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MODERN EDUCATION TECHNIQUES AND TECHNOLOGY FOR ECONOMICAL GROWTH OF INDIA

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ABSTRACT

An essential component in the process of propelling economic expansion in India is the incorporation of contemporary educational practices and technological advancements. Traditional educational paradigms are being replaced by dynamic techniques that place an emphasis on critical thinking, problem-solving, and flexibility in the context of a global landscape that is rapidly undergoing change or transformation. The process of cultivating a competent workforce that is required for navigating the complexity of the 21st-century economy can be accomplished in India through the implementation of personalised learning, project-based approaches, and competency-based education. A further point to consider is that the incorporation of technology, such as artificial intelligence, virtual reality, and adaptive learning systems, has the potential to democratise education, thereby reducing socioeconomic gaps and promoting inclusiveness. The adoption of these forward-thinking initiatives not only equips individuals with the skills necessary for employability, but it also stimulates entrepreneurialism and innovation across a variety of industries. However, in order to see this vision come to fruition, it is necessary for many stakeholders to work together in order to devise and put into action comprehensive policies that are adapted to India's specific socio-economic environment. This will pave the way for India to experience sustainable economic growth and societal progress.

Keywords: *Modern Educational Methods, Technological Advancements, India's Economic Development, and Personalised Learning, Project-Based Learning, Competency-Based Education, Virtual Reality, Artificial Intelligence, Entrepreneurship, and Innovation are some of the current trends in education.*

1. INTRODUCTION

In the rapidly evolving and increasingly linked global economy of the 21st century, the role of education as a catalyst for economic growth and advancement has never been more emphasised than it is in the 21st century. Especially for a nation like India, with its enormous populace and objectives for turning into a worldwide economic force to be reckoned with, the necessity of using modern education techniques and technologies couldn't possibly be more critical. The purpose of this presentation is to pave the way for a comprehensive inquiry of the ways in which innovative educational strategies and cutting-edge technology might contribute to the direction of economic growth in India.

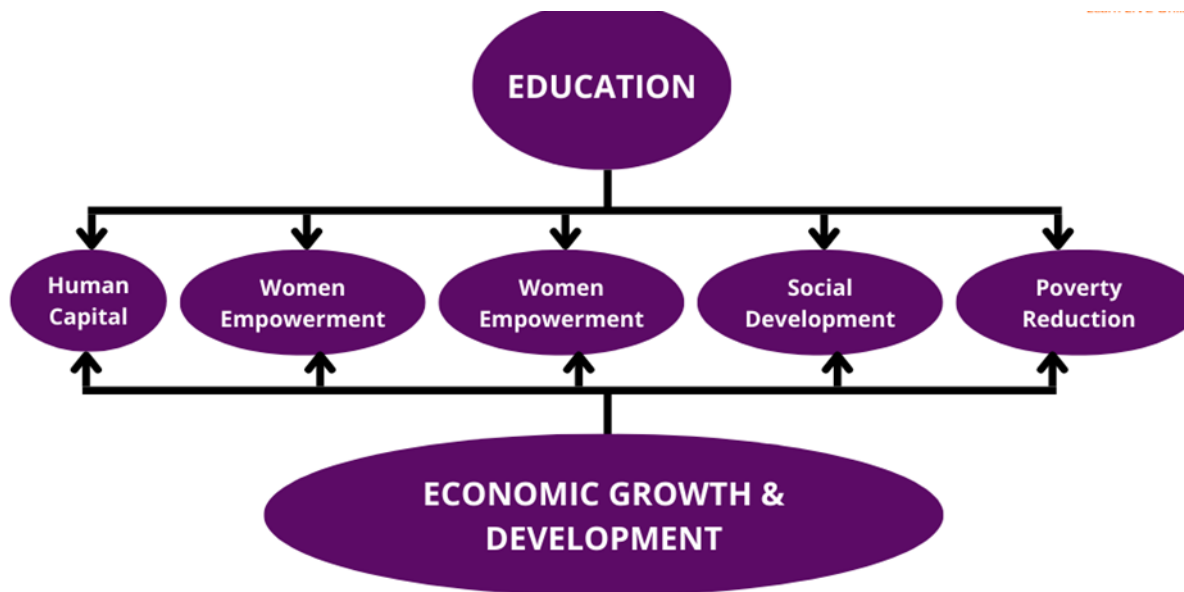


Figure 1: Education and Economic Growth

India is still at a fundamental crossroads in its process of development, despite the fact that it is home to more than 1.3 billion people and a significant youth population. It is now more important than ever to equip people with the capabilities and skills that are necessary for them to thrive in the modern economy. This is because the labour force is growing and economic policies are becoming more aggressive. On the other hand, the traditional educational system, which is characterised by the retention of students through repetition and the administration of tests by the state, frequently fails to adequately prepare students for the ever-changing and evolving demands of the 21st-century workplace. Teachers, politicians, and industry pioneers are gradually turning towards modern education practices as a way to connect the abilities partition and unlock the maximum capacity of India's people resources. This is because they are aware of the gap that exists between the two.

