented.	0.600			

Note: ρA: Dijkstra–Henseler; AVE: Average extracted variance.

Table 2. Discriminant validity before eliminating indicators

	Means	Partnership	Affordable Loss	Contingency	Control	Causation
Means						
Partnership	0.713					
Affordable Loss	0.170	0.308				
Contingency	0.540	0.590	0.314			
Control	0.445	0.771	0.244	0.660		
Causation	0.512	0.667	0.489	0.562	0.668	

Table 3. Convergent reliability and validity after eliminating items

Constructs/Indicators	Loads	Composite Reliability	ρA	AVE
Means		0.868	0.773	0.686
I use my personal knowledge and experience in the best possible way.	0.829			
I pursue those initiatives for which I have great motivation and interest.	0.812			
I pursue those initiatives for which I personally have the relevant competencies.	0.843			
Partnership		0.812	0.705	0.524
When I work with others, I aim to ensure that gains and risks are shared fairly.	0.610			
I approach potential partners very early on in order to jointly co-create new things.	0.808			
I enter into relationships with partners who are willing to commit (e.g. invest time) from the onset.	0.812			
When new actors appear in my environment, I perceive them as potential partners.	0.641			
Affordable Loss		0.819	0.683	0.602
I would only invest in a business what I can afford to lose.	0.814			
In a business, I would try to limit the potential loss of initiatives to an acceptable degree, although it could be that by investing more, I would finally obtain benefits.	0.748			
I would only invest in my business if the loss of the investment would not ruin the company, although it could be that by investing more, I would finally obtain benefits.	0.764			
Contingency		0.880	0.828	0.648

I regard surprises to be new opportunities that I could take advantage of.	0.780			
I exploit contingencies as effectively as possible.	0.888			
When I have new information, I try to take advantage of it.	0.743			
I use setbacks as new opportunities to take advantage of.	0.802			
Control		0.835	0.744	0.561
I attempt to shape the environment I operate in.	0.810			
I attempt to proactively design my environment with others.	0.816			
In a business, we must attempt to create with others new needs for the market.	0.603			
I attempt to influence trends.	0.748			
Causation		0.834	0.763	0.504
I usually design a long-term plan to organise myself in my tasks.	0.743			
I prefer to have predetermined goals and to strive to achieve the results of these goals.	0.785			
I analyse long-run opportunities and select what I think would provide the best returns.	0.757			
I usually implement control processes to make sure I meet the objectives.	0.637			
I think my relationships with those who can influence my future should be long term and goal oriented.	0.612			

Note: ρA: Dijkstra–Henseler; AVE: Average extracted variance

Table 4. Discriminant validity after elimination of items

	Means	Partnership	Affordable Loss	Contingency	Control	Causation
Means						
Partnership	0.713					
Affordable Loss	0.170	0.308				
Contingency	0.540	0.590	0.314			
Control	0.445	0.771	0.244	0.660		
Causation	0.500	0.665	0.406	0.571	0.637	