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THE STATISTICAL ANALYSIS OF STRUCTURE OF MANUFACTURING SECTOR – WITH SPECIAL REFERENCE TO BANGALORE INDUSTRIAL REGION

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ABSTRACT

This recent spurt in growth is propelled by radical reforms such as the removal of restrictions on foreign investment and industrial de-licensing. Tailoring the EXIM policy to promote exports and aligning the import duties to meet WTO commitments further contributed to this development. This trend is expected to continue over the next five years, driven by a favorable business policy environment in terms of tax cuts, broadening tax base, and reduced interest rates. Thus it is observed that both development (commercial) enterprises and manufacturing enterprises are loss-making sectors in the aggregate sense. Therefore, pressure is mounting on the ground that from revenue point of view also, government should try to reduce its share from these sectors. Furthermore, financial institution sector and the development (noncommercial) sector are also incurring net losses. INDIAN industrial policy operates within the framework of overall economic and planning policies. A brief discussion of the background of such policies and recent development in the growth process and structural change may be useful so that the framework in which industrial policies operate can be appreciated. The major industrial sectors are registering high growth as a result of the economic reforms. In tune with India's progress, the state of Karnataka has played an important role in various spheres. The per capita income of Karnataka has more than doubled in the last 50 years. In the post-1991 era, Bangalore has emerged as the "Destination City" for fresh investments, gaining the reputation of being the "Silicon Valley of India." At present, there is cause for optimism due to the favorable industrial climate of Karnataka and its human resources.

KEYWORDS

Reforms, development, Manufacturing, Statistical, Policy, Economic planning.

INTRODUCTION

There is something very basic about manufacturing – value is added by taking raw materials and labor, and producing products that can be sold in high quantities, with quality, to generate good return on the investment. In the past decade, manufacturing technology has expanded rapidly on a global scale. Many countries have mastered the methods, the quality processes, the execution systems and software. In this new century, the global spread of manufacturing knowledge is having far-reaching consequences. We are seeing fundamental changes in international business structures and deployment of global capital.

Manufacturing's share of the US economy, as measured by real GDP, has been stable since the 1940s. During this entire time, the ratio of manufacturing output to GDP has ranged from 16 to 19%. As of 2002, it was 16%. During this same 50-year time span, with alternating booms and recessions, the number of manufacturing employees has remained fairly constant, oscillating at around 16.5 million. In the recent downturn, manufacturing employment fell to about 14.2 million.

At the start of April 2009 the Department of Innovation, Industry, Science and Research (DIISR) began collecting data on Australian firms facing restructuring or difficulty during (and immediately after) the GFC. Over the subsequent year (comprising the June, September and December quarters of 2009 and the March quarter of 2010) DIISR gathered detailed information on 760 firms. For the purposes of the study, references to the past year refer to this period. While this is a very limited sample, some interesting trends and observations emerge from an analysis of the data.

The Indian economy is firmly on the path of steady growth. Even during the last decade when other countries were in the grip of a massive slowdown, India continued to enjoy a comfortable economic position. This recent spurt in growth is propelled by radical reforms such as the removal of restrictions on foreign investment and industrial de-licensing. Tailoring the EXIM policy to promote exports and aligning the import duties to meet WTO commitments further contributed to this development. This trend is expected to continue over the next five years, driven by a favorable business policy environment in terms of tax cuts, broadening tax base, and reduced interest rates.

Karnataka's industrialization got off to a start as early as in 1884 when the first textile mill was set up in the state. However, the sugar industry came into existence prior to this—in 1800 itself. The commencement of the flow of electricity from Shivasamudram in 1902 marked the beginning of a new era in the state's industrial development. Within a decade after the commissioning of the electricity generating station, the number of industrial establishments using electric power had risen to 80 which was a significant achievement in those days.

INDUSTRIAL SCENARIO IN KARNATAKA

The growth rates of states varied widely and the range was quite significant- Growth rates of gross state domestic product (SDP) for different states are given below:

ANNUAL GROWTH RATE COMPARISONS (In per Cent)

State	1980-81 to 90-91	1991-92 to 1997-98
Andhra Pradesh	5.65	5.03
Tamil Nadu	5.38	6.22
Kerala	5.37	5.81
Karnataka	5.29	5.29
Gujarath	5.08	9.57
Maharashtra	6.02	8.01
GDP (Nat. Accounts)	5.55	6.89

Source Ahluwalia, 2000: 1638.

"PSEs, whose activities are commercial in nature or which produce consumer goods, and where there exists a strong private sector presence, would be restructured through privatization or closure."

