

<https://doi.org/10.48047/AFJBS.6.14.2024.10847-10859>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

INVESTIGATING THE DYNAMICS OF DEMOGRAPHIC TRANSITION AND ITS IMPACT ON ECONOMIC GROWTH IN INDIA: AN IN-DEPTH ANALYSIS

1. Dr. Kiran A. Dongre, Dr. Priti Khodke, Ramesh Kumar, Arvind Gupta, Dr.
Tejashri Talla, Dr. Rashmi Paranjpye

1 Associate Professor, Department of Electrical Engineering, Prof Ram Meghe college of Engineering and management
Badnera, Amravati, Maharashtra, India. kirandongre2015@gmail.com

2 Associate Professor, Department of Information Technology, Prof Ram Meghe college of Engineering and management
Badnera, Amravati, Maharashtra, India. priti.khodke@gmail.com

3 Assistant Professor, Department of Economics, Sri Aurobindo College (Morning), Delhi University, Delhi, India.
thakur.udani083@gmail.com

4 Assistant Professor, Department of Commerce, Ramjas College, University of Delhi
Delhi, India. arvindgupta@ramjas.du.ac.in

5 Associate Professor, Department of PGDM, Dr. D. Y. Patil B School, Pune, Maharashtra, India. tejashritalla@gmail.com

6 Professor, Department of Management, Dr. D. Y. Patil B School, Pune, Maharashtra, India. rashmi.paranjpye@dpu.edu.in

Volume 6, Issue 14, Aug 2024

Received: 15 June 2024

Accepted: 25 July 2024

Published: 15 Aug 2024

[doi: 10.48047/AFJBS.6.14.2024.10847-10859](https://doi.org/10.48047/AFJBS.6.14.2024.10847-10859)

Abstract

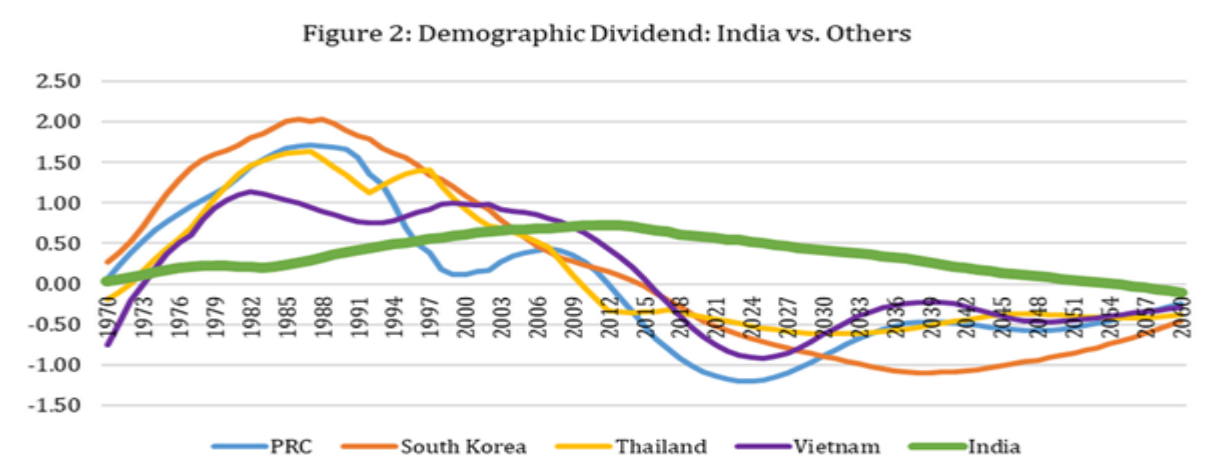
India's changing demographics, which are marked by a decline in the country's high birth and mortality rates, offer both a special opportunity and a problem for the country's economic development. The dynamics of this shift and how it affects India's economic future are examined in this article. Many consider the demographic dividend a brief acceleration of economic growth brought about by a greater number of people in working age—to be a key factor in the prosperity of the economy. Nevertheless, a number of variables, such as the labor market, healthcare, education, and social infrastructure, will determine how much India can profit from this demographic dividend. The study uses a multifaceted methodology to examine the relationship between population structure and economic outcomes by examining historical demographic data in conjunction with economic indicators. The study explores regional differences within India, acknowledging that the nation's demographic and economic changes are not consistent. It also looks at how government policies might help particular areas deal with the problems brought on by an aging population while maximizing the possibilities of a youthful population.

