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REVIEW

Design thinking as a development tool in SMEs in Ecuador: a systematic review

El Design Thinking como herramienta de desarrollo en las PYMES: una revisión sistemática

Diego Bonilla-Jurado[1], Freddy Lalaleo-Analuisa[1,2], Shirley Zapata-Romero[2], Rafael Sánchez-Macias[2]

[1]Instituto Superior Tecnológico España, Centro de Innovación y Transferencia Tecnológica. Ambato. Ecuador.
[2]Universidad Estatal de Bolívar, Gestión de Talento Humano extensión San Miguel. Guaranda. Ecuador.

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Corresponding author: Diego Bonilla Jurado

ABSTRACT

All businesses are born with the ideas of visionaries who seek to make their dreams come true, whether through the development of new technologies, the reworking of existing ones, or simply positional strengthening. Currently, SMEs have deficiencies in the creative area to solve their problems, which prevents them from facing the various challenges of the market, therefore it is essential to find an alternative that solves this problem. In this way, the objective of the research is to analyze the importance of using the Design Thinking tool to solve problems in SMEs. For this, the qualitative methodology was used with the Systematic Review method, compiled in Scopus, during the years 2018-2022, finding 164 articles, to which the inclusion and exclusion criteria were applied, to finally examine 13 investigations, of which from which it is concluded that the DT is an adequate and efficient instrument to solve technical difficulties, since it synthesizes the entire creative process, and provides a diversity of ways to find solutions, in addition to predicting possible errors in the short, medium and long term; however, the success of the company does not depend on a tool, but is anchored to macro and microeconomic factors.

Keywords: Creative Area; Design Thinking; Smes; Problem Solving; Systematic Review.

RESUMEN

Todos los negocios nacen con las ideas de los visionarios que buscan hacer sus sueños realidad, ya sea mediante el desarrollo de nuevas tecnologías, la reelaboración de las existentes o simplemente el fortalecimiento posicional. En la actualidad, las Pymes, presentan deficiencias en el área creativa para la resolución de sus problemas, lo que impide que puedan afrontar los diversos retos del mercado, es indispensable buscar una alternativa, que resuelva esta problemática. El objetivo de la investigación es analizar la importancia de utilizar la herramienta Design Thinking, para resolver los problemas en las Pymes. Para esto se empleó la metodología cualitativa con el método de Revisión Sistemática, recopilada en Scopus, durante los años 2018-2022, encontrando 164 artículos, a los que se les aplicó los criterios de inclusión y exclusión, para finalmente examinar 13 investigaciones, de las cuales se concluye que el DT es un instrumento adecuado y eficiente para, resolver dificultades técnicas, puesto que sintetiza todo el proceso creativo, y aporta una diversidad de caminos para encontrar soluciones, además que predice posibles errores a corto, mediano y largo plazo; sin embargo el éxito de la empresa, no depende de una herramienta, sino que está anclado a los factores macro y microeconómicos.

Palabras clave: Área Creativa; Design Thinking; Pymes; Resolución de Problemas; Revisión Sistemática.

INTRODUCTION

This study addresses the limited understanding in SMEs of the real need for innovative problem-solving tools, proposing Design Thinking (DT) as a method that offers sustainable long-term solutions.[1]

SMEs are defined by their size: microenterprise (1-9 employees), small (10-49), and medium (50-199).[2] They are fundamental to the active economy and adapt to the current market.[3] In Ecuador, they represent 90 % of productive units, generate 60 % of employment, and contribute 50 % of GDP. In China, they account for 90 % of companies and cont03ribute 60 % of GDP, facing challenges such as financing, training, and technology transfer.[4]

DT, developed since 1959 to improve technical creativity, evolved in the 1970s to focus on specific human needs, fostering innovation and value creation, differentiating itself from traditional management methods.[5]

The application of Design Thinking (DT) can reveal business quality, as in a study in Poland on industrial machine production, which concluded that the proposed design did not reflect reality.[6] SMEs, due to their simple structure and small size, demonstrate a great capacity to innovate and adapt quickly to technological, environmental, and market changes. Thus, DT enhances their innovation by identifying human and contextual needs, stimulating creativity and value generation, in line with their flexible nature.