- 1) To evaluate the state PSEs and suggest measures which would promote greater productivity and profitability within the next five years.
- 2) Suggest measures, which could promote autonomy and reduce or preferably remove budgetary support.
- 3) Evolve a long-term reform programme, which would enable government to identify PSEs that need alternative forms of management such as complete privatization or disinvestment or merger etc. If any PSE needs government support to enhance its long-term profitability, strategies should be evolved to identify them.

Accordingly, during the first phase of reform drive, 20 commercial enterprises were selected and the second phase consists of another 20 enterprises.

REVIEW OF LITERATURE

The perusal of past research programmes is very important in order to comprehend the concepts of statistical analysis of structure of manufacturing sector. Further, going deeper and understanding the intricacies of the topic entail the review of literature. The literature includes books, articles, reports, news bulletin, newspapers, annual reports of the Group-A companies, orders, notices and reports, Company Law, International Stock Market Journals, CD ROM, micro-films, annual reports and Government and private publications. The literature survey phenomenon is more fully arrayed in the following.

Rajiv Kumar and Abhijit Sen. Gupta (2008)¹ This paper is attempted about The Indian manufacturing sector has grown at an impressive average rate of 9.5 per cent annually since 2003-04. Its sustained growth is crucial for generating employment opportunities needed to absorb the rapidly expanding workforce. In this context, this paper reviews the current state of the sector and focuses on determinants of its competitiveness. The paper finds that Indian manufacturing sector exhibits a great deal of regional variation and a marked dualism between the organized and the unorganized segments in terms of both productivity and wage levels. The level of labour absorption in the organized manufacturing sector has been weak as reflected in the declining labour intensity in this sector. This does not augur well for achieving inclusive growth. We also find that although there have been significant changes in the composition of exports in the last 20 years; India is still a very small player at the global level, especially in knowledge intensive and advanced technology products. Finally, the paper explores India's potential for transforming itself into a hub of mass manufacturing. We find that the main constraints in doing so have been the low level of R&D, relative lack of skilled personnel and relatively low FDI levels.

Graham Hall, Patrick Hutchinson and Nicos Michaelas² (2000), undertook a study titled "East and west: Differences in SME capital structure between former Soviet- Bloc and Non Soviet – Bloc European countries." to analyse of the determinants of capital structure. The results for the former Soviet-bloc SME"S show that they have lower levels of debt, both short term and long-term than the non Soviet-bloc countries. The results also show that the SB SME"S have lower profitability, higher growth rates, are younger, have higher non-debt tax shields, higher stocks and lower risk compared to non Soviet-bloc countries, all of which suggest higher levels of short-term debt and at the same time they have more fixed assets, are smaller, have fewer growth options and lower levels of net debtors which suggests lower STD. Similarly, for long-term debt, SB SME"S have lower profit, higher growth rates, more fixed assets, more stock and lower risk which are associated with high LTD but are smaller, younger and have lower levels of net debtors that are associated with lower LTD.

Francisco Sogorb Mira³ (2001), undertook a study titled "How SME uniqueness affects capital structure: Evidence from a 1994-1998 Spanish data panel" to obtain the main determinants of debt policy decisions in small firms. The principal aim is to test how firm characteristics affect Small and Medium Enterprise (SME) capital structure. The study concluded leverage was negatively related to alternative tax shields like depreciation and taxes. Size and asset structure are both positively correlated with firm debt level. However, regarding asset structure a positive correlation was obtained with long term debt level but negative with short term debt level. Thirdly, SME"S with more growth options seem to employ more debt, although this relationship becomes negative with short term debt. Finally, predictions of Pecking Order Theory seem to explain debt policy in SME"S relatively well, although the underlying justification of this theory in this case may resemble managers propensity to not losing part of their control in the firm. Put another way, the financing of SME"S relies on internal resources instead of external means.

Susana Menendez Requejo⁴ (2002), conducted a study entitled "SME vs. Large enterprise leverage: Determinants and Structural Relations" to examine the importance of the different theoretical proposals that explain a firm's capital structure in relation to the existence of an optimal ratio that balances the firm's tax benefits and financial risk (Tradeoff Theory), besides considering their interdependence with the investment decision. The results from the Structural Equation Model reveal that both the preference for internal financing and sectorial debt ratio are determinants of capital structure in a similar proportion. Business features linked to financial constraints are also significant and have a greater incidence. The interpretation of the relation found shows the lesser possibility of SME"S, together with firms not belonging to a business group, more recently created firms and firms with a lower market share, to defer investment and leverage. These results also agree with the significantly higher leverage level observed in SME"S versus large enterprises in Spain, having also significantly higher financial costs.

