

National Public University Business Office

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Abstract

By establishing a regulatory framework that promotes entrepreneurship and the sustainability of microenterprises, the goal is to increase social and equitable well-being through education. This study seeks to analyze the perception among microentrepreneurs about what they have learned in their entrepreneurship. 327 entrepreneurs from 16 Social Intervention Centers – CIS – in the country's capital participated. Which completed the online business consultation instrument. (Results) The analyzes of the Bayesian binomial test show that when faced with the question: Do you consider that you have learned in entrepreneurship?, the results show that the first Totally agree with 176 has a proportion of 0.538, the second agree with 91 has a proportion of 0.278, the third I have learned something with 26 has a proportion 0.080, the fourth I have learned with 10 has a proportion 0.031, and the fifth I have learned a lot with 24 with a ratio of 0.073. It is concluded that the evidence provided by the Bayesian Factor suggests for the first response in favor of the null hypothesis; for the second answer in favor of the alternative hypothesis; in the third response in favor of the alternative hypothesis; regarding the fourth response in favor of the alternative hypothesis; finally, compared to the fifth answer, the evidence in favor of the alternative hypothesis increases exponentially.

Keywords: Business Consulting, Entrepreneurship, perception of microentrepreneurs, Learning, Bayesian binomial test.

Introduction

In recent years, microentrepreneurs have been assuming a leading role in strengthening the economy in different countries, which has brought great interest on the part of higher education institutions, giving an orientation towards the transmission of information and technological adoption to meet customer needs. The rise of interest in entrepreneurship education coincides with the rise of entrepreneurs as key players in global business growth (Wathanakom et al., 2020). The relevance of a business consultancy is evidenced as a result of the approach to the productive sector, thanks to the latent needs oriented towards the opening of new markets in order to have a local, national and international impact (Guerrero Molina et al., 2021). The role that business consultancies play in all universities is necessary because the labor market increasingly prefers people with a high level of education and skills, the latter are influenced by rapid technological evolution and globalization, which demands more specialized skills and advanced, which can be provided by universities, through their business consultancies. A high level of education and skills will be increasingly important in the labor market in the coming years (Serrano et al., 2023).

The competition from new markets and their globalization mean that trained people are required, which is why the productive sector must rely on the academic sector to form a key that allows the formation of innovative human capital, this can be achieved through strengthening university business consultancies. Human capital is

best described as a resource that encompasses creativity and innovation, while facilitating modern economic growth and development. Human capital needs to be cultivated to improve qualifications, skills and creativity Saraireh, M. (2021). Companies derived from university business consultancies, created with the purpose of commercializing knowledge, technology or research results, constitute an important subset of start-ups that can become an economically powerful group of companies (Buratti et al., 2021). The relationship between the company and the university provides good results, mainly in the transfer of technology and the training of personnel. Universities often have expert personnel who facilitate this transfer of knowledge but which requires large resources. The interaction and relationship between industry and university have resulted in technology transfers from the university to the market.

The technology transfer process is complex, involving many interconnected tasks (Meeampol & Rassameethes, 2023). This is why the operation of the business consultancy in universities is necessary, by playing an important role in the training not only of their students for immersion in working life, but also in supporting micro-entrepreneurs where the transfer of knowledge is carried out (Alvear-Pájaro, 2022). To meet their innovation requirements, universities and industry need to interact to adopt and implement new technologies (Abbas et al., 2018). A business consultancy is a strategic point in the University-Business union, where innovation, knowledge and consulting allow for greater competitiveness of companies, strengthening the relevance of a business consultancy as a point of convergence between the university and companies. In the consultancies, innovation is encouraged, knowledge is shared and advice is provided to enhance business competitiveness. There is still little systematic understanding of organizational practices in the management of university intellectual property (Siegel et al., 2003). Linking universities with industry (and other actors) has multiple benefits in terms of teaching, learning, research and income generation (Ferreira & Steenkamp, 2015). In recent years, Colombian universities have worked to have innovative products and services, seeking to provide technological development to the business sector. But to finish strengthening this work, the government must create regulations that encourage universities to acquire outstanding skills in management and entrepreneurship. During recent years, innovations and technology transfer processes have become priorities for universities. They help develop the next generation of technologies and increase the number of high-growth startups (Stankevičienė et al., 2017).