In the academic field, DT is essential for developing critical thinking, as opposed to traditional methodologies based on memorization that limit graduates' preparation for business challenges. This approach, focused on human solutions, accepts ambiguity, understood as the coexistence of multiple interpretations of the same phenomenon.[7]

Design thinking is not limited to distinguishing between right and wrong, but seeks superior alternatives through a conscious understanding of existing constraints. Its application transcends problem solving to drive social change, design public policy, and address environmental challenges. International organizations, governments, and NGOs have adopted this approach to address complex and multifaceted problems, validating its effectiveness in various contexts.[8]

To get started, it is essential to begin and then move forward. Some Design Thinking tools include: hopes and fears model, Team Canvas, root cause analysis, one-on-one interviews, empathy map, journey mapping, "How might we?", problem statement, Crazy Eights, storyboarding, elevator pitch, voting, low-fidelity prototyping, and roleplay.In keywords: "Forget everything you thought you knew about design; the only thing that matters is your customer".[8]

The objective of this research was to qualitatively analyze Design Thinking (DT), focusing on the conclusions of authors who have used this tool in their studies. The data was extracted from the Scopus platform using inclusion and exclusion criteria to evaluate the efficiency and application of DT in different SME environments. However, it is still unclear how to implement this methodology in the management of SMEs in Ecuador, given that many are limited-capital ventures that face problems in financial management, human resources, and technological skills, which limits their growth and expansion.[9]

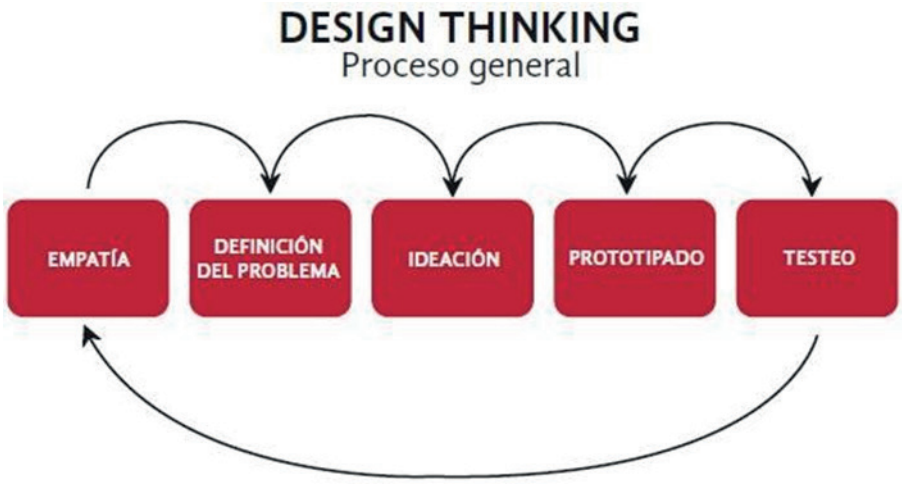

Figure 1. General design thinking process
Source: Prepared by the author based on data from Mallén[10]

METHOD

The research was analyzed qualitatively, using the systematic review method. The literature was extracted from the Scopus scientific platform, using the keywords "design thinking-SMEs." The PRISMA statement guidelines were followed to generate the flowchart structure.[11]

Initial search

In the first search, the words DT were used. The search was then expanded with the Boolean operators and

and or for the following terms: SMEs, business, enterprise, medium, micro, small. The search results showed a large number of articles, but some of them were not relevant to the review.

Systematic Search

Segmentation: Open access articles from 2018 to 2022.

