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1.0 Background

1.1 The problem of the economic development of the poor countries of the contemporary world is one of the most widely discussed topics of our time. A number of international conferences on the subject have been held and the likelihood of more coming is just as tantamount to the probability that the sun will rise from the east tomorrow. Experts in various fields such as economics, politics, sociology and even engineering have held startlingly diversified views about the nature of underdevelopment and poverty, its causes and remedies. It has however been fully recognised that the nature and causes of the 'poverty of the nations' are very complex and the remedies are neither easy nor quick.

1.2 In as much as prescribing a once off medication to the problem of poverty is daunting a task unenviable by even an imaginary cloned social scientist with equal capabilities in all fields from economics to sociology, it is generally universally accepted that economic growth as measured by increased real production plays an integral role in averting the problem. In this regard, industrial economics as the branch of economics which basically looks at the

microeconomic contribution of the firm in enhancing social welfare has a bearing on the economic development of a country.

- 1.3 This paper examines the relationship between industrial economics and economic development. In other words how does the former feeds both the theoretical and empirically into the latter.

1.4 Introduction

A few of the most compelling developments in the economic scenery of the past quarter century have greatly challenged conventional economic thinking. How do traditional models, for example gauge up to explaining phenomena such as the economic miracles that enabled Japan and Germany to rise out of the ashes of World War II, only to be besieged by recent slumps in the last decade of past century?

- 1.5 How do traditional models explain the sustained growth and employment creation in the U.S. in recent years while Europe and Asia stagnated, which only a decade earlier would have been dismissed as a quixotic dream? How can traditional models account for IBM, the giant which

dominated the computer industry for a quarter of a century, suddenly stumbling and giving way to two upstarts, Microsoft and Intel, that now rank among the most profitable companies in the world?

- 1.6 More fundamentally, how can traditional models account for the precipitous decline of the leading U.S. automobile, steel, and consumer electronics firms that not long ago dominated their world markets, and for the equally impressive rise of U.S. software and biotechnology companies?
- 1.7 Conventional economics has been remarkably numb on pressing questions such as these. The most obvious explanation for this reticence is the inherently static nature of the discipline. The intellectual heritage of economics is rooted in equilibrium thinking, yet the common denominator among the questions posed above is change.
- 1.8 Traditional static analyses have proven to be more of a burden than an instrument of enlightenment in making sense of many of these important issues. The growing gap between the methods of the economics discipline and their ability to explain, understand, and predict the most compelling economic events of our time is alarming. The validity of the discipline lies in its ability to make sense of

real world phenomena.

1.9 Perhaps in response to this gap, scholars in the past quarter century have begun developing alternative frameworks and methodologies for analyzing economic phenomena involving change. They seek to explain how and why firms are diverse and how firms, industries, and regions change over time. They build on a rich intellectual heritage dating back to an earlier tradition represented by scholars such as Josef Schumpeter and Frank Knight. The phenomena of the afore-said change, is where industrial economics is fostering its continued existence.

1.10 The genesis of industrial Economics can be traced back to the beginning of the 20th Century. However, it is in the 1950s that Industrial economics developed as a separate economic discipline. It emerged as a separate discipline after the rise of the large modern manufacturing corporation.

1.11 Industrial economics as a separate discipline has been known by two titles

- (a) industrial economics -Europe
- (b) industrial organisation -USA

1.12 According to Scherer and Ross (1990) industrial organisation is mainly “concerned with how productive activities are brought into harmony with the demand for goods and services through some organising mechanism such as a free market and how variations and imperfections in the organising mechanism affect the success achieved in satisfying the economy’s wants.”

1.13 Ferguson P. (1988) defines industrial economics “as the application of microeconomic theory to the analysis of firms, markets and industries.” Industrial economics is seen as the elaboration of and development of the theory of the firm which consists mainly of the analysis of different market structure and their implications on economic welfare.

1.14 George Stigler (1968) described the boundaries of industrial economics:

“....there is no such subject as industrial organisation. The courses taught under this heading have for their purpose the understanding of the structure and behaviour of the industriesof an economy. These courses deal with the size structure of firms (one or many, ‘concentrated’ or not), the causesof this size structure, the effects of concentration on competition, the effects of competition

upon prices, investment, innovation and so on. But this is precisely the content of economic theory –price or resource allocation.”

1.15 Thus, according to Stigler industrial economics also deals with

- theory.
- Measurement and hypothesis testing
- The analysis of public policy towards business

1.16 According to Richard Schmalensee and George Stigler industrial economics is “the study of the supply side of the economy, particularly those markets in which business firms are sellers.”

1.17 Some industrial economists tend to use the terms industrial organisation and industrial economics interchangeably but Carson (1985) tries to distinguish the two. His definition of industrial economics encompasses both industrial organisation and what he calls industrial dynamics.

1.18 Industrial dynamics is “mainly concerned with the evolution of the industry as a process in time at both the

macro level, the sector or industry level and the firm level.”

1.19 Industrial organisation is mainly concerned with the structure of industries at a particular point in time and is based on the neoclassical theory of the firm.

1.20 Industrial dynamics stems from the work of Alfred Marshall and the Austrian School. The inclusion of industrial economics widens the area of investigation in this field.

