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Review Article

Technological capabilities in emerging social enterprises: a pathway to social impact

Capacidades tecnológicas en empresas sociales emergentes: una ruta de impacto social

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ABSTRACT

Social enterprises seek to address significant global issues by maximizing the social impact of their products and services. Technology and innovation stand as crucial opportunities for their growth. This research aimed to analyze the technological capabilities of emerging social enterprises to enhance their social impact. Using a qualitative approach, a systematic literature review was conducted in Redalyc, Web of Science, and ScienceDirect databases with thematic descriptors like "social enterprises and technology" and "social tech ventures." Out of the studies reviewed, 56 were selected for a detailed analysis. The findings indicate that technology-based emerging companies are oriented towards social impact, making the development of technological capabilities essential. Factors such as the founders' education and access to financing play a crucial role. These insights lay the groundwork for future studies that contribute to Latin America's economic and social development.

Keywords: technological capabilities, technological social enterprises, social impact, advanced technology.

JEL Classification: M13, O33, O35

RESUMEN

Las empresas sociales buscan solucionar problemas significativos de la humanidad mediante la maximización del impacto social de sus productos o servicios. La tecnología y la innovación representan oportunidades clave para su desarrollo. Esta investigación tuvo como objetivo analizar las capacidades tecnológicas de las empresas sociales emergentes con miras a potenciar su impacto social. Utilizando un enfoque cualitativo, se realizó una revisión sistemática de la literatura en las bases de datos de Redalyc, Web of Science y ScienceDirect con descriptores temáticos como "empresas sociales y tecnología" y "social tech ventures". De las investigaciones revisadas, 56 fueron seleccionadas para un análisis detallado. Los resultados indican que las empresas emergentes con base tecnológica se orientan hacia el impacto social, siendo esencial la construcción de capacidades tecnológicas. Factores como la educación de los fundadores y el acceso a financiamiento juegan un papel crucial. Estos hallazgos sientan las bases para futuros estudios que contribuyan al desarrollo económico y social de América Latina.

Palabras clave: capacidades tecnológicas, empresas sociales tecnológicas, impacto social, tecnología avanzada.

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INTRODUCTION

Since their inception, companies have traditionally had the purpose of generating profits for shareholders. However, recognized experts such as Michael Porter argue that companies must also address social problems that exceed the intervention capabilities of traditional institutions, such as governments, philanthropic entities, and non-governmental organizations. Social enterprises emerge as hybrid entities that address global challenges by combining for-profit activities with a clear and defined mission (Doherty et al., 2014). These companies offer an alternative to Non-Governmental Organizations (NGOs), governmental efforts, philanthropy, and actors traditionally charged with addressing social issues.

These companies' leading indicator of success is their ability to generate tangible social impact. Emerging social enterprises continuously explore mechanisms to leverage this impact (Islam, 2021). Scaling such impact involves expanding the scope and depth of positive societal changes (Islam, 2020). In this context, adopting and managing emerging technologies represent crucial opportunities for these enterprises.

Thus, the concept of "social tech ventures" or "social tech companies" arises, in which technology plays a fundamental role in the development and scaling of social innovations by enabling more significant mobilization and connection with communities, optimizing the use of resources and offering faster and broader responses to social needs (Grassi & Toschi, 2021). The term "impact tech startups" is also introduced, referring to technology startups that seek to achieve social impact. These companies use private financing to develop innovative solutions (Gidron et al., 2021).

With emerging technologies such as artificial intelligence, the Internet of Things, blockchain, cloud computing, and virtual and augmented reality, unprecedented opportunities arise for social enterprises and entrepreneurs (Ciarli et al., 2021). Despite the extensive existing literature on technological social enterprises (Arena et al., 2018; Benitez et al., 2022; Dal Mas et al., 2023; Fakhimi & Miremadi, 2022; Ghauri et al., 2022; Grassi & Toschi, 2021; Peterlin et al., 2021), much remains to be explored in the Latin American context. Therefore, this systematic literature review aims to analyze research related to the technological capabilities of emerging social enterprises in search of expanding their social impact.

