

## **THE ROLE OF INNOVATION IN THE DEVELOPMENT OF THE INDIA'S ECONOMY**

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### **INTRODUCTION**

Recent history suggests that innovation drives economic progress. Humans, societies, and nations have sought economic progress, as history shows. From wheel to internet, people are always developing new products, services, and industrial processes. Long-term economic development and a better quality of life depend on product and process innovation. Developed nations spend more on R&D than developing and impoverished nations. That's one of the key reasons developed nations are ahead of following countries. Any nation wants long-term economic development to lead. By boosting production, a nation may attain this. GDP is a country's annual production. This study acknowledges that GDP measures economic expansion despite considerable debate. Two methods raise GDP: through boosting production inputs. (2) Increase input productivity. New goods and industrial procedures boost productivity. Abramowitz measured American economic growth from 1870 to 1950. He then assessed capital and labor input growth over the same period. He then developed fair estimates about how much a gain in labor and capital should increase economic production. The measured expansion of inputs (capital and labor) between 1870 and 1950 only accounted for 15% of the economy's output growth. Thus, 85% of the residue was unexplained (Nathan Rosenberg, OECD, 2004).

This study examines India's economic development and innovation. Patents, technical advancement, and education investment may explain a country's creativity, but it's hard to assess. This study analyzes patent applications, education, and R&D investment to explain innovation. Because patents enable innovative development, which keeps an economy innovating, boosting productivity, and achieving long-term economic growth. Education and R&D expenditures boost workforce productivity. This research report recommended policies to aid India's long-term development.

### **LITERATURE REVIEW**

The literature study emphasizes the value and significance of innovation for a nation's economic development. The establishment and support of an environment that promotes innovation and the use of new technologies are essential for long-term economic growth, according to the Organization for Economic Cooperation and Development (OECD).<sup>8</sup> Economic productivity and growth are supported by innovative activities. Countries that foster innovation, develop novel technologies, and promote their use expand more quickly than those that do not. HARVEY, I., WILD, J., & ATUN, R. A. (2007).

One fundamental element of contemporary thought on economic development is that technical advancements endogenously support growth. However, unlike the use of private commodities, the use of invention is non-rival and arguably non-excludable, making it

inherently vulnerable to theft. Therefore, the ability of innovators to profit from their creative work determines the motivation to innovate and, therefore, the pace of economic development. Intellectual property (IP) rights are a crucial institution that governs the incentive for innovation. (2013) (Hu, A. G., & Png, I.).

The role of technical standards for economic growth is a relatively new topic that has not been extensively covered in economics literature, despite the widespread acceptance of the significance of technological activities as a key determinant of the economic performance of industrialized economies today. In contrast, since Nordhaus (1969), the impact of the patent system on economic development has drawn more attention. (2008.) Blind, K., and Jungmittag, A. J. M. Ortiz-Villajos (2009). performed a quantitative investigation on how technology and economic growth interacted in more than 20 nations from the start of the 19th century to the end of the 20th. He discovered a strong association between patents and per capita income and made it possible to see the beneficial impact of technical innovation on economic growth. J. M. Ortiz-Villajos (2009). In addition, he discovered regressions between several economic indicators and the time series of patent applications in Spain between 1826 and 1985, which likewise revealed a positive association between the two variables, particularly between patents and Gross Fixed Capital Formation.

Measurement of innovation and its impact on economic development, however, is challenging. However, neither the expansion of patent rights nor more R&D investment can be used to explain the nation's economic progress. In his study, Bronwyn H. Hall (2005) outlined various facts concerning shifts in U.S. companies' patenting practices during the previous 20 years, some more clearly and convincingly than others. First, the variables on the right side are obvious. Between 1983 and 1984, there was 15 signs of a structural change toward a greater growth rate in total patenting in the United States, which was mostly driven by American businesses with some input from Asian and European ones. Second, despite the fact that patenting by American inventors has increased across all technology classes, this trend is mostly attributable to businesses in the electrical and computer technology sectors. Although R&D has grown in this industry as well, the magnitude of the growth in patenting cannot be explained by this. The equilibrium investment in technology development and, consequently, the expected rate of technological progress, exhibit an inverted U-shape relationship with respect to the legal patent length, according to Chen, M. X., and Iyigun, M. (2011) research on the relationship between the optimal patent length and economic growth. A quality-ladder model with wealth heterogeneity and an elastic labor supply was created by Chu, A. C. (2010) to study the impact of patent policy on growth and inequality. According to the model, enhancing patent protection would lead to an increase in (a) economic growth by encouraging R&D expenditures and (b) wealth disparity by boosting asset returns. In addition to productivity growth, factor accumulation also affects output growth. According to certain growth accounting studies, even in industrialized nations, a substantial portion of the rise in production is accounted for by increases in physical capital.