1.21 In this paper we shall define we define industrial economics to mean both industrial dynamics and industrial organisation which is the study of different market structure and their implications for economic welfare. We therefore follow Scherer and Ross, George Stigler and others’ definition of industrial economics/industrial organization as well as Cason’s industrial dynamics. Of great concern to our study is the organisation of firms and markets and how their interactions affect the economic development process.

1.22 Industrial economics can be studied under the three following broad areas

- Determinants of the behaviour, scale, scope and organisation of business firms.

1.23 This area spills into both labour economics and corporate finance.

- Imperfect competition.
This area basically focuses on market structure, conduct and performance.
- Public policy toward business.
This areas focuses on antitrust (or competition) policy, regulation and government enterprise. Recently, other issues have been added such as liberalisation, privatisation, industrial policies aimed at affecting technical progress and international competitiveness.

1.24 By and large, industrial economics is concerned with a free market economic system. It is concerned with the analysis of industries and markets, and with the behaviour of firms within those markets. Industrial economics deals with the interdependence between firms within markets and the links that exist between market conditions, firm behaviour and economic performance. Industrial economics' primary concern is the manufacturing sector

because of its strategic importance in the process of economic development.

1.25 On the other end of the spectrum, economic development is defined as a sustainable increase in living standards that implies increased per capita income, better education and health as well as environmental protection. Public policy generally aims at continuous and sustained economic growth and expansion of national economies so that 'developing countries' become 'developed countries'.

1.26 The economic development process supposes that legal and institutional adjustments are made to give incentives for **innovation** and for **investments** so as to develop an efficient production and distribution system for goods and services.

1.27 Traditionally economists have made little if any distinction between economic growth and economic development as such they have been using the terms almost synonymously. Economic development can be seen as a complex multi-dimensional concept involving improvements in human well-being.

1.28 Critics point out that GDP is a narrow measure of economic welfare that does not take into account

important non-economic aspects such as more leisure time, access to health & education, the environment, freedom, or social justice. Economic growth is a necessary but insufficient condition for economic development. Professor Dudley Seers argues that development is about outcomes, that is, development occurs with the reduction and elimination of poverty, inequality, and unemployment within a growing economy.

1.29 Professor Michael Todaro sees three objectives of development:

- Producing more ‘life sustaining’ necessities such as food, shelter, and health care and broadening their distribution
- Raising standards of living and individual self esteem
- Expanding economic and social choice and reducing fear

1.30 The UN has developed a widely accepted set of indices to measure development against a mix of composite indicators:

- UN’s Human Development Index (HDI) measures a country’s average achievements in three basic dimensions of human development: life expectancy,

educational attainment, and adjusted real income (\$PPP per person).

- UN's Human Poverty Index (HPI) measures deprivation using the percent of people expected to die before age 40, the percent of illiterate adults, the percent of people without access to health services and safe water and the percent of underweight children under five

1.31 In this paper we shall restrict the measurement of economic development to be the level of Gross Domestic product a country is able to produce. The behaviour of the firm under a certain market structure or basic conditions will affect how much they produce at any given time, will equally affect the amount of resources that they set aside for the purposes of acquiring technology (innovation). All this will eventually be eventually be reflected through the amount of output in the country thus affecting economic development.

2.0 Theoretical Review

2.1 The fundamental problem of economics is trying to afford solutions the following questions at each point in time;

- What products to supply.

- How much of each to produce
- How scarce resources will be apportioned to produce each product.
- How the end product will be distributed among the members of society.

2.2 The problems can all be answered in three traditional ways which encompass

- **Conformity to tradition** -distribution by cultured practice for example land allocation, peasantry.
- **Central planning** -government decision
- **Free market economic system** -under which consumers and producers act in response to price signals generated by the interplay of supply and demand in more or less freely operating markets.

2.3 Another fundamental principle of economics identifies two main players within an economy –the producers and the consumers each with their own set of expectations from either side.

- (a) **Producers** - who are responsible for the production of goods and services.
- (b) **Consumers** –that is society

2.4 What society requires from producers of goods and services is good performance. Good performance embodies the following goals:

- (1) Decisions as to what, how much and how to produce should be in two aspects
 - (a) scarce resources should not be wasted.
 - (b) Production decisions should be responsive quantitatively and qualitatively to consumer demand.
- (2) The operations of producers should be progressive taking advantage of opportunities opened by science and technology to increase output per unit of input and to provide consumers with superior new products, in both ways contributing to the long run growth of real incomes.
- (3) The operations of producers should facilitate stable full employment of resources, especially human resources. Or at a minimum they should make maintenance of full employment through the use of macroeconomic policy instruments excessively difficult.

- (4) The distribution of income should be equitable. Equity implies that producers do not secure rewards in excess of what is required to call forth the amount of services supplied.

2.5 Good performance requires maximum satisfaction of all the four goals. Measuring the degree of extent of fulfilment of these goals;

- (a) magnitude of price-cost margins
- (b) rates of change of output per hour of work (labour productivity)
- (c) price levels
- (d) the size of gaps between actual and minimum feasible unit costs
- (e) variability of employment over the business cycle.