METHODS

The research paradigm used was qualitative. We chose to conduct a systematic literature review, and the methodologies of Bettany-Saltikov (2012) and Snyder (2019) were considered. From Bettany-Saltikov (2012), the PER matrix (Population, Exposure, and Outcomes for qualitative reviews) was taken to direct the literature review, the preliminary classification matrix, and the guidelines to create the inclusion-exclusion criteria. On the other hand, according to Snyder (2019), the four phases of conducting a systematic literature review are considered: design, conducting, analyzing and structuring, and writing the review. Subsequently, a preliminary clarification matrix was used to present the problem statement and review questions and objectives using the methodology provided by Bettany-Saltikov (2012).

The search was conducted in three databases: Redalyc, Web of Science Core Collection, and ScienceDirect; the descriptors in Spanish used were "empresas sociales y tecnología" and in English, "social tech ventures." Redalyc initially found 12,863 results, Web of Science 284 results, and ScienceDirect 11,636 results. Only studies written in Spanish and English were considered. When searching again and including the NOT operator to exclude marketing topics and the AND operator to add the term social impact, 47 results were obtained in Web of Science, 6,808 results in Redalyc, and 4,544 results in ScienceDirect.

Subsequently, only empirical research articles were selected, and filters were applied to review only management, information science, and engineering articles. This resulted in 39 results in Web of Science, 1,587 in ScienceDirect, and 495 in Redalyc. For the Redalyc database, only research from the four Spanish-speaking countries with the highest innovation index was selected: Spain, Chile, Mexico, and Costa Rica. In addition, the search was limited to the last six years, from 2017 to 2023.

This decreased the number of articles to 30 in Redalyc, 31 in Web of Science, and 628 in ScienceDirect. However, it was necessary to narrow the search more in ScienceDirect, so four journals related to technology and business were chosen: Technological Forecasting and Social Change, Technovation, Technology in Society, and Futures. This resulted in a sample of 181 articles.

The articles were selected by reading titles and abstracts, leaving a sample of 46 articles from ScienceDirect, 12 from Web of Science, and five from Redalyc. This gives 52 articles, adding four articles found through references related to the topic. The total is 56 articles. The selection of articles is shown in table 1.

Table 1.
Selected sample of articles for the systematic literature review

(Author, year)	Title
(Gramescu, 2016)	Scaling Social Innovation in Europe: An Overview of Social Enterprise Readiness
(Batabyal y Yoo, 2017)	On research and development in a model of Schumpeterian economic growth in a creative region
(Brem y Radziwon, 2017)	Efficient Triple Helix collaboration fostering local niche innovation projects – A case from Denmark
(Carmeli y Dothan, 2017)	Generative work relationships as a source of direct and indirect learning from experiences of failure: Implications for innovation agility and product innovation
(Chavez et al., 2017)	The importance of the technologically able social innovators and entrepreneurs: A US national laboratory perspective
(Chitsaz et al., 2017)	The impact of resource configuration on Iranian technology venture performance
(Joung y Kim, 2017)	Monitoring emerging technologies for technology planning using technical keyword-based analysis from patent data
(Necoechea-Mondragón et al., 2017)	Critical factors for participation in global innovation networks. Empirical evidence from the Mexican nanotechnology sector
(Agarwal et al., 2018)	Towards a higher socio-economic impact through shared understanding of product requirements in emerging markets: The case of the Indian healthcare innovations
(Amankwah-Amoah et al., 2018)	Contemporary challenges and opportunities of doing business in Africa: The emerging roles and effects of technologies
(Arena et al., 2018)	Unlocking finance for social tech start-ups: Is there a new opportunity space?
(Baglieri et al., 2018)	University technology transfer office business models: One size does not fit all
(Carayannis et al., 2018)	Composite innovation metrics: MCDA and the Quadruple Innovation Helix framework
(Fragoso y Pineda, 2018)	IT governance model to improve the performance of retail business projects
(Howell et al., 2018)	Value capture and value creation: The role of information technology in business models for frugal innovations in Africa
(Metallo et al., 2018)	Understanding business model in the Internet of Things industry
(Shaw y Allen, 2018)	Studying innovation ecosystems using ecology theory
(Zapata y Hernández, 2018)	Absorptive capacity: literature review and a model of its determinants.
(Ahmed y Brennan, 2019)	The impact of Founder's human capital on firms' extent of early internationalisation: Evidence from a least-developed country
(Cavallo et al., 2019)	Fostering digital entrepreneurship from startup to scaleup: The role of venture capital funds and angel groups
(Dutrénit et al., 2019)	Development profiles and accumulation of technological capabilities in Latin America
(Kummitha, 2019)	Smart cities and entrepreneurship: An agenda for future research
(Martin-Rojas et al., 2019)	Technological antecedents of entrepreneurship and its consequences for organizational performance
(Pérez et al., 2019)	Statistical analysis of Mexico's absorptive capacity and its influence on the generation of technological knowledge
(Rippa y Secundo, 2019)	Digital academic entrepreneurship: The potential of digital technologies on academic entrepreneurship
(Aharonson et al., 2020)	The influence of multinational corporations on international alliance formation behavior of colocated start-ups
(Atiase et al., 2020)	The emergence and strategy of tech hubs in Africa: Implications for knowledge production and value creation