These innovation processes will have a successful transfer if they are taken as a basic factor to become competitive. Individual actors related to science, technology and innovation (such as companies, universities or government research laboratories) cannot meet the country's innovative capacity alone, but need to link their strengths (Zmuidzinaite et al., 2021). Within this rapidly evolving global climate, the best way to achieve optimal results is primarily through investment. This investment should ideally be in the field of scientific research and specifically in the field of human capital (Muslim Saraireh, 2021). One of the objectives of a university business consultancy is to facilitate the transfer of knowledge and innovative development between the university and the business community in order to satisfy the requirements of a globalized market. Since the university acquired the social commitment to promote economic development through the transfer of knowledge and technologies to other organizations, the need arose to create formally constituted spaces that were responsible for mobilizing research results (Alvarado-Moreno, 2018). Universities have adopted a more entrepreneurial approach, helping people who want to start a business or focusing their efforts on generating patents, strengthening the processes that allow technology transfer through the incubation of new companies. Creating positive impacts through the commercialization of science is one of the most prominent policy objectives that universities have incorporated into their strategic plans (Baglieri et al., 2018).

The objective of this research article is to interpret the results about what entrepreneurs think about their learning about entrepreneurship and which can be contrasted through their a priori probability before the study. The methodology to obtain information about what entrepreneurs think in relation to the university business consultancy was to calculate the sample of the chosen respondents who represent the total population, the primary data was collected through the application of an online instrument, in the 16 Social Intervention Centers – CIS – of the city of Bogotá, Colombia.

Finally, the research findings may be useful to develop university policies related to knowledge and technology transfer activities in a university business consultancies. The main motivation for research and development activity carried out at the national and international level is to create data and contribute to economic development,

this is achieved through interaction or collaboration between the university and the company (Kireyeva et al., 2020). The commercialization of research and technology in universities has helped develop economies, leading to the creation of universities, the growth of other startups, and associated employment (Hamilton & Philbin, 2020). Likewise, university business consultancies are important in economic development, innovation and entrepreneurship, while strengthening ties between the educational sector and the business sector. Research and development can be used to expand businesses, obtain a competitive advantage and increase expected profits in companies, and achieve the sustainable development necessary so that they can compete better in the markets (Suttipun & Insee, 2024). As a complement to the knowledge learned in the classrooms, students have the need to live or experience everyday cases presented in the business world at the consulting level and at the operational level (Ruz, 2016).

Methodology

Type of study

The sample of respondents chosen to represent the total population. The sample size is a significant portion of the population that meets the characteristics of the research, reducing costs and time to avoid bias in the interpretation of the results obtained.

$$n = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

Where the calculated variables are: N = population size; e = margin of error (percentage expressed with decimals); desired confidence level 95% therefore $z = 1.96$ 1.65; n = sample size. 327 entrepreneurs from 16 Social Intervention Centers – CIS – in the country's capital participated in this project. Which completed the online business consultation instrument. There are cases in which they have assisted in different semesters identifying advisors served by the university business consultancy. Given the sample size, the formula is applied and the result of a representative sample is obtained by applying the survey to 327 randomly selected entrepreneurs.

Results

The entrepreneurs surveyed belong to 16 Social Intervention Centers or CIS that serve entrepreneurs and businessmen in the city and country in terms of consulting, formalization and competitiveness: October 12 with 20 participants, Anolaima with 18 participants, Barrios Unidos with 12 participants, Bibliored with 10 participants, Bosa Casa de la participación with 30 participants, Bosa Liceo Nuevos Horizontes with 42 participants, Ciudad Bolívar IED Rodrigo Lara with 44 participants, Courses extension with 4 participants, Engativa with 20 participants, Garzón-Huila with 31 participants, Jóvenes YMCA with 6 participants, Normandía with 29 participants, Policarpa with 22 participants, Proyectando el futuro with 1 participants, Sopó Alcaldía (Casa de la Juventud) with 7 participants, Suba with 29 participants.

Table 1.

Descriptive Statistics

	1. Totally agree	2. Agree	3. I have learned something	4. I have learned	5. I have learned a lot
Valid users	176	91	26	10	24

Note. Not all values are available for nominal text variables

From the results obtained by the project through the survey, Bayesian statistics was applied, which is based on subjective probability, this works with the updating of the evidence where the previous knowledge acquired plus the evidence obtained are considered. The interpretation of the results requires the specification of the hypotheses, consider what has been learned in the venture which is contrasted and its a priori probability before the study.

The evidence of the study is measured with the Bayes factor (ratio of data compatibility under the proposed hypotheses). The conjunction of the a priori probabilities of the hypotheses with the Bayes factor allows us to calculate the a posteriori probability of each one. The hypothesis with the highest degree of certainty in its update is the one accepted for making the decision.