Keywords: Demographic Transition, Aging Population, Economic Development, Population Structure India

1. India's Demographic History

The demographic transition, a change from high to low rates of birth and death has a significant impact on the dynamics of the economy. India, which is going through this change, offers a special case study. The demographic history of India is first traced, with special attention paid

to significant turning points like the drop in mortality rates and the ensuing decline in fertility. The demographic history of India is traced in depth at the outset of the research, along with the significant turning points that have moulded the country's population structure over time [1]. The dramatic decrease in death rates is emphasized, especially in the case of infant mortality, which fell from almost 165 deaths per 1,000 live births in the 1960s to 27.7 deaths per 1,000 live births by 2023. This decline, fuelled by improvements in nutrition, sanitation, and healthcare, signalled the start of India's demographic shift and resulted in a significant population boom [2]. The analysis looks at how fertility rates gradually decreased as the population grew, from an average of 5.9 children per woman in the 1950s to 2.0 children per woman by 2023. Increased access to education, especially for women, increased use of contraception (the prevalence rate of contraception climbed from 13% in the 1970s to approximately 54% by 2023), and shifting social standards regarding the size of the family all had an impact on this reduction [3]. The birth rate stabilized, resulting in a more evenly distributed age distribution across the population, making this fertility decline a pivotal point in the demographic transition. India's median age by 2023 was 28.7 years, up from 22.5 years in 2000. This indicates a shift in the country's demographics toward a higher proportion of working-age citizens [4]. The analysis focuses on how these significant turning points have affected India's social and economic environment as a whole, laying the groundwork for the possible realization of a demographic dividend.



<https://india.unfpa.org/en/news/reaping-indias-demographic-dividend>

2. Demographic Transition Theory

Countries generally go through stages of population change, according to the demographic transition theory, from high birth and death rates termed as pre-transition Stage 1, to very low

or negative growth rates stated as Stages 2 and 3, where birth rates fall below replacement levels. Kirk noted that non-European countries typically have a faster transition than European countries, with a fall in mortality occurring prior to a decline in fertility rates [5]. Furthermore, non-European nations with less developed socioeconomic systems usually go through this shift. This notion is expanded upon by the idea of the Second Demographic Transition (SDT), which denotes a period of continuous fertility decrease to levels below replacement. A number of variables, including rising nonmarriage rates, personal autonomy, gender role equality, advancements in female education, and women's economic independence, have an impact on this reduction [6]. Though these countries might not suffer the same patterns as European countries, there is disagreement on the applicability of SDT to developing nations. Migration-related changes in population composition are addressed by the Third Demographic Transition (TDT). This shift highlights how migration affects the demographic composition, highlighting issues like aging populations and declining labor forces [7]. TDT extends beyond the parameters of the original demographic transition theory, even if it takes these new concerns into account.