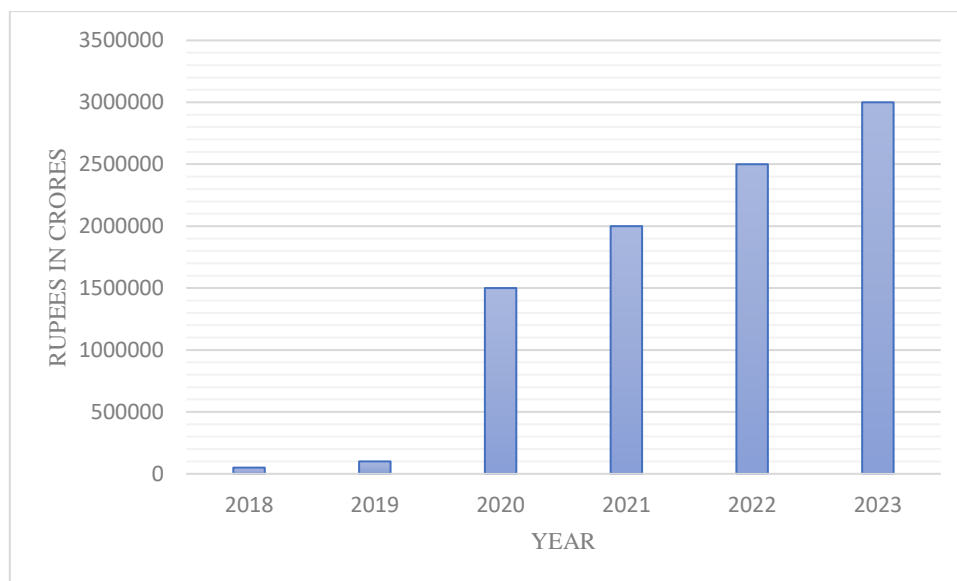


Figure 2: The Total Amount That the Education Department Has Spent on Education and Training.

One of the most important pillars of contemporary education is the transition away from passive ways of learning and towards dynamic, experiential approaches that foster the development of abilities in areas such as critical thinking, inventive thinking, and analytical reasoning. The concept of personalised learning, which involves adapting instruction to the specific requirements and preferences of each student, has gained significant traction as a means of enhancing pupils' dedication to their studies and their academic achievements. Additionally, project-based learning places an emphasis on collaborative, involved projects that encourage students to apply theoretical knowledge to real-world problems. This helps students acquire more practical skills and deepen their understanding of the material. Furthermore, competency-based education is centred on the dominance of specific talents and skills rather than the completion of a predetermined educational plan. This gives students the ability to grow at their own pace and demonstrate their authority via the accomplishment of substantial results. Whatever the case may be, the transformation of education cannot take place in isolation from the advancements in technology. In a world that is undoubtedly dominated by computers, technology has emerged as a powerful and empowering effect on educational innovation. It has opened up new avenues for learning, collaboration, and the enhancement of knowledge. An example of this would be artificial intelligence, sometimes known as man-made intelligence, which has the potential to personalise learning experiences, analyse vast amounts of data in order to identify areas of weakness in learning, and provide targeted interventions to assist students in their educational pursuits. Advanced technologies such as virtual reality (VR) and augmented reality (AR) provide students with immersive and user-friendly learning

environments. These technologies enable students to research complicated concepts in ways that go beyond the limitations of traditional classrooms. Flexible learning frameworks have the ability to modify calculations in order to tailor instruction to the specific requirements of individual students, hence simplifying the learning process and promoting inclusion. In addition, the integration of technology into educational settings has the potential to make access to high-quality education more accessible to more people, which is particularly important in a nation as geographically and socioeconomically diverse as India. Students are provided with possible opportunities to access educational content whenever and wherever they choose through the use of web-based learning platforms, mobile applications, and sophisticated resources. This helps to reduce barriers to learning and expand educational opportunities for underserved communities. As a result of India's ability to harness the power of technology, the country is able to address long-standing challenges such as educator deficits, framework requirements, and variations in educational quality, which will ultimately lead to the promotion of an education framework that is more equitable and complete.