2.6 As its starting view industrial economics recognises that;

- (a) in some markets, a monopolist may operate protected by high barriers to entry
- (b) in most industrial markets barriers to entry are insufficient to exclude all new competition and/or a number of firms operate in the market. In some cases some degree of competition

(actual or potential) will exist so that intermediate imperfect competition outcomes are most likely.

2.7 Industrial economics recognises that firms are often multiplant, multiproduct, multinational oligopolists who;

- compete against each other by differentiating their products.
- Shield their innovations behind walls of patents
- Reshape entire industries by buying up their competitors
- Lobby extensively for preferential treatment from government

2.8 Thus, industrial economics recognises that the theory of competitive market structures although simple to solve for if an equilibrium exists, in most cases cannot explain the composition and behaviour of firms in the industry. Industrial economics is thus mainly concerned with oligopolistic market structures. It seeks to answer the following questions;

- (a) What are the market structures which best promote efficiency?

- (b) What kinds of markets best promote technical progress?

2.9 The prime elements for consideration are

- (a) **Market power/concentration** -many industries are composed of few firms
- (b) **Product characteristics** -firms in some industries produce homogeneous products, whereas firms in others distinguish themselves from competing firms by selling differentiated brands.
- (c) **Costly activities** -firms in an industry are engaged in repeated costly activities targeted for the purpose of enhancing the sales of their brands. Such activities include advertising, quality control, product differentiation costs marketing etc.
- (d) **Research and development** -firms allocate resources for investing cost reducing production technologies as well as new products.

2.10 Studies in the field of industrial economics have a direct and continuing influence on the formulation and implementation of public policies in such areas as;

- (a) the choice of between private and public enterprises
- (b) the regulation and deregulation of parastatals
- (c) the promotion of competition through
 - (i) the establishment of monopolies and mergers commission
 - (ii) adoption of antitrust laws
 - (iii) free trade policies

2.11 Industrial economics also ensure stimulation of technological progress through patent grants and subsidies as well as helping governments and policy advisors, since to ensure the raising of industrial performance of their economies they require an analysis of the inter-relations between industrial structure, organisation and efficiency.

2.12 At the roots of main stream industrial economics lies a methodological debate concerning the relationship between theoretical and empirical analysis, that continues to the present day. In the ensuing of the debate, two approaches to the study of industrial economics emerged:\

- a. The structure-conduct-performance paradigm which is highly descriptive and provides an overview of the entire field propounded by
- b. The price theory paradigm which uses microeconomic models to explain firm behaviour and market structure.

2.13 The Structure-Conduct-Performance Paradigm

This dominant framework in industrial economics was first developed by Mason of Harvard University in the 1930s and then later on elaborated by several other scholars.

- a. This approach has now become the central study of industrial economics as it provides an overview of industrial organisation.
- b. The paradigm stipulates causal relationships between the structure of the market, the conduct of the firms in the market and their economic performance.

2.14 It was Bain (1956) who decomposed a market into structure, conduct and performance. The paradigm contends that an industry's performance (the success of an

industry in producing benefits for consumers) depends on the conduct (behaviour of the firms in the market) which in turn depends on the structure (factors that determine the competitiveness of a market).

2.15 Structure means -how sellers interact with other sellers, with buyers and with potential entrants. It describes the environment within which firms in a particular market operate. It also defines the product in terms of the potential number of variants in which the product can be produced. The major elements of market structure describe ways in which markets depart from the conditions that describe perfect competition. These include two aspects;

- (a) **internal aspects**; number of buyers and sellers, barriers to entry
- (b) **external aspects**; product differentiation, vertical integration, diversification

2.16 Conduct

This refers to the behaviour (actions) of the firms in the market; it also refers to the decisions these firms make and also to the way in which these decisions are taken. It is the behaviour of the firm in response to conditions imposed by the market structure. Market conduct refers to how firms

determine their price policy, sales and promotions.

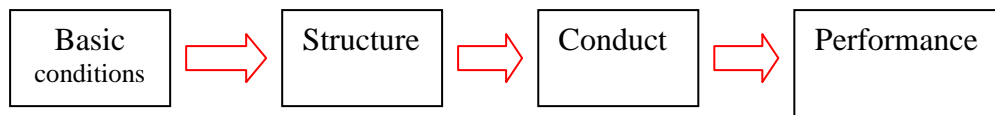
Significant aspects of the firm conduct include;

-pricing behaviour; -advertising; -research and development; -plant investment; -legal tactics; -product choice; -collusion; -merger and contracts

2.17 Performance

Performance encompasses the welfare aspect of the market interaction. It relates to the record of the industry in terms of the benefits which it generates for its various stakeholders. It refers to the extent in which firms are able to satisfy consumer demands in the current. The question here is whether the firm's performance enhances economic welfare. Important aspects of performance include: - productive efficiency; -allocative efficiency; -equity; - productive quality; -technical progress; -profits

2.18 An important addition to the structure-conduct-performance paradigm was the idea of an industry's basic conditions. The structure-conduct-performance paradigm became



2.19 Basic conditions

These can be divided into two, the supply side and the demand side conditions;

- a. On the supply side the basic structure determining conditions include;- the location and ownership of essential raw materials; -nature of the relevant technology; -the degree of labour unionisation; -product quality; -the value/weight ratio of the product business attitudes; -legal framework

- b. On the demand side, significant basic conditions include: -price elasticity of demand at various prices; - availability of (and cross price elasticity of demand for) substitutes; -the rate of growth and variability overtime of demand; -purchase method; the methods employed by buyers in purchasing (e.g. acceptance of list prices as given versus solicitation of sealed bids versus haggling); -the market characteristics of the product sold.