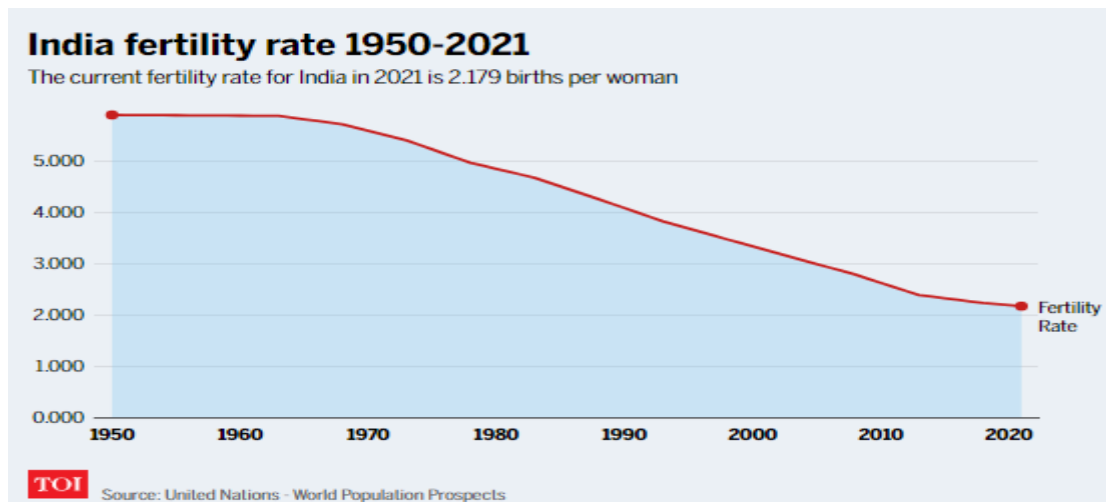
3. Major Drivers of Population Growth

After that, the paper explores the various aspects of India's demographic transformation, highlighting the interrelated roles of enhanced healthcare, education, socioeconomic growth, urbanization, and modifications to cultural and societal norms.

a. Fertility

The total fertility rate (TFR) for India throughout the previous 150 years. From 1871 through 1951, the TFR, which represents the average number of children a woman would have based on existing age-specific fertility rates, stayed largely constant at 6.3 children per woman. This stability was in line with Coale's survival strategy, which proposed that a TFR above six was required to guarantee modest population increase under high mortality conditions, notwithstanding variations in the quality of census data [8]. The TFR started to fall in the late 1960s, with a significant decrease of roughly 1.1 children per woman (19%) between 1966 and 1971 and 1976 and 1981 [9]. Changes in the family planning program, which introduced intrauterine devices in 1965 and grew more target-oriented, contributed to this drop. The subsequent decade (1976–1981 to 1986–1991) saw a 15% decrease in the rate of decline, which was impacted by the mandatory family planning measures implemented during the Emergency period (1975–1977). The TFR fell by an additional 19% between 1986–1991 and 1996–2001, from roughly 4 to 3.2 children per woman [10]. Between 1996 and 2001, there was an

approximate 14% decline in the TFR. The family planning strategy changed during this time from a target-oriented to a target-free system, which at first caused program performance to stagnate.



<https://x.com/timesofindia/status/1415711728352956419>

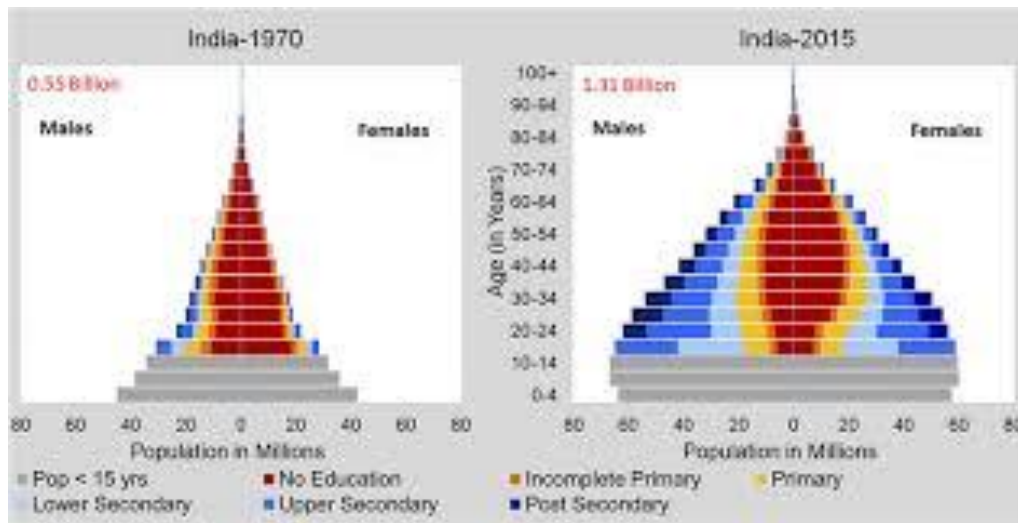
b. Healthcare Improvements:

The enormous improvements in healthcare that have led to a large decrease in mortality rates and an increase in life expectancy are first examined in the analysis. Government programmes like the National Rural Health Mission (2005) and the more recent Ayushman Bharat plan (2018), which aimed to offer comprehensive healthcare to rural populations and the economically vulnerable, have been a major driving force behind these achievements [11]. Death rates have been significantly lowered as a result of mass immunization efforts, advancements in maternity and paediatric healthcare, and initiatives to combat infectious diseases like tuberculosis and polio [12]. By 2023, the average life expectancy at birth will have risen from approximately 41 years in 1950 to nearly 70 years. The population is now healthier as a result of these healthcare developments, and this has impacted family planning choices and decreased fertility rates.

c. Education:

The impact of education, especially that of women, on India's demographic shift is further examined in this study. Literacy rates increased as educational possibilities increased, especially as a result of programs like the Right to Education Act (2009) and the Sarva Shiksha Abhiyan (2001). The rise in female literacy from 8.9% in 1951 to over 70% in 2023 has been a major contributor to the decline in fertility rates [13]. A cycle of socioeconomic progress is facilitated by educated women's propensity to marry later, have fewer children, and spend more on their kids' health and education [14]. The study emphasizes how education has helped

women become more powerful and has also encouraged a change in the social norms surrounding marriage, family size, and reproductive options.



Age and education pyramids for India (national level) for 1970 and 2015

<https://www.pnas.org/doi/full/10.1073/pnas.1722359115>

d. Socioeconomic Development:

The research also looks at the larger socioeconomic variables that have shaped India's demographic change. Prolonged economic expansion, especially after the 1990s economic liberalization, resulted in a rise in income levels, which subsequently influenced consumer habits and expectations [15]. Smaller families were preferred as a result of families prioritizing quality over quantity when it came to raising children as earnings increased. Demand for jobs, healthcare, and education has increased as a result of the middle class's growth and growing ambitions for higher living standards [16]. The report also emphasizes how government initiatives to combat poverty, such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), have impacted population trends and improved economic stability.

e. Urbanization:

The impact of urbanization on demographic trends is further examined in the study. India's population has been growing more urbanized than rural, and this has resulted in a major change in living standards and lifestyle preferences. Access to healthcare, education, and work possibilities has improved with urbanization, especially for women [17]. Smaller families are encouraged by the greater living expenses and space restrictions that come with moving to an urban region [18]. Furthermore, urban areas typically provide easier access to family planning resources and knowledge, which expedites the decrease in fertility rates.

f. Cultural and Societal Norms:

The research also looks at how globalization and economic progress have changed cultural and societal norms. Conventional wisdom on the size of a family, gender roles, and marriage is progressively altering as a result of growing individualism, shifting economic conditions, and greater exposure to international media [19]. Particularly in urban regions, there is a rising acceptance of delayed marriage, childbirth, and smaller families. According to the study, these cultural changes both contribute to and are a result of demographic change, which feeds back on itself and accelerates the shift in population [20].

Thus, it emphasizes that a complex interaction between advances in healthcare, the growth of education, socioeconomic development, urbanization, and changing cultural norms has led to India's demographic transformation. The population structure of India has been altered by these variables together, creating the possibility of economic growth if the demographic dividend is successfully captured by well-timed governmental measures.