Inclusion Criteria

- Document type: Scientific articles
- Languages: English-Spanish
- Boolean operator: and
- Subareas: SMEs, business

Exclusion Criteria

- Document type: Articles blocked for download or reading
- Boolean operator: and not
- Subareas: covid

After the search, 164 articles were obtained. Upon analysis of the titles, 27 were considered suitable, of which 3 duplicates were eliminated. Upon reading the abstracts, 3 were discarded for focusing on the area of construction and urban planning, 2 for focusing on ecological environmental regulations, 4 for being systematic reviews, and 2 for being blocked from reading. Finally, 13 met all the estimated criteria, all of which focused on DT as a way to boost SMEs. They also mention that critical thinking is a necessary factor in generating new and better ideas, and one even explains that there is a variant that is on par with design thinking.

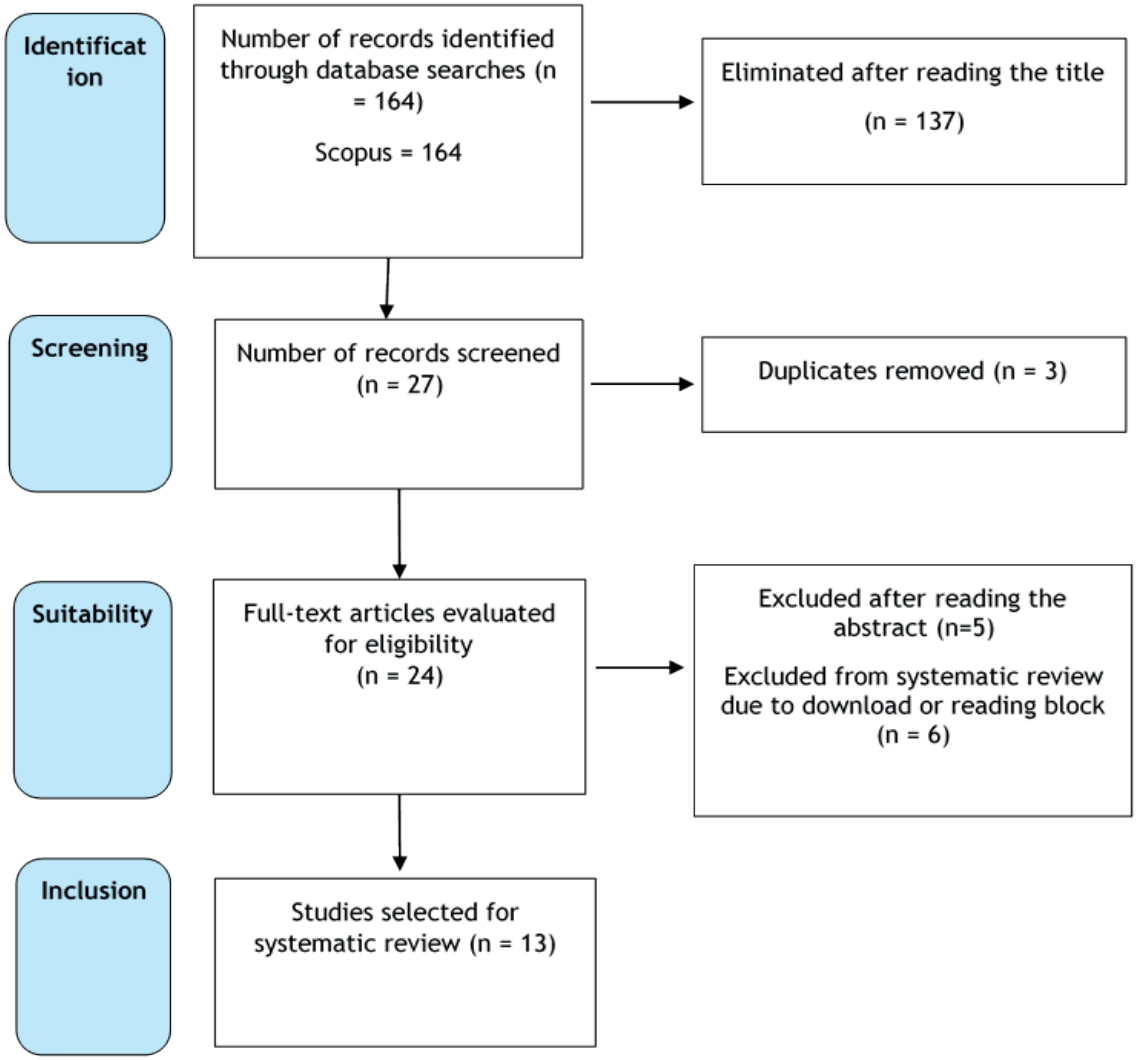

Figure 2. Four-level flow diagram – PRISMA

RESULTS

Table 1. Characteristics of the articles reviewed

Author (year)	Sample	Methodology	Main results
Khan et al.[12]	5 companies, manufacturing and trade, Australia, 230 employees	Qualitative with questionnaire to managers and employees	Human capital is the most important asset; critical thinking and retention of key employees are essential for effectiveness.
Mayanja et al.[13]	392 SMEs in Kampala, Uganda, 784 respondents	Mixed methodology; cross-sectional survey and correlational analysis	Leaders motivate employees; networking essential for innovation and opportunity seeking.
Wyrwicka et al.[6]	1 industrial company, Poland, 15 employees	OCAI questionnaire to assess organizational culture	Satisfied and competitive employees; willingness to learn Design Thinking.
Pfeiffer et al.[14]	1 automotive company, Germany, 230 engineers	Surveys using the Q-sort method	Valued knowledge; standardization hinders new ideas; engineers not very involved in decisions.
