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Maximizing Educational Impact: A Mixed-Method Analysis of Strategic Funding Pathways for Sci-Bono Discovery Centre in South Africa

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Abstract

This paper investigates the financial dynamics of the Sci-Bono Discovery Centre (Sci-Bono), focusing on its current funding model while evaluating both short-term and long-term sustainability. The study aims to provide a comprehensive understanding of the Centre's financial strengths, weaknesses, and vulnerabilities, with special attention to its reliance on government funding, corporate sponsorships, and visitor-generated revenue. The research assesses risks posed by economic fluctuations, shifts in educational priorities, and the volatility of corporate social responsibility (CSR) initiatives. Additionally, it identifies alternative funding sources to diversify Sci-Bono's financial base, which is critical for maintaining and expanding its mission of providing equitable, high-quality science education across socio-economic divides. New funding avenues such as national and international government grants, expanded corporate partnerships aligned with sectoral needs, and community initiatives, including crowdfunding and local fundraising, will be explored. This comprehensive examination serves as a guide for stakeholders and policymakers to ensure Sci-Bono's sustainable growth and its continued impact on inspiring scientific learning for future generations.

Keywords: Funding model, Sci-Bono, Financial base, Corporate Social Responsibility and Sustainable funding model.

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1. Introduction

Sci-Bono Discovery Centre (Sci-Bono) plays an essential role in encouraging curiosity, knowledge, and enthusiasm for science and technology. Its goal is to motivate students, especially those from underprivileged backgrounds, to delve into STREAM (Science, Technology, Engineering, Research, Reading, Engineering, Arts and Mathematics) fields that are vital for the nation's future (Sci-Bono, 2020). However, like any institution of its nature, the Centre's capacity to function effectively is linked to its financial health.

The funding structure of Sci-Bono has enabled it to expand and continue positively influencing the lives of numerous young South Africans, though it also encounters considerable challenges. This evaluation will examine the strengths and weaknesses of Sci-Bono's existing funding model, analysing both its short-term and long-term sustainability (Gonzalez & Kuenzi, 2019). Furthermore, it scrutinises the current financial structure, associated risks, and potential new funding sources that support Sci-Bono's mission to provide accessible science education to all ages. The analysis covers the challenges posed by financial dynamics, scrutinises the existing funding model, and investigates risks influenced by economic fluctuations and educational priority shifts (Mazola, 2019).

It also highlights potential avenues for additional funding, including governmental grants, corporate partnerships, and community-driven initiatives. The underlying objective is to safeguard Sci-Bono's financial stability by ensuring its long-term capacity to inspire scientific literacy, innovation, and curiosity among South African students, particularly those from marginalised communities. This comprehensive overview serves as a roadmap for ensuring its financial stability. that Sci-Bono remains an essential institution for science education in the face of evolving economic and societal pressures.

By stressing and enhancing the important contributions made by the Sci-Bono Discovery Centre within the STEAM (Science, Technology, Engineering, Arts, and Mathematics) sector, this article seeks to add to the body of knowledge already in use and support scholarly debate. The study will highlight the critical part Sci-Bono

performs in advancing inclusive and fair access to quality education for poor young people in South Africa by looking at the Centre's projects, funding sources, and educational impact. By means of this investigation, the paper aims to provide a more thorough awareness of the centre's impact on the larger STEAM scene and inspire continuous research and communication to support its objective of empowering next generations.

1.1. **About Sci-Bono Discovery Centre**

Sci-Bono Discovery Centre is the largest science centre in the Southern Hemisphere, situated in the Gauteng Province and city of Johannesburg. It was established in 2004 for the promotion of Science, Technology, Engineering and Mathematics (STEM) education. There are thirty-five (35) South Africa Agency for Science and Technology Advancement (SAASTA) accredited science centres in eight of South Africa's nine provinces. A science centre is a unique and valuable educational tool for schoolchildren in South Africa, as it provides an interactive learning environment that allows them to explore science and technology and to develop their knowledge and understanding of the subject matter. Science centres are a great way to engage and motivate students, as they provide an environment in which students can explore, experiment, and interact with the material they are learning. In South Africa, science centres have been proven to be an effective way to enhance education and teaching (Ntsobi & Mwale, 2024).

Sci-Bono provides various interactive exhibits, seminars, and instructional activities meant to spark interest and participation in STREAM fields as an innovative learning environment. Providing access to necessary tools and resources that improve learning opportunities, the centre acts as a hub for families, teachers, and students, thereby strengthening their interactions. Its efforts are especially important in the context of South Africa, where differences in educational quality usually follow socioeconomic status. Maximising Sci-Bono's educational impact depends a lot on its funding possibilities. To secure financial support for its initiatives, the centre collaborates with a variety of stakeholders, including government agencies, commercial businesses, and non-governmental organisations (Sci-Bono, 2025). Sci-Bono uses this money to support its projects, empowering local young people and fostering a generation skilled in STREAM disciplines (Molefe, 2024).