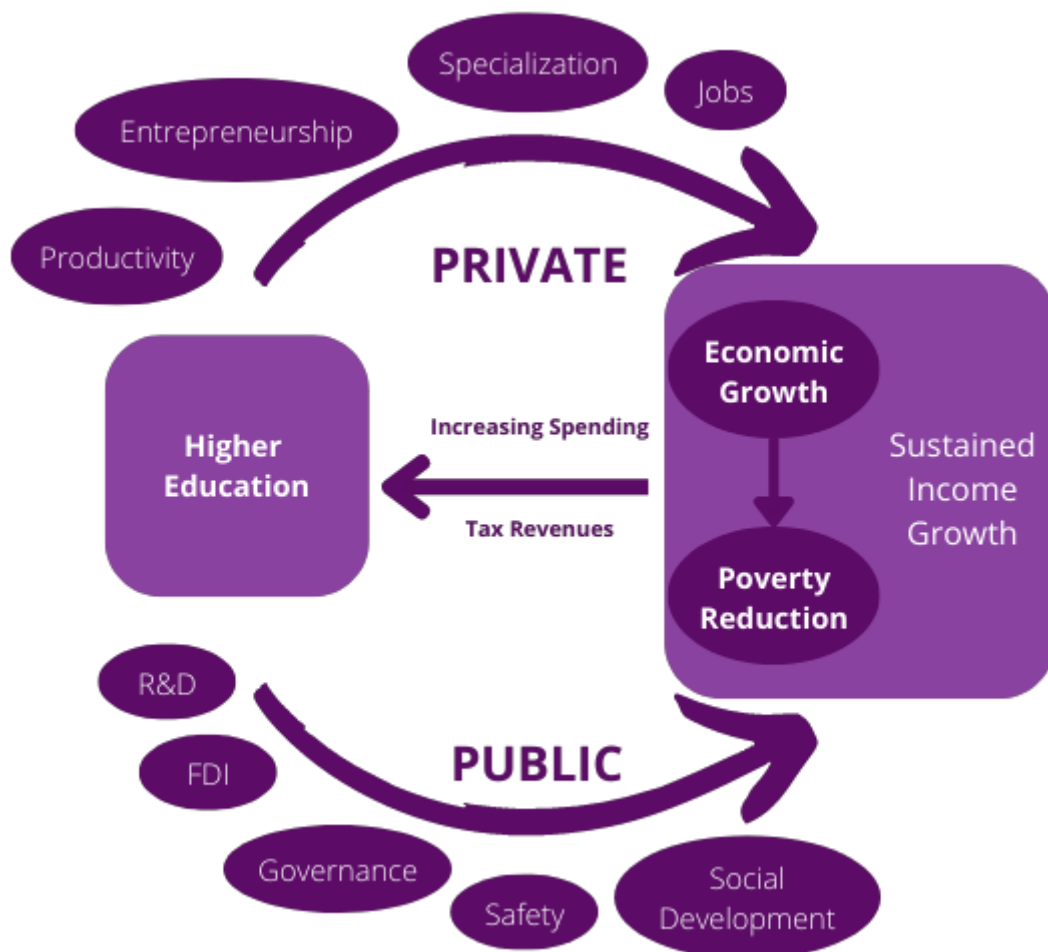


Figure 3: Employment Training Affects the Economy

There is a revolutionary opportunity for India to accelerate the direction of its economic growth that is presented by the combination of contemporary educational methods and technological advancements. India is able to support a skilled labour force that is equipped to prosper in the computerised age by adopting inventive teaching techniques that place an emphasis on decisive reasoning, imagination, and critical thinking, as well as by utilising technology to promote openness, inclusion, and the nature of education. In any event, coming to terms with this vision necessitates a concerted effort on the part of all partners, which includes policymakers, educators, pioneers in the industry, and suppliers of technology, to collaborate, improve, and invest resources in the construction of a future-oriented educational framework that empowers individuals, propels innovation, and sustains economic growth for a considerable amount of time into the future.

2. LITERATURE REVIEW

Subramanian et.al (2019). In his work, Subramanian takes a critical look at the dynamics of engineering education in India, with a special emphasis on the role that caste plays in determining the outcomes of education. Through painstaking study and analysis, Subramanian reveals the complex relationship that exists between discrimination based on caste and the meritocratic principles that are ingrained in the Indian educational system. The author focuses light on how caste hierarchies continue to infiltrate educational institutions by looking into historical legacies and contemporary practices. This has an impact on the access, opportunities, and outcomes for communities who are marginalised. The insights provided by Subramanian call into question the conventional concepts of meritocracy and highlight the necessity of structural reforms in order to overcome the systematic inequities that exist within the area of engineering education in India.

Bhutoria et.al (2022). The purpose of this systematic study is to investigate the junction of personalised education and artificial intelligence (AI) in three key global contexts: the United States of America, China, and India. Bhutoria examines the acceptance, implementation, and ramifications of AI-driven personalised learning systems by doing a synthesis of the available literature. This is done via the lens of a human-in-the-loop model. This article provides useful insights into the many educational environments and legislative frameworks that are affecting the integration of artificial intelligence technology. These insights are provided through an analysis of key trends, challenges, and innovations. The research conducted by Bhutoria highlights the transformative potential of personalised education initiatives while also drawing

attention to the ethical and equity problems that are inherent in educational interventions that are powered by artificial intelligence.