Magistretti et al.[15]	5 technology SMEs, Italy, 70 participants	Exploratory study with interviews and observations during UX Challenge	DT evolves into other forms; Design Sprint involves external professionals; DT omits user experience at the outset.
Bugwandin et al.[16]	48 800 online SMEs, South Africa, 384 respondents	Mixed methodology, analysis with NVivo	Change, purpose, and leadership strengthen strategies; leadership is key to sustainability.
Cautela et al.[17]	457 furniture companies, Italy, 106 managers	Online Likert questionnaire	Managers value holistic thinking in designers; design provides competitive advantage; need for ergonomic studies.
Garbulho et al.[18]	Case studies in digital services, Brazil, 5 companies	Interviews with design professionals	DT facilitates conflict resolution and organizational change.
Freitas da Silva[19]	3 educational courses in Brazil, 12 months	Analysis of reports from technological innovation workshops	DT promotes effective learning and the development of innovative prototypes.
López Padilla et al.[20]	217 university students, Peru	Survey with 20 items on critical thinking	Critical thinking strengthens decision-making; correlation with perceived performance, not academic performance.
Ngamvichaikit[21]	53 informants from the pharmaceutical sector, Thailand	Marketing strategies based on DT structure	Conflict between ethics and profits; key technology for regulations; preference for online shopping by some consumers.
Gonera et al.[22]	5 research and innovation consortia, Norway-Germany	Case study with workshops, interviews, and observation	DT contradicts scientific mindset; requires adaptive planning; DT skills are lost without continuous application.
Linton et al.[23]	12 students in entrepreneurship course, Sweden	Course based on DT modules, assessing understanding and solution	Connection between business education and DT; students develop business solutions and opportunities.

