

Industrial growth patterns across Global, Income groups and Major Countries

K. Deepika^{1*} and B. Mathavan²

^{1*2}Department of Economics, Faculty of Arts, Annamalai University, Annamalai Nagar, Chidambaram,

Address for Correspondence : K. Deepika

Ph.D. Research Scholar,
Department of Economics, Faculty of Arts, Annamalai Nagar,
Annamalai University, Chidambaram – 608002. Tamil Nadu, (India)
Email ID: deepukamal296@gmail.com

Contact details of authors: ¹K. Deepika – 9486399327

ORCID ID: <https://orcid.org/0009-0000-8420-0699>

²B. Mathavan – 9042218660

ORCID ID: <https://orcid.org/0000-0001-9908-8994>

Abstract

Industrial growth remains a fundamental driver of economic transformation, yet its patterns differ considerably across the world. This paper examines industrial growth across global regions, income groups, and major countries to identify trends of divergence and convergence. The emerging economies such as China and India have demonstrated accelerated industrial expansion; advanced economies like Japan, United States, and Germany have experienced stagnation or slower growth rates in recent decades. Similarly, middle- and low-income countries often exhibit accelerated industrial growth compared to high-income nations, highlighting a divergence in growth trajectories. These variations raise important questions about the nature, pace, and sustainability of industrial development across different contexts. So, the findings provide insights into the uneven nature of industrialization and emphasize the need for inclusive strategies that bridge growth gaps across income groups and countries.

Key words : Industrial growth, Developed countries, income groups, Global regions, Economic transformation and growth trajectories.

¹Ph.D. Research Scholar (Reg No: 1804050001) ²Professor and Head

The economic development begins when a country progresses through distinct stages towards economic growth and development, which has been achieved through industrialization⁵ particularly the industrial sector contributes significantly to the country's GDP, create employment opportunities and drive technological advancement which helps the country to improve the people's standard of living and compete in global markets. In many advanced economies, industrialization initially acted as the backbone of economic expansion, gradually paving the way for the rise of service-oriented sectors. However, the pace and patterns of industrial growth vary significantly across regions, among the income groups, and individual countries. This paper aims to elucidate these diverse patterns by examining the dynamics of industrial expansion across different income groups and analysing the top industrialized country-level experiences to identify commonalities and divergences in their developmental paths¹. Furthermore, while industrialization typically involves a rising share of manufacturing, recent trends suggest a more nuanced picture, with some economies experiencing significant growth in the service sector even at earlier stages of development⁶. This phenomenon challenges the traditional economic growth models, which often posit a linear progression from agricultural to industrial, and then to service-based economies, necessitating a re-evaluation of the drivers of structural change in the contemporary global economy.⁵ Moreover, the industrialization generates a large scale of employment opportunities, particularly in labour intensive industries, which is vital for countries with rapidly growing population³. It helps to absorb surplus labour from agriculture sector and promotes urbanization;

infrastructure development and improved access to essential services of technological advancements and skill development are stimulated through industrialization, contributing to human capital formation and innovation. This emphasis on manufacturing as a primary engine for economic advancement remains pertinent, especially for low-income nations, as it offers a pathway to leverage their developmental lag and achieve substantial growth and also for the developing country, the industrialization is essential for enabling them to achieve rapid economic catch-up².

Objectives :

To analysis the global scenario of industrial sector and comparative analysis among the selected individual and group of countries percentage share to GDP during 1980 to 2020.

Statement of the Problem :

Industrial growth plays a crucial role in shaping economic development, improving productivity, creating employment, and enhancing standard of living. However, the patterns of industrial growth are not uniform across the world. Significant disparities exist between global regions, income groups, and individual countries, reflecting differences in resource endowments, technological progress, institutional frameworks, and policy orientations. While most of the developed countries have shown relatively stagnant or decelerating trends in recent decades. Similarly, middle- and low-income countries often exhibit accelerated industrial growth compared to high-income nations, highlighting a divergence in growth trajectories. These variations raise important

questions about the nature, pace, and sustainability of industrial development across different contexts. Despite the importance of understanding these dynamics, there is limited comparative research that systematically examines industrial growth patterns across the world, grouped by income levels and major individual countries. Addressing this gap is essential to identify the underlying causes of divergence and convergence in industrial growth and to provide insights for policymakers aiming to foster balanced and inclusive development.