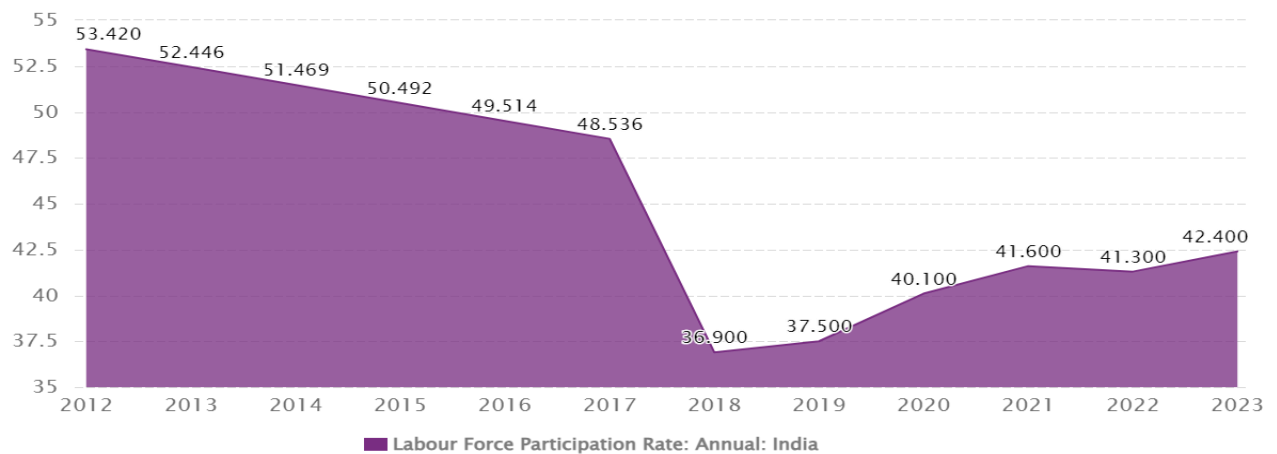
4. Impact of Demographic Transition on Economic Indicators

Wider economic ramifications may result from changes in consumer patterns. Changes in spending, for example, might impact inflation rates, change the trade balance, and effect total economic growth [21]. Businesses and policymakers can better navigate the changing economic landscape caused by demographic shifts by having a better understanding of these patterns. A number of economic indices, including as labor force participation, savings rates, and consumption trends, are significantly impacted by the demographic shift. Here's a thorough examination of the influences on each of these factors:

a. Labor Force Participation

The labor force participation rate usually undergoes notable fluctuations as nations move through several phases of demographic transition. An increasing labor force is initially the result of high birth rates and a young population. But the labor force may grow more slowly or even contract as the population ages and fertility rates fall. This change in the population may result in lower wages, more competition for jobs, and labor shortages in some industries [22]. Furthermore, the labor force's composition shifts as more women join the workforce and educational attainment grows, which frequently results in higher productivity and economic growth [23]. For instance, there is a high dependence ratio and a sizable proportion of dependents compared to the working-age population in the early phases of the demographic shift. With more people of working age in the population, the dependency ratio improves as the transition moves forward. This may result in a "demographic dividend," whereby a larger percentage of the populace engages in economic activity, hence benefiting the economy [24]. Later on, though, as the population ages, there might be more strain on healthcare and pension

systems, which might have an effect on economic sustainability and labor force participation rates.



<https://www.ceicdata.com/en/indicator/india/labour-force-participation-rate>

According to the above-mentioned data, India's Labor Force Participation Rate (LFPR) increased from 41.3% to 42.4% in December 2023. The LFPR has fluctuated historically, averaging 54.2% since December 1990, hitting a high of 57.2% in December 2000 and a low of 36.9% in December 2018 [25]. India has 1,395 million people living there as of March 2024, according to the most recent data from CEIC Data. Furthermore, in December 2020, the jobless rate in India rose to 7.1%.

b. Savings Rates



<https://economictimes.indiatimes.com/markets/stocks/news/inflation-and-interest-rates-why-they-matter-where-they-are-headed/articleshow/92225355.cms?from=mdr>

The changing demographics have an impact on savings rates in several ways. Due to families devoting resources to raising children, high fertility and a young population in the early phases of the transition sometimes result in lower savings rates. People tend to save more for

retirement as a result of declining birth rates and an aging population [26]. Increased capital accumulation and investment may result from this shift toward higher savings rates, which may propel economic expansion. Furthermore, changes in savings behavior are usually the outcome of aging populations. Although they may deplete their resources in retirement, older people tend to save more in the years preceding their retirement, which influences overall savings rates [27]. Furthermore, nations that benefit from demographic dividends and experience strong economic growth frequently have greater national savings rates as economic expansion leads to increased income and savings opportunities.