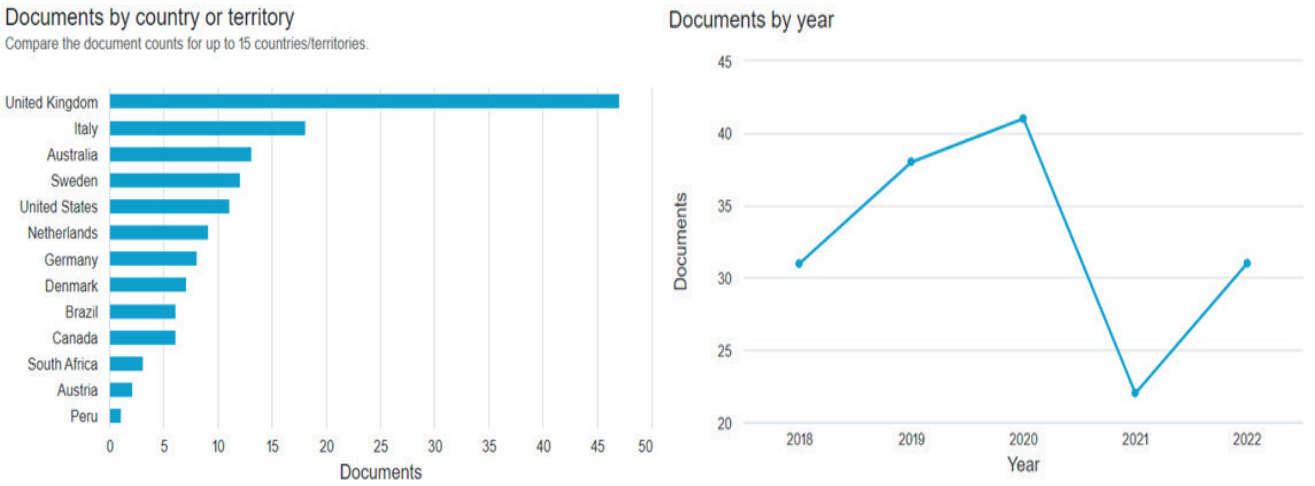

Figure 3. Research behavior - general search

Figure 4 shows the evolution of research using the keywords DT-SMEs during the years 2018-2022, with

the highest level in 2020 and the lowest in 2021 due to the pandemic, with a significant rebound in 2022. Similarly, the countries that have conducted the most research using the DT creative tool are England and Italy. This is due to government funding for research, such as the European Regional Development Fund (ERDF). In the taxonomy of keywords used for the search, the term Design Thinking, Business clearly stands out, thus confirming that the search was successful. Although the taxonomy SMEs or SMEs is not shown, it is understood that the word business already includes it. Similarly, the number of times per year that some authors have been cited for other research is displayed.

From the specific search, focused on authors who met the inclusion and exclusion criteria, it was found that most of the research comes from developing countries, with Brazil having developed the most explorations in the field of DT. To understand why the United States and Canada have not yielded results for analysis, it is likely that the terminology SMEs or SMEs does not apply to businesses, as most of them are born with strong investment capital. While in other countries, an idea is enough to start a business, this reaffirms that these businesses have a cultural basis in their structure. It was also found that with the taxonomy of keywords extracted from the articles, it was possible to construct a word cloud, corroborating that the authors analyzed have used the creative DT tool in their research.