2.20 The whole matrix crumbles down to the fact that the conditions that exist within a market, exogenous or endogenous influence the way industry strategize in their quest to survive which in turn affects the performance of the whole industry. Economic development is directly influenced by the performance of the industry via provision of goods and services.

2.21 Economic Development.

Having looked at the theory of industrial economics, it is important that we take a road to look at the theories of economic development, as depending on which theory an economist may be coming from, industrial economics may note directly feed into economic development.

2.22 For many lay people, economic development - by which we mean the analysis of the economic progress of nations - is what economics as a whole is designed to address. For modern economists, however, the status of economic development is somewhat more uncomfortable: it has always been the maverick field, lurking somewhere in the background but not really considered "real economics" but rather an amalgam of sociology, anthropology, history, politics and, all-too- often, ideology.

2.23 Nonetheless, a number of the greatest economists tried to venture into the hazy field of economic development economics where solutions to poverty no-matter how closer they may be yet they may not be visible. The subject of economic development dates back to the classical era of, Adam Smith and indeed, perhaps the entire Classical School. Schumpeter's first famous book was entitled a *Theory of Economic Development* (1911).

2.24 Nonetheless, "economic development", as it is now understood, really only started in the 1930s when, prompted by Colin Clark's 1939 quantitative study, economists began realizing that most of humankind did not live in an advanced capitalist economic system. However, the great early concern was still Europe: namely, postwar European reconstruction and the industrialization of its eastern fringes - as exemplified by the pioneering 1943 article of Paul Rosenstein- Rodan and Kurt Mandelbaum's 1947 tome. It was only some time after the war that economists really began turning their concerns towards Asia, Africa and Latin America.

2.25 To this end, decolonization was an important catalyst. Faced with a new plethora of nations whose standards of living and institutions were so different from the European, modern development theory, by which we mean

the analysis not only of growth but also of the institutions which could induce, sustain and accelerate growth, began in earnest. Early development theorists - such as Bert Hoselitz, Simon Kuznets, W. Arthur Lewis, Hla Myint were among the first economists to begin analyzing economic development as a distinct subject.

2.26 The post-war formation of the United Nations - and its attendant agencies, such as the World Bank, the I.M.F., the I.L.O. and the various regional commissions - proved to be another important impetus. The commissioning of numerous studies by these institutions led to the emergence of a non-academic strand of development theory.

2.27 Development as Growth and Capital-Formation

Early economic development theory was but merely an extension of conventional economic theory which equated "development" with growth and industrialization. As a result, Latin American, Asian and African countries were seen mostly as "underdeveloped" countries, i.e. "primitive" versions of European nations that could, with time, "develop" the institutions and standards of living of Europe and North America.

2.28 As a result, "stage theory" mentality of economic development dominated discussions of economic development. As later made famous by Alexander Gerschenkron (1953, 1962) and, more crudely, Walt W. Rostow (1960), the stages theories argued that all countries passed through the same historical stages of economic development and that current underdeveloped countries were merely at an earlier stage in this linear historical progress while First World (European and North American) nations were at a later stage. "Linear stages" theories had been developed earlier by German Historicists, thus it ought not be surprising to find historians, such as Gerschenkron and Rostow, among its main adherents.

2.29 More enlightened attempts to arrive at an empirical definition of the concept of "underdevelopment", as exemplified by the work of Hollis Chenery, Simon Kuznets and Irma Adelman, led to the general conclusion that while there were not explicit "linear stages", countries tended nonetheless to exhibit *similar* patterns of development, although some differences could and did persist. The task of the development economist, in this light, was to suggest "short-cuts" by which underdeveloped countries might "catch up" with the developed and leap over a few stages.

2.30 By equating development with output growth, early development theorists, prompted by Ragnar Nurkse (1952), identified capital formation as the crucial component to accelerate development. The celebrated early work on the "dual economy" by Sir W. Arthur Lewis (1954, 1955) precisely stressed the role of savings in development. Early Keynesians, such as Kaldor and Robinson, attempted to call attention to the issue of income distribution as a determinant of savings and growth. Even modern Marxians such as Maurice Dobb (1951, 1960) focused on the issue of savings-formation.

2.31 Of course, savings could themselves be manipulated by government intervention - as Lewis had intimated and the Keynesians insisted. Indeed, earlier, Rosenstein-Rodan (1943) had argued that increasing returns to scale made government-directed industrialization feasible. The notion of turning "vicious circles" of low savings and low growth into "virtuous circles" of high savings and high growth by government intervention was reiterated by Hans W. Singer in his doctrine of "balanced growth" and Gunnar Myrdal in his theory of "cumulative causation". Thus, government involvement - whether by planning, socio-economic engineering or effective demand management - was regarded as a critical tool of economic development.