The Sci-Bono Discovery Centre helps to build a qualified workforce, crucial for South Africa's socioeconomic progress, through its strategic alliances and efficient use of funds. Therefore, evaluating the whole impact of the centre on society depends on knowing the dynamics of funding and how it affects its educational projects.

2. **Research Problem**

Whilst Sci-Bono plays a significant role in expanding STREAM education among poor young people in South Africa, its funding source affects its sustainability and impact capacity. There is still a great need to evaluate the elements of this funding model even if business sponsorships, visitor-generated income, and government funds are relied upon. This study intends to evaluate the strengths and shortcomings of the present financial structure, spot weaknesses that might compromise the operations of the centre and investigate alternative financing sources to vary its income. By tackling these problems, the study aims to offer practical solutions to improve the financial stability of the Sci-Bono Discovery Centre, therefore ensuring its ongoing empowerment of local young people and support of a trained STREAM workforce.

2.1. **Research Objectives**

The following research objectives seeks to address the fundamental gaps identified by the research problem statement:

1. To analyse the primary components of the Sci-Bono Discovery Centre's current funding structure, including government funding, corporate sponsorships, and visitor-generated revenue.
2. To identify the strengths, weaknesses, and vulnerabilities of the Centre' funding model.
3. To propose strategies for diversifying Sci-Bono' financial base to reduce over-reliance on existing funding streams.

2.2. **Research Questions**

The following are the research questions that the study seeks to probe and answer:

1. What are the primary components of the Sci-Bono Discovery Centre's current funding model?
2. What are the financial strengths, weaknesses, and vulnerabilities of Sci-Bono's existing funding structure?
3. What potential funding sources exist to diversify Sci-Bono's financial base?

3. Theoretical Literature

Resource Dependence Theory (RDT) explains how organisations rely on external resources and how these dependencies influence their behaviour and strategies. It emphasises that organisations are not self-sufficient and must engage with other entities in their environment to obtain necessary resources. RDT focuses on how resource availability, scarcity, and control shape organisational power dynamics and strategies for managing dependencies (Jiang, Luo, Xia, Hitt & Shen, 2022). The RDT, proposed by Pfeffer and Salancik (1978), stipulates that organisations must manage their dependencies on external sources to minimise risk and ensure sustainability. The theory emphasises the importance of revenue diversification, which enables organisations to continue operation despite one source being disrupted. For Sci-Bono, funding diversification is of importance. Overreliance on one funding stream (e.g., a government grant) makes the centre vulnerable to policy changes and economic fluctuations.

Narku *et al.* (2024) state that diversifying funding sources through partnerships with corporations, international grants, and community-driven initiatives (such as crowdfunding) can mitigate these risks and ensure financial stability. This theory offers important hints about how Sci-Bono can navigate its funding challenges and unlock new opportunities. By diversifying funding sources, focusing on long-term sustainability, and leveraging social capital, Sci-Bono can continue to provide high-quality science education to South Africa's diverse population. Hillman, Withers and Collins (2009) state that the RDT theory also underlines the need for strategic partnerships and adaptive funding strategies that are responsive to both local and global shifts in educational priorities and funding landscapes.