c. Consumption Patterns

During population shifts, consumption habits also experience substantial adjustments. Early on, a large youthful population and high birth rates drive up the consumption of products and services associated with family maintenance, education, and childrearing [28]. Consumption patterns change as the population ages and reproduction rates fall, favoring products and services targeted at senior citizens, such retirement planning, healthcare, and recreational opportunities. The population's shifting age distribution has an impact on market dynamics and aggregate demand [29]. For example, an aging population may lead to a rise in the need for healthcare and retirement-related goods, whereas a declining younger population may result in a decline in the need for childcare and schooling. These changes in consumer habits can have varying effects on industries, causing adjustments in certain economic sectors and affecting the expansion of the economy as a whole. In conclusion, the demographic shift has a significant impact on economic metrics like savings rates, consumption trends, and labor force participation [30]. Comprehending these effects aids decision-makers and companies in getting ready for and adjusting to the changing economic environment influenced by population shifts. Assessment of the Demographic Transition in India [31]. India's demographic shift has come a long way, yet there are still problems and regional differences to be addressed. Due to advancements in healthcare and education, the nation has transitioned from a time of high birth and death rates to one of decreasing fertility. To overcome these discrepancies, tailored interventions are necessary, as this shift is unequal among states and socioeconomic categories [32]. India's large population puts a lot of strain on social services like healthcare and education, which need to be improved constantly to keep up with demand. Better urban planning is required since urbanization has not only brought about problems like slum expansion and inadequate infrastructure but has also accelerated the drop in birth rates in cities [33]. Looking ahead, further efforts in healthcare, education, women's empowerment, and efficient population control will determine how India's demographic transformation plays out. In order to secure a

prosperous future, India needs to prioritize equitable and all-encompassing development, tackling the potential as well as the challenges brought about by its changing demographics.

5. Conclusion

India has failed to establish a strong civil registration system for births and deaths, a continuous difficulty that is revealed by the country's rich historical data from decadal censuses, which were started in 1881. Evidence-based policymaking has been hampered by this data deficit, especially when it comes to addressing health and demographic challenges. Acknowledging these shortcomings, the Indian government implemented the Sample Registration System almost twenty years after independence. The first National Family Health Survey was released in the early 1990s and provided insightful information on changes in the national and subnational populations. India is the second most populous country in the world, and its demographic trends have attracted a lot of attention from around the globe. India's population surpassed one billion people in 2001, growing at an average annual pace of almost 2% between 1961 and 2001 [34]. India added almost 18 million people a year between 2001 and 2011, even if growth slowed, reaching 1.21 billion by that year. Based on projections, the population of India is expected to reach a peak of 1.65 billion by 2061 and then decline to 1.44 billion by 2100. States like Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan have high rates of both fertility and death, which will propel substantial population growth; by 2061, these states are predicted to house 45% of the country's total population. Reducing birth rates and reaching population stabilization in these high-fertility states will require expanding access to contraception and enhancing public health services [35]. As replacement fertility approaches, India's demographic transition suggests that, although the nation may soon hit this milestone, population growth will continue due to momentum until about 2060. It is only when the crude mortality rate exceeds the crude birth rate that a drop in population growth is anticipated. When comparing India's human capital to that of China, which began investing extensively in universal education in the 1950s, India seems to be three or four decades behind. India's educational profile now is similar to China's from about 1980, and estimates for 2050 indicate that India might follow China's example of rapid educational progress [36]. This comparison suggests that India is expected to have significant human-capital driven improvement in the coming decades, despite institutional and cultural differences. As a result, this study provides insightful information about future population projections for India and the world. It illustrates how future forecasts are affected when varying degrees of population variability are taken into account. Although it is not possible to provide general suggestions, we propose adopting a pragmatic approach similar to Long's and adding user-relevant and empirically supported

factors. Forecasts should regularly take into account education in particular because of its proven effects on mortality and fertility. Future educational attainment is a crucial indicator of a nation's human capital and growth potential, and the data and techniques for including education are easily accessible.

6. Recommendations for Population Management and Future Research

India needs to take a few crucial steps in order to control population increase and guarantee sustainable development. By providing more options for contraception and advocating for reproductive health services, family planning programs can be strengthened. In order to reduce fertility rates and alleviate regional inequities, education should be prioritized, especially for women. For improved access to maternity and child health services, improve the infrastructure of the healthcare system with a focus on rural areas. Increase women's access to education and decision-making opportunities to advance gender equality. Use sustainable urban development techniques to mitigate the negative effects of urbanization on the environment. To support evidence-based policy and incorporate climate change considerations into population management strategies, improve research and data gathering. To successfully implement these policies, encourage cooperation between the government, non-governmental organizations, academic institutions, and international organizations.

