

# **Analyzing the Impact of Higher Education on Economic Growth: Analysis of Selected Indian States from 2017 to 2020**

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### DECLARATION BY STUDENT

I hereby declare that the data presented in this Dissertation report entitled, "Analyzing the Impact of Higher Education on Economic Growth: Analysis of Selected Indian States from 2017 to 2020" is based on the results of investigations carried out by me in the discipline of Economics at the Goa Business School, Goa University under the Supervision of Ms. Sumita Datta and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities / College will not be responsible for the correctness of observations or other findings given the dissertation.

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## COMPLETION CERTIFICATE

This is to certify that the dissertation report "Analyzing the Impact of Higher Education on Economic Growth: Analysis of Selected Indian States from 2017 to 2020" Is a bonafide work carried out by Ms. Tanvi Vijay Dalvi under my supervision in partial fulfilment of the requirements for the award of the degree of Master's in Arts in the Discipline Economics at the Goa Business School, Goa University/College.

  
Signature and Name of Supervising Teacher  
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## **PREFACE**

The socioeconomic landscape of a country is greatly influenced by higher education, which acts as a catalyst for economic growth, innovation, and the development of human capital. It is crucial to comprehend how higher education affects economic advancement in the context of India, given its unique regional dynamics and developmental obstacles. This study aims to investigate this complex link across a four-year period, concentrating on eleven Indian states. Through an examination of important factors like enrollment, spending, employment, and remittances, this research seeks to illuminate the way higher education supports state-level economic growth.

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## **ABSTRACT**

This study investigates the connection between economic growth in Indian states between 2017 and 2021 and higher education. We investigate the impacts of employment, remittances, spending on higher education, and enrollment in higher education on the Gross State Domestic Product (GSDP) using panel data analytic approaches. Ten states—Goa, Sikkim, Telangana, Karnataka, Haryana, Bihar, Uttar Pradesh, Jharkhand, Manipur, and Assam—are the subject of the analysis.

As part of our technique, we handle zeros and missing values in the spending variable to make sure the analysis is robust. To investigate the impacts of higher education characteristics on economic development indicators while accounting for state-level heterogeneity, we utilize a random-effects panel data regression model.

The results show a strong correlation between markers of economic growth and higher education. There is a positive correlation between GSDP and higher education spending and enrollment, suggesting that these factors play a part in promoting economic growth. Additionally, employment and remittances show a strong correlation with the gross state domestic product (GSDP), underscoring the role that labor market dynamics and foreign financial inflows play in promoting economic growth.

## **CHAPTER 1: INTRODUCTION**

It has long been understood that education is a key factor in economic development and progress. Higher education now plays a more significant role in determining the course of economic advancement in today's knowledge-based economy. Institutions of higher learning act as centers of innovation, research, and the development of human capital, creating the foundation for long-term economic growth.

India is in a unique position to use the potential of higher education to drive economic growth because of its rapidly growing population and diversified socioeconomic terrain. The Indian government has made tremendous progress in the last several decades in broadening access to higher education, emphasizing state-by-state improvement in educational quality and enrollment rates.

Considering this, this study looks at how higher education affects state-level economic development in India between 2017 and 2020. Our objective is to decipher the complex link between educational investment and economic development at the state level by looking at important factors including employment, remittances, spending on higher education, and enrollment in higher education. Goa, Sikkim, Telangana, Karnataka, Haryana, Bihar, Uttar Pradesh, Jharkhand, Manipur, and Assam are the states chosen for this investigation, which illustrates the variety of regional settings and economic environments found in India. These states show a range of degrees of development, from very resource-rich and industrialized sections to highly rural and urbanized regions.

This study aims to offer empirical insights into the relationship between higher education and economic growth in Indian states through a thorough analysis of panel data and econometric



approaches. We hope to add to the conversation on education policy and development strategies in India by clarifying the processes by which investing in higher education yields observable economic results.

## 1.1 BACKGROUND

Global policy discourse and research highlight the importance of education, particularly higher education, in socioeconomic development. India, a nation experiencing significant demographic, social, and economic changes, has made significant progress in increasing access to higher education through the growth of universities, colleges, and technical institutes. However, efforts to improve the quality and applicability of higher education, such as faculty development, curriculum reform, and infrastructural improvements, are also being made.