4. Methodology

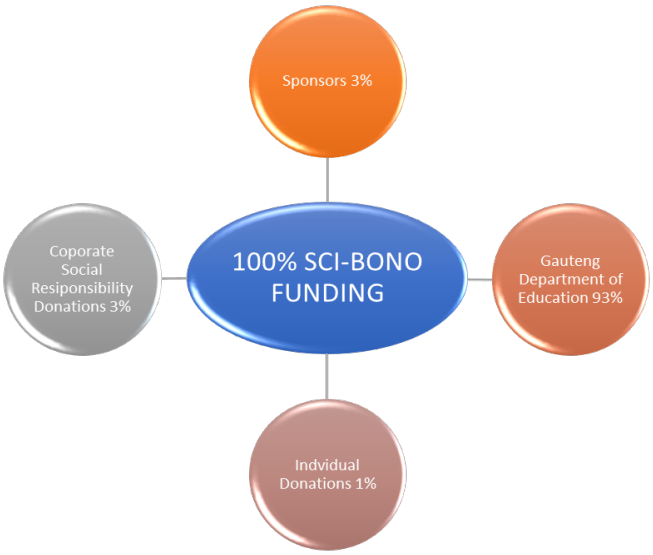
The study collected and analysed data using a mixed-method approach. This strengthened the rigour and robustness of results from the participants and hence provides deeper experiences and insight into the subject matter (Yin, 2014). Moreover, qualitative data was collected from 50 interviewees through fact-to-fact engagements. Some of the interviewees included, but were not limited to, Sci-Bono's higher management echelon, executives' managers, members of the Board committees and other stakeholders affiliated with Sci-Bono. Difficult questions were rephrased and simplified by the interviewer to the interviewees. Data coding and thematic analysis were used to analyse the qualitative data. On the contrary, the qualitative approach was also used to collect data through a five-point Likert scale questionnaire distribution. Moreover, the quantitative data analysis was done through statistical correlational analysis (Yin, 2014). Therefore, the mixed-method approach provided enriched results, conclusions and recommendations. Furthermore, ethics-related issues were observed to ensure that there was voluntary participation, informed consent, anonymity, and no potential harm to all participants and the research institution in general (Bhandari, 2021).

5. Sci-Bono Funding Outlook

Sci-Bono's current funding model is a carefully crafted financial tapestry that intricately weaves together diverse sources of support to sustain its mission of providing accessible and engaging science education. At the core of this model is a significant dependency on the Gauteng Department of Education, which shoulders a substantial 93% of Sci-Bono's financial requirements (see figure 1.1). This major allocation underscores the integral partnership between Sci-Bono and the regional educational authority, emphasising the centrality of government backing in fuelling the centre's educational initiatives.

Furthermore, individual donations constitute a modest yet meaningful 1% of Sci-Bono's funding. This signifies the commitment of private individuals who recognise the value of Sci-Bono's work and contribute to its sustainability on a personal level. These donations, whether small or large, collectively play a crucial role in diversifying the funding streams and ensuring a degree of financial stability. Revenue generated from internal activities contributes another 1% to the funding model. This amount may encompass funds generated from admission fees, workshops, or other educational programmes hosted by Sci-Bono. By leveraging its resources and offerings, Sci-Bono contributes to its financial sustainability, thereby reducing reliance on external sources.

Figure 1.1 Sci-Bono Funding Outlook:



Source: Authors own compilation

Sci-Bono's funding model includes Corporate Social Responsibility (CSR) donations at 3% and sponsorships at 2%, reflecting corporate engagement and targeted support for specific projects. While these contributions are valuable, they form a small portion of the overall funding. The center's heavy reliance on government funding introduces vulnerabilities to budgetary and policy changes. This points to the strategic value of diversifying funding sources to ensure Sci-Bono's long-term sustainability and resilience in continuing its impactful science education initiatives. Exploring alternative funding avenues becomes critical to preserving and expanding Sci-Bono's ability to contribute significantly to science education despite potential financial challenges.

6. Strengths of the Sci-Bono Funding Outlook

6.1. Multiple Funding Streams

The Sci-Bono Discovery Centre depends on a diverse funding model for its functionality, which includes government grants, corporate sponsorships, donor support, and revenue from visitors (through entry fees and educational programmes). The diverse funding model makes the organisation less vulnerable to financial shocks. For instance, if there is a drop in corporate sponsorship during a recession, other sources of funding could assist in stabilising the Centre’s finances. Multiple streams of revenue create a financial cushion that can support ongoing projects, ensuring that important STREAM education initiatives are not disrupted in the short term. Moreover, it minimises the overreliance of the Centre on any single stakeholder, enabling it to operate with a degree of independence.

6.2. Strong Government Support

The Gauteng Department of Education (GDE) is one of the most reliable sources of funding for Sci-Bono, providing stability for the center's educational programs and outreach initiatives. The GDE's financial support demonstrates a commitment to addressing educational inequities through STREAM education, thus giving Sci-Bono the ability to plan programmes with confidence in the short term. Sci-Bono's solid partnership with the GDE ensures that the Centre aligns with its mandate of promoting science education, particularly in underprivileged communities.

Analysing the initiatives and outcomes of the Sci-Bono Discovery Centre emphasises the great help the Gauteng Provincial Government offers, especially through the Gauteng Department of Education. Recognising the need to encourage interest among underprivileged populations in South Africa, the GDE has constantly supported projects aiming to improve STREAM education. By giving local young people access to essential resources and possibilities in science and technology, this cooperation has helped initiatives that improve educational results and empower local young people. By means of this cooperation, Sci-Bono successfully closes the educational disparity in impoverished communities, therefore fostering a fairer future for all the local pupils.