#### **DATABASE AND METHODOLOGY**

In this essay, the impact of innovation on India's economic development is examined. This study covers a period of 15 years, from 1996 to 2011. The 1990s serve as the analysis's chronological context. Because this year marks the emergence of the so-called "New Economy" from an economic standpoint. The intense use of information technology and

technology in general is described by DeLong and Summers (2001) as the "essence of the New Economy".<sup>6</sup> The "New Economy" is also defined by the Canadian government (2002) as "an Economy that is producing or intensively using innovative or new technologies."<sup>6</sup> From this concept, it is clear how crucial innovation is to a nation's economic development.

Due to a lack of resources, it was impossible to locate the data prior to the selected time range. This research paper's main source is the World Bank Data Bank. Due to a paucity of data, certain factors from this research had to be eliminated, including capital accumulation, infrastructure investment, and spending on technical advancement. The GDP growth rate and per capita GDP growth rate are the two main variables used in this research to gauge India's development. The variables to quantify India's effort and the impact of that effort on economic development in India include R&D expenditure as a proportion of GDP, education spending as a percentage of GNI, and the number of patent applications submitted. This research examines the expansion of innovation in India using the number of patent applications submitted as a variable. All of the study's variables are shown in Tabel-1 along with an explanation of each one.

One model, using the GDP growth rate as the dependent variable, has been used to examine the relationship between economic growth and innovation. The other factors were included as independent variables in the study.

**GDP Growth:** The actual growth rate of India's gross domestic products from one year to the next is known as the GDP growth rate. This is a reliable indicator of an economy's growth over a certain time period.

**GDP Per Capita Growth:** The measure of a country's level of life is its GDP per capita growth. There should be a positive association between GDP growth rate and GDP per capita growth rate, however given India's fast population increase, it is crucial to take both into account when determining the economy's real pace of expansion.

**R&D Expenditure:** The amount of R&D spending expressed as a percentage of GDP serves as a rough indicator of how active R&D is in a given country. A higher score for this variable indicates a greater degree of worry about technological advancement. Given that it serves as "an engine" for an economy's development in both the economy and innovation, this indicator should be large and favorable.

**Patents:** The number of applications for exclusive rights for inventions, such as new methods of doing things or innovative technological solutions to problems, that are registered with the national patent office is represented by the number of patents. For a certain time, often 20 years, a patent grants the owner of the patent protection for the innovation.

**Education spending as a percentage of GNI** Education spending as a percentage of GNI serves as a stand-in for economic innovation. Spending more money on education raises the economic level of education, which encourages innovation.

**Unemployment:** In this model, unemployment is seen as a control variable, and it is presumptively negatively connected with both economic expansion and innovation. A state's foreign investors' interest may be inferred from the percentage of GDP that is made up of foreign direct investment. A high value denotes a sound economy that may provide a good environment for doing business. We suppose that the two dependent variables and this indicator are substantially and directly connected.

## **RESULTS**

The various liner models discussed above provide the overall goodness-of-fit metrics. If it is determined to be sufficient after satisfying assumptions, it may be utilized with confidence. Regression statistics are used to evaluate the models' suitability. The representations of multiple correlation and coefficients of determination, respectively, are multiple R and multiple R square. The GDP growth rate is the dependent variable, and the other independent variables utilized in the study are strongly positively correlated, according to the R (.99). A lower P value indicates that the model is more significant. However, it's unexpected to see negative correlations between R&D expenditure, education, FDI, and patent applications. In other words, as the Indian economy's economic growth rate increases, so will R&D expenditures, education spending, FDI, and the number of patent applications submitted in India. That seems improbable. The four factors mentioned above should be all positive. Because a lower P value indicates that the model is important, I am adopting it. But this article raises a lot of questions.

### CONCLUSION

Allocating money for research and development and education may contribute to India's long-term sustainable economic growth. Innovation is a fundamental component of a nation's economic success. India may become a leader rather than a follower nation through fostering innovation. In order to accomplish this aim, more money should be spent on R&D and education, which would boost India's production in the long run. The outcome of this study paper model, however, is unexpected. India's development is not fueled by innovation, as is the case for many industrialized nations, according to the result. According to the findings, as India's economy develops, R&D expenditures, educational expenditures, foreign direct investment, and the number of patent applications submitted in India would all decline. This begs the issue of whether this economic development will be long-term or simply a passing fad. Are we deploying our resources effectively, the policy maker wonders in light of this negative correlation? Future study in this area may now be initiated thanks to these questions. Even though this research has shown the importance of innovation for India's economic development, it has several drawbacks. The data's lack of availability was the main restriction. There are other more factors that may have been included for the research, but the lack of data precluded it.

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