(Das y Drine, 2020)	Distance from the technology frontier: How could Africa catch-up via socio-institutional factors and human capital?
(Min et al., 2020)	The effect of innovation network size and public R&D investment on regional innovation efficiency
(Singh et al., 2020)	Antecedents of innovation implementation: a review of literature with meta-analysis
(Baier-Fuentes et al., 2021)	Does triple helix collaboration matter for the early internationalisation of technology-based firms in emerging Economies?
(Demiralay et al., 2021)	How do Artificial Intelligence and Robotics Stocks co-move with traditional and alternative assets in the age of the 4th industrial revolution? Implications and Insights for the COVID-19 period
(Foroudi et al., 2021)	Intellectual evolution of social innovation: A bibliometric analysis and avenues for future research trends
(Gidron et al., 2021)	Impact Tech Startups: A Conceptual Framework, Machine-Learning-Based Methodology and Future Research Directions
(Grassi & Toschi, 2021)	A Systematic Literature Review of Technology Social Ventures: State of the Art and Directions for Future Research at the Micro-, Meso- and Macro-Level
(Hossain, 2021)	Frugal innovation: Unveiling the uncomfortable reality
(Ollivier et al., 2021)	Madurez tecnológica e innovación en empresas mexicanas
(Roberts et al., 2021)	Psychological factors influencing technology adoption: A case study from the oil and gas industry
(Rong et al., 2021)	Sharing economy platforms: creating shared value at a business ecosystem level
(Soni et al., 2021)	Technological interventions in social business: Mapping current research and establishing future research agenda
(Suominen et al., 2021)	'Gold', 'Ribbon' or 'Puzzle': What motivates researchers to work in Research and Technology Organizations
(Tarighi y Shavvalpour, 2021)	Technological development of E&P companies in developing countries: An integrative approach to define and prioritize customized elements of technological capability in EOR
(Yeganegi et al., 2021)	The role of information availability: A longitudinal analysis of technology entrepreneurship
(Cannavacciuolo et al., 2022)	Digital innovation and organizational changes in the healthcare sector: Multiple case studies of telemedicine project implementation
(Drencheva et al., 2022)	Whom to Ask for Feedback: Insights for Resource Mobilization From Social Entrepreneurship
(Ellwood et al., 2022)	Crossing the valley of death: Five underlying innovation processes
(Fakhimi y Miremadi, 2022)	The impact of technological and social capabilities on innovation performance: a technological catch-up perspective
(Fernandes et al., 2022)	Digital entrepreneurship platforms: Mapping the field and looking towards a holistic approach
(Ghauri et al., 2022)	Digital technology-based entrepreneurial pursuit of the marginalised communities
(Llopis et al., 2022)	Navigating multiple logics: Legitimacy and the quest for societal impact in science
(Majdouline et al., 2022)	Revisiting technological entrepreneurship research: An updated bibliometric analysis of the state of art
(Oliva et al., 2022)	Risks and critical success factors in the internationalization of born global startups of industry 4.0: A social, environmental, economic, and institutional analysis
(Tsouri et al., 2022)	Knowledge recombination for emerging technological innovations: The case of green shipping
(Tunçalp y Yıldırım, 2022)	Sustainable Entrepreneurship: Mapping the Business Landscape for the Last 20 Years

(Massaro, 2023)	Digital transformation in the healthcare sector through blockchain technology. Insights from academic research and business developments
(Wang et al., 2023)	Government digital initiatives and firm digital innovation: Evidence from China

Source: own elaboration.