6.3. Corporate and Donor Engagement

Sci-Bono's successful initiative to attract funding from corporate sponsors and private donors, particularly those aligned with educational goals, enables the Centre to expand its influence by collaborating with industries that benefit from a scientifically literate society. Moreover, private funding comes with fewer complexities compared to government grants, allowing for greater flexibility in program design and implementation (Kirkpatrick, 2017).

7. Weaknesses of the Current Funding Model

7.1. Over-reliance on Government Funding

The Centre's heavy reliance on the GDE makes it vulnerable to changes in public policy or budget cuts. When the provincial government shifts its priorities or faces financial constraints, Sci-Bono's funding becomes vulnerable to financial risk. This overreliance on public funds poses a risk to the future sustainability of the program given the fluctuating economic conditions in South Africa, which can lead to reduced government spending in sectors such as education and scientific outreach. Diversification toward more self-sustaining revenue streams, such as private sector involvement or increased community engagement, would mitigate this risk (Reed & Jeyaraj, 2020).

7.2. Insufficient Focus on Long-Term Sustainability

The current funding model focuses heavily on short-term grants and project-based funding. While these sources of funds are essential for immediate operations, they are less suited to long-term financial sustainability. Sci-Bono's dependency on time-bound grants creates uncertainty about the future of its programs and staffing. Baker & McGowen (2019) state that without a solid endowment or more robust income-generating activities, such as membership programmes or expanded partnerships with the private sector, the Centre may struggle to maintain its activities if temporary funding sources are exhausted.

7.3. Economic Fluctuations and Corporate Dependency

While government funding is stable, Sci-Bono's long-term dependency on corporate sponsorships carries significant risks associated with reduced corporate investment in STREAM education. Harrison & Wicks (2020) state that economic recessions and global market downturns, especially those affecting key South African industries like mining, manufacturing, and finance, directly impact corporate profitability, reducing companies' willingness to invest in CSR initiatives. As a result, Sci-Bono's ability to attract and retain consistent corporate funding is often tied to economic booms and busts, a tenuous situation for any non-profit organisation.

7.4. Limited Engagement with International Donors

Sci-Bono's current funding model consists of the local government and South African corporations. Although this current funding model strengthens local partnerships, it fails to recognise the potential to tap into international funding organisations and foundations that support educational and STREAM-focused initiatives across Africa. There is a need for Sci-Bono to explore international grant opportunities, particularly from global foundations that support education, scientific literacy, and innovation in developing countries. These could provide additional resources, including technology and research-based collaborations (Huang & Spector 2021).

7.5. Underutilized Revenue from Visitors

Despite Sci-Bono's efforts to generate revenue through entry fees and paid programs, these sources still account for only a small proportion of its total budget. There is potential to increase revenue from this channel by enhancing visitor engagement, introducing additional paid experiences (such as premium workshops, corporate events, or STREAM-themed camps), and improving marketing strategies (Hawkins & Williams, 2020). Offering membership or annual passes could also assist in building a loyal visitor base, providing a steady income stream. Therefore, to achieve this, Sci-Bono should develop programs focused on creating and enhancing a loyal visitor base, which will ensure a stable income stream (Bishop & Phelan, 2021).

8. Alternative Funding Avenues for Sci-Bono

Sci-Bono has successfully helped bridge the educational gap for many students, especially those from marginalised communities. However, the long-term sustainability of Sci-Bono depends on its ability to diversify and expand its funding model to meet evolving demands in education and society. To secure continuity of its mission, Sci-Bono needs to explore new funding avenues that supplementts existing streams. Ebrahim & Rangan (2021) support this argument that potential avenues such as government grants, corporate partnerships, and community initiatives form a bedrock of a more robust and resilient funding strategy.

While Sci-Bono currently relies on the Gauteng Department of Education (GDE) for much of its financial support, expanding public sector support to a wider array of government grants could further secure its financial base. Daniel (2020) states that government grants, especially those at the national level or from international bodies, offer a stable and often renewable source of funding. Government agencies, such as the Department of Science and Innovation (DSI) or the Department of Higher Education and Training (DHET), may have programmeseses aligned with Sci-Bono's objectives, offering opportunities for project-specific grants that complement existing provincial funding.

López & Morgan (2020) state that at the international level, development agencies and multilateral organisations such as UNESCO, the World Bank, or the African Development Bank (AfDB) may offer grants specifically for educational development, particularly in the STREAM fields. These grants are aimed at capacity-building, skills development, and equitable access to education, key pillars of Sci-Bono's mission. Sullivan & Reed (2019) argue that institutions like Sci-Bono, by structuring themselves as models for effective STREAM education in Africa, could tap into international funding streams to support their expansion and innovation efforts.