Scope and Significance of the Study :

This study examines industrial growth patterns across global regions, income groups, and major countries during 1980 to 2020, by analysing the decadal changes in GDP and the industrial sector's contribution to the GDP, the research identifies trajectories of divergence and convergence in industrial development, particularly among income economies, as well as key nations such as China, the United States, Japan, Germany, India, Russia, and Indonesia. The significance of this study lies in its ability to highlight the uneven nature of industrial growth and the implications of global crises, structural shifts, and policy contexts on industrial performance. As industrialization remains central to economic transformation, the findings provide valuable insights for policymakers, researchers, and development practitioners in formulating inclusive strategies that address growth disparities, foster balanced industrial development, and enable countries to leverage industrialization as a pathway to sustainable economic advancement.

Overview of Reviewed literature and Research Gap :

The review of literature provides an overview of the theoretical and empirical studies related to industrial growth across global, regional, and national contexts¹ delves into the various factors that have influenced industrial growth over time, delving into the roles of technology, investment, and government policies. The author provides the comparative analysis of industrial growth patterns in different countries, highlights the transition from primary industries to manufacturing and services as economies grow, providing a framework to understand how industrial structures evolve in relation to per capita income and offering valuable insights into the diverse paths that industrial development can take. So, by examining the historical trends and patterns, Chenery offers a nuanced perspective on the factors that have propelled industrial development in different regions. Furthermore, the comparative analysis of industrial growth across various countries illuminates the diverse strategies and approaches adopted to foster economic progress⁴ has overviewed the historical evolution of economic performance of global development trajectories, revealing that during the 20th century, fewer than 10 percent of economies transitioned from low- or middle-income to high - income status, underscoring a clear pattern of divergence. In the last decade of the early twenty first century witnessed a sharp reversal from a pattern of divergence to convergence, especially from a set of large middle - income countries. The latter phenomenon was also driven by increasing economic ties by the intellectual scale, increased knowledge generation and sharing among the developing countries⁷ examined the role of manufacturing in driving economic growth in developing countries from 1950 to

2005, the data was sourced from the world development indicators by using the panel data with information about the shares of manufacturing and services in GDP for a sample of 88 countries, the authors find a moderate positive impact of manufacturing on growth, particularly in developing countries with high levels of human capital, while also highlighting the declining effectiveness of manufacturing as a growth strategy since 1990. The paper underscores the importance of absorptive capacity, such as education, in leveraging manufacturing for growth and provides valuable insights into the shifting dynamics of industrialization in the global economy² analyses the industrialization in developing countries with two distinct periods: 1970–1990 and 1991–2014 by using the robust methodology to identify countries with sustained manufacturing value-added (MVA) growth, the study highlights through investment (both public and private), human capital development, institutional stability, competitive exchange rates, and geographic advantages. They emphasize the importance of strategic government interventions, including selective trade and capital policies, tailored to each country's specific needs. The author also underscores the role of demographic trends, inequality, and social cohesion in shaping industrialization outcomes. While the study provides valuable insights, its focus on East Asian success stories may limit generalizability to other regions, and the impact of emerging technologies on future industrialization pathways is only briefly addressed. Overall, this research offers critical guidance for policymakers, advocating for context-specific strategies to promote sustained industrial growth in developing countries. Therefore, this study focussed on the growth performance of industrial sector across the world, income

groups and individual countries during the period between 1980 to 2020.

Data And methodology :

The entire study is based on secondary data. The data used for this study have been extracted from the world development indicator, in that both the GDP and the industrial (including construction) and value added are at constant 2015 USD. Each above indicators are deflated separately into billion USD to get the percentage industrial share to GDP for the period from 1980 to 2020.

The average annual growth trend is analysed by fitting the semi-log trend model which gives the comparative decadal growth performance of selected individual and group of countries during the study period.

The semi- logarithmic trend model is expressed as

$$\mathbf{Ln(yt) = a + bt + \mu t}$$

Where, $\ln(yt)$ is dependent variable is a natural log at the time t , a and b are the parameters, and μ is the residual term of various times. The coefficient b represents the changes in the dependent variable at specific or different periods.