Francisco Sogorb-Mira and Francisco Sogorb-Mira⁵ (2003), conducted a study titled "Pecking order Versus Trade off: An empirical approach to the small and medium enterprise capital structure" to examine the financing of small and medium sized companies (SME"S) and explore whether the main theories of firm financing can explain the capital structure of these firms. Regarding trade-off theory, the results clearly indicate the existence of an optimal or target debt level where firms partially converge – the transaction costs not being excessively high. The evidence seems to confirm that Spanish SME"S adjust their target ratio very quickly – faster than publicly listed companies. Small Spanish firms seem to find the costs of an unbalanced position higher than the costs of the process of adjustment. As a result, it is confirmed that bank financing, typical in these companies, offers more advantages than obtaining funds from the capital markets. With respect to pecking order theory, small Spanish firms do not adjust their level of debt to their financial needs.

Maria Psillaki and Nikolaos Daskalakis⁶ (2007), undertook a study titled "Are the Determinants of Capital Structure Country or Firm Specific? Evidence from SME"S" to investigate the capital structure determinants of Greek, French, Italian and Portuguese small and medium sized enterprises (SME"S) and to compare their capital structures and consider if differences in country characteristics such as financial development and institutional features may impact on capital structure choices. The study shows that the four countries present similar financial and institutional characteristics.. There seem to be similarities in the determinants of capital structure across sample countries. Italian SME"S seem to maintain the highest leverage in their capital structure, whereas the French SME"S have the lowest debt ratio. The size is positively related to leverage. Asset structure is negatively correlated with leverage. Thus, firms that maintain a large proportion of tangible assets in their total assets tend to use less debt than those which do not. Profitability is also negatively related to leverage which is consistent with the pecking order theory that argues that firms prefer internal financing from external. The leverage and risk are negatively related. Finally, the results show that growth variable is not statistically significant for any of the four countries in our sample. It is found that firm rather than country factors explain differences in the intensity of capital structure choices.

1 Rajiv Kumar Abhijit Sen. Gupta, Towards A Competitive Manufacturing Sector, Working Paper No. 203, INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS. 2008

2 Graham Hall, Patrick Hutchinson and Nicos Michaelas⁵² (2000), "East and west: Differences in SME capital structure between former Soviet- Bloc and Non Soviet – Bloc European countries." International Journal of the Economics of Business, Volume 7, Issue 3, 2000. p 297 – 312.

3 Francisco Sogorb Mira⁵⁴ (2001), undertook a study titled "How SME uniqueness affects capital structure: Evidence from a 1994-1998 Spanish data panel" Small Business Economics, Vol. 25, No. 5, Dec., 2005, (pp. 447-457)

4 7 http://papers.ssrn.com/sol3/papers.cfm?abstract_id=313981

5 8 <http://www.ivie.es/downloads/docs/wpasec/wpasec-2003-09.pdf>

6 12 http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1341860

Joshua Abor⁸⁰ (2008)⁷, conducted a research titled Determinants of the Capital Structure of Ghanaian Firms with the objective -compare the capital structures of publicly quoted firms, large unquoted firms, and small and medium enterprises (SME"S) in Ghana. Examine the determinants of financing choices (capital structure) of Ghanaian firms. Publicly quoted and large unquoted firms were found to have higher debt ratios than SME"S. Overall, listed and unquoted firms exhibit different financing behaviour from that of SME"S. Older SME"S are more likely to rely on long-term debt finance. Firm growth was found to have a positive association with long-term debt for the unquoted firms" sample and short-term debt ratio for SME"S. Firms with high risk profile avoid taking more financial risk by using less long-term debt. SME"S with high managerial shareholding rely less on short-term debt. Industry was found to be important in explaining the SME"S" capital structure. SME"S located outside the capital city depend less on debt finance. Limited liability companies are more likely to obtain long-term debt finance relative to sole-proprietorship businesses. The pecking order theory appears to dominate the Ghanaian capital structure story.

IMPORTANCE OF THE STUDY

The present study is confined to manufacturing sector with specific reference to public sector and private sector undertakings. The study reviews the manifestation and magnitude of manufacturing in public and private sectors. The present study aims to analyses that the sectors in terms of statistical tools and techniques. The existing study will analysis overall performance of manufacturing sector in Karnataka State.

STATEMENT OF THE PROBLEM

Manufacturing sector in our country, have worked as important tool of the overall strategy of national economic growth and planning. Despite present more of economic liberalization nobody can deny the vital role of those manufacturing sector play in our economy. Taking up of statistical analysis of manufacturing sector potential has become one of the major strategic management initiatives to sustain and grow in the present contest globalization.

Understanding under effective change in the manufacturing sector based on forms of organization is made under their affects upon the reinforcement of statistical analysis. The competition among organization is increasing creating greater pace than ever. Therefore, every organization trying to get the competitive advantages over its competitor. The statistical analysis will gives them a definite edge over their rival firms. So the statistical analysis of manufacturing sector will become stand practice rather than a specialized area and it holds the key in deciding success. The present study aims to view and analyses the manufacturing sector potential and growth in Karnataka State.