Table 2. Bayesian Binomial Test

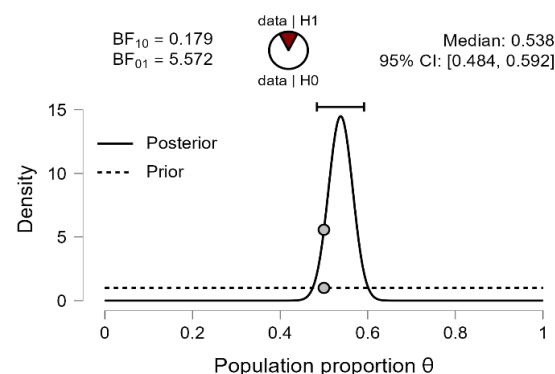
		Level	Counts Total Proportion			BF ₀₁
Do you think you have learned in entrepreneurship?	1. Totally agree		176	327	0.538	5.572
	2. Agree		91	327	0.278	5.597e-14
	3. I have learned something		26	327	0.080	2.561e-58
	4. I have learned		10	327	0.031	4.022e-78
	5. I have learned a lot		24	327	0.073	1.819e-60

Note. Proportions tested against value: 0.5. The shape of the prior distribution under the alternative hypothesis is specified by Beta (1, 1).

Below, the development of the inference graphs regarding the question: Do you think you have learned in entrepreneurship?, and the first response Totally agree. The data summarized in the density table and sequential analysis present the following results: When asked the question: Do you consider that you have learned in entrepreneurship? - 1. Totally agree.

Figure 1

Prior and Posterior

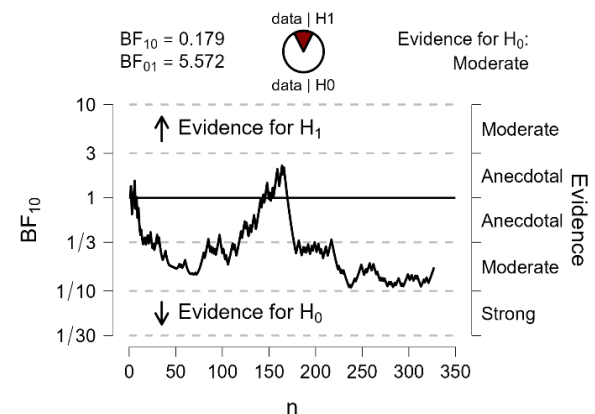


Note. The density plot represents the posterior distribution of the proportion of the population surveyed with JASP statistical software (Version 0.16.3) [Computer software].

Figure 2.

In the density plot, the solid line represents the posterior distribution of the proportion of the population surveyed, that is, after observing the data; while the dotted line represents the a priori distribution of the population, that is, prior to the observation of the data. The "y" axis shows the density, which describes the relative probability according to which said random variable will take a certain value. For its part, the "x" axis shows the proportion of the population which varies between 0 to 1. The analysis shows that with the evidence observed in the survey and considering neutral a priori beliefs, the Median obtained from the posterior distribution is 0.538 and the updated probability is 95% in favor of a differential effect between the treatments against 0.5% in favor of being equal. The 95% credibility interval (CI) ranges between [0.484, 0.592], which means that with 95% credibility, the population proportion is between 0.484 and 0.592. Regarding the Bayes factor: 1) with a $BF_{10} = 0.179$ for the

Sequential analysis

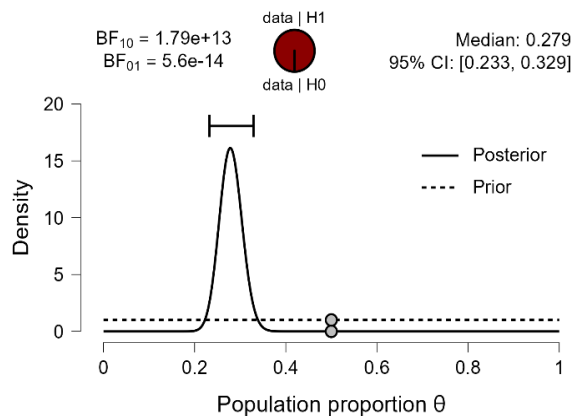


Note. The sequential analysis graph interprets according to the evidence being moderate, anecdotal or strong for H0 or H1 with the JASP statistical software (Version 0.16.3) [Computer software].

alternative model (H1) over the null model (H0), a BF_{10} less than 1 suggests that the data are more compatible with H0 than with H1; 2) A $BF_{01} = 5.572$ for the null model (H0) over the alternative model (H1). A BF_{01} greater than 1 suggests that the data supports H0 more than H1. Which means that for this case, a BF_{01} of 5.572 means that the data is approximately 5.572 times more likely in favor of H0 than in favor of H1. For the sequential analysis, according to the table of Quantifiable Interpretation Values of the Bayes factor (Jeffreys, 1961), with a $BF_{10} = 0.179$, it is between the values 0.1 to -0.03 suggesting that the evidence is moderate for H0.