A country's Industrial growth performance cannot remain constant over the different periods, or the growth rate of the time series data has been changing with the varying of time. Hence the coefficient 'b' can be written as a linear function of the time *i.e.*,

$$\mathbf{b = \beta + \gamma t}$$

Substituting the semi-log trend model

and linear function equation, the log – linear trend equation becomes a log quadratic model, which is expressed as

$$\ln(y) = \alpha + \beta t + \gamma t^2 + \mu t$$

Where, $\ln(y)$ is dependent variable in natural log and α , β and γ are parameters. The coefficient β is the average annual trend growth, and if the coefficient γ is statistically significant, then the growth rate is either accelerating which means that the coefficient γ is positive.

If the sign of the parameter is negative, then the growth rate is decelerating. The log quadratic trend model is used as the average growth rate can be computed by

$$\text{Growth rate} = \epsilon | (\beta + 2\gamma t) / n | * 100$$

An insignificant value of γ indicates the growth rate is constant over the period, where in the log – linear model ' $\ln(yt) = \alpha + \beta t + \mu t$ ' has to be fitted for computing the constant growth rate. The growth rate **[Antilog (b) -1] *100**.

Percentage share of industrial sector to GDP :

The major countries decadal industrial share to GDP in billion USD and the decadal percentage share of industrial sector to GDP was portrayed in the table 1 and chart 1 in that the aggregate GDP of world was 26315.65 billion U.S dollars in the year 1980, which was increased to 48347.39 in 2000 and drastically increased to 82037.26 billion dollars in 2020 at 2015 constant price shows that nearly 311.74

times that the global aggregate GDP was increased during the study period between 1980 to 2020. In that most of the selected individual and group of countries industrial sector output was considered only from the year 2000 onwards, the world industrial output was 13100.65 billion dollars which shows that the industrial sector contribution to the world GDP was 27.10 percentage. Whereas, in the next decade of 2010, it was marginally declined to 26.60 percentage this was mainly due to the recession happened in the year 2008, in that many developed countries were affected because of the United States economics was collapsed but in the last decade of 2020 the percentage share to GDP was slightly increased to 26.95 percentage. Additionally, in the income groups, particularly in the high income there are eighty-one countries are considered across the world in that too the industrial output was taken into account from 2000 onwards which was about 9323.95 billion dollars the percentage share was 25.19 and in the next decade of 2010 it was marginally declined to 23.02 percentage, nearly 2.17 percentage per decade was declined. Subsequently, in the last decade of the study period, the percentage share of industrial sector was further decreased which was ended about 22.69 percentage per annum in 2020 due to the pandemic of covid-19. On the other hand, both the middle- and low-income countries are not affected by the recession, shows that the percentage share to GDP was increased as 33.63 and 22.97 percentage in 2010, shows that the middle-income countries GDP and industrial sector output was rapidly increased but the percentage share of industrial sector to GDP was marginally fluctuating over the study period.

Table-1 Major countries industrial share to GDP in Billions of USD at 2015 constant price.