OBJECTIVES OF THE STUDY

Among the other objectives, the study embarked upon the following

1. To study industrial potential in Karnataka.
2. To study critical analysis of industrial policy in Karnataka since 1950.
3. To study of regional disparities in industrialization in Karnataka.
4. To study the correlation between economic growth and change in industrial structure –manufacturing sector
5. To validate the data and offer constructive suggestions

HYPOTHESES

The present study relied on the following conjectures or the tentative statements, which form the hypotheses of the study

1. Karnataka has high industrial potential
2. The industrial policy of government of Karnataka is very favorable for the growth of manufacturing sector than other sectors of the industry.
3. The industrialization brought balanced regional industrial growth.
4. there is a correlation between economic growth and structure of industrialization (Manufacturing sector)

METHODOLOGY

The proposed study will be a case study and it adopts analytical approached. It is based on secondary data. The secondary required for the study is going to be collected from different official sources and journals and from published sources such as annual reports, prospectus etc.

DATA ANALYSIS

The researcher aims to apply various statistical tools techniques for the purpose of drawing inferences and valid findings some the techniques contemplated to use are given bellow.

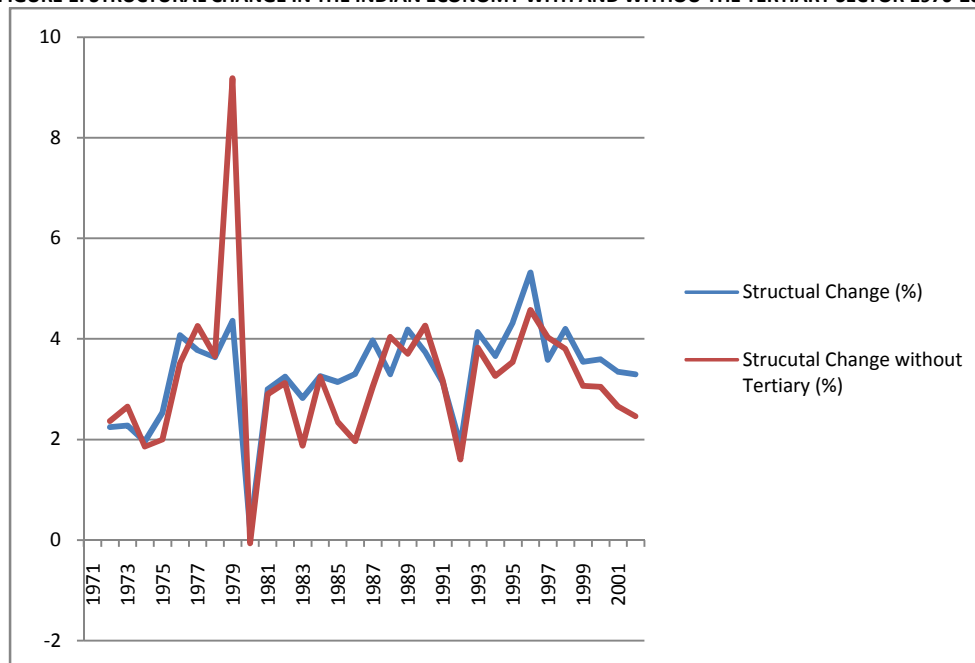
- Descriptive
- Percentages
- Chi-Square test
- Co-efficient of variance
- Rank correlation

RESULTS & DISCUSSION

The Results will display what was calculated through using the aforesaid method. The results will be presented in the form of tables and graphs, with some interpretation of the data. This section will mainly be descriptive and explanatory; most of the analysis in concert with the theory will be done in the Discussion section. The Results section will be divided into a number of subsections. The first subsection will present the structural change calculated using the procedure described in the Methods section. The other three sections will to support these results through economic indicators including; total factor productivity, capital-output ratio, and investments.

⁷ 13 http://ideas.repec.org/p/aer/rpaper/rp_176.html

FIGURE 1: STRUCTURAL CHANGE IN THE INDIAN ECONOMY WITH AND WITHOUT THE TERTIARY SECTOR 1970-2002



Source: Calculated by author using data from (Timmer and de Vries, 2007).

From Figure 1, it is apparent that these two variables follow very similar trajectories. These figures are almost identical during the 1970's, and do not really diverge until after 1981. There is a spike in the late 1970's that suggests that the economy would have done better had the tertiary sector not existed. This suggests that the tertiary sector, in the mid to late 1970's was absorbing more capital than it was producing. However, from 1981 until 2002, the economy with the tertiary sector included (the blue line), was more productive. Therefore it can be concluded that the reallocation of labour into the tertiary sector had a positive effect on the economy. To see the effects of the tertiary sector more clearly, The structural change without the tertiary sector is thus subtracted from the entire structural change, leaving on the change that can be attributed to the tertiary sector.