Reference

1. Lutz, W., & Kebede, E. (2016). Education and health: Redrawing the Preston curve. *Population and Development Review*, 44(2), 343–361.
2. Nagpal, P., & Kumar, A. C. K. (2019). The effect of perceived high-performance work practices on employee engagement: An empirical study on IT firms in India. *Think India Journal*, 22(43), 272-278. ISSN: 0971-1260.
3. Patel, V., Chatterji, S., Chisholm, D., et al. (2018). Chronic diseases and injuries in India. *The Lancet*, 377(9763), 413-428.
4. Nagpal, P., Pawar, A., & S. H. M. (2024). Predicting employee attrition through HR analytics: A machine learning approach. In 2024 4th International Conference on Innovative Practices in Technology and Management (ICIPTM) (pp. 1-4). Noida, India. <https://doi.org/10.1109/ICIPTM59628.2024.10563285>
5. Ministry of Skill Development & Entrepreneurship, Government of India. (2015). National policy for skill development and entrepreneurship report. Retrieved from <http://pibphoto.nic.in/documents/rlink/2015/jul/p201571503.pdf>

6. Pooja Nagpal (2023). The Transformative Influence of Artificial Intelligence (AI) on Financial Organizations World Wide. 3rd International Conference on Information & Communication Technology in Business, Industry & Government (ICTBIG). Symbiosis University of Applied Science, Indore.
7. Nagpal, P., & RameshKumar, M. (2024). Navigating teachers' adoption of Artificial Intelligence in English foreign language: Uncovering inhibitors and drivers. SPAST Reports. <https://www.spast.org/ojspace>
8. Lutz, W., & Muttarak, R. (2017). Forecasting societies' adaptive capacities through a demographic metabolism model. *Nature Climate Change*, 7(3), 177–184. <https://doi.org/10.1038/nclimate3226>
9. Bargavi, N., Irfana, S., Ramana, A. V., Shankar, G., Nagpal, P., & Dhote, S. (Year). Circular economy towards sustainable businesses: Exploring factors shaping adoption and implementation barriers. *Educational Administration: Theory and Practice*, 30(3), 813-819.
10. Shankar, S. G., Kumari, V. P., Nagpal, P., & Dhote. (Year). Revolution agri-food systems: Leveraging digital innovations for equitable sustainability and resilience. *African Journal of Biological Sciences (South Africa)*, 6(8), 520–530.
11. Pooja Nagpal & Senthil Kumar. (2017). A study on drivers and outcomes of employee engagement – A review of literature approach. *Asia Pacific Journal of Research*.4 (1) 56- 62. ISSN -2320-5504. Online E ISSN – 2347-4793.
12. Madhusudhan R. Urs & Pooja Nagpal (2019). A study on Determinants and Outcomes of Job Crafting in an Organization; *Journal of Emerging Technologies and Innovative Research*, 7, (15). 145-151. ISSN: 2349-5162
13. Wittgenstein Centre for Demography and Global Human Capital (2015) Wittgenstein Centre Data Explorer. Version 1.2. Available at www.wittgensteincentre.org/dataexplorer/.
14. Nagpal, P., Pawar, A., & Sanjay, H. M. (2024). Sustainable entrepreneurship: Balancing push and pull factors for customer loyalty in organic product marketing. *African Journal of Biological Sciences*, 6(9). <https://doi.org/10.33472/AFJBS.6.9.2024.1134-1144>
15. Rajagopal, N. K., Anitha, L., Nagpal, P., & Jitendra, G. (2024). Green HR techniques: A sustainable strategy to boost employee engagement. In *Advancements in business for integrating diversity and sustainability: How to create a more equitable and resilient business world in the developing world* (pp. 104-107). Routledge.
16. Ministry of Finance, Government of India. (2019). *Economic survey 2018–19*.