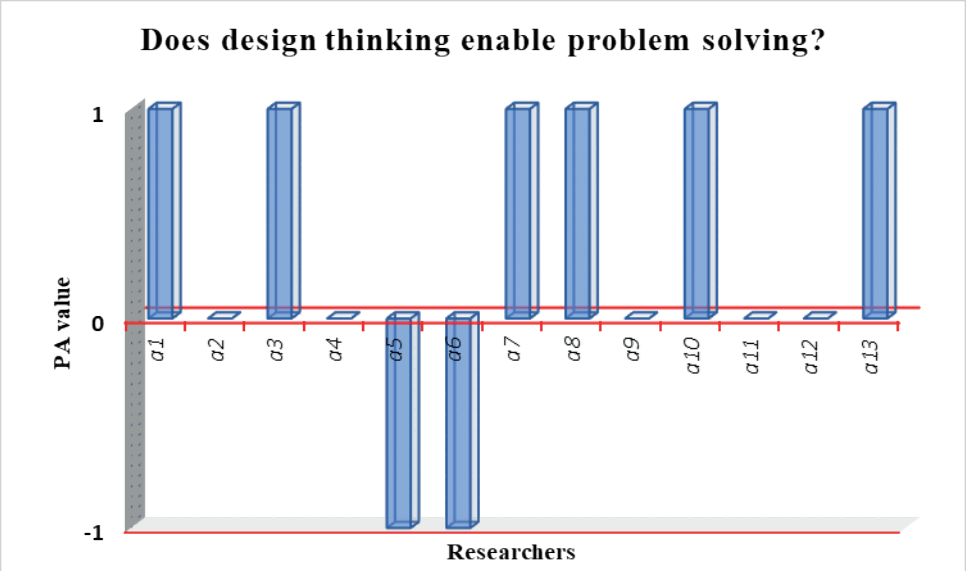

Figure 4. Authors' Position

From the systematic review carried out, based on the results and conclusions, it was determined that 46 % of the research found that the DT tool has contributed to improving and solving various business problems, while 23 % consider that it does not provide new solutions because, for certain people, this technique goes against their paradigms, as they are governed solely by established protocols, and 31 % have a neutral opinion, considering that this technique provides benefits, but these have not been proven within the studies themselves, as constant training is required.

DISCUSSION

The analysis of the literature on Design Thinking (DT) in SMEs reveals significant findings that deserve in-depth interpretation. The results show that 46 % of the research analyzed considers that DT effectively contributes to solving business problems, while 23 % maintains a critical stance and 31 % presents a neutral view. This diversity of perspectives reflects the complexity inherent in implementing innovation methodologies in diverse business contexts.

The DT tool allows problems within SMEs to be solved through a sequence of creative steps, but it does not guarantee success or business development. Authors mention that DT is evolving into other forms and that Design Sprint involves external professionals, which can be a challenge for SMEs with limited resources.[15] The authors present extremely interesting criteria and point out that design thinking does not have a predefined structure, but is adaptive to diverse business environments,[24] and relies on human capital, with the hiring of multidisciplinary professionals, to learn about and understand the problems of a product, a company, or a management model.[22]

There is a deficiency within the academic sphere, as most universities work in a traditional way that emphasizes memorization of concepts, and this prevents students from developing critical thinking skills,[7,20] because without any focus on creativity, they are vulnerable when faced with real business problems.[20] It

is also necessary to contribute to student training in techniques such as GODWILL (goodwill) for low-capital ventures.[25]

A recurring problem is not giving the necessary importance to the user, but rather basing the entire approach on increasing sales, as mentioned by authors who focus on marketing strategies based on DT structure,[21] since all businesses must have values that are above profits, which, although necessary, must go hand in hand with credibility.

All researchers agree that human capital is the most valuable asset a company has. In terms of ideas for prototype design, futuristic or paradigmatic ideas are not the most appropriate; it is much better to follow the market trend, as successful projects must provide better solutions and reduce risks.[26] The practice and evolution of design thinking has been led by several organizations worldwide, among which IDEO stands out. This global design firm has an exceptional reputation for the application and continuous development of design thinking. IDEO has demonstrated through its work that effective management of ambiguity can lead to innovative, user-centered solutions, reaffirming the importance of design thinking in solving complex problems.

As design thinking continues to evolve, we are likely to see its application in new and exciting ways that bring strategic value to the understanding of DT as more than just a technical tool, recognizing it as an approach that can transform the vision and operation of SMEs.[17]

CONCLUSIONS

The Design Thinking tool allows problems within SMEs to be solved through a sequence of creative steps, but it is not a guarantee of success or business development, as there are other external factors such as competitors, customers, suppliers, the macroeconomic environment, demand, technological improvements, access to private credit, and government support that directly influence results.

Companies around the world, like IDEO, will continue to explore how they can use design thinking to drive innovation, improve the user experience, and solve the most pressing challenges of our time.

There is a significant deficiency in the academic sphere, where most universities maintain traditional approaches that emphasize memorization of concepts, preventing students from developing the critical thinking skills necessary to address real business problems. It is necessary to contribute to student training in techniques such as GODWILL for low-capital ventures.