Mangal and Mangal (2019), which elucidates the essential principles, theories, and uses of educational technology in modern-day learning contexts. The writers guide through numerous aspects of educational technology, such as instructional design, digital learning resources, and upcoming trends such as blended learning and virtual reality, by drawing on a plethora of theoretical frameworks and the practical examples that they have gathered. The book provides educators and practitioners with the key information and skills necessary to effectively harness technology for the purpose of improving teaching and learning outcomes. This is accomplished through an approach that is rich in pedagogical content. The work that Mangal and Mangal have done functions as an invaluable resource for educators, instructional designers, and policymakers who are interested in utilising technology for the purpose of fostering educational innovation and transformation.

Szymkowiak et.al (2021) study the complex interaction that exists between information technology (IT) and Generation Z (Gen Z) in the context of education. By conducting empirical research and qualitative analysis, the authors investigate the ways in which individuals belonging to Generation Z navigate the digital landscape and interact with learning experiences that are mediated by technology. The study provides useful insights into the changing dynamics of education in the digital age by analysing the roles that teachers play, the internet, and the various technology platforms. The findings of Szymkowiak and colleagues show the revolutionary potential of technology in terms of catering to the tastes and wants of Gen Z learners in terms of learning. Additionally, these findings highlight the necessity of encouraging digital literacy and responsible use of technology in educational settings.

Aithal et.al (2019) takes a critical look at the proposed reforms that are detailed in the Indian National Education Policy (NEP) of 2019, with a particular emphasis on higher education. The authors provide unique insights into the potential ramifications of the National Education Policy (NEP) on the higher education scene in India by conducting a comprehensive examination of policy objectives, tactics, and implementation issues. Through the identification of important areas of alignment and divergence between policy ambitions and ground realities, the study brings to light the inherent complications that are present in the process of converting policy ideals into reforms that can be implemented. The research conducted by Aithal and

Aithal makes a contribution to the ongoing discussions that are taking place in the Indian higher education sector around educational governance, equity, and quality assurance practices.

3. RESEARCH METHOD

3.1.Method of Collecting Data

For the purpose of this investigation, the following parameters were taken into consideration: gross enrolment proportion (essential), gross enrolment proportion (auxiliary), gross enrolment proportion (tertiary), and gross domestic product for India. Each year from 2018 to 2023 is included in the time frame that is being used as an example. Each and every piece of information was obtained from World Bank and World Advancement Markers. In order to determine the degree of causation between the components, Johansen's Cointegration technique and the Vector Error Correction Model (VECM) have applied their respective methodologies.

3.2.Objective of the study

The current research endeavours to investigate the causal relationship that exists between the implementation of modern educational methods, the use of technology, and the expansion of the economy in India. This study aims to discover the processes via which education contributes to economic growth in the modern environment by conducting an analysis of how improvements in education methodology and the utilisation of technology influence the economic development of India. The purpose of this study is to provide insights into the potential routes and policy implications for using modern education practices and technology to support sustainable economic growth in India. These insights will be provided through empirical analysis and theoretical frameworks.

4. RESULTS AND DISCUSSION

- **Unit root tests**

The current evaluation attempted to determine whether or not the selected time series information was stationary. For this purpose, an Expanded Dickey Fuller (ADF) test was conducted, and the results of this test are presented in Table 1.

Table 1: Augmented Dickey-Fuller Test Statistics for Economic Variables

Variable	Augmented Dickey-Fuller Test Statistics
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	Level
Gross Domestic Product	2.0847 (0.9998)
Gross Enrolment Ratio (Primary)	-0.3885 (0.8978)
Gross Enrolment Ratio (Secondary)	0.1776 (0.9658)
Gross Enrolment Ratio (Tertiary)	2.4943 (0.9999)

Expanded Dickey-Fuller (ADF) tests were directed by the review in order to investigate the stationarity of selected time series data that was associated with "Modern Education Techniques and Technology for Economic Growth in India." Gross domestic product (GDP) and gross enrollment proportions at the primary, secondary, and tertiary levels are among the parameters that are taken into consideration while conducting this analysis. The stationarity of each variable is demonstrated by the evidence provided by the ADF test findings and the associated likelihood values. Specifically, the Gross Domestic Product (GDP) exhibited a t-measurement of 2.0847, and its p-value was 0.9998, indicating that it is not stationary. Similar to the previous example, the Gross Enrollment Proportions at both the essential (-0.3885, 0.8978) and auxiliary (0.1776, 0.9658) levels exhibited non-stationarity. In spite of this, the Gross Enrollment Proportion at the tertiary level displayed a t-measurement of 2.4943 and a p-value of 0.9999, which indicates that the data is not stationary. These findings provide the foundation for further econometric investigations to study the relationship between education markers and economic growth in India. These investigations will make use of several philosophies, such as Johansen's Cointegration approach and the Vector Mistake Rectification Model (VECM).