Corporate partnerships have the potential to contribute long-term to the existing Sci-Bono funding model, with companies investing in educational programmeseses as part of their corporate social responsibility initiative (Tschannen-Moran & Gareis, 2019). There is room for engagement in strategic industry partnerships r sectors such as telecommunications, renewable energy, and health sciences such that engaging with Sci-Bono creates a skilled workforce that can support their future growth. For instance, the renewable energy sector might fund sustainability initiatives or sponsor educational programmeseses on climate science, energy efficiency, and innovation in green technologies. These partnerships would enable Sci-Bono to remain at the forefront of STREAM education while offering companies directagement with future talent (Miller & Handley 2021).

Countries such as the United States haveee seen an uprise in corporate involvement in education through initiatives like the STREAM Education Coalition, which summons business leaders, educators, and policymakers to enhance STREAM programmeseses nationwide. Prominent tech companies like Google, Microsoft, and Intel often partner with schools and science centres, providing funding, technology, and mentorship programmeseses that empowertudents with experience on cutting-edge technology (Liu Kwan, 2021). These partnerships aim to address the skills gap in tech-related fields, ensuring that the next generation of workers is prepared for high-demand industries (Gonzalez Rodriguez, 2020).

Furthermore, many corporations in India, especially in technology and telecommunications, have partnered with educational institutions to improve access to STREAM education. These partnerships have led to better infrastructure, scholarships, and outreach programmeses, particularly in rural areas. Sci-Bono could similarly tap into South African corporate CSR funds, with companies sponsoring specific programmeses or exhibits that align with their business goals (Sankaran & Pisharodi, 2020).

Community-based initiatives offer a unique opportunity for Sci-Bono to foster baseline support and build deeper connections with the local population. Engaging the community in its fundraising efforts can enhance the Centre's visibility and increase its financial independence. Initiatives such as crowdfunding enable Sci-Bono to engage with individuals and small businesses who share their passion for education and science (Floyd &

McDonald, 2020). These campaigns could fund specific projects, such as new exhibits, outreach programs, or scholarships for students in disadvantaged areas. Strauch & Chang (2021) state that local fundraising events, such as science fairs, charity galas, or community workshops, can also induce support from the local community while raising awareness of the Centre's work. These events foster a sense of ownership among the Centre's visitors and supporters, ensuring that Sci-Bono remains a vital and valued resource within its immediate environment (Lehner & Hirth, 2021).

In the UK, museums and science centres have successfully leveraged community support through crowdfunding campaigns and local fundraising drives. The Science Museum Group in London, for instance, regularly engages its local audience through community fundraising events and membership programmes. These initiatives instill a sense of ownership and pride among residents, ensuring that the institution remains a vital part of the community (Phillips & Smith, 2022).

Odundo & Karanja (2020) state that many rural communities in countries like Kenya have taken ownership of educational projects by organising local fundraising drives to build schools and provide educational resources. While these initiatives are often small-scale, they illustrate the power of grassroots involvement in education. Sci-Bono could leverage this community spirit by engaging local businesses, civic organisations, and individuals in Johannesburg and beyond to contribute to specific initiatives, such as expanding outreach programmes to rural areas or creating new exhibits focused on local scientific achievements.

9. Conclusion

Despite the funding challenges and weaknesses, Sci-Bono's budget could be at risk of significant cuts if there is a potential shift in educational priorities at the government level. While STREAM education is currently a priority, a shift in bureaucracy could redirect funding to other areas of need, such as healthcare, infrastructure, or social welfare. Moreover, evolving educational trends could also pose a risk (Rogers, 2021). For instance, if national education policies shift towards online learning at the expense of STREAM initiatives, Sci-Bono could struggle to secure the same level of public funding and support that it currently benefits from (Hambleton & Lin 2020).

10. Recommendation

The future of Sci-Bono Discovery Centre lies in its ability to diversify and strengthen its funding streams, ensuring its continued role in inspiring and educating future generations of young South Africans. While the current funding model has facilitated significant impact, it remains susceptible to financial vulnerabilities. To secure the future of STREAM education in South Africa, Sci-Bono must adopt a more robust and diversified funding strategy. Fry & Hsu (2020) argue that by tapping into new funding avenues such as government grants, strategic corporate partnerships, and community initiatives, the Centre can build a more resilient financial foundation that supports both its immediate operational needs and long-term sustainability. Embracing this diversified approach will ensure that Sci-Bono remains at the forefront of science education, empowering learners and fostering innovation for future generations.

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