Economics	Value added	year								
		1980	1990	2000	2010	2020				
World	GDP (constant 2015 billion US\$)	26315.65	35956.95	48347.39	64860.91	82037.26				
	Industry, value added (constant 2015 billion US\$)	..	..	13100.65	17250.45	22108.12		
	% Share of industrial sector	..	..	27.10	26.60	26.95		
High income	GDP (constant 2015 billion US\$)	20622.26	28059.02	37019.64	44004.42	50150.35				
	Industry, value added (constant 2015 billion US\$)	..	..	9323.95	10132.89	11377.45		
	% Share of industrial sector	..	..	25.19	23.03	22.69		
Middle income	GDP (constant 2015 billion US\$)	5417.75	7592.04	10892.79	20181.84	31071.05				
	Industry, value added (constant 2015 billion US\$)	1784.84	2498.84	3544.06	6786.23	10305.87				
	% Share of industrial sector	32.94	32.91	32.54	33.63	33.17				
Low income	GDP (constant 2015 billion US\$)	..	195.23	247.29	397.89	546.01				
	Industry, value added (constant 2015 billion US\$)	..	50.94	51.42	91.38	135.64				
	% Share of industrial sector	..	26.09	20.79	22.97	24.84				
South Asia	GDP (constant 2015 billion US\$)	384.26	654.29	1091.28	2004.71	3246.73				
	Industry, value added (constant 2015 billion US\$)	84.17	155.78	265.67	544.18	836.46				
	% Share of industrial sector	21.91	23.81	24.34	27.15	25.76				
China	GDP (constant 2015 billion US\$)	422.77	1027.38	2770.11	7554.10	14616.54				
	Industry, value added (constant 2015 billion US\$)	117.97	290.78	1030.14	3072.82	5765.23				
	% Share of industrial sector	27.90	28.30	37.19	40.68	39.44				
United States	GDP (constant 2015 billion US\$)	7080.77	9811.05	13754.30	16383.04	19377.38				
	Industry, value added (constant 2015 billion US\$)	..	..	2984.08	3088.65	3574.32		
	% Share of industrial sector	..	..	21.70	18.85	18.45		
Japan	GDP (constant 2015 billion US\$)	2258.39	3509.52	3986.76	4218.91	4363.13				
	Industry, value added (constant 2015 billion US\$)	..	..	1236.52	1227.48	1280.74		
	% Share of industrial sector	..	..	31.02	29.09	29.35		
Germany	GDP (constant 2015 billion US\$)	1860.61	2342.14	2835.48	3087.97	3463.69				
	Industry, value added (constant 2015 billion US\$)	..	..	776.11	826.29	916.18		
	% Share of industrial sector	..	..	27.37	26.76	26.45		

India	GDP (constant 2015 billion US\$)	270.94	465.24	800.53	1535.90	2508.59
	Industry, value added (constant 2015 billion US\$)	66.57	122.50	208.69	441.76	659.20
Russian Federation	% Share of industrial sector	24.57	26.33	26.07	28.76	26.28
	GDP (constant 2015 billion US\$)	..	1161.49	780.43	1250.66	1422.62
Indonesia	Industry, value added (constant 2015 billion US\$)	..	474.02	253.87	369.63	429.15
	% Share of industrial sector	..	40.81	32.53	29.55	30.17
Indonesia	GDP (constant 2015 billion US\$)	158.13	270.26	395.01	657.84	1027.66
	Industry, value added (constant 2015 billion US\$)	65.72	111.38	184.18	274.83	392.28
	% Share of industrial sector	41.56	41.21	46.63	41.78	38.17

Source: Extracted from the World Development Indicator.

The south Asian countries aggregate GDP was increased from 384.26 to 1091.28 billion dollars in 2000, after that it was tripled which was increased to 3246.73 billion dollars in 2020. Whereas, the industrial sector output was gradually increased from 84.17 billion USD to 836.46 billion USD during 1980 to 2020, their percentage share to GDP was also increased from 21.91 to 27.15 percentage but in the last decade, it was declined to 25.76 percentage due to the covid pandemic in 2020. The China percentage share to GDP was slightly declined to 39.44 percentage in 2020, China was the second largest GDP contributor among the selected individual countries which was next to the United States as seen in the table 1.1. The united states the industrial output was 2984.08 billion USD, the percentage share of industrial sector to GDP was 21.70 and in the year 2010 it was sharply declined to 18.85 percentage this was due to the US government great economic recession happened in the year 2008, which affected their entire economics especially developed countries for a couple of years and in the next decade of 2020 again it was slightly fallen to 18.45 percentage in the year 2020. Both the Japan and Germany percentage share of industrial sector to GDP was 31.02 and 27.37 in 2020 after that for the remaining study period was marginally declined.

The Indian aggregate GDP was marginally growing from 270.94 billion dollars to 800.53 billion dollars between 1980 to 2000. However, from 2010 onwards the aggregate GDP was drastically increased to 2508.59 billion dollars in 2020. The industrial sector contribution to GDP was also grown by ten times from 66.57 billion to 659.20 billion US dollars. Rather, the percentage share of