TABLE 1: STRUCTURAL CHANGE WITH AND WITHOUT TERTIARY SECTOR, PERCENTAGE DUE TO THE TERTIARY SECTOR. BY DECADE FROM 1970-2004

	Structural Change	Without Tertiary	Due to Tertiary	% due to Tertiary
1971-1980	-0.190	-.262	0.072	-37.6%
1981-1990	0.993	0.752	0.242	24.3%
1991-2000	1.423	1.068	0.355	24.9%

Source: Calculated by author using data from (Timmer and de Vries, 2007).

The negative contribution of the tertiary sector is expected during the 1970's. With GPT's there is a productivity lag, where it takes time for a country and/or region to absorb and adapt the new technology. During the onset of a new technology, there is an initial cost, which accounts for reorganization, re-education and redistribution of resources. Since 1980, the structural change has become more effective, suggesting that the reallocation of labour is having a positive effect on the society. Furthermore, the tertiary sector, which was negatively affecting the economy in the 1970's, has become a great contributor to the structural change during the 1980's and 1990's.

TOTAL FACTOR PRODUCTIVITY

As discussed in the Theoretical Background section, technology is seen by economic historians as the prime impetus for structural change. One way to investigate technological change in economic history is to look at the total factor productivity (TFP). This number is a residual; it is what labour and capital cannot account for in the output. Since it is a residual, it is not definite that it is due to technology. The difficulties surrounding the strength of TFP coupled with data complications, have kept the TFP out of the scope of this essay. However, the author recognizes the importance given to TFP in the realm of economic history and believes that it would be a valuable future addition to this essay.

The total factor productivity is a measurement of technological progress. It is the amount of growth that cannot be accounted for by labour and machinery. This number is a residual:

Equation 10: Total factor productivity

$$Y = A * K^a * L^b$$

Where:

Y= GDP a= Capital elasticity (.3) K= Capital input
A= TFP b= Labour elasticity (.7) L= Labour input

There have been many criticisms of the use of TFP as an indicator of technological change. The main concern has been that since it is a residual, it reflects everything that is not accounted for by labour and machinery, ie. fluctuations in weather.... However, when the TFP is looked at on the long term, these fluctuations even out. Therefore, I believe that when taking an average over a long period of time, the TFP represents mainly technological change. When a new technology is introduced into a society, we expect there to be changes to occur in order to adapt and adopt the new innovation.

TABLE 2: TOTAL FACTOR PRODUCTIVITY IN INDIA- AGGREGATED AND SECTORAL CONTRIBUTIONS

Sector/Period	Year	GDP	GDP/Worker	Contribution of:			
				Capital	Land	Education	TFP
Total Economy	1960-81	3.4	1.3	1.0	-0.2	0.2	0.2
	1981-00	5.8	3.8	1.4	0.0	0.4	2.0
Agriculture	1960-81	1.9	0.1	0.2	-0.2	0.1	-0.1
	1981-00	2.8	1.8	0.5	-0.1	0.3	1.1
Industry	1960-81	4.7	1.6	1.8	-	0.3	-0.4
	1981-00	6.4	2.9	1.6	-	0.3	1.0
Services	1960-81	4.9	2.0	1.1	-	0.5	0.4
	1981-00	7.6	4.0	0.7	-	0.4	2.9