- **Johansen's Cointegration Test**

During the course of the research project titled "Modern Education Techniques and Technology for Economic Growth in India," the Johansen's Cointegration test is utilised to investigate the long-term relationship that exists between the gross enrollment percentages at the primary, secondary, and tertiary levels and the Gross Domestic Product (GDP). A comparison is made between the elective hypothesis of the presence of anything similar to one cointegrating condition and the invalid conjecture, which demonstrates that there is no cointegration whatsoever. Due to the aftereffects of Johansen's follow measures, which are presented in Table

2, it is discovered that there is a single cointegrating vector between the components. Based on this conclusion, it is recommended that a more in-depth connection be established between the expansion of the economy and the proportions of gross enrollment throughout all three levels of schooling. The relevance of investing resources in education foundation and modern learning advancements to foster sustainable and comprehensive growth is highlighted by these results, which contain crucial repercussions for policymakers and partners who are attempting to use education as a catalyst for economic change in India.

Table 2: Results of Augmented Dickey-Fuller Test for Cointegration

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob. **
None*	0.726	60.784	47.856	0.002
At most 1	0.578	28.333	29.797	0.073
At most 2	0.196	6.711	15.494	0.611
At most 3	0.047	1.227	3.841	0.267

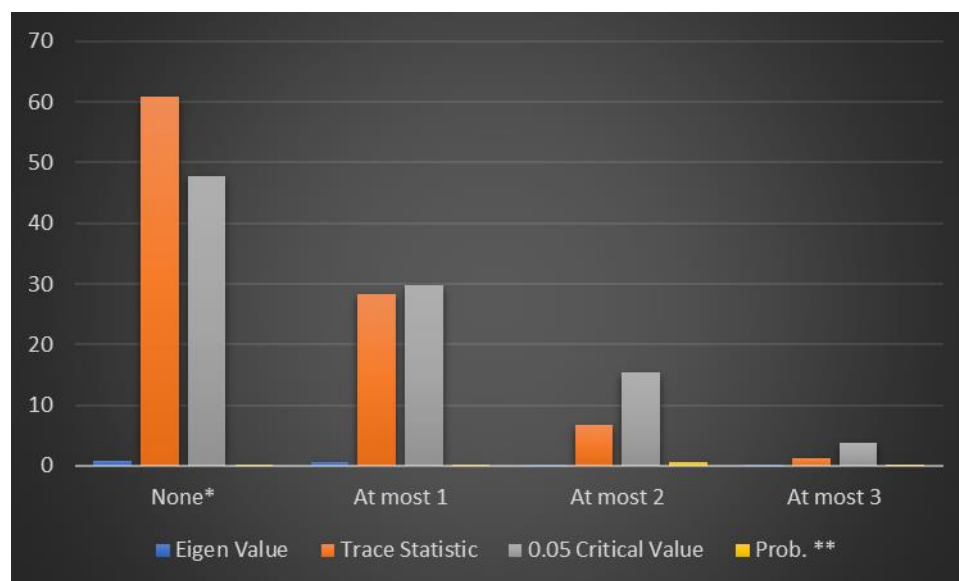


Figure 3: Augmented Dickey-Fuller Test

- **Testing for Causality**

With regard to the investigation of "Modern Education Techniques and Technology for Economic Growth in India," the review makes use of a powerful Vector Blunder Rectification Model (VECM) structure in order to investigate the factors that are responsible for the

correlation between gross enrollment proportions at the primary, secondary, and tertiary levels and GDP (Gross Domestic Product). As a result of this system's consideration of the testing of both short-run and long-run causality, it provides insight into the immediate and supported implications of changes in education policy on economic growth, as well as the other way around. The error correction term (ECT) in the VECM has the ability to capture the rate of movement towards long-run equilibrium. It does this by displaying the portion of long-term disequilibrium in gross domestic product that is adjusted in each brief time. It is recommended that the elements be viewed as exogenous to the framework, with the assumption that both the short-run causality coefficients and the ECTs are negligible. Evidence-based approach mediations and vital interests in education and technology framework to encourage a sustainable and comprehensive economic turn of events are illuminated by the evaluations from the VECM structure and Granger's Causality tests, which are presented in Table 3 and Table 4, respectively. These evaluations provide significant bits of knowledge into the complex transaction that exists between education pointers and economic growth elements in India.

Table 3: Causation Analysis between GDP and Gross Enrolment Ratios

Dependent Variable	Source of Causation	Short run Wald χ^2 Statistics	Long run Least Squares (Gauss-Newton/Marquardt steps)
		GER(P)	GER(S)
GDP	6.00	0.911	16.757

In this table, "Prob.=" denotes the probability values associated with the respective statistical tests.