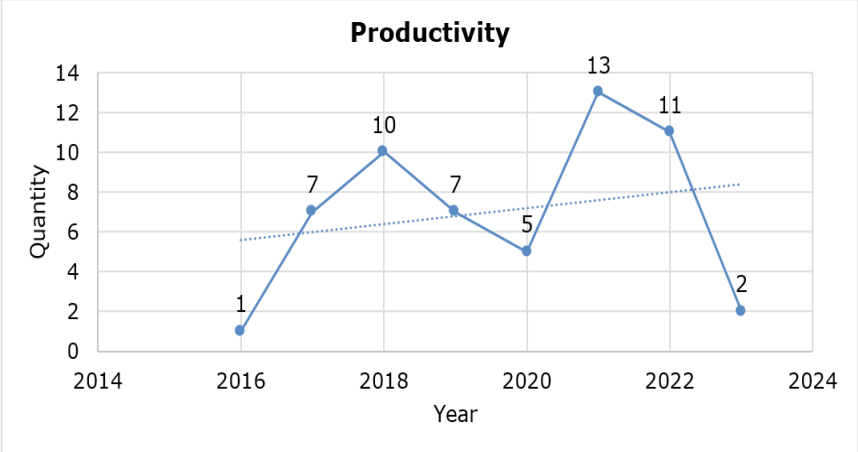
Productivity indicators (number of articles published per year), the quartile of the journal and its impact factor were also analyzed to create a ranking. The information was obtained from scimagojr (https://www.scimagojr.com/).

RESULTS AND DISCUSSION

Indicator analysis

There is an increase in the number of articles on technological capabilities in emerging social enterprises that trend towards increasing over time, with a peak in 2021 with 13 publications (Figure 1).

Figure 1.
Productivity of articles (2016-2023)



Source: own elaboration.

The ranking of the leading journals where the topics addressed in the research were published was obtained (Table 2). The leading journals are located in quartile 1 (Q1) with 11 (73.33 %), in quartile 2 (Q2) with 1 (6.67 %), and in quartile 3 with 2 (13.33 %), while one is currently without quartile or impact according to scimagojr. The countries where these journals are located are the United States of America, the United Kingdom, Switzerland, Ecuador, and Colombia.

Table 2.
Ranking of magazines

Ranking	Journal	Quartile	Impact factor
1	Organization Science	Q1	6.54
2	Industrial Marketing Management	Q1	2.66
3	Technological Forecasting and Social Change	Q1	2.64
4	Technovation	Q1	2.41
5	Resources Policy	Q1	1.87
6	Journal of International Management	Q1	1.77
8	Technology in Society	Q1	1.49
9	Asia Pacific Journal of Management	Q1	1.41
10	Journal of Social Entrepreneurship	Q1	0.81
11	Sustainability	Q1	0.66
12	Foresight	Q2	0.48
13	Retos	Q3	0.26

14	Innovar	Q3	0.17
15	Procedia - Social and Behavioral Sciences	-	0

Source: own elaboration

Analysis of the main contributions

According to Grassi and Toschi (2021), technological and social enterprises have specific characteristics that not only define them as a distinct organizational form. All these characteristics stem from the multiplicity of logic and dimensions that coexist within this type of enterprise, where the elements of business, social impact, and technology must be managed appropriately and balanced. This coincides with the research presented by Gidron et al. (2021).

They also suggest that companies must improve their technological capabilities to develop their products or services, scale their impact on society, and integrate them into a broader set of heterogeneous resources that serve their social and economic missions. They then propose that it is essential to investigate how technological social enterprises build and maintain technological capabilities and how the development and maintenance of such capabilities affect the typical organizational processes of social enterprises.

Understanding how this process works is necessary to determine what valuable combination of resources is needed. In addition, it is essential to establish what type of governance is most appropriate to manage it. This could contribute to understanding how technological and social enterprises build the capacities that allow them to overcome the obstacles to achieve their insertion in the markets by detonating their social reach.

It is highlighted that emerging countries and developing economies are creating opportunities and efforts to detonate the creation of startups to solve the problems of each community (Agarwal et al., 2018; Amankwah-Amoah et al., 2018; Atiase et al., 2020; Chitsaz et al., 2017; Das and Drine, 2020; Dutrénit et al., 2019) from the creation of spaces for technological development to the creation of policies that enable research and development, with all the factors involved in processes of this magnitude in creative regions (Batabyal & Yoo, 2017).