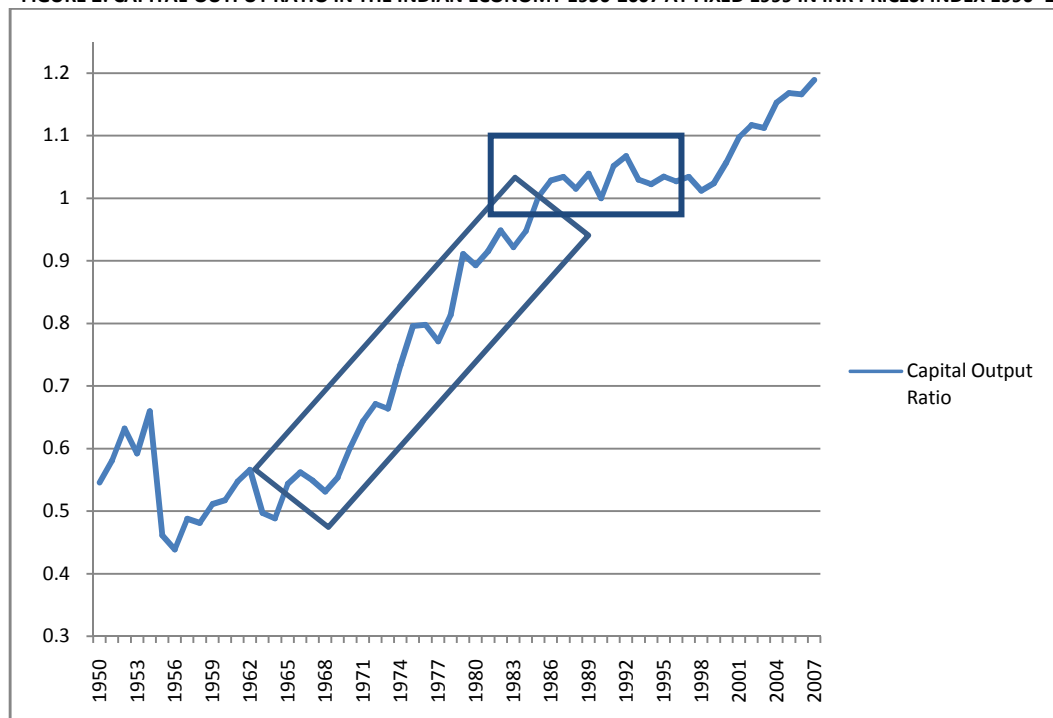
Source: (Bosworth, Collis, Vramani, 2007)

From the results that Bosworth, Colis and Vramani it is clear that the TFP became a significant source of growth after the 1980's. The high TFP suggests that 'knowledge and competence have diffused among the employees, leading to improved conditions to technological diffusion'. In short, the people have become more competent at exploiting the technology and this has in turn accelerated the new technologies importance in society. In this case the TFP contributes to more than 1/3 of India's GDP growth. It is also important to note from Table 2 is the differences at a sectoral level in the TFP results. The TFP contribution was most impressive in the service sector at 2.9%. Therefore, the total economy is benefiting from the technology between 1981 and 2000; the advantages are felt greatest in the service sector.

INVESTMENTS

To analyze the investment pattern in India the capital-output ratio was calculated and presented in Figure 2. The Capital-Output Ratio depicts the amount of investment (in fixed capital) in relation to the overall output (GDP). Therefore, when the curve is rising, it means that more is being invested into the economy than is being produced. Similarly, where the figure is decreasing, the GDP is higher than the investments. The graph is shown in constant 1999 INR prices with 1990 being the base year; equaling one. Thus each of the values can be seen in relation to the base year of 1990.

FIGURE 2: CAPITAL-OUTPUT RATIO IN THE INDIAN ECONOMY 1950-2007 AT FIXED 1999 INR PRICES. INDEX 1990=1



Source: Calculated by author from Data found in Handbook of Statistics on the Indian Economy, Reserve Bank of India 2008-2009 p.5

From Figure 2 it is evident that between 1965 and 1984 there was a steady increase in investments to output. This suggests there is development in infrastructure, such as roads, airports, science parks, and other infrastructure to support and encourage the growth of the new technology. This high expenditure in physical capital is characteristic of the transformation stage, as companies, firms and cities are forced to transform their economy to incorporate the newly introduced General Purpose Technology into their fields. From the mid-1980s, the investment is higher than the base year of 1990 however, it has stabilized. While investment to output continues to grow, it is at a much slower rate of change. This suggests a rationalization economic phase. The investment shifts from large, expensive projects, to more small scale projects that improve the production and quality of what is already being produced. Growth begins again in high investments in the early 2000's. Since the curve stops at 2007; it is difficult to make any real conclusive observations from this. For Bangalore, the detailed data necessary to calculate the capital-output ratio was not available. Instead to investigate investments in Bangalore, Foreign Direct Investment has been chosen as an indicator. Below is a table of the major contributors to the investments in Bangalore:

TABLE 3: INVESTMENT IN BANGALORE (Rs. Billion)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Central Government	1.32	1.32	3.15	3.15	4.78	4.78	5.53	7.03	9.21	10.93
State Government					0.3	0.3	1.09	2.36	2.76	3.46
Private (Domestic)	0.08	2.43	3.86	4.29	26.89	31.34	39.66	45.61	52.39	56.38
Private(Foreign)	0.45	3.85	3.85	3.85	28.54	40.1	43	49.93	67.17	68.13
Total	1.85	7.6	12.17	12.59	61.81	78.2	90.95	116.13	142.72	150.11

Source: Shaw and Satish 2007

Over the 10 years, between 1995 and 2004, the FDI increased by 15,040 %. Furthermore, since 1999, every year the amount of foreign domestic investment has been relatively higher than private domestic investment. The table below compares the percentage share of these two forms of investment in Bangalore:

TABLE 4: SHARE OF INVESTMENT IN BANGALORE (%)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Private (Domestic)	4.32	31.97	31.72	34.07	43.50	40.08	43.61	39.27	36.71	37.56
Private(Foreign)	24.32	50.66	31.64	30.58	46.17	51.28	47.28	42.99	47.06	45.39

Source: Calculated by author using data from: Shaw and Satish 2007

The fact that FDI has a higher percentage share than any other form of investment is a tribute to the influence that global forces have on Bangalore today. The potential that can be gained from these investments in high; spillovers and transfers, both physical and knowledge based will occur. However, if the FDI dominates investment, then the negative results of FDI are accentuated. This becomes apparent in the structure of the nongovernment organizations. These groups have been described by Jalal as having an 'increasing voice, weight and significances in the urban area' (Jalal, 2005). The non-government political influencers are supported by the elite, the middle class and the ex-government officials, thus these voices have to the forefront. Some have argued that this is

good and that the middle class has been given a greater voice, while others have been skeptical of this newly established undemocratic power (Shaw and Satish 2007)

DISCUSSION AND RESULTS

The Discussion aims at analyzing the results presented in the previous section, as well as underlying the implications that arise from these results. The first two subsections of the Discussion will pertain to the analysis of the data, and the last two will make some generalizations and potential policy implications. This analysis will be done through three broad categories. The first will look at how applicable the Schön Cycle is to the case of India.

THE SCHÖN CYCLE

From the results it is, however, unclear what stage of the Schön Cycle India is currently in. The Total Factor Productivity results as well as the conclusions made from the Capital-Output ratio indicator, suggest that India is currently undergoing Rationalization. This is logical temporally to the introduction of the GTP. If we accept the Schön Cycle then the Transformation phase should last approximately 25 years, and would have begun at the introduction of a the GTP, around 1970. During those 25 years changes occurred in the economy, investment was high in order to create the infrastructure and means to exploiting the new technology. Then around 1991-1995, the Rationalization phase should begin, where the investments to capital stabilize, and the TFP is exceptionally high.

Throughout the 1990's, labour has been successfully being reallocated into areas with higher value added. Thus the productivity of the economy has been rising at a rapid rate. Yet, this deduction does not really follow the theory, for the structural change was still positive throughout the 1980's, and accelerated in the 1990's. Therefore, using 1991 as the marking point of Transformation does not seem very logical.

These results therefore do not completely support the Schön Cycle. This has two implications; the first is that this study is flawed, and further research, for a longer period of time will support the Schön Cycle. The alternative explanation is that the Schön Cycle is in fact not applicable for all cases. While it describes the Swedish situation in a very compact and impressive form, it is not however a universal model. If the Schön Cycle is not universal, and the phases cannot be predicted, exactly, then policies suggestions become less simple to make.

THE INFERENCES FOR BANGALORE

From the results of India in the shift share analysis, it is clear that the movement of labour since 1980, has had a positive effect on the economy. The structural change has increased in the 1990s even more so, suggesting that there are more people moving into areas of higher value added sectors. As described in the Historical Background section, the movement of workers to high value added sectors has been slow.

For city of Bangalore, it is believed that the movement of labour would have occurred faster than other areas of India. This is because Bangalore is home to some of the best universities in the country, the first research park was set up in Bangalore and the city has undergone industrialization under British rule. For these reasons, it is thought that Bangalore would adopt to value added shifts much faster than India as a whole. For example, in India there is a much faster decline in agriculture's contribution of GDP, from 40% in 1980 to 27% in 2004, as compared to the movement of employment, from 73% in 1980 to 63% in 2004. This suggests that there are a higher proportion of people dependent on agricultural incomes for their livelihood without any growth in productivity. Thus there is higher reliance with less capital; this should consequently cause an increase in poverty throughout the society. Furthermore, while the tertiary sector contributes 53% of India's GDP, in Bangalore, the tertiary sector supplies 63%.

Moreover, since Bangalore is progressing at a much faster rate than India, it is logical that there is a divergence going on within the country. While Bangalore 'takes-off' and moves into the forefront of the global stage, there are other cities that do not succeed in the same way. The divergence burrows deeper however. Bangalore has undergone a process of urban growth through agglomeration. The formation of urban agglomerations causes the economic activity of the region to concentrate and centralize. There is a divergence occurring within Bangalore at present. However, as discussed above, there is an expectation of self correction.