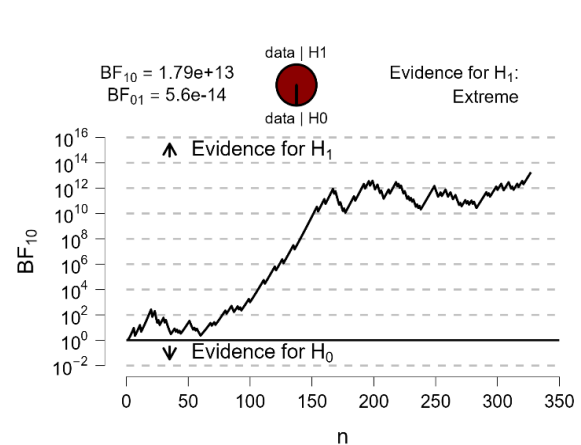
When asked the question: Do you consider that you have learned in entrepreneurship? and to the second answer Agree, the data summarized in the density table and sequential analysis present the following results:

Figure 3 Prior and Posterior



Note. The density plot represents the posterior distribution of the proportion of the population surveyed with JASP statistical software (Version 0.16.3) [Computer software].

Figure 4 Sequential analysis

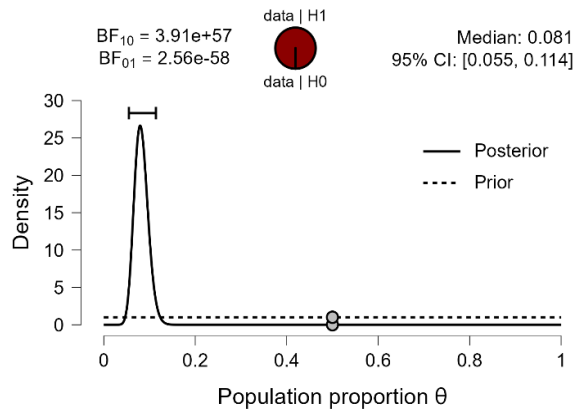


Note. The sequential analysis graph interprets according to the evidence being moderate, anecdotal or strong for H0 or H1 with the JASP statistical software (Version 0.16.3) [Computer software].

In the density plot, the solid line represents the posterior distribution of the proportion of the population surveyed, that is, after observing the data; while the dotted line represents the a priori distribution of the population, that is, prior to the observation of the data. The “y” axis shows the density, which describes the relative probability according to which said random variable will take a certain value. For its part, the “x” axis shows the proportion of the population which varies between 0 to 1. The analysis shows that with the evidence observed in the survey and considering neutral a priori beliefs, the Median obtained from the posterior distribution is 0.279, and the updated probability is 95% in favor of a differential effect between the treatments against 0.5% in favor of being equal. 95% Credibility Interval (CI) varies between [0.233, 0.329]. This means that, with 95% credibility, the proportion of the population surveyed is between 0.233 and 0.329. Regarding the Bayes factor: 1) With a $BF_{10} = 1.79e+13$ for the alternative hypothesis (H1) over the null hypothesis (H0), a BF_{10} greater than 1 suggests that the data are more compatible with H1 than with H0, for the case BF_{10} is large which suggests strong evidence in favor of H1; 2) With a $BF_{01} = 5.6e-14$ for the alternative hypothesis (H1) over the null hypothesis (H0), because a BF_{01} less than 1 suggests that the data supports H1 more than H0, for the case a very small BF_{01} suggests strong evidence against H0. Compared to the sequential analysis, it can be inferred that a $BF_{10} > 1$: Indicates evidence in favor of (H1), a $BF_{10} < 1$: Indicates evidence in favor of (H0) and a $BF_{10} = 1$: Indicates neutral evidence. For the case with a $BF_{10} = 1.79e+13$, the graph shows clear evidence in favor of H1, due to: 1) At the point where the sample size (n) reaches around 100, the value of BF_{10} crosses the threshold of 10, which begins to show a strong trend in favor of H1; 2) Compared to H0, the value $BF_{01} = 5.6e-14$, which is the inverse of BF_{10} (i.e., $1/BF_{10}$), is quite low which reinforces high evidence against H0, and also allows strengthening the conclusion that the evidence is extremely in favor of H1.