For future research, it is necessary to study DT in the different functional areas of an SME (management, human resources, production, finance or accounting, marketing, and sales) in order to establish where it is most effective. It would also be ideal to create a qualitative model to measure the advantages and disadvantages of prototyping, and for bibliographic reviews, it is recommended to expand the Boolean operators.

BIBLIOGRAPHICAL REFERENCES

1. Suci A, Maryanti S, Hardi H, et al. Embedding Design Thinking Paradigm in a University's Business Assistance to Small Business. Syst Pract Action Res. 2022;35(2):177-201. https://doi.org/10.1007/s11213-021-09565-w

2. Superintendencia de Compañías S. Boletín Jurídico. Clasificación de las PYMES, Pequeña y Mediana Empresa. Boletín Jurídico Clasificación de las PYMES, Pequeña y Mediana Empresa. 2017;000:2. http://www.ccq.ec/wp-content/uploads/2017/06/Consulta_Societaria_Junio_2017.pdf

3. Lalaleo-Analuisa FR, Bonilla-Jurado DM, Robles-Salguero RE. Tecnologías de la Información y Comunicación exclusivo para el comportamiento del consumidor desde una perspectiva teórica. Retos. 2021;11(21):147-64. https://doi.org/10.17163/ret.n21.2021.09

4. Amores Ron RE, Castillo Sacoto AV. Las PYMES Ecuatorianas: Su Impacto En El Empleo Como Contribución Del PIB PYMES al PIB Total Ecuadorian SMEs: Their Impact on Employment as a Contribution of SME GDP to Total GDP. 2017. https://www.researchgate.net/publication/326879615_Las_PYMES_ecuatorianas_su_impacto_en_el_empleo_como_contribucion_del_PIB_PYMES_al_PIB_total_Ecuadorian_SMEs_their_impact_on_employment_as_a_contribution_of_SME_GDP_to_total_GDP_Contenido

5. Müggenburg J, Rothe K, Cohen Cole J, et al. Designing Thinking. Designing Thinking. 2019. https://doi.org/10.30965/9783846761366

6. Wyrwicka MK, Chuda A. The Diagnosis of Organizational Culture as a Change's Factor in the Context Application of Design Thinking. Logforum. 2019;15(2):279-90. https://doi.org/10.17270/J.LOG.2019.319

7. Zapalska AM, McCarty MD, Young-McLear K, et al. Design-of-Assignments-Using-the-21st-Century-Blooms-Revised-Taxonomy-Model-for-Development-of-Critical-Thinking-SkillsProblems-and-Perspectives-i-

n-Management.Pdf. 2018. http://dx.doi.org/10.21511/ppm.16(2).2018.27

8. Janhagen V. Design thinking ha muerto . Larga vida al Design thinking. Cómo nutrir y hacer crecer el design thinking en tu organización. 2019;132.

9. Rodríguez-Mendoza R, Aviles-Sotomayor V. Las PYMES en Ecuador. Un análisis necesario. 593 Digital Publisher CEIT. 2020;5–1(5):191-200. https://doi.org/10.33386/593dp.2020.5-1.337

10. Mallén Lomas JE. El Design Thinking en las Agencias de Diseño de Monterrey. Zincografía. 2021;5(10):106-23. https://doi.org/10.32870/ZCR.V5I10.97

11. Urrútia G, Bonfill X. PRISMA declaration: A proposal to improve the publication of systematic reviews and meta-analyses. Med Clin (Barc). 2010;135(11):507-11. https://doi.org/10.1016/j.medcli.2010.01.015

12. Khan YK, Kasuma J, Ali A. The Challenges of Small and Medium Businesses in Managing Human Capital towards SMEs Performance – A Qualitative Study. Asian Journal of Business and Accounting. 2022;15(1):311-44. https://doi.org/10.22452/ajba.vol15no1.10