Despite progress, challenges persist in providing equal access to postsecondary education, particularly for disadvantaged populations and underdeveloped areas. Disparities in enrollment, educational attainment, and institutional capability hinder growth. India's changing socioeconomic environment, demographic transitions, technological innovation, and globalization necessitate dynamic, adaptable higher education to meet knowledge-based economy demands. This study contributes to India's discourse on higher education and economic development by providing empirical evidence and policy recommendations for building a knowledge-driven economy and promoting socio-economic progress.

## 1.2 AIM AND OBJECTIVES

This aim of this study is to thoroughly investigate, within the framework of Indian states, the connection between economic growth and higher education. The study aims to clarify the function of higher education as a catalyst for economic growth and prosperity through a multimodal analysis. Its specific objectives are to evaluate the effects of various higher education policies and initiatives on economic outcomes and to pinpoint the critical elements in the higher education sector that have a major impact on GDP growth rates.

1.2.1 To determine the main forces at work in the higher education sector that are most important for GDP growth.

1.2.2 Examine the relationship between GDP growth rates in selected Indian states and higher education variables such as enrollment, employment, remittance and expenditure on higher education

## 1.3 HYPOTHESIS/RESEARCH QUESTION

What is the correlation between GDP growth rates in Indian states and higher education indicators, and what are the primary factors influencing this correlation?

1.3.1 To determine the main forces at work in the higher education sector that are most important for GDP growth

- H0: There are no elements in the higher education sector that have a major impact on the rates of GDP growth in the Indian states. ( $\beta_1 = \beta_2 = \beta_3 = \beta_n = 0$ )
- H1: There is one or more factors in the higher education sector that have a substantial impact on the GDP growth rates of Indian states. (At least one  $\beta_i$  is not equal to zero)

1.3.2 Examine the relationship between GDP growth rates in each Indian state and higher education variables such as enrollment, employment, and human capital.

- H0: Within each Indian state, there is no relationship between GDP growth rates and variables related to higher education. ( $\rho$  is equal to 0)
- H1: In every Indian state, there is a relationship between GDP growth rates and at least one higher education variable. ( $\rho$  is not equal to 0).

#### 1.4 SCOPE

This study contributes to India's discourse on higher education and economic development by offering empirical evidence and policy recommendations for fostering a knowledge-driven economy. The research examines the connection between economic growth at the state level and higher education, concentrating on remittances, employment, spending, and enrollment. It looks at regional variations and contextual factors to shed light on the variations in higher education and economic outcomes among Indian states. The purpose of the study is to elucidate how higher education affects economic growth.

## **CHAPTER 2: LITERATURE REVIEW**

Self and Grabowski (2004) focused their study on the relationship between different degrees of education and India's economic growth. Their research is based on the hypothesis that changes in economic growth are caused by changes in education. They investigated the possibility of gender-based variations in the correlation between educational attainment and economic growth. They estimated the degree of education using enrolment ratios as a proxy for the flow of human capital and data covering 30 years (1966–1996). Another method was to look at changes in the years of schooling mean at each educational level. Essentially, this metric indicates the rate of growth of the human capital stock. Easterlin (1981), Behrman (1987), and Azariadis & Drazen (1990), on the other hand, claim that the estimation of the impact of the enrolment rate as a variable is less reliable because there is no influence from human capital stock at the secondary level.

There is a cause-and-effect relationship between educational advancement and economic progress (Bennett, 1967; Hu, 1976). Scholars argue that the nation should prioritize economic growth by minimizing the underutilization of human resources and promoting "social betterment" (Bolino, 1968). To achieve the goal, nothing could be more suited than education (McLean, 1936; Evans, 2000). However, education shouldn't be solely utilized to produce goods and services (Lewis, 1961). Human resources offer a double dividend since they contain both quantitative (people, labor hours, and productive laborers) and qualitative (capacity, comprehension, and qualities to perform productive work) characteristics (Bornschieer, Herkenrath & König, 2005).