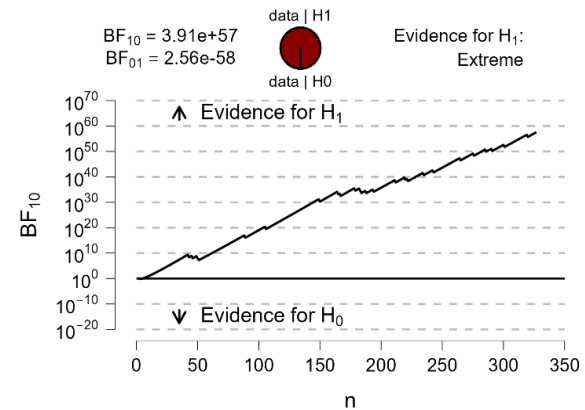
Regarding the question: Do you consider that you have learned in entrepreneurship? and from the third answer I have learned something. The data summarized in the density table and sequential analysis present the following results:

Figure 5 Prior and Posterior



Note. The density plot represents the posterior distribution of the proportion of the population surveyed with JASP statistical software (Version 0.16.3) [Computer software].

Figure 6 Sequential analysis

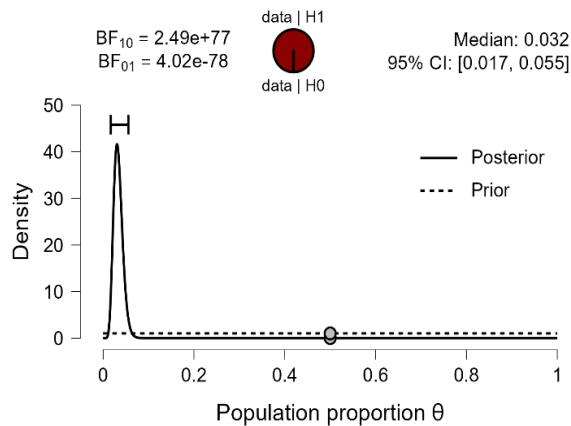


Note. The sequential analysis graph interprets according to the evidence being moderate, anecdotal or strong for H0 or H1 with the JASP statistical software (Version 0.16.3) [Computer software].

In the density plot, the solid line represents the posterior distribution of the proportion of the population surveyed, that is, after observing the data; while the dotted line represents the a priori distribution of the population, that is, prior to the observation of the data. The "y" axis shows the density, which describes the relative probability according to which said random variable will take a certain value. For its part, the "x" axis shows the proportion of the population which varies between 0 to 1. The analysis shows that with the evidence observed in the survey and considering neutral a priori beliefs, the Median obtained from the posterior distribution is 0.081 and the updated probability is 95% in favor of a differential effect between the treatments against 0.5% in favor of being equal. 95% Credibility Interval (CI) varies between [0.055, 0.114]. This means that, with 95% credibility, the proportion of the population surveyed is between 0.055 and 0.114, which can be considered a precise and reliable estimate because the narrowness of the confidence interval suggests that there is a high precision in this estimate. Regarding the Bayes factor: 1) With a $BF_{10} = 3.91e+57$, It indicates that the evidence in favor of (H1) is extremely strong compared to (H0); 2) With a $BF_{01} = 2.56e-58$, which is the inverse of BF_{10} , it reinforces the conclusion that (H1) is strongly favored over (H0). Faced with the sequential analysis, it can be inferred that: 1) With a $BF_{10} = 3.91e+57$ it can be seen that the observed data are much more probable under H1 than under H0 and that this value is considerably large, indicating very strong evidence in favor from H1; 2) With a $BF_{01} = 2.56e-58$, which is the inverse of BF_{10} , the values are extremely low, indicating an almost zero probability that the observed data are consistent with H0.

In relation to the question: Do you consider that you have learned in entrepreneurship?, and to the fourth answer I have learned, The data summarized in the density table and sequential analysis present the following results:

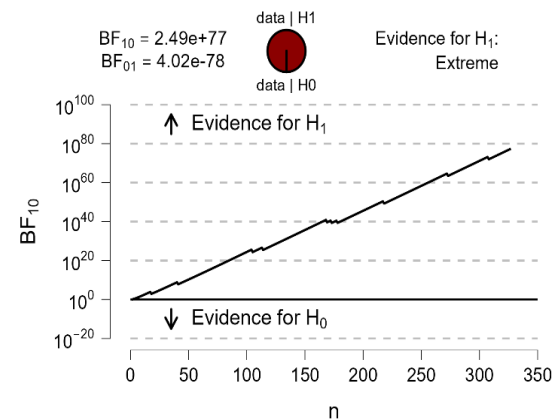
Figure 7 Prior and Posterior



Note. The density plot represents the posterior distribution of the proportion of the population surveyed with JASP statistical software (Version 0.16.3) [Computer software].