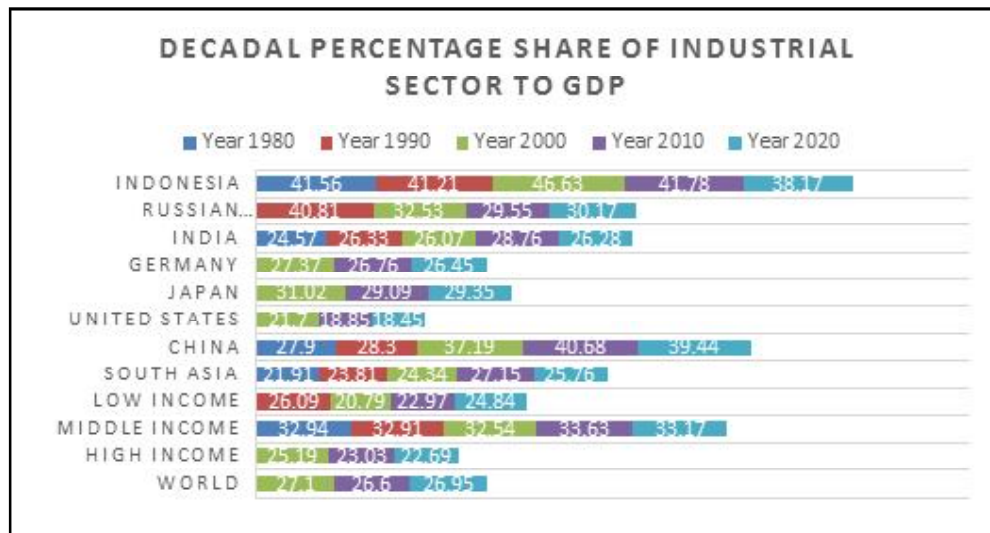


Chart 1. Decadal percentage share of industrial sector to GDP.

industrial sector was fluctuation in overall period, only in the year 2010 shows a highest share of 28.76 percentage and in 2020 it was sharply declined to 26.28.

Currently, Indian GDP ranks fourth-largest economy, surpassing Japan. This rising GDP because of technology, manufacturing and service sector growth is often seen as the story of India's remarkable economic progress. Whereas, the Indonesia percentages share to industrial sector in 2000 was the highest percentage which was about 46.63 percentage, but both the aggregate GDP and industrial sector contribution was low comparatively to other selected individual and group of countries, at the same time the Russian federation the percentage share to GDP was sharply declined to 32.53 percentage after that both the above countries percentage share was declined respectively.

Trends in GDP for the selected individual

and income groups countries during the period from 1980 to 2020 :

The annual average growth rate of GDP for the selected individual and group of countries across the world economy are portrayed in the table 1.2 shows that in the overall world the aggregate GDP was estimated by using log quadratic model in that the R-square was 0.998, the regression coefficient of 'γ' was 0.000 found statistically significant at 5 percentage level shows an accelerated growth rate of 3.04 percentage per annum. Additionally, the income group namely high, low and middle-income countries GDP also shown an accelerated growth rate in that there are eighty-one countries across the globe considered as high-income countries shows a least growth rate of 2.40 percentage per annum and the remaining income groups, of middle income shows an highest growth rate of 4.70 percentage per decade, following the low-income countries growth rate was 3.26

Table-2. Trends in GDP for the selected individual and group of countries during 1980 to 2020.

Sl. No.	Economics	R-Square	Coefficients			t-values			significant			Growth Rate	Nature of growth rate
			a	b	c	a	b	c	a	b	c		
1	world	0.998	10.119	0.033	0.000	1188.460	34.860	-2.411	0.000	0.000	0.021	3.04	A
2	high income	0.996	9.858	0.037	0.000	1056.988	36.165	-13.128	0.000	0.000	0.000	2.40	A
3	middle income	0.995	8.564	0.026	0.000	407.353	11.414	9.217	0.000	0.000	0.000	4.70	A
4	low-income	0.991	5.077	0.011	0.001	259.496	5.096	10.380	0.000	0.000	0.000	3.26	A
5	south Asia	0.999	5.910	0.048	0.000	483.303	35.804	6.066	0.000	0.000	0.000	5.60	A
6	China	0.998	5.893	0.105	0.000	258.744	41.822	-4.935	0.000	0.000	0.000	9.26	A
7	united states	0.994	8.784	0.041	0.000	713.424	30.226	-10.861	0.000	0.000	0.000	2.66	A
8	Japan	0.965	7.718	0.041	-0.001	407.191	19.495	-12.594	0.000	0.000	0.000	1.52	D
9	Germany	0.985	7.467	0.027	0.000	592.680	19.716	-7.889	0.000	0.000	0.000	1.67	A
10	Indian	0.998	5.545	0.050	0.000	374.113	30.583	6.009	0.000	0.000	0.000	5.93	A
11	Russian federation	0.648	7.127	-0.041	0.001	31.351	-2.127	3.215	0.000	0.042	0.003	0.94	A
12	Indonesia	0.988	5.044	0.049	0.000	162.711	14.282	-0.585	0.000	0.000	0.562*	4.78	C
		0.988	5.058	0.047		254.647	56.657		0.000	0.000			

