

THE ROLE OF FEDERAL INSTITUTES OF EDUCATION, SCIENCE, AND TECHNOLOGY IN LOCAL SUSTAINABLE DEVELOPMENT: EVIDENCE FROM BRAZIL'S NORTHEAST REGION

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Resumo

Introduction: Education plays an important role in societal progress by developing skills, capacities, and promoting social advancement. It serves not only as a means for individual growth but also as a catalyst for sustainable development (UNESCO, 2016; Pereira; Cruz, 2019; Kilag et al., 2024). Emancipatory education, which promotes critical thinking and scientific knowledge, becomes essential in this context (Farias et al., 2019). Moreover, Sustainable Development Goal (SDG) 4 highlights inclusive and equitable education as a means of advancing society sustainably (UN, 2015; UNESCO, 2016). In Brazil, the Federal Network of Professional, Scientific, and Technological Education (Rede Federal de Educação, Profissional, Científica e Tecnológica - RFEPCT) was institutionalized by Law No. 11,892/2008, with the purpose of providing technical-scientific education that fosters local and regional development. These institutions are directly linked to SDG 4, which focuses on quality education. The research question of this study is: What is the relationship between the Federal Institutes (FIs) and local sustainable development? To answer this question, the following objective was outlined: To analyze the relationship between the FIs and local sustainable development. **Theoretical Background:** Education is a pivotal element in sustainable development, as recognized by SDG 4 (UN, 2015). Through education, individuals develop critical thinking, political awareness, and the necessary skills to combat social inequalities (UNESCO, 2016; Farias et al., 2019). High-quality education fosters autonomy and empowers individuals to become agents of socio-environmental change (Campello; Silveira, 2016). In Brazil, the establishment of the FIs in 2008 under the RFEPCT framework aimed to democratize access to Vocational and Technological Education, promote scientific development, and enable socio-economic transformations (Pacheco et al., 2010; Souza; Meza, 2022). The FIs are responsible for fostering applied research, innovation, and entrepreneurship, thereby addressing local socio-economic and environmental needs (Brazil, 2008; Macedo, 2017). The FIs contribute to sustainable development by aligning their practices with scientific and technical education that empowers individuals to think critically and act upon environmental and socio-political issues (Campello; Silveira, 2016). Their role in promoting local and regional development is evidenced by their involvement in producing technical and technological solutions that meet diverse social needs (Otranto, 2012; Pereira; Cruz, 2019). **Methodology:** This research adopts a descriptive and quantitative approach, analyzing data from 1,794 municipalities across nine states in Brazil's Northeast region. The study uses the Sustainable Cities Development Index (Índice de Desenvolvimento Sustentável das Cidades - IDSC) as a measure of local sustainable development. Data for this cross-sectional analysis, referring to the year 2023, were collected from the Sustainable Cities website and FIs portals. Municipalities were

categorized into two groups: those with and those without an FI. A t-test was applied to compare the IDSC averages between these groups. This methodology aims to verify whether the presence of an FI in a municipality is associated with higher levels of sustainable development. Results and Discussion: Initially, a descriptive analysis of the IDSC was conducted. It was observed that the state of Ceará has the highest IDSC average among the states, and Maranhão has the lowest average. The coefficients of variation indicate low dispersion, showing that the states do not have a marked discrepancy regarding local sustainable development. The results indicate that, overall, when analyzing the Northeast Region as a whole, municipalities with FI campuses show higher local sustainable development compared to those without FI. When analyzing by state, the results indicate that only the states of Alagoas, Ceará, and Sergipe did not show a difference in the level of sustainable development between municipalities with and without FIs. Considering the overall analysis, it is assumed that the research hypothesis, that the presence of FIs is associated with a higher level of local sustainable development, was supported. Previous studies have highlighted the role of educational institutions, such as federal universities and FIs, in promoting local development. These institutions contribute to socio-economic growth and sustainable development, reduce poverty, and improve education levels (Casqueiro; Irffi; Silva, 2020; Barbosa; Petterini; Ferreira, 2020; Kilag et al., 2024). Similarly, the expansion of the RFEPCT has demonstrated positive results in local development, particularly in the Northeast region, by offering education aligned with local needs and promoting social inclusion (Souza; Meza, 2022; Macedo, 2017). Final Remarks: The study concludes that FIs play a significant role in fostering local sustainable development, particularly in municipalities in Brazil's Northeast region. This aligns with SDG 4, emphasizing the importance of inclusive and quality education in addressing inequalities and promoting sustainable development. Practically, this research emphasizes the need for policymakers to continue expanding and strengthening Vocational and Technological Education as a tool for socio-economic transformation and sustainability. Theoretically, it enriches discussions on the role of educational institutions in local development, supporting theories that view education as a driver of social progress. Future research should incorporate additional variables related to sustainable development and the demographic context of municipalities. Expanding the analysis period and applying more sophisticated statistical tests could provide a more comprehensive understanding of the impact of FIs on local sustainable development. References: BARBOSA, Marcelo Ponte; PETTERINI, Francis Carlo; FERREIRA, Roberto Tatiwa. Política de expansão das universidades federais: é possível potencializar os impactos econômicos?. *Revista de Administração Contemporânea*, v. 24, n. 1, p. 1-24, 2020. CASQUEIRO, Mayara Lima; IRFFI, Guilherme; SILVA, Cristiano da Costa da. A expansão das Universidades Federais e os seus efeitos de curto prazo sobre os indicadores municipais. *Avaliação*, v. 25, n. 1, p. 155-177, 2020. KILAG, Osias Kit T. et al. Technical vocational education in the Philippines for sustainable development. *European Journal of Higher Education and Academic Advancement*, v. 1, n. 2, p. 57-70, 2024. MACEDO, Pedro Clei Sanches. Educação profissional e desenvolvimento territorial: a expansão dos institutos federais de educação, ciência e tecnologia. *Revista Brasileira da Educação Profissional e Tecnológica*, v.2, n.13, p. 94-106, 2017. PEREIRA, Luiz Augusto Caldas; CRUZ, José Luis Vianna da. Os institutos federais e o desenvolvimento regional: interface possível. *HOLOS*, v. 4, n. 35, p. 01-18, 2019.

Palavras Chave

Federal Institutes, Sustainable Development, Northeast Region

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