Figure 8

Sequential analysis

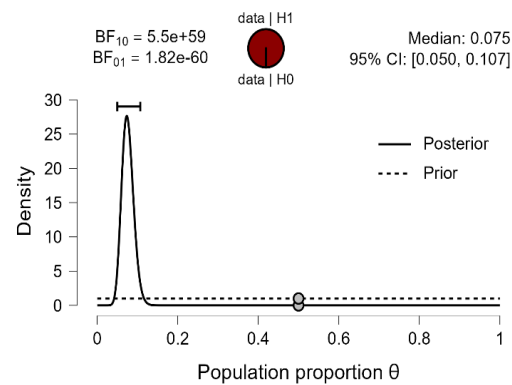


Note. The sequential analysis graph interprets according to the evidence being moderate, anecdotal or strong for H0 or H1 with the JASP statistical software (Version 0.16.3) [Computer software].

In the density plot, the solid line represents the posterior distribution of the proportion of the population surveyed, that is, after observing the data; while the dotted line represents the a priori distribution of the population, that is, prior to the observation of the data. The "y" axis shows the density, which describes the relative probability according to which said random variable will take a certain value. For its part, the "x" axis shows the proportion of the population which varies between 0 to 1. The analysis shows that with the evidence observed in the survey and considering neutral a priori beliefs, the Median obtained from the posterior distribution is 0.032 and the updated probability is 95% in favor of a differential effect between the treatments against 0.5% in favor of being equal. 95% Credibility Interval (CI) varies between [0.017, 0.055]. This means that, with 95% credibility, the proportion of the population surveyed is between 0.055 and 0.114, the posterior distribution (solid line) shows a very pronounced peak, suggesting that the highest probability density is found at values very low probably because those who responded in favor of this question represent a very low number and the a priori distribution (dotted line) is quite flat, indicating that before seeing the data, there was no strong preference for any particular value. Regarding the Bayes factor: The extremely high values of $BF_{10} = 2.49e+77$ and extremely low values of $BF_{01} = 4.02e-78$ indicate that the data confirm very strong evidence in favor of H1 over H0. It reinforces the conclusion that (H1) is strongly favored over (H0). Regarding the sequential analysis it can be inferred that: 1) With a $BF_{10} = 2.49e+77$ it indicates extreme evidence in favor of H1, and the graph shows that as the sample size (n) increases, the BF_{10} also increases logarithmically; 2) With a $BF_{01} = 4.02e-78$, the evidence for (H1) is extremely strong, as indicated in the extremely high graph.

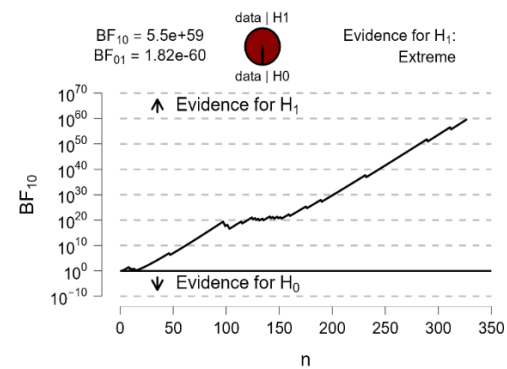
Regarding the question: Do you think you have learned in entrepreneurship?, and to the fifth answer I have learned a lot. The data summarized in the density table and sequential analysis present the following results:

Figure 9 Prior and Posterior



Note. The density plot represents the posterior distribution of the proportion of the population surveyed with JASP statistical software (Version 0.16.3) [Computer software].

Figure 10 Sequential analysis

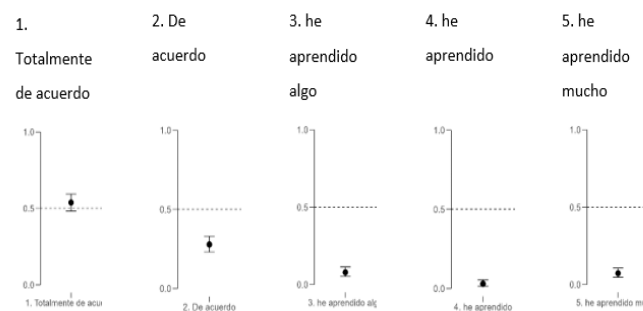


Note. The sequential analysis graph interprets according to the evidence being moderate, anecdotal or strong for H0 or H1 with the JASP statistical software (Version 0.16.3) [Computer software].