Source: Extracted the data from the World Development Indicators. Significant at 5% level. A, C and D indicates the growth rates of Accelerated, Constant and Decelerated respectively.

percentage per annum. Apart, from the world economy and the income group countries, the south Asian countries namely Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka aggregate GDP growth rate were the third highest growth rate of 5.60 percentage per annum during the study period between 1980 to 2020, the estimated regression coefficient of ' γ ' was 0.000 found statistically significant, the R- square was 0.999.

Among, the selected individual countries the aggregate GDP of China shows a highest accelerated growth trend of 9.26 percentage per annum, the regression coefficient of ' γ ' was 0.000 are found significant. But the United States growth rate was also accelerated trend of 2.66 percentage per annum, but by comparing with the China economy the United States economy was declined nearly four time during the study period of 1980 to 2020, due to the economic recession in 2008 have affected its economy till 2010 which have impacted growth rate to be less. On the contrary, Japan GDP shows a decelerated growth rate of 1.52 percentage per annum. However, the Germany country's aggregate GDP was gradually increasing from 1860.61 billion USD to 3463.69-billion USD but shows a lowest accelerated growth trend of 1.67 percentage per annum, the R-square was 0.985. Conversely, the Indian GDP growth was the second largest growth rate of 5.93 which was next to the China, it was increased tremendously from 270.94 billion dollars to 2508.59 billion dollars USD within four decades. Currently, Indian GDP was now fourth place among the world economics that have recently surpassed the Japan GDP growth to be fifth place.

The Russian federation shows a least accelerated growth trend of 0.94 percentage per annum, the R-square was 0.648 and the coefficient of ' γ ' was 0.001 found significant, the p- value was 0.003. On the other hand, the Indonesian growth trend was first estimated by using log quadratic model in that it was found insignificant. So, the log linear model was used in that the estimated coefficient of ' β ' was 0.047 found significant, shows a stagnant growth rate of 4.78 percentages per annum respectively.

Trends in Industrial sector for the selected individual and group of countries :

The table-3 and chart 1.2 analyses the trends in the industrial sector for the selected individual and group of countries for the year between 1980 to 2020. The word economics industrial sector was first estimated by using log quadratic model found insignificant. So, the log linear model was used in that the regression coefficient of ' β ' was 0.029 found significant, shows a constant growth rate of 2.99 percentage per annum, the R- square was slightly decreased from 0.993 to 0.992. Additionally, the high-income countries also show a constant growth rate of 1.26 percentage per annum estimated by using log linear model in that the R-square was declined to 0.885, the estimated coefficient of ' β ' was 0.013 found significant at 5 percentage level. Whereas, the middle and low incomes countries industrial growth rate are accelerated trend with the growth rate of 4.84 and 2.64 percentage per annum, shows that the structural transformation from agriculture to industrial in recent year which have impacted to be accelerate trend.

Table-3. Industry sector in world economics during 1980 to 2020.