2.32 Other economists turned to international trade as the great catalyst to growth. Already Hla Myint, Gottfried Haberler and Jacob Viner had stressed this avenue - arguing along lines similar to the classical doctrine of Adam Smith that trade and specialization can increase the "extent of the market". However, earlier in the 1930s, D.H. Robertson had expressed his doubts on this account - and these were later reiterated by Ragnar Nurkse, H.W. Singer and Raúl Prebisch.

2.33 Social Aspects of Economic Development

Although capital-formation never really left the field, the meaning of the term mutated somewhat over time. T.W. Schultz, drawing upon his famous Chicago School thesis, turned away from physical capital accumulation to emphasize the need for "human capital" formation. This led to an emphasis on education and training as prerequisites of growth and the identification of the problem of the "brain drain" from the Third World to the First (and, as would later be stressed, from the private sector to government bureaucracies). W. Arthur Lewis and Hans W. Singer extended Schultz's thesis by arguing that social development as a whole - notably education, health, fertility, etc. - by improving human capital, were also

necessary pre-requisites for growth. In this view, industrialization, if it came at the cost of social development, could never be self-sustaining.

2.34 However, it was really only in 1969 that Dudley Seers finally broke the growth fetishism of development theory. Development, he argued, was a social phenomenon that involved more than increasing per capita output. Development meant, in Seers's opinion, eliminating poverty, unemployment and inequality as well. Singer, Myrdal and Adelman were among the first old hands to acknowledge the validity of Seers's complaint and many younger economists, such as Mahbub ul Haq, were galvanized by Seers's call to redefine economic development. Thus, structural issues such as dualism, population growth, inequality, urbanization, agricultural transformation, education, health, unemployment, etc. all began to be reviewed on their own merits, and not merely as appendages to an underlying growth thesis.

2.35 Particularly worthy of note was the resurrection of the work of Chayanov on the unique structures of peasant economies. Also emergent, in this period, was a debate on the very desirability of growth. E.F. Schumacher, in a famously provocative popular book, *Small is Beautiful* (1973), argued against the desirability of industrialization

and extolled the merits of handicrafts economies. As the world environmental crisis became clearer in the 1980s, this debate took a new twist as the very sustainability of economic development was questioned. It became clear that the very desirability of development needed to be reconsidered.

2.36 Structuralism and its Discontents

Before Seers's complaint, many economists had already felt extraordinarily uncomfortable with early development theory and the implicit assumptions behind "stages" reasoning. A new (or old - depending on one's vantage point) idea began to germinate - what may be loosely termed "structuralism". The "structuralist" thesis, succinctly, called attention to the *distinct* structural problems of Third World countries: underdeveloped countries, they argued, were not merely "primitive versions" of developed countries, rather they had distinctive features of their own. As mentioned, Chenery had argued a similar thesis, but nonetheless focused on the similarities of experience. The newer structuralists, in contrast, sought to bring attention to the differences. Albert O. Hirschmann (1958) was one of the early few

who stressed the need for country-specific analysis of development - as was stressed later by Dudley Seers.

2.37 One of these distinctive features was that, unlike European industrialization, Third World industrialization was supposed to occur while these countries existed alongside already- industrialized Western countries and were tied to them by trade. This, speculated a few, could give rise to distinct structural problems for development.

2.38 Coincidental with H.W. Singer, the UNCLA economist, Raúl Prebisch, formulated the famous "dependency" theory of economic development, wherein he argued that the world had developed into a "center-periphery" relationship among nations, where the Third World was regressing into becoming the producer of raw materials for First World manufacturers and were thus condemned to a peripheral and dependent role in the world economy. Thus, Prebisch concluded, some degree of protectionism in trade was necessary if these countries were to enter a self-sustaining development path. Import-substitution, enabled by protection and government policy, rather than trade and export-orientation, was the preferred strategy. Historical examples of government-directed industrialization, such as Meiji Japan and Soviet Russia, were held up as proof that

there was not only one path to development, as had been implied by the cruder "stages" theories.

2.39 The Prebisch-Singer thesis resounded particularly with Marxian thinkers - who identified elements of Rosa Luxemburg's and V.I. Lenin's arguments on imperialism in it. Breaking with savings-obsessed orthodox Marxian thinkers such as Dobb, Neo-Marxians such as Paul Baran, Paul Sweezy, A.G. Frank and Samir Amin took the Prebisch-Singer thesis, merged it the Luxemburg thesis, and drew it into the modern era. Many Third World governments adopted the language and policies of the structuralists and/or the Neo-Marxians in the 1960s and 1970s, and indeed, the movement seemed to have been eminently influential. "Neo-Colonialism", "core-periphery" and "dependency" were the catch-words of the day.

2.40 However, as time moved on, these policies seemed to fail to yield their promised fruit, and a Neoclassical (or, more accurately, Neo-Liberal) countermovement initiated by the lone voices of P.T. Bauer, I.M.D. Little, Deepak Lal, Bela Balassa, Anne Krueger and Harry G. Johnson began to gain more adherents. Their thesis was simple: government intervention did not only not improve development, it in fact thwarted it. The emergence of huge bureaucracies and

state regulations, they argued, suffocated private investment and distorted prices making developing economies extraordinarily inefficient. In their view, the ills of unbalanced growth, dependency, etc. were all ascribed to too much government *dirigisme*, not too little.