On the other hand, it has been shown that to have higher chances of success in creating technology-based startups, the founders' education is a key differentiating factor (Ahmed & Brennan, 2019). A high level of education is related to developing skills, knowledge, motivation, self-confidence, problem-solving abilities, and entrepreneurial inclinations. This enables founding entrepreneurs to learn more about markets, culture, and technology and discover new entrepreneurial opportunities. In the same vein, creative capital requires many years of formal study to be in a position to develop new technologies and innovations (Batabyal & Yoo, 2017).

It has also been found that the technological element is associated with government involvement in adopting emerging technologies. Technological development should be driven by the government, generating an agenda and the design of policies and programs that disseminate the effects of technology adoption on entrepreneurship (Amankwah-Amoah et al., 2018). This is important to generate the right connections to foster innovation through local projects (Baier-Fuentes et al., 2021; Brem & Radziwon, 2017).

Another preponderant factor for developing technological capabilities, especially in a scaling-up phase, is access to financing for this type of social startup (Arena et al., 2018). The government and private initiative must actively participate through different investment mechanisms, primarily research and development (Fragoso & Pineda, 2018; Min et al., 2020).

However, the social impact-oriented nature of these organizations makes it difficult for founders of technology-based social enterprises to access financing mechanisms. The dilemma of their hybrid model, oriented partly to generate profits and partly to create social benefits, is the biggest detractor for typical funding institutions such as banks and venture capitalists (Arena et al., 2018).

So, emerging social enterprises need specific solutions to scale through financing. However, technological solutions to address social problems must find optimal mechanisms to design a sustainable business model (Cavallo et al., 2019). Since these companies make intensive use of technology, they must take initiatives that make them similar to high-tech companies in their traditional definition (Arena et al., 2018; Chavez et al., 2017; Fakhimi & Miremadi, 2022; Grassi & Toschi, 2021).

Since social enterprises of this type can potentially solve social problems on a large scale, public policymakers must have specific incentives to support this new type of entrepreneurship. In this regard, social impact investments, which proactively pursue social and environmental objectives and prioritize the creation of social impact, are identified as appropriate financing alternatives. Thus, financing is critical, and knowing the stages for each phase of the development of emerging companies is appropriate.

One of the most successful efforts to support the development of technology startups is the creation of Technology Hubs. These centers challenge the dominance of universities in generating knowledge and generate greater efficiency in creating solutions in response to industry needs. They are, therefore, highly effective generators of knowledge to create economic and social value (Atiase et al., 2020). Therefore, this type of space can strengthen social entrepreneurs' and startups' capabilities.

These are laboratories that operate as creative spaces aimed at solving social problems. They are considered an area of great opportunity to enhance the creation of technological social enterprises. These centers provide an inclusive technological platform where low-income communities participate in developing local technology.

For their part, universities contribute through appropriate mechanisms in technology transfer offices; however, different business models should be considered to enable the sustainability of this dynamic. The creation of high-quality startups and research are associated with high economic performance, so these offices are centers that should also offer opportunities for strengthening the technological capabilities of technology-based social enterprises (Baglieri et al., 2018).

What is important to highlight in these spaces of creation and technological development are their positive impacts on creating a creative class and capital with the ability to create new technologies. From a Schumpeterian perspective, this generates economic growth models in the regions where these mechanisms exist (Batabyal & Yoo, 2017). So, these spaces provide educational opportunities for the creative capital segment where the theoretical principle is creative destruction, generating innovations that replace conventional ones by changing the status quo.

However, to detonate these capacities, it is also necessary to effectively participate in a triple helix that allows the generation of local innovation projects. In this sense, the participation of industry, university, and government allows the recreation of collaborative processes to guide innovation towards pressing societal problems. From this perspective, ventures benefit from strengthening the ecosystem (Baier-Fuentes et al., 2021; Brem & Radziwon, 2017).

Socio-technical systems are essential as a construct that enables the flow of processes that generate niche technologies oriented to creating new disruptions and windows of opportunity. This system involves markets, consumer preferences, science, industry, public policy, culture, and technology. The social groups that derive from these segments are more prolific and include researchers, academics, workers, consultants, venture capital organizations, companies, suppliers, and local consumers.