The results obtained from the Vector Error Correction Model (VECM) system indicate critical and expected finishes paperwork for the Error Correction Term (ECT), which suggests the existence of a long-term connection between gross enrollment proportions at essential, optional, and tertiary levels and GDP (Gross Domestic Product). This is particularly relevant when considering the topic of "Modern Education Techniques and Technology for Economic Growth in India." In addition, the experimental findings reveal slacked coefficients that are demonstrably crucial between the essential gross enrolment proportion and the gross domestic product, as well as between the tertiary gross enrolment proportion and the gross domestic product, which infers a short-run dependence between these components. These findings shed light on the interrelationship that exists between educational indicators and economic growth factors in India. They also emphasise the potential for educational advancements to have a

significant impact on economic growth in both the short and long term. These kinds of experiences are extremely helpful in shedding light on evidence-based arrangement mediations that are aimed at containing the revolutionary force of schooling in order to propel India's economy in a manner that is both reasonable and comprehensive.

Table 4: Results of Granger Causality Test between GDP and Gross Enrolment Ratios

Null Hypothesis	Pairwise Granger Causality	F-Statistic
GER (P) does not Granger Cause GDP	3.17327	0.0473*
GDP does not Granger Cause GER (P)	0.18164	0.9441
GER (S) does not Granger Cause GDP	0.35464	0.8366
GDP does not Granger Cause GER (S)	1.13266	0.3809
GER (T) does not Granger Cause GDP	2.15712	0.1273
GDP does not Granger Cause GER (T)	13.6311	0.0001**

As part of the investigation titled "Modern Education Techniques and Technology for Economic Growth in India," Granger's Causality test is used to validate the findings obtained from the Vector Error Rectification Model (VECM). This test reveals significant causal elements that exist between gross enrolment proportions and total national output (Gross domestic product). In particular, the results of the experiment demonstrate that the gross enrolment proportion at the essential level Granger is the cause of gross domestic product, however the opposite causal link is not observed. Additionally, the Gross Domestic Product Granger is the cause of the Gross Enrollment Proportion at the Tertiary Level, which suggests that there is a directional connection between the enrollment in tertiary education and the expansion of the economy. However, the opposite circumstance is not taken into consideration, which suggests that enrollment in tertiary education does not directly have an effect on gross domestic product. In addition, the fact that the gross enrollment % at the auxiliary level is irrelevant to the overall model suggests that it is more likely to be seen as anything that is external to the framework. These insights provide key pieces of knowledge into the intricate linkages between education indicators and parts of economic growth in India. They also shed light on the methods that policymakers and partners can utilise to employ education as a driver of practical and comprehensive economic turn of events.

- **Discussion**

By utilising Johansen's Cointegration and Vector Error Remedy Model (VECM) structure, this research investigates the puzzling causal connection that exists between gross enrollment proportions (essential, auxiliary, and tertiary) and Total national production (Gross domestic product) within the context of the Indian setting. The review, which makes use of annual time series data from the World Development Marks of the World Bank and covers the period from 1986 to 2013, reveals a significant long-term connection between gross enrolment proportions and gross domestic product. This finding provides further evidence that education plays an essential role in the process of driving economic growth. The investigation of causality reveals that there is a short-run unidirectional causal connection between the gross enrolment proportion (essential) and the gross domestic product. This connection highlights the basic significance of essential education in establishing the ground for economic turn of events. Furthermore, the research demonstrates that there is a one-way short-run causal connection between gross domestic product and net enrolment proportion (tertiary), which suggests that economic expansion may be the driving force behind rising enrolment rates in tertiary education. In spite of this, the study suggests that although the proportions of students enrolled in tertiary education may not directly influence the growth of the gross domestic product in the short term due to factors such as delayed entry into the workforce and the mind channel, they do play a significant role in shaping the collection of human resources over the long term and growth in the economy. These discoveries accentuate the basic for policymakers to focus on interest in essential education as the foundation of economic turn of events, while likewise perceiving the meaning of kept financing in advanced education to cultivate human resources collection and support long haul economic growth directions. In addition, authorities are being urged to face the challenge of establishing employment opportunities that are capable of retaining excellently educated graduates and post-graduates, reducing the risk of mind channel, and increasing the economic benefits of interests in education.