2.41 In recent years, the Neoclassical thesis has gained greater adherence, particularly in Latin America. However, the evidence is still ambivalent and disputed. Both structuralists and counter-structuralists point to fast East Asian development and disastrous African experience as proofs of their directly opposing theses.

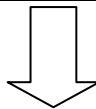
2.42 Theoretical link between industrial Economic and economic development

The theoretical linkage between Industrial economics and economic development is best realizable if one follows the theory of equating development with output growth- an early development theory, prompted by Ragnar Nurkse (1952), in which case capital formation is identified as the crucial component to accelerate development. This gets us to the relationship which is given in the figure over leaf.

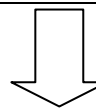
2.43 The basic conditions that prevail within the economy from both the demand and supply side determines the markets structure that eventual prevails within that economy-be it

perfect competition, monopolistic competition, monopoly or even oligopoly. Bearing in mind that the main goal of business is to make profit and survive, the prevailing markets structure influences the need for venturing into Research and Development or generally to acquire improved technology which in turn lowers the cost of production. This important of innovation is captured in the conduct aspect of our paradigm. The final issue of performance is where economic development is directly measurable. Better performance will be manifested through improved productivity thus increasing the choice of consumers as well stabilizing the prices which naturally are some of the indicators of development.

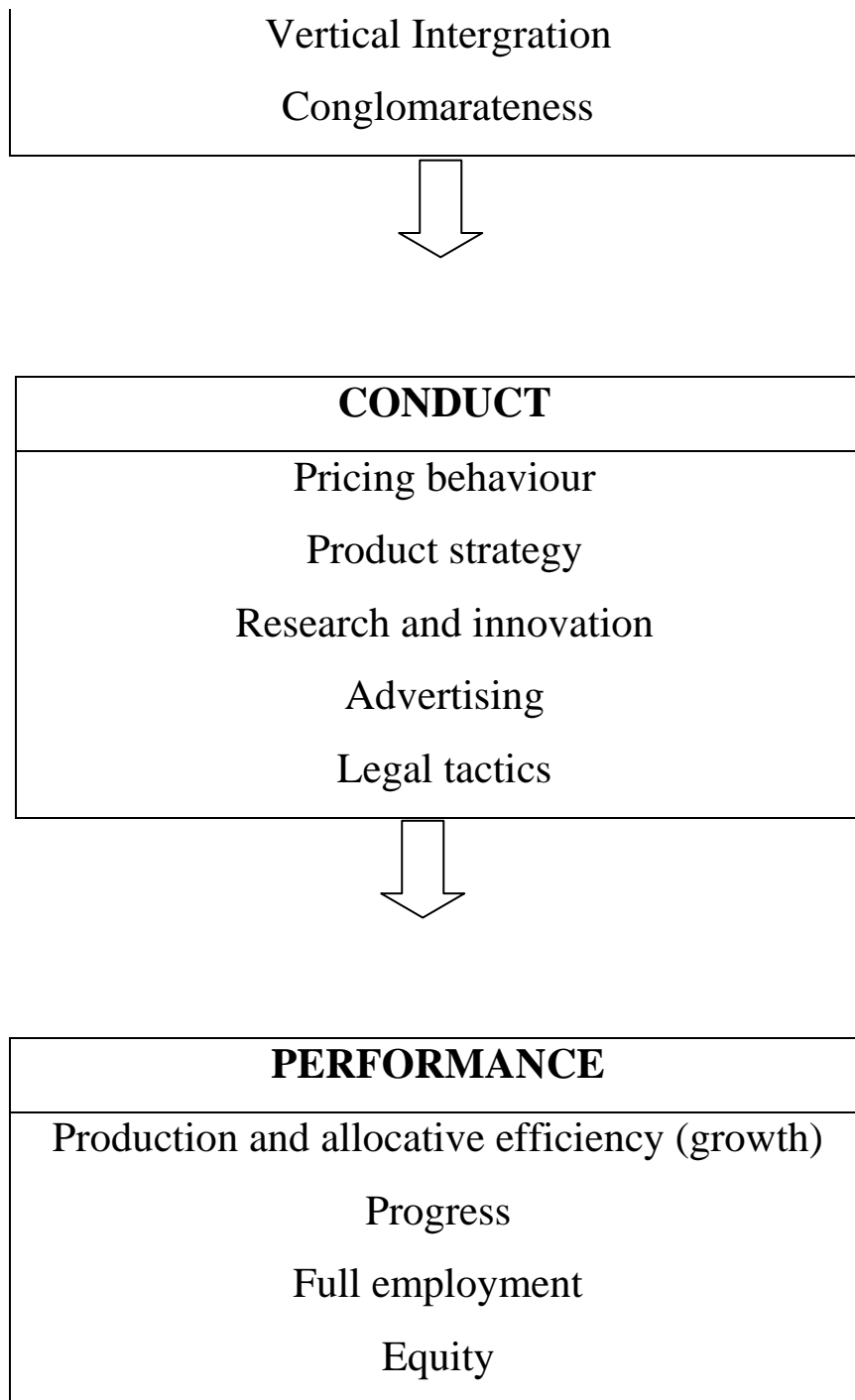
| BASIC CONDITIONS | |
|-------------------------|---------------------------------|
| SUPPLY | DEMAND |
| Raw materials | Price elasticity |
| Technology | Rate of growth |
| Product durability | Substitutes |
| Value/Weight | Marketing type |
| Business attitudes | Purchase method |
| Unionisation | Cyclical and seasonal character |