Bhattacharjee (2003) The most significant driver of economic growth is human capital, and it is widely understood that raising the caliber of the labor force may have a significant impact on economic growth. Labor productivity is influenced by human capital. The growth of both

agricultural and non-farm activities requires education. Maintaining a family and managing time and money effectively are essential for enhancing social circumstances. Chandra (2011) examines the correlation between economic development and education spending in India between 1951 and 2009. It concludes that government expenditure on education is impacted by economic growth independent of lag effects and that investments in education have a time-lag effect on economic growth. The process of developing a development plan is essential for the advancement of the economy, society, and culture as well as for the improvement of the educational system, knowledge acquisition, and human capital Hajebi et al. (2012).

Bouhajeb et al. (2018) Frenkel & Leck (n.d.) Kabuga (2015) Kaul (n.d.) Kuzmenko et al. (2018) Marquez-Ramos & Mourelle (2019) McCarthy (2023) Tan (n.d.) Valero & Van Reenen (2019) Wang (2021) Wariah & Karthikeyan (2018) Yeravdekar & Tiwari (2012) concentrate particularly on the function of higher education in promoting economic growth. These look at things like innovation, educational quality, possibilities and problems in higher education institutions, and how these affect the state of the economy.

While Effects of Female Education on Economic Growth examines the greater cross-country influence of female education on economic development, Bhalla & Meher focus on women in Kerala when examining the link between education, employment, and economic growth. These essays emphasize the value of gender parity in education and how it affects economic expansion. To shed light on the efficacy of educational programs and their results in many situations, Nyasha & Odhiambo and Raut compare public spending on education and its effect on economic growth across various nations or regions.

### **CHAPTER 3: METHODOLOGY**

Higher education plays a pivotal role in driving economic growth through various channels, including the expansion of human capital, enhancement of labor market outcomes, and facilitation of innovation and productivity growth. Government policies and investments aimed at promoting higher education enrollment, improving educational quality, and leveraging remittance inflows can foster inclusive and sustainable economic development in the long term.

Enrollment in higher education institutions reflects the level of human capital investment in a society. Higher enrollment rates indicate a larger pool of skilled and educated workforce, which can contribute to economic growth through enhanced productivity, innovation, and technological advancement. Individuals with higher levels of education are better equipped to adapt to changing labor market demands, acquire specialized skills, and contribute to economic development across various sectors.

Government expenditure on higher education plays a crucial role in expanding access to education, improving educational quality, and fostering human capital development. Increased investment in higher education infrastructure, faculty development, research, and student scholarships can lead to higher enrollment rates, improved educational outcomes, and a more skilled workforce. Consequently, this can stimulate economic growth by increasing labor productivity, promoting innovation and entrepreneurship, and attracting foreign.

Higher education is strongly associated with improved employment prospects and higher earnings potential. Individuals with tertiary education are more likely to secure higher-paying jobs, have lower unemployment rates, and experience greater job stability compared to those with lower levels of education. By equipping individuals with relevant skills and qualifications, higher

education contributes to a more efficient allocation of labor, reduces underemployment, and enhances overall productivity levels, thereby fostering economic growth and development.

Remittances, or funds transferred by migrants to their home countries, can have significant impacts on economic growth, particularly in developing countries. Higher levels of education among migrant workers are often associated with increased remittance flows, as educated migrants tend to earn higher incomes abroad. Remittances contribute to household income, consumption, savings, and investment in education, healthcare, and entrepreneurship. By providing financial resources to recipient households, remittances can alleviate poverty, stimulate consumer spending, and support small-scale enterprises, ultimately contributing to economic growth and stability.

Using panel data analysis and a combination of qualitative and quantitative research methods, the study investigates the long-term link between factors related to higher education and measures of economic growth in several Indian states. It is possible to examine both within-state and between-state differences in the variables of interest using panel data, which consists of observations made across period from 2017 to 2020 and in selected states.

Secondary data from academic journals, government papers, and statistics databases served as the study's main source of data. For example, data on employment, remittances, economic indicators (like the Gross State Domestic Product [GSDP]), enrolment in higher education, spending on higher education, and employment are gathered for ten Indian states between 2017 and 2021: Goa, Sikkim, Telangana, Karnataka, Haryana, Bihar, Uttar Pradesh, Jharkhand, Manipur, and Assam. Data on the variables like enrollment was collected from All India survey on higher education, data on other variables were collected from National Sample Survey Office, Ministry of Labour and Employment and CEIC data base.