5. CONCLUSION

It can be concluded that the incorporation of contemporary educational methods and technological advancements presents a transformative opportunity for the purpose of propelling economic progress in India. Through the utilisation of cutting-edge technologies and creative pedagogical approaches, the educational system has the ability to grow a skilled labour force that is capable of meeting the requirements of a global economy that is undergoing rapid

change. Access to high-quality education is made more accessible to more people through the use of personalised learning approaches, digital resources, and online platforms. This helps to promote diversity and empower individuals who come from a variety of backgrounds. Furthermore, current education strategies enable learners to adapt to the ever-changing needs of the labour market and make important contributions to India's knowledge-based economy. These techniques foster digital literacy, critical thinking, and problem-solving abilities, which are all essential for success in today's world. Nevertheless, in order to realise the full potential of these efforts, strategic investments in infrastructure, teacher training, and legislative frameworks are required. These investments must be made in order to guarantee equal access and maximise the impact across all sectors of society. With a united effort from policymakers, educators, and industry partners, India has the potential to harness the transformative power of education in order to generate sustainable economic growth, foster innovation, and construct a prosperous future for all of its residents.

References

1. Aithal, P. S., & Aithal, S. (2019). Analysis of higher education in Indian National education policy proposal 2019 and its implementation challenges. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 3(2), 1-35.
2. Bhutoria, A. (2022). Personalized education and artificial intelligence in the United States, China, and India: A systematic review using a human-in-the-loop model. *Computers and Education: Artificial Intelligence*, 3, 100068.
3. Chen, Y., Kumara, E. K., & Sivakumar, V. (2021). Investigation of finance industry on risk awareness model and digital economic growth. *Annals of Operations Research*, 1-22.
4. Das, K. (2019). The role and impact of ICT in improving the quality of education: An overview. *International Journal of Innovative Studies in Sociology and Humanities*, 4(6), 97-103.
5. Majeed, M. T., & Ayub, T. (2018). Information and communication technology (ICT) and economic growth nexus: A comparative global analysis. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 12(2), 443-476.
6. Majid, M. (2020). Renewable energy for sustainable development in India: current status, future prospects, challenges, employment, and investment opportunities. *Energy, Sustainability and Society*, 10(1), 1-36.

7. Mangal, S. K., & Mangal, U. (2019). Essentials of educational technology. PHI Learning Pvt. Ltd..
8. Pradhan, R. P., Arvin, M. B., Nair, M. S., Hall, J. H., & Bennett, S. E. (2021). Sustainable economic development in India: The dynamics between financial inclusion, ICT development, and economic growth. *Technological Forecasting and Social Change*, 169, 120758.
9. Raja, R., & Nagasubramani, P. C. (2018). Impact of modern technology in education. *Journal of Applied and Advanced Research*, 3(1), 33-35.
10. Subramanian, A. (2019). *The caste of merit: Engineering education in India*. Harvard University Press.
11. Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, 65, 101565.

12. P William, Narendar Chinthamu, Indradeep Kumar, Manish Gupta, Anurag Shrivastava, Arun Pratap Srivastava, Schema Design with Intelligent Multi Modelling Edge Computing Techniques for Industrial Applications, 2023 3rd International Conference on Pervasive Computing and Social Networking (ICPCSN).
13. P William, Narendar Chinthamu, Indradeep Kumar, Manish Gupta, Anurag Shrivastava, Arun Pratap Srivastava, Schema Design with Intelligent Multi Modelling Edge Computing Techniques for Industrial Applications, 2023 3rd International Conference on Pervasive Computing and Social Networking (ICPCSN).
14. Kuldeep Chouhan, Abhishek Singh, Anurag Shrivastava, Structural Support Vector Machine for Speech Recognition Classification with CNN Approach, 2021 9th International Conference on Cyber and IT Service Management (CITSM).
15. A Deepak, P William, Rajat Dubey, Shilpa Sachdeva, C Vinotha, Sunny Masand, Anurag Shrivastava, Impact of Artificial Intelligence and Cyber Security as Advanced Technologies on Bitcoin Industries, International Journal of Intelligent Systems and Applications in Engineering, Vol-12, Issue-3.
16. J. Prakash Arul Jose, Anurag Shrivastava, Prem Kumar Soni, N. Hemalatha, An Analysis of the Effects of Nanofluid-Based Serpentine Tube Cooling Enhancement in Solar Photovoltaic Cells for Green Cities, Hindawi, Journal of Nanomaterials Volume 2023,
17. Pooja Bagane, Susheel George Joseph, Abhishek Singh, Anurag Shrivastava, B Prabha, Amit Shrivastava, Classification of Malware using Deep Learning Techniques, 2021 9th International Conference on Cyber and IT Service Management (CITSM)
18. Rakesh Kumar Godi, Mule Shrishail Basvant, A Deepak, Arun Pratap Srivastava, Manoj Kumar, Akhil Sankhyan, Anurag Shrivastava, Sentiment Analysis on Omicron Tweets Using Hybrid Classifiers with Multiple Feature Extraction Techniques and Transformer Based Models, International Journal of Intelligent Systems and Applications in Engineering, Vol-12, 15-S.
19. Ayan Banik, Jarabala Ranga, Anurag Shrivastava, Subash Ranjan Kabat, AVGA Marthanda, S Hemavathi, Novel Energy-Efficient Hybrid Green Energy Scheme for Future Sustainability, 2021 International Conference on Technological Advancements and Innovations (ICTAI)
20. Bikash Chandra Saha, Anurag Shrivastava, Sanjiv Kumar Jain, Prateek Nigam, S Hemavathi, On-Grid solar microgrid temperature monitoring and assessment in real time, Materials Today: Proceedings, Volume 62, Part 7, 2022.
21. Shamita Chakaborty, Yogini Dilip Borole, Archana S Nanoty, Anurag Shrivastava, Sanjiv Kumar Jain, Moti Lal Rinawa, Smart Remote Solar Panel Cleaning Robot with Wireless Communication, 2021 9th International Conference on Cyber and IT Service Management (CITSM)
22. Shrivastava, A., Chakkaravarthy, M., Shah, M.A..A Novel Approach Using Learning Algorithm for Parkinson's Disease Detection with Handwritten Sketches. In Cybernetics and Systems, 2022
23. Shrivastava, A., Chakkaravarthy, M., Shah, M.A., A new machine learning method for predicting systolic and diastolic blood pressure using clinical characteristics. In *Healthcare Analytics*, 2023, 4, 100219
24. Shrivastava, A., Chakkaravarthy, M., Shah, M.A.,Health Monitoring based Cognitive IoT using Fast Machine Learning Technique. In *International Journal of Intelligent Systems and Applications in Engineering*, 2023, 11(6s), pp. 720–729