Sl. No.	Economics	R-Square	Coefficients			t-values			significant			Growth Rate	Nature of growth rate
			a	b	c	a	b	c	a	b	c		
1	World	0.993 0.992	8.757 8.847	0.036 0.029	0.000	155.369 564.161	8.599 54.612	-1.654	0.000 0.000	0.111*	2.99	C	
2	High income	0.891 0.885	8.720 8.856	0.022 0.013	0.000	66.195 302.154	2.411 12.993	-1.060	0.000 0.000	0.301*	1.26	C	
3	Middle income	0.992	7.424	0.027	0.001	285.581	9.395	7.801	0.000	0.000	4.84	A	
4	Low-income	0.922	4.027	-0.032	0.001	59.102	-4.564	8.919	0.000	0.000	2.64	A	
5	South Asia	0.997 0.997	4.361 4.341	0.058 0.061	0.000	215.214 329.067	26.259 111.727	1.262	0.000 0.000	0.215*	6.31	C	
6	China	0.997	4.455	0.133	-0.001	125.927	34.259	-7.370	0.000	0.000	10.53	D	
7	United states	0.800 0.794	7.587 7.721	0.021 0.012	0.000	44.077 203.856	1.743 9.205	-0.797	0.000 0.000	0.096* 0.434*	1.16	C	
8	Japan	0.306 0.219	7.230 7.042	-0.012 0.003	0.000	63.883 222.597	-1.375 2.651	1.728	0.000 0.000	0.182* 0.014	0.29	C	
9	Germany	0.857	6.754	-0.016	0.000	97.120	-2.882	4.643	0.000	0.000	0.43	A	
10	Indian	0.996 0.996	4.117 4.090	0.058 0.062	0.000	170.645 258.531	21.940 94.313	1.469	0.000 0.000	0.150* 0.000	6.39	C	
11	Russian federation	0.487	6.175	-0.052	0.001	20.544	-2.103	2.793	0.000	0.045	0.31	A	
12	Indonesia	0.986	4.075	0.064	0.000	123.805	17.842	-5.218	0.000	0.000	4.62	A	

Source: Extracted the data from World Development Indicators. Significant at 5% level. A, C and D indicates the growth rates of Accelerated, Constant and Decelerated respectively.

However, the south Asian countries show a stagnant growth rate of 6.13 percentage per annum, which was estimated by the log linear model, the regression coefficient of ' β ' was 0.012 found significant at 5 percentage level. On the other hand, the China's industrial sector was the highest decelerated growth trend of 10.53 percentage per annum which can be seen in the below chart:2. As, it shows that in the table 1.1, the industrial sector was increasing throughout the period, but the percentage share of industrial sector to GDP was declined to 39.44 percentage in the last decade which was affected due to the outbreak of covid pandemic in 2020. Conversely, the United States and Japan industrial sector growth rate was estimated by using log quadratic model, in that the regression coefficient of ' γ ' are same as 0.000 but both are found insignificant, Therefore, log linear model was used in that the coefficient of ' β ' are 0.012 and 0.003 are found significant, shows a stagnant growth trend of 1.16 and 0.29 percentage per annum, the R- square was declined to 0.794 and 0.219. Whereas, the

country of Germany shows an accelerated trend with the minimum growth rate of 0.43 percentage per annum, the estimated coefficient of ' γ ' was 0.000 found significant. Furthermore, the Russian federation industrial sector growth rate was also accelerated trend which was the second least growth rate of 0.31 percentage per annum, the estimated coefficient of ' γ ' was 0.001 are found significant, the R- square was 0.857. Whereas, the Indian country's industrial sector shows a constant growth rate of 6.39 percentage per annum was estimated by using log linear model, the regression coefficient of ' β ' was 0.062 are found significant, the R- square in both the model are same as 0.996. Whereas, the Indonesian country's industrial sector growth rate was accelerated trend, as we can see in the table 1.1 the industrial sector of Germany was raising only at marginal level as compared to other individual and group of countries with the increased growth rate of 4.62 percentage per annum, the R- square was 0.986, the estimated regression coefficient of ' γ ' was 0.000 are found significant.