Likewise, authorities regulate the ecosystem by creating interactions with the media, nonprofit social groups, users and consumers, and even repair and maintenance shops for each technology (Brem & Radziwon, 2017). Therefore, technological and social enterprises can generate technological capabilities more easily if they are immersed in and supported by a strengthened and constantly evolving innovation ecosystem that prioritizes creating new niche technological projects to solve social problems.

Indeed, for many companies, adopting technology is one of the most significant challenges in organizational transformation and innovation. Technology can benefit vulnerable areas, primarily through information technologies facilitating access to remote regions. Digital technologies are revolutionizing the way organizations operate and carry out their activities. These tools digitize and optimize business processes, allowing dispersed actors to collaborate in a coordinated manner. Thus, integrating these technologies enhances value creation (Cannavacciuolo et al., 2022).

Thus, technological projects, such as telemedicine, require consideration of three dimensions: functionality, application, and technology. This can be extended to other areas involving technological development in startup companies with social impact. The technology involves three sub-dimensions: synchronicity, network design, and connectivity. These elements must be resolved by considering individual user behavior, which requires appropriate qualitative research.

On the other hand, there is a clear need for adequate organizational support to successfully implement technologies

or develop technology-based value propositions, especially in the digital realm. In this sense, as mentioned above, the government can recreate initiatives to foster digital innovation (Wang et al., 2023). In this way, enterprises can have sufficient opportunities and support to solve social problems with technology successfully.

In the initial stages, technology-based social enterprises identify the potential benefits of stakeholders, the project's scope, the challenges of the external environment, and potential sponsors and partners that define the initial organization. On the organizational side, four organizational capabilities are identified that are required for technology development: evaluation, collaborative leadership, stakeholder networking, and organizational flexibility. Therefore, the organization must develop the appropriate capabilities to assess user needs.

Collaborative leadership is necessary to establish relationships between users and other members of other organizations. In addition, networking among stakeholders is required to attract funding and to disseminate projects in other contexts. Finally, organizational flexibility is adapting to new business models (Cannavacciuolo et al., 2022). Holistically, these factors are related to technology, the organization of the enterprise, and the individuals involved in the diffusion processes of the new technologies provided by these social enterprises.

When implementing technological projects, it is essential to consider both macro factors - which include technology, user acceptance, finances, organizational structure, and policy and legislative framework - and determinants, such as the support provided, training, tool usability, tool quality, user attitude, evidence of its effectiveness based on usage, dissemination strategies, suppliers involved, specific laws, standardization, and security measures, as they all significantly influence the success of the technological implementation.

That said, it is essential to strengthen and strengthen the innovation ecosystem surrounding technological and social enterprises, fostering collaborations that drive innovation, developing technological competencies, implementation, and scaling. Synergies between technological aspects and those linked to human resources and labor organization are crucial. It is vital to recognize that project implementation is affected not only by purely technological factors but also by organizational and human elements.

Furthermore, social enterprises need access to adequate financing to achieve higher levels of growth and scalability. In this context, Social Impact Investment emerges as a facilitating mechanism, reducing the barriers to access to capital. Technology-based social startups need to thoroughly understand the steps to access funding effectively, thus enhancing their impact on society.

CONCLUSIONS

Social technology startups distinguish themselves by developing innovations that address social problems through sustainable business models. To establish a startup in this field, the founders must possess a solid formal education, creative capital to generate specific technological solutions, organizational skills in evaluating technological projects, and a vision of collaborative leadership.

Technological progress depends on the synergy between several domains and factors to guarantee a successful insertion in the market. These include technology, public acceptance, financing, organizational structure, and the regulatory and legislative environment. In a context of limited technological adoption and a slow pace in consolidating legal and political frameworks, organizations must promote adaptive practices that overcome these barriers, considering the interrelationships between these domains and factors.

The collaboration of technology experts, sector specialists, IT professionals, entrepreneurs, and managers is required to realize technological solutions with a significant social impact. In addition, it is essential to master aspects such as business economics, organizational impacts, and change management strategies. An emerging opportunity lies in developing specific spaces for the ideation of these models, such as technology hubs, which are in tune with the technology transfer offices of academic institutions.

Future research

The literature on technology-based social enterprises in Latin America must be attractive, offering excellent opportunities to investigate successful Latin American start-ups' implementation and scaling-up paths. In this sense, empirical studies offer an outstanding possibility to generate new in-depth research. Under the magnifying glass and context it covers, this research will offer insights to continue developing new technology-based social ventures for the region.

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