17. BK Kumari, VM Sundari, C Praseeda, et.al (2023), Analytics-Based Performance Influential Factors Prediction for Sustainable Growth of Organization, Employee Psychological Engagement, Work Satisfaction, Training and Development. *Journal for ReAttach Therapy and Developmental Diversities* 6 (8s), 76-82.
18. Namita Rajput, Gourab Das, Kumar Shivam, et, al (2023). An inclusive systematic investigation of human resource management practice in harnessing human capital, *Materials Today: Proceedings*, 80 (3), 2023, 3686- 3690, ISSN 2214-7853,
19. P Nagpal, Arulmoli, et.al. (2024). Determinants Of Women Entrepreneur Motivational Factors Towards Marketing Organic Products, 6 (10), 687-699. doi: 10.33472/AFJBS.6.10.2024.687-699
20. NITI Aayog. *State Population Policies in India: A Comparative Study*. New Delhi: Government of India (2020).
21. Lakshmi, J.Divya, Pooja Nagpal, et al., (2021). Stress and Behavioral Analysis of Employees using Statistical & Correlation Methods. *International Journal of Aquatic Science* 12(01), 275-281. ISSN: 2008- 8019 2021
22. P. William, A. Shrivastava, H. Chauhan, P. Nagpal.(2022). "Framework for Intelligent Smart City Deployment via Artificial Intelligence Software Networking," 2022 3rd International Conference on Intelligent Engineering and Management (ICIEM), pp. 455-460, doi: 10.1109/ICIEM54221.2022.9853119.
23. P Nagpal, C. Vinotha, et.al. (2024). Machine Learning and Ai in Marketing–Connecting Computing Power to Human Insights. *International Journal of Intelligent Systems and Applications in Engineering*, 12(21s), 548–561. <https://ijisae.org/index.php/IJISAE/article/view/5451>
24. G. Gokulkumari, M. Ravichand, P. Nagpal and R. Vij. (2023). "Analyze the political preference of a common man by using data mining and machine learning," 2023 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India. doi: 10.1109/ICCCI56745.2023.10128472.
25. Pooja Nagpal (2022) Online Business Issues and Strategies to overcome it- Indian Perspective. *SJCC Management Research Review*. Vol 12 (1) pp 1-10. June 2022, Print ISSN 2249-4359. DOI: 10.35737/sjccmrr/v12/il/2022/151
26. Joe W, Kumar A, Rajpal S (2018) Swimming against the tide: economic growth and demographic dividend in India. *Asian Popul Stud.* <https://doi.org/10.1080/17441730.2018.1446379>

27. F. A. Syed, N. Bargavi, A. Sharma, A.et.al . (2022). "Recent Management Trends Involved with the Internet of Things in Indian Automotive Components Manufacturing Industries," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India. pp. 1035-1041, doi: 10.1109/IC3I56241.2022.10072565.
28. Pooja Nagpal (2023). The Impact of High Performance Work System and Engagement. Business Review" Vol17 (1) pp 57-64, ISSN 0973- 9076
29. Das Gupta, M. (2003). Explaining Asia's "missing women": A new look at the data. Population and Development Review, 31(3), 529-535.
30. Pooja Nagpal., Kiran Kumar., A.C. & Ravindra., H. V. (2020). Does Training and Development Impacts – Employee Engagement? Test Engineering and Management, the Mattingley Publishing Co., Inc. 83. 19407 – 19411. ISSN: 0193-4120.
31. Ministry of Health and Family Welfare. National Population Policy 2000. New Delhi: Government of India (2020).
32. Kumar, S., & Nagpal, P. (2018). A study on drivers and outcomes of employee engagement: A review of literature approach. Asia Pacific Journal of Research, 2320, 5504.
33. Ashraf QH, David NW, Joshua W (2013) The effect of fertility reduction on economic growth. Popul Dev Rev 39(1):97–130
34. Mitra S, Nagarajan R (2005) Making use of the window of demographic opportunity: an economic perspective. Econ Pol Wkly 40(50):5327–5332
35. Romero MS (2013) The role of demography on per capita output growth and saving rates. J Popul Econ 26(4):1347–1377
36. Thakur V (2012) The demographic dividend in India: gift or curse? A state level analysis on differing age structure and its implications for India's economic growth prospects. International development, London School of Economics and Political Science, working paper- No. 12–128