In the density plot, the solid line represents the posterior distribution of the proportion of the population surveyed, that is, after observing the data; while the dotted line represents the a priori distribution of the population, that is, prior to the observation of the data. The “y” axis shows the density, which describes the relative probability according to which said random variable will take a certain value. For its part, the “x” axis shows the proportion of the population which varies between 0 to 1. The analysis shows that with the evidence observed in the survey and considering neutral a priori beliefs, the Median obtained from the posterior distribution is 0.075 and the updated probability is 95% in favor of a differential effect between the treatments against 0.5% in favor of being equal. 95% Credibility Interval (CI) varies between [0.050, 0.107]. This means that, with 95% credibility, the proportion of the population surveyed is between 0.050 and 0.107 which can be considered a precise and reliable estimate because the relative narrowness of the confidence interval suggests that there is a high precision in this estimate. Regarding the Bayes factor: 1) With a $BF_{10} = 5.5e+59$, It indicates that the evidence in favor of the alternative hypothesis (H1) is extremely strong compared to the null hypothesis (H0); 2) With a $BF_{01} = 1.82e-60$, which is the inverse of BF_{10} , it reinforces the conclusion that the alternative hypothesis (H1) is strongly favored over the null hypothesis (H0). Faced with the sequential analysis, it can be inferred that: 1) With a $BF_{10} = 3.91e+57$ it can be seen that the observed data are much more probable under H1 than under H0 and that this value is considerably large, indicating very strong evidence in favor of H1; 2) With a $BF_{01} = 2.56e-58$, which is the inverse of BF_{10} , it indicates extremely weak evidence in favor of the null hypothesis (H0) compared to the alternative hypothesis (H1).

Below is a descriptive graph facing the question: Do you think you have learned in entrepreneurship? with all the answers, where the percentage distribution of the answers given by the surveyed population is graphically shown.

Figure 11 Descriptives Plots



Note. The descriptive graph graphically shows the percentage distribution of the answers given by the population surveyed with the JASP statistical software (Version 0.16.3) [Computer software].

The descriptive plots graphically show the percentage distribution of the answers given by the population (N) surveyed, which included a number of 327 entrepreneurs distributed among 16 social intervention centers (CIS). Of which (176) about 53.8%, when asked the question: Do you think you have learned in entrepreneurship?, they totally agreed. A situation that was not permanent with the other responses, which had a lower proportion in favor with the following distribution: 1) With the response *Agree* (91), which represents 27.8%; 2) With the answer *I have learned something* (26), which represents 8%; 3) With the answer *I have learned* (10), which represents 3.1% and 4) With the answer *I have learned a lot* (24), which represents 7.3%.

Conclusions

Bayesian hypothesis testing is an intuitive tool for statistical inference. When asked the question: Do you consider that you have learned in entrepreneurship? resolved using the Likert Scale and applied to the surveyed population, compared to the evidence provided by the Bayesian Factor suggests for the first response *Totally agree*, with a Bayes, it is approximately five times more likely in favor of the null hypothesis; where moderate to strong evidence remains constant across different sample sizes, with BF_{10} indicating predominant support for the null hypothesis. In the sequential analysis graph the initial fluctuating evidence stabilizes, indicating that a greater amount of data provides a more robust conclusion in favor of the null hypothesis.

For the second *agree* response, the Bayesian factors indicate extremely strong evidence in favor of the alternative hypothesis over the null hypothesis; the sequential analysis plot shows that the Bayes factor begins to increase significantly as the sample size increases.

For the third answer *I have learned something*, the data provides extremely strong evidence for the alternative hypothesis and ruling out the null hypothesis; the sequential analysis graph shows that as the sample size grows, the evidence in favor of the alternative hypothesis becomes overwhelmingly strong, reaching considerably high levels.

Regarding the fourth answer, *I have learned*, the evidence in favor of the alternative hypothesis can be considered extreme, indicating that the data strongly supports the alternative hypothesis over the null hypothesis; the sequential analysis graph allows us to see that as the sample size increases, the evidence in favor of the alternative hypothesis therefore increases exponentially.

Finally, in response to the fifth answer *I have learned a lot*, the evidence provided by the data extremely strongly favors the alternative hypothesis over the null hypothesis; the sequential analysis graph allows us to see that, similar to the previous answer, as the sample size increases, the evidence in favor of the alternative hypothesis increases exponentially.

References

- [1] Abbas, A., Avdic, A., Barker, K. C., & Xiaobao, P. (2018). Knowledge transfer from universities to industry through university technology transfer offices. *Science and Innovation*, 14(2), 5–18. <https://doi.org/10.15407/scine14.02.005>
- [2] Alvarado-Moreno, F. (2018). The role of the Technology Transfer Offices (TTOs) in Universities: A Perspective of the Last Decade. *Journal of technology management & innovation*, 13(3), 104–112. <https://dx.doi.org/10.4067/S0718-27242018000300104>
- [3] Alvear-Pájaro, R. (2022). Importancia de los consultorios empresariales en Instituciones de Educación Superior. *Revista Científica Profundidad Construyendo Futuro*, 17(17), 62–75. <https://doi.org/10.22463/24221783.3826>
- [4] Baglieri, D., Baldi, F., & Tucci, C. L. (2018). University technology transfer office business models: One size does not fit all. *Technovation*, 76–77, 51–63.
- [5] <https://doi.org/10.1016/j.technovation.2018.05.003>.
- [6] Buratti, N., Profumo, G., & Persico, L. (2021). The impact of market orientation on university spin-off business performance. *Journal of International Entrepreneurship*, 19(1), 104–129.