13. Mayanja S, Ntayi JM, Munene JC, et al. Ecologies of innovation among small and medium enterprises in Uganda as a mediator of entrepreneurial networking and opportunity exploitation. Cogent Business and Management. 2019;6(1). https://doi.org/10.1080/23311975.2019.1641256

14. Pfeiffer S, Lee H, Held M. Doing Industry 4.0-participatory design on the shop floor in the view of engineering employees. Cuadernos de Relaciones Laborales. 2019;37(2):293-311. https://doi.org/10.5209/crla.66039

15. Magistretti S, Dell'Era C, Doppio N. Design sprint for SMEs: an organizational taxonomy based on configuration theory. Management Decision. 2020;58(9):1803-17. https://doi.org/10.1108/MD-10-2019-1501

16. Bugwandin V, Bayat MS. A sustainable business strategy framework for small and medium enterprises. Acta Commercii. 2022;22(1):1-12. https://doi.org/10.4102/ac.v22i1.1021

17. Cautela C, Simoni M, Moran P. Microfoundations of dynamic design capabilities: An empirical analysis of "excellent" Italian design firms. Journal of Product Innovation Management. 2022;39(1):3-23. https://doi.org/10.1111/jpim.12592

18. Garbulho GS, Fleury AL, Ferreira ECK. Assessing the impact of design on the development of digital services. Gestao e Producao. 2021;27(4). https://doi.org/10.1590/0104-530X4135-20

19. Freitas da Silva I. Describing the design thinking and extreme programming activities during a technology innovation academic workshop. Innovation and Management Review. 2020;17(3):267-84. https://doi.org/10.1108/INMR-03-2019-0039

20. López Padilla RDP, Rodríguez Alegre L, Ramos Pacheco HDR, et al. Disposition to critical thinking in university students. Revista Venezolana de Gerencia. 2022;27(98):831-50. https://doi.org/10.52080/rvgluz.27.98.28

21. Ngamvichaikit A. Leveraging design thinking for pharmaceutical digital marketing. Asian Journal of Business Research. 2021;11(1). https://doi.org/10.14707/ajbr.210102

22. Gonera A, Pabst R. The use of design thinking in transdisciplinary research and innovation consortia: Challenges, enablers and benefits. Journal of Innovation Management. 2019;7(3):96-122. https://doi.org/10.24840/2183-0606_007.003_0006

23. Linton G, Klinton M. University entrepreneurship education: A design thinking approach to learning. J Innov Entrep. 2019;8(1):1-11. https://doi.org/10.1186/s13731-018-0098-z

24. Maltsev E. Value-centered entrepreneur role model design. Problems and Perspectives in Management. 2018;16(2):252-9. https://doi.org/10.21511/ppm.16(2).2018.23

25. Jackson D, Shan H, Meek S. Enhancing graduates' enterprise capabilities through work-integrated learning in co-working spaces. High Educ (Dordr). 2022;84(1):101-20. https://doi.org/10.1007/s10734-021-00756-x

26. Shepherd CD, Ahmed PK, Ramos L, et al. ADMINISTRACIÓN DE LA INNOVACIÓN. 2012. http://190.57.147.202:90/xmlui/bitstream/handle/123456789/531/Administracion%20de%20la%20Innovacion%20K.%20Ahmed.pdf?sequence=1

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CONFLICT OF INTEREST

There is no conflict of interest.

AUTHOR CONTRIBUTION

Conceptualization: Diego Bonilla Jurado.
Data curation: Diego Bonilla Jurado.
Formal analysis: Diego Bonilla Jurado.
Research: Freddy Lalaleo Analuisa.
Methodology: Freddy Lalaleo Analuisa.
Project Management: Freddy Lalaleo Analuisa.
Resources: Freddy Lalaleo Analuisa.
Software: Shirley Zapata Romero.
Supervision: Shirley Zapata Romero.
Validation: Shirley Zapata Romero.
Visualization: Rafael Sánchez Macias.
Writing – original draft: Rafael Sánchez Macias.
Writing – revision and editing: Rafael Sánchez Macias.