POLICY IMPLICATIONS

The Indian economy can be seen as a pendulum swinging. Between 1950 and 1984, it was an extremely closed economy slowly moving into a more liberal system. From 1984 on, we can see the economy progressing as the protectionist laws have more or less disappeared. What is expected from here is another swing back into a more government controlled system. However, with this swing there is less velocity than last time, and the restrictions are expected to be less radical than the ones previous to 1984. At present the Indian economy is being dictated by liberal values, however as wages increase, it is likely that citizens will demand more social welfare, and safety nets.

It is important to recognize the significance that cultural and social norms have on the diffusion and alteration of technology. In the Swedish example, discussed by Schön, Swedish workers were able to effectively adopt and adapt the technology from Britain, as the two cultures were quite similar. Thus using the Swedish model, has its flaws when analyzing Bangalore. Most of the 'revolutionary' technologies were incremental; the product was not perfect when it entered the market. Rather with time, these products diffused and were altered depending on the demands of the society.

CONCLUSIONS

This paper has presented an overview of theoretical arguments and empirical evidence for the proposition that in the past 50 years, manufacturing has functioned as an important engine of growth in developing countries. There is no doubt that manufacturing has been an important driver of growth and catch-up. But not all expectations of the engine of growth hypotheses are supported by the statistical evidence, in particular not with regard to the presumed higher capital-intensity in manufacturing and the productivity dynamics of manufacturing. In more recent years, productivity growth in agriculture has even been higher than in manufacturing. Given this economic structure, we find the reforms suggested by the government and various economists do not address themselves to the following important issues. Ability of the Indian state to integrate the unincorporated sector with the national market, both product markets and capital markets. If the proposition that the Indian State is in search of a nation is true then one of the basis of such a nation state is the recognition of the role of the unincorporated sector which has become a dominant player in the national economy and the need to integrate it in an orderly fashion, into the regulatory system.

From these results it is clear that both India, and to a greater extent Bangalore, have been expanding and developing at a rapid rate. Throughout the 1990's Bangalore has transformed into a sophisticated high-tech centre. This city has become an exemplar of 21st century growth; it is a newly globalized city which exemplifies the success and wealth that can be obtained through liberalization. The structural change within India suggests that there has been a positive shift of the economy from the primary sector into the secondary and tertiary sectors. Moreover, since the tertiary sector has the highest value added, it can be assumed that the structural change is mainly a product of labour movement into the tertiary sector.

Bangalore has undergone an economic boom, which has given hope to other industrializing megacities. However, the need for a domestic market appears to be necessary for Bangalore's future success. Furthermore, the inconsistent results question the relevance of the Schön Cycle and highlights problems of generalizations and invoke a need for future research.

SCOPE FOR FURTHER RESEARCH

After carrying out an extensive survey of existing research on Indian manufacturing, and supplementing it with our own research, we find that there is a strong need to address additional research questions to understand how different firms' different strategic and operational choices lead to different performance outcomes. Most of the existing empirical studies were based on industry-level data and were focused on more macro-level issues. We believe that the implications and learning that can be derived by studying the following firm-level issues can contribute significantly to understanding and guiding the future growth and success of Indian manufacturers in global competition.

• How did firms react to the relaxation of restrictions on **vertical integration**? Did the larger firms manage to become more efficient by backward and/or forward integration of operations? How did the firm strategies of cost efficiency and differentiation prior to liberalization affect the opportunities to vertically integrate post-liberalization? How did the vertical integration decisions by larger firms affect smaller firms, which were the suppliers of raw materials and intermediate goods before the restrictions were removed?

• How did firms react to competition after the **trade liberalization**? Did the hangover from pre-liberalization inhibit growth? What kind of operational and manufacturing strategies did they use to counter competition and protect their market shares? Were they able to raise enough capital in order to scale-up the facilities and import state-of-the-art technologies? Did the smaller firms manage to survive competition from low cost and high volume producers like China, particularly in industries such as consumer goods, garments, leather, toys etc.? What kind of support and opportunities did the liberalized economy offer the small-scale firms that could not upgrade?

For the former research project, major cities in countries such as; Israel, Taiwan or China, would be optimal. Since these countries have similar growth processes in relation to IT technology, this analysis help to draw conclusions. If these centers followed similar economic growth then the correlation between IT, and economic success is further strengthened, however, if these cities do not follow similar growth then there is probably a third variable for Bangalore 'forging ahead'. To further test these conclusions a comparison between Bangalore and dissimilar cities should be compared. It would be optimal to be able to compare Bangalore to a city that is the same in every way except where clustering did not occur. There are inherent difficulties in finding such a city since the fact that clustering did occur in Bangalore, as well as Hyderabad and Pune suggests that these cities have a comparative advantage. Therefore, it is unlikely that a comparison to a city without clustering would truly be the same in every other aspect. The problem of the third variable thus is much stronger in a cross-city analysis

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In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

Our Other Journals