- [7] Ferreira, E. J., & Steenkamp, R. J. (2015). The exploration of the triple helix concept in terms of entrepreneurial universities and corporate innovation. *Corporate Ownership and Control*, 12(2 CONT4), 491–506.
- [8] Guerrero Molina, M. I., Zapata Vásquez, M. I., & Zapata Vásquez, L. C. (2021). Estructuración de un consultorio empresarial para la competitividad organizacional como unidad académico-administrativa. *En-Contexto: Revista de Investigación en Administración, Contabilidad, Economía y Sociedad*, 9(14), 107-126.
- [9] Hamilton, C., & Philbin, S. P. (2020). Knowledge based view of university tech transfer—a systematic literature review and meta-analysis. *Administrative Sciences*, 10(3), 62. <https://doi.org/10.3390/admsci10030062>
- [10] Kireyeva, A. A., Turdalina, S., Mussabalina, D., Turlybekova, N. M., & Akhmetova, Z. B. (2020). Analysis of the Efficiency Technology Transfer Offices in Management: The Case of Spain and Kazakhstan. *The Journal of Asian Finance, Economics and Business*, 7(8), 735–746. <https://doi.org/10.13106/JAFEB.2020.VOL7.NO8.735>
- [11] Meeampol, S., & Rassameethes, B. (2023). Business school strategies for successful research commercialisation process in Thailand. *International Journal of Innovation and Learning*, 34(1), 1–18.
- [12] Muslim Saraireh, S. A. (2021). The role of business incubators in the economic development and creativity in Jordanian universities: Evidence from Mutah University. *Academic Journal of Interdisciplinary Studies*, 10(1), 266–282. <https://doi.org/10.36941/ajis-2021-0023>
- [13] Ruz, A. (2016). Consultorio contable: enlace entre la comunidad académica universitaria y las pymes, distrito Barranquilla. *Económicas CUC*, 37(1), 123-134. DOI: <http://dx.doi.org/10.17981/econcuc.15.5.2016.06>
- [14] Saraireh, M. (2021). The role of business incubators in the economic development and creativity in Jordanian universities: Evidence from Mutah University. *Academic Journal of Interdisciplinary Studies*, 10(1), 266–282. <https://doi.org/10.36941/ajis-2021-0023>
- [15] Serrano, D. R., Fraguas-Sánchez, A. I., González-Burgos, E., & Llorente, C. et al. (2023). Women as Industry 4.0 entrepreneurs: Unlocking the potential of entrepreneurship in Higher Education in STEM-related fields. *Journal of Innovation and Entrepreneurship*, 12(1), 78. <https://doi.org/10.1186/s13731-023-00346-4>
- [16] Siegel, D.S., Waldman, D.A., Atwater, L.E., & Link, A.N. (2003). Commercial knowledge transfers from universities to firms: Improving the effectiveness of university-industry collaboration. *Journal of High Technology Management Research*, 14(1), 111–133. [https://doi.org/10.1016/S1047-8310\(03\)00007-5](https://doi.org/10.1016/S1047-8310(03)00007-5).
- [17] Stankevičienė, J., Kraujalienė, L., & Vaiciukevičiūtė, A. (2017). Assessment of technology transfer office performance for value creation in higher education institutions. *Journal of Business Economics and Management*, 18(6), 1063–1081. doi:10.3846/16111699.2017.1405841
- [18] Suttipun, M., & Insee, K. (2024). R&D intensity and firm performance of SME firms in Thailand: The moderating role of firm size. *Cogent Business and Management*, 11(1), 2304370. <https://doi.org/10.1080/23311975.2024.2304370>
- [19] Wathanakom, N., Khlaisang, J. & Songkram, N. The study of the causal relationship between innovativeness and entrepreneurial intention among undergraduate students. *J Innov Entrep* 9, 15 (2020). <https://doi.org/10.1186/s13731-020-00125-5>
- [20] Zmuidzinaite, R., Zalgeviciene, S., & Uziene, L. (2021). Factors influencing the performance of technology transfer offices: The case of the European Consortium of Innovative Universities. *Engineering Economics*, 32(3), 221–233. <https://doi.org/10.5755/j01.ee.32.3.25785>