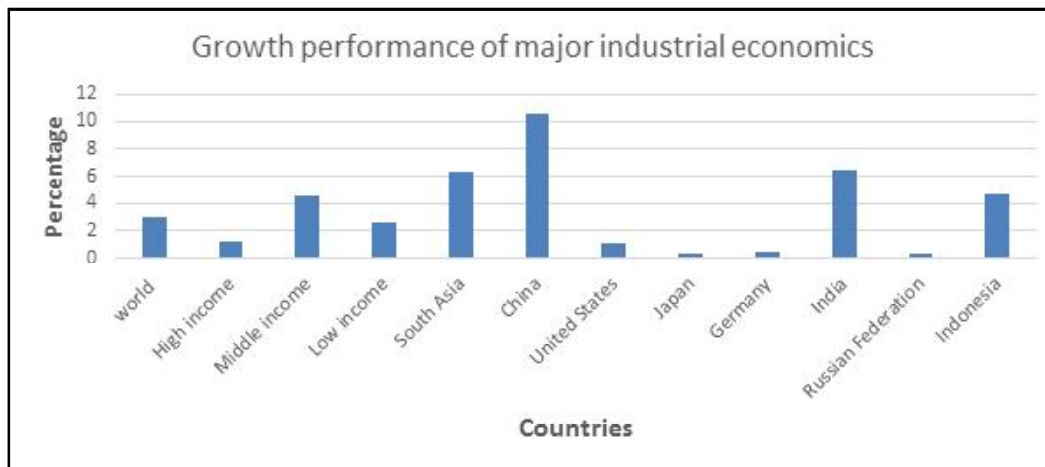


Chart 2: The Industrial sector growth performance in world economics during 1980 to 2020.

Overall, the growth performance highlights the uneven industrial growth patterns across the individual and group of countries. While the middle- and low-income countries and the individual countries Germany, and Indonesia shows an accelerated growth trend, shows a strong industrial expansion. Whereas, the high-income economies, south Asian countries and Japan exhibit stagnation due to their transition towards service-oriented structures. China, despite recording the highest average growth rate, demonstrates a decelerating growth rate of 10.53 percentage trend, signalling a broader structural shift from industry to services. These variations emphasize that the trajectory of industrial growth is largely shaped by each country's stage of development and its evolving economic priorities.

Limitation of the study :

While this study provides valuable insights into industrial growth patterns across global regions, income groups, and major countries, it is subject to certain limitations. First, the analysis relies primarily on secondary data from sources such as the World Development Indicators, which may be constrained by reporting gaps, differences in data collection methodologies, and revisions over time. Second, the study adopts a decadal perspective, which, while useful for identifying long-term trends, may overlook short-term fluctuations and cyclical variations in industrial performance. Third, external shocks such as the 2008 global financial crisis and the COVID-19 pandemic have had profound but uneven impacts across countries, making it difficult to fully isolate structural industrial changes from temporary disruptions. Finally, the focus on selected countries and income groups may limit

the generalizability of findings, as unique regional contexts and country-specific policies can produce divergent outcomes.

Scope of further Research :

Future research on industrial growth patterns could extend in several directions. A key area is the impact of technological change, particularly digitalization, automation, and green technologies, on industrial contributions to GDP and employment, especially in developing countries. Comparative analyses of industrial policies, such as trade liberalization, subsidies, and industrial clustering, would also help to identify best practices for sustaining growth across different income groups. Furthermore, the growing linkages between manufacturing and service sectors, including IT, logistics, and finance, deserve closer examination to understand how they reshape industrial performance in the global economy.

I extend my sincere gratitude to all those who have contributed to finish this research report. Special thanks are extended to my research supervisor providing academic support of valuable guidance and constructive feedback. I also want to thank Department of Economics at Annamalai University for generously providing access to find the essential resources and data that greatly enriched my study during the study period. Finally, heartfelt appreciation is extended to family for their constant encouragement and support throughout the research process.

Funding

This study was conducted autonomously, with no financial support from external sources and it is a part of Ph.D. thesis, Annamalai

University.

Conflict of Interest

The author declares that there are no conflicts of interest with respect to the publication of this research paper. Thus, study was conducted independently and has not received any financial support from public, commercial, or nonprofit organization.

References

1. Chenery, H. B. (1960). *The American economic review*, 50(4): 624-654.
2. Haraguchi, N., B. Martorano, and M. Sanfilippo, (2018). *Structural Change and Economic Dynamics*, 49: 266-276.
3. Kuznets, S. (1973). *The American economic review*, 63(3): 247-258.
4. Lin, J.Y., and D. Rosenblatt, (2012). *Journal of Economic Policy Reform*, 15(3): 171-194.
5. Rostow, W. W. (1959). *The Economic History Review*, 12(1): 1-16.
6. Roy, A. (2015). *Global Economy Journal*, 15(3): 409-430.
7. Szirmai, A., and B. Verspagen, (2015). *Structural change and economic dynamics*, 34: 46-59.
8. UNIDO. (2022). Industrial development report 2022: The future of industrialization in a post-pandemic world. United Nations Industrial Development Organization. <https://www.unido.org/sites/default/files/unido-publications/2023-03/IDR-2022-en.pdf>
- 9) World Bank (2023), World development indicators <https://databank.worldbank.org/source/world-development-indicators>