25. Boina, R., Ganage, D., Chincholkar, Y.D., Chinthamu, N., Shrivastava, A., Enhancing Intelligence Diagnostic Accuracy Based on Machine Learning Disease Classification. In *International Journal of Intelligent Systems and Applications in Engineering*, 2023, 11(6s), pp. 765–774
26. Shrivastava, A., Pundir, S., Sharma, A., ...Kumar, R., Khan, A.K. Control of A Virtual System with Hand Gestures. In *Proceedings - 2023 3rd International Conference on Pervasive Computing and Social Networking, ICPCSN 2023*, 2023, pp. 1716–1721
27. Amodei, D., Olah, C., Steinhardt, J., Christiano, P., Schulman, J., & Mané, D. (2016). Concrete problems in AI safety. arXiv preprint arXiv:1606.06565.
28. Beam, A. L., & Kohane, I. S. (2018). Big data and machine learning in health care. *JAMA*, 319(13), 1317-1318.
29. Che, Z., Purushotham, S., Khemani, R., & Liu, Y. (2016). Interpretable deep models for ICU outcome prediction. *AMIA Joint Summits on Translational Science proceedings AMIA Summit on Translational Science*, 2016, 371.
30. ALMahadin, Ghayth, Yassine Aoudni, Mohammad Shabaz, Anurag Vijay Agrawal, Ghazaala Yasmin, Esraa Saleh Alomari, Hamza Mohammed Ridha Al-Khafaji, Debabrata Dansana, and Renato R. Maaliw. "VANET Network Traffic Anomaly Detection Using GRU-Based Deep Learning Model," *IEEE Transactions on Consumer Electronics* (2023).
31. Al-Khafaji, Hamza MR, Esraa S. Alomari, and Hasan S. Majdi. "Review of Analytics Tools on Traffic for IoT and Cloud Based Network Environment," In *2020 3rd International Conference on Engineering Technology and its Applications (IICETA)*, pp. 73-77. IEEE, 2020.
32. Al-Khafaji, Hamza Mohammed Ridha, Esraa Saleh Alomari, and Hasan Shakir Majdi. "Secured environment for cloud integrated fog and mist architecture," In *2019 IEEE International Conference on Electrical Engineering and Photonics (EExPolytech)*, pp. 112-116. IEEE, 2019.
33. Nuijaa, Riyadh Rahef, Selvakumar Manickam, Ali Hakem Alsaeedi, and Esraa Saleh Alomari. "Enhancing the Performance of Detect DRDoS DNS Attacks Based on the Machine Learning and Proactive Feature Selection (PFS) Model," *IAENG International Journal of Computer Science* 49, no. 2 (2022).
34. Alomari, Esraa Saleh. "Soft computing-based cluster head selection for secured energy aware routing in flying ad hoc networks (FANET)," *Indian J. Public Health Res. Dev* 9 (2018): 1993.
35. Al Ogaili, Riyadh Rahef Nuijaa, Esraa Saleh Alomari, Manar Bashar Mortatha Alkorani, Zaid Abdi Alkareem Alyasser, Mazin Abed Mohammed, Rajesh Kumar Dhanaraj, Selvakumar Manickam, Seifedine Kadry, Mohammed Anbar, and Shankar Karuppayah. "Malware cyberattacks detection using a novel feature selection method based on a modified whale optimization algorithm," *Wireless Networks* (2023): 1-17.