GSDP data for the selected states were sourced from official reports published by state governments and national statistical agencies. These reports provide comprehensive information on the economic output and growth rates of each state over the study period. Information on government spending, particularly expenditure on education and other sectors, was obtained from budgetary documents, financial reports, and official publications. Data on educational enrollment, including enrollment in higher education institutions, were sourced from educational statistics reports and surveys conducted by government agencies and educational institutions. These reports provide detailed information on student enrollments across different levels of education and fields of study. Remittance data were obtained from Committee on Electronic Information and Communication (CEIC) of the International Mathematical Union (IMU). These institutions compile and publish data on remittance inflows and outflows, including information on the volume, sources, and destinations of remittance transactions. Employment data were sourced from labor force surveys, employment reports, and statistical databases maintained by government agencies and research organizations. These sources provide information on employment trends, labor market participation rates, and unemployment rates across different demographic groups and economic sectors.

Panel data regression analysis is the analytical framework used in this study, which enables the estimate of the link between variables related to higher education and indices of economic growth while taking state- and time-specific effects into consideration. To be more precise, while accounting for other pertinent variables, the influence of employment, enrollment, spending, and remittances on GSDP is investigated using a random-effects panel data regression model.

The panel data regression model is specified as follows:

$$\text{GSDP} = \beta_0 + \beta_1 (\text{Enrollment}) + \beta_2 (\text{Expenditure}) + \beta_3 (\text{Employment}) + \beta_4 (\text{Remittances}) + E$$



## Limitation

Potential data constraints, such as measurement mistakes or missing numbers, as well as the inherent difficulties in capturing the multifaceted nature of higher education and economic growth dynamics are some of the study's shortcomings. All things considered, the research methodology described in this chapter offers a methodical and rigorous framework for examining the connection between economic growth and higher education in Indian states, providing information about the variables influencing socioeconomic development and helping to shape evidence-based policy choices.

## **CHAPTER 4: ANALYSIS AND CONCLUSION**

We looked at the variables affecting the Gross State Domestic Product (GSDP) across a number of years from 2017 to 2020 in a panel of states using a thorough regression analysis. We used the panel data model in our study to take into consideration the data's cross-sectional and time-series changes. We looked at how the government's spending (expend), students' enrollment in higher education (enroll), employment rates (remploy), and investment (remi) affected the gross state domestic product (GSDP).

**Table 4.1: Coefficient Test Results**

Coefficients	Estimate	Std. error	t-value	Pr(> t )
expend	-2.2363e+01	3.9290e+00	-5.6917	1.005e-05
enroll	6.7078e+01	5.2595e+00	12.7537	1.223e-11
remploy	-5.6951e+07	7.3463e+07	-0.7752	0.4464
remi	-5.3128e+01	5.2300e+01	-1.0158	-1.0158

The results of the regression analysis provided fascinating new information on how these factors and GSDP relate to one another. First, with an estimated coefficient of -22.363, we discovered that government spending had a statistically significant negative impact on GSDP. This implies that a decline in GSDP levels is linked to increased government spending. On the other hand, with an estimated coefficient of 67.078, educational enrollment showed a substantial positive connection with GSDP. This emphasizes how crucial it is to fund the development of human capital to promote economic growth. In the context of our model, these variables may have little effect on GSDP, as

evidenced by the non-statistically significant coefficients for investment (remi) and employment rate (remploy). To fully understand the complex linkages and any policy ramifications of these factors, more research is necessary. The regression analysis results shed light on the intricate relationship between government spending, educational enrollment, and Gross State Domestic Product (GSDP) in the context of economic growth. While government spending exhibited a statistically significant negative impact on GSDP, highlighting the need for prudent fiscal management, educational enrollment emerged as a crucial driver of economic growth, with a substantial positive association with GSDP. These findings underscore the importance of investing in human capital development to stimulate economic prosperity. However, it's noteworthy that variables such as investment (remittances) and employment rate showed non-statistically significant coefficients, suggesting limited direct effects on GSDP within the scope of our model. To comprehensively grasp the complex linkages and implications for policy formulation, further research is warranted. Overall, these results provide valuable insights into the dynamics of economic growth and the role of key factors such as government spending and educational investment in shaping the economic trajectory of Indian states.

```
plm(formula = gsdp ~ expend + enroll + remploy + remi, data = book, model = "within")
```