| MARKET STRUCTURE |
|------------------------------|
| Number of sellers and buyers |
| Product differentiation |
| Barriers to entry |
| Cost structures |
| Vertical Intergration |
| Number of sellers and buyers |



| MARKET STRUCTURE |
|------------------------------|
| Number of sellers and buyers |
| Product differentiation |
| Barriers to entry |
| Cost structures |



3.0 Empirical Reveiw

3.1 In this section we bring together the empirical prose that has looked at the various facets of industrial economics

notably innovation as the prime driver of improved production systems which in turn positively affect economic development through enhanced industrial performance. At first glance, the approaches may seem disparate in that they cover different subjects using different approaches and methodologies.

3.2 However, what links this generation of empirical prose is the focus on change as a central phenomenon. Innovative activity, one of the central manifestations of change, is at the heart of much of this work. Entry, growth, survival, and the way firms and entire industries change over time are linked to innovation. The dynamic performance of regions and even entire economies is linked to how well the potential from innovation is tapped.

3.3 The contributions included in this volume can be grouped based on a number of perspectives and lines of research. These perspectives span the firm, the industry, the region, and the country, as well as the interactions among all of these

3.4 The Startup of New Firms

Why are new firms started? The traditional, equilibrium-based view is that new firms to an industry, whether they be startups or firms diversifying from other industries, enter when incumbent firms in the industry earn supernormal profits. By expanding industry supply, entry depresses price and restores profits to their long-run equilibrium level.

3.5 Thus, in equilibrium-based theories entry serves as a mechanism to discipline incumbent firms. The papers in this section probe empirically this characterization of entry. They also develop and evaluate alternative characterizations of entry based on innovation and costs of firm growth.

3.6 Paul Geroski in “What do we know about entry,” distills a series of “stylized facts and results” from the empirical literature on entry. Four-digit SIC industries regularly experience substantial entry by small startup firms. These firms have high failure rates, and survivors often take more than a decade to reach the size of incumbents.

3.7 Entry within industries tends to occur in bursts that are related to innovation but are not closely tied to the

profitability of incumbents, and entry has limited effects on industry price-cost margins and incumbent behavior. Geroski concludes that entry is less a mechanism for keeping prices down and more a mechanism for bringing about change associated with innovation.

3.8 In “Spin-Offs and the New Firm Formation Process,” David Gavin analyzes the circumstances that lead employees of incumbent in USA firms to start their own firms in an industry. In reviewing evidence from a large number of industries, he finds such “spin-offs” are more likely in younger industries whose technology is more embodied in human rather than physical capital and which are composed of more specialized market niches.

3.9 In a chapter from his book, *Innovation and Industry Evolution*, David Audretsch analyzes the factors that influence the rate of new firm startups. He finds that such startups are more likely in industries in which small firms account for a greater percentage of the industry’s innovations. This suggests that firms are started to capitalize on distinctive knowledge about innovation that originates from sources outside of an industry’s leaders.

3.10 In “Entry, Industry Growth and the Micro-Dynamics of Industry Supply,” J. Hause and G. Du Reitz develop a theory of entry based on firm costs of adjustment to growth. Consistent with their model, they find that entry is greater in industries subject to greater growth in employment.

3.10 Sources and Implications of Diversity

Market competition *is* generally thought to pressure less efficient firms either to copy their more successful rivals or to exit. Thus, strong selection forces exist to reduce diversity among firms in the same industry. Nevertheless, considerable diversity exists within industries. The papers in this section explore the nature, sources, and implications of this diversity.

3.11 Walter O , in his article “Heterogeneous Firms and the Organization of Production,” Walter O asks why firms vary in size within industries and why larger firms are more capital intensive, have higher capital utilization rates, invest more in new equipment, and employ more educated, salaried, and full-time workers who receive more training and greater wages and fringe benefits.

3.12 Size differences are related to the types of needs firms service. Differences in internal structure are related to differential abilities of entrepreneurs and the need for entrepreneurs to monitor workers. More able entrepreneurs head larger firms and have a higher opportunity cost to monitor workers and thus engage in various practices to economize on monitoring costs, which includes using more capital intensive methods of production and employing better quality and thus more highly compensated workers.

3.13 Wesley Cohen and Steven Klepper explore the sources of variation within industries in the intensity of firm R&D efforts, defined as the ratio of R&D expenditures to size. They conjecture that variations in R&D intensity reflect differences in the expertise possessed by firms and the effect of firm size on the returns from R&D. Modeling the acquisition of expertise as a random process; they show how their theory can explain a number of features of the distributions of firm R&D intensities within industries.

3.14 The theory also provides a non-causal explanation for long- observed relationships across industries in mean R&D intensity, market concentration, and the coefficient of variation of R&D intensity and for the inverse relationship across firms between R&D productivity and

size.