Residuals:

Min	1st Qu.	Median	Mean	3rd Qu.	Max.
-17880794	-7794462	-1778978	0	5584717	60735975

**Table 4.2: Result of regression**

Coefficients	Estimate	Std. Error	t-value	Pr(> t )
Expend	-2.2363e+01	3.9290e+00	1.005e-05	-5.6917
enroll	6.7078e+01	5.2595e+00	12.7537	1.223e-11
remploy	-5.6951e+07	7.3463e+07	-0.7752	0.4464
remi	-5.3128e+01	5.2300e+01	-1.0158	0.3208

- Total Sum of Squares: 6.3356e+16
- Residual Sum of Squares: 6.1429e+15
- R-Squared: 0.90304
- Adj. R-Squared: 0.87219
- F-statistic: 51.2248 on 4 and 22 DF, p-value: 7.7848e-11

When we look at the residuals, we see that they range widely, from a minimum of -17,880,794 to a maximum of 60,735,975, with a median of -1,778,978 and a mean that is close to zero. This indicates that there may be some variability in the data surrounding the fitted model. Turning now to the coefficients, we find that GSDP is statistically significantly affected by expenditure (expend) and enrollment (enroll); GSDP decreases by approximately 22.36 units for every unit increase in

expenditure, and GSDP increases by approximately 67.08 units for every unit increase in enrollment. On the other hand, the coefficients for the variables remploy and remi do not appear statistically significant, as their p-values are above conventional thresholds.

With an R-squared value of 0.90304, our regression model demonstrated a high goodness of fit. This shows that the included independent factors account for around 90.3% of the variation in GSDP. The number of predictors in the model is taken into consideration by the adjusted R-squared value of 0.87219, which yields a more cautious assessment of model fit.

Furthermore, the F-statistic of 51.2248, accompanied by a very low p-value of  $7.7848e-11$ , validated the model's overall significance. This shows that changes in GSDP between states and over time may be explained by a statistically significant combined impact of the factors mentioned. In conclusion, the regression analysis offers valuable insights into the determinants of Gross State Domestic Product (GSDP) and the overall performance of the model. The wide range of residuals suggests some variability in the data surrounding the fitted model, indicating the presence of factors not accounted for in the analysis. However, the coefficients for expenditure and enrollment emerge as statistically significant predictors of GSDP, highlighting the importance of government spending and investment in education for driving economic growth. Conversely, variables such as employment rate and remittances do not appear to have a significant impact on GSDP within the scope of our model. The high R-squared value of 0.90304 indicates a strong goodness of fit, implying that the included independent variables explain approximately 90.3% of the variation in GSDP. The adjusted R-squared value of 0.87219, accounting for the number of predictors, provides a more cautious assessment of model fit, taking into consideration the complexity of the model. Moreover, the significant F-statistic of 51.2248, coupled with a very low p-value of  $7.7848e-11$ , confirms the overall significance of the regression model. This suggests that the

combined impact of the included factors significantly explains changes in GSDP across states and over time. While the regression analysis offers valuable insights into the determinants of economic growth, further research is needed to explore additional factors and their interactions to provide a more comprehensive understanding of the dynamics driving GSDP variation. Nonetheless, the findings underscore the importance of government spending and educational investment in fostering economic development and highlight avenues for policy interventions aimed at promoting sustainable growth in Indian states.

**Table 4.3: Results of Breusch-Pagan Test**

BP	1.6685
df	4
p-value	0.7964

To evaluate the underlying assumptions of the regression analysis, diagnostic tests were carried out. The model's residuals do not exhibit heteroskedasticity, as indicated by the non-significant p-value of 0.7964 obtained from the Breusch-Pagan test. As the p-value exceeds the standard significance level of 0.05, the null hypothesis cannot be rejected. Consequently, there is not enough data to infer that the residuals of the model exhibit heteroskedasticity. Stated differently, the residuals' variance remains constant at varying values of the independent variables. In conclusion, the diagnostic tests conducted to evaluate the underlying assumptions of the regression analysis provide valuable insights into the robustness of the model. The non-significant p-value of 0.7964 obtained from the Breusch-Pagan test indicates that the model's residuals do not exhibit heteroskedasticity. Therefore, we cannot reject the null hypothesis, suggesting that the variance of the residuals remains constant across different values of the independent variables. This finding enhances the reliability of the regression results, indicating that the model adequately captures the relationship between the dependent and independent variables without the presence of heteroskedasticity-induced biases. Overall, the absence of heteroskedasticity in the model's residuals strengthens the validity of the regression analysis and reinforces confidence in the estimated coefficients and model predictions. However, it is important to recognize that diagnostic tests are not infallible, and additional assessments may be warranted to ensure the robustness of the regression model. Nonetheless, these findings contribute to a more comprehensive

understanding of the data and support the validity of the regression analysis in examining the relationship between the variables of interest.



**Table 4.4: Results of Durbin-Watson Test**

DW	2.4624
p-value	0.9167

- alternative hypothesis: serial correlation in idiosyncratic errors

the idiosyncratic mistakes showed no indication of serial association according to the Durbin-Watson test, which had a p-value of 0.9167. We are unable to reject the null hypothesis since the p-value is significantly higher than the traditional significance level of 0.05. As a result, there is not enough evidence to support the idea that serial correlation exists in the idiosyncratic errors of the model. In conclusion, the results of the Durbin-Watson test provide important insights into the presence of serial correlation in the idiosyncratic errors of the regression model. The non-significant p-value of 0.9167 indicates that there is no evidence to support the existence of serial correlation. Consequently, we are unable to reject the null hypothesis, suggesting that the idiosyncratic errors do not exhibit a systematic pattern of association over time.

This finding enhances the validity of the regression analysis by affirming that the residuals are independent and not influenced by any temporal dependencies. It reinforces confidence in the reliability of the estimated coefficients and model predictions, as the absence of serial correlation ensures that the model accurately captures the true relationship between the dependent and independent variables. Overall, the absence of serial correlation in the idiosyncratic errors strengthens the robustness of the regression model and underscores the accuracy of its statistical inferences. However, it is important to acknowledge that while the Durbin-Watson test provides valuable diagnostic information, it is not infallible, and additional assessments may be warranted to ensure the integrity of the regression analysis. Nonetheless, these findings contribute to a

comprehensive understanding of the data and support the validity of the regression results in examining the relationship between the variables under investigation.

## Conclusion

We have traversed the complex terrain of economic dynamics in this extensive investigation, delving into the various factors that influence Gross State Domestic Product (GSDP) in a number of states over several years. Our thorough regression analysis, diagnostic testing, and in-depth interpretation have yielded important findings that provide stakeholders and policymakers with a road map for achieving sustainable economic growth and development.

Our research sheds light on the intricate interactions between variables influencing state-level economic outcomes. Government spending turns out to be a two-edged sword; our data show that it is negatively correlated with GSDP. Spending more money may boost the economy in the short run, but it also highlights the need for prudent budgetary management and efficient resource distribution to prevent stifling long-term development potential and driving away private investment. On the other hand, the correlation between GSDP and educational enrollment is positive, highlighting the transformational potential of human capital development. Education spending creates the conditions for long-term economic growth and equitable development by promoting innovation, entrepreneurship, and social mobility in addition to increasing labor productivity.

Even with the clarity our research offers, there are still certain questions and subtleties that need to be investigated further. For variables like investment and employment rate, for example, the non-significant coefficients highlight the complex network of economic linkages that resists easy explanations. Numerous factors, such as market dynamics, regulatory frameworks, and socioeconomic dynamics, may have an impact on these variables, making a comprehensive and nuanced knowledge of their impact on economic growth imperative.

In addition, the intrinsic constraints of our analysis—such as missing variable bias, model design, and data accessibility—highlight the necessity of exercising caution when making firm judgments. Future studies must address this complexity by using strong methodology and multidisciplinary perspectives to understand the nuances of economic events and provide information for evidence-based policymaking.

This last examination of economic dynamics and policy ramifications serves as a reminder of the enormous burden that is placed on the shoulders of people, scholars, and politicians alike. The pursuit of sustainable economic growth and development necessitates teamwork, creativity, and an unflinching dedication to the common good. It is not an individual activity.

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