3.15 The Size Distribution of Firms

While in most industries firms periodically change rank in terms of their size, the size distribution of firms within industries and even whole economies almost always assumes a predictable form, which is highly positively skewed. The papers in this section explore the dynamic process that could give rise to such a distribution.

3.16 In “The Size Distribution of Business Firms,” Herbert Simon and Charles Bonini continue a tradition initiated by Robert Gibrat in which the growth of firms is conceptualized as a random process. They show that if in each period the distribution of firm growth rates is the same for all firms above a minimum size and the birth rate of new firms *is* constant over time, then a positively skewed steady-state size distribution emerges that conforms closely with industry and economy firm-size distributions. The parameters of the distribution for each industry provide a natural way to measure industry market structure, and departures from the predicted size distribution at small firm (or plant) sizes provide a way of inferring the minimum efficient size firm (or plant).

3.17 Using data for the steel, petroleum, rubber tire, and automobile industries for various periods, in “Entry, Gibrat’s Law, and the Growth of Firms” Edwin Mansfield probes the stochastic framework used by Simon and Bonini. He shows that allowing the probability of failure and the variability of firm growth rates to decline with firm size can accommodate his findings that the mean and variance of firm growth rates among surviving firms declines with size. He also finds support for a model in which the probability of firms changing rank in an industry’s size distribution declines with the age of the industry and the degree of inequality of the industry’s size distribution.

3.18 In the last paper in this section entitled “Selection and the Evolution of Industry,” Boyan Jovanovic develops a model in which the stochastic factor underlying firm growth rates is noisy signals about relative firm efficiencies. Young firms have less experience and respond more sensitively to signals, which Jovanovic shows can account for smaller firms having higher probabilities of failure and higher and more variable growth rates. The theory can also explain other patterns, including why more concentrated industries tend to have more stability over time in firm rates of return, greater

variability in firm rates of return at a moment in time, and higher rates of return enjoyed by larger firms.

3.19 Growth

As the selections in the prior section indicate, firm growth patterns can provide discriminating evidence regarding the forces shaping industry market structure. The papers in this section dig deeper empirically into the firm growth process in order to develop a greater understanding of the forces governing the firm-size distribution and industry market structure.

3.20 In “The Relationship between Firm Size and Firm Growth in the U.S. Manufacturing Sector,” Bronwyn Hall explores growth patterns among publicly traded manufacturing firms. She demonstrates that the tendency for mean firm growth rates to decline with size is robust to two econometric problems that could spuriously contribute to this pattern—errors in measuring firm size and sample selection due to small firms having higher failure rates.

3.21 In “The Growth and Failure of U.S. Manufacturing Plants,” Timothy Dunne, Mark Roberts, and Larry Samuelson investigate further the size-growth relationship

as well as other influences on the mean and variance of growth rates using Census data on all U.S. manufacturing plants. They find that the failure rate and the mean and variance of the growth rate for nonfailing plants decline with size and age for both plants owned by single and multi-plant firms.

3.22 When all plants, including failing plants which are assigned a growth rate of—100%, are considered, however, the patterns change. Their most striking finding is that for plants owned by single-plant firms mean firm growth rates continue to decline with size, but for plants owned by multi-plant firms the decrease of failure with size overwhelms the decline in growth rates with size for non-failing plants, leading the mean growth rate for all plants to increase with size for larger and older plants. These older and larger plants of multi-plant firms have distinctively low failure and high growth rates.

3.23 In the third paper, “Gibrat’s Legacy,” John Sutton reviews theoretical and empirical work on firm growth and failure rates and on the firm-size distribution and develops a stochastic model for the firm-size distribution that can accommodate the most distinctive patterns. His model is similar to Simon and Bonini’s but relaxes their growth assumption by assuming only that firm growth in absolute

terms (not the rate of growth) is a nondecreasing function of firm size. His model yields a lower bound relationship for the firm-size distribution that is well satisfied by industries in the UK, US, and Germany. The model implies a positively skewed firm-size distribution, with industry concentration dependent on the extent to which absolute firm growth increases with firm size.

3.24 Survival

Growth is one aspect of the performance of firms. Another that is closely linked to growth is survival. The papers in this section explore empirically the characteristics of entrants and the industries that enter that influence survival.

3.25 In “New Firm Survival: New Results Using a Hazard Function,” David B. Audretsch and Talat Mahmood find that the survival of new establishments in the manufacturing sector depends on establishment and industry conditions. The hazard of exit appears to be related to the degree of scale economies in an industry, with the hazard greater the more capital intensive the industry entered and the smaller the establishment at entry relative to an estimate of the industry’s minimum efficient size plant. The hazard of exit is also greater in more

innovative industries and when unemployment is high.

3.26 These relationships hold principally for new startups rather than diversifying entrants, suggesting environmental conditions are most determinative of performance of new firms.

3.27 In “Life Duration of New Firms,” Jose Mata and Pedro Portugal find that for Portuguese entrants, the length of survival is a function of entrant and industry characteristics. Similar to Audretsch and Mahmood, they find that larger entrants survive longer, but the (estimated) size of the minimum efficient firm in the entrant’s industry does not affect survival. They also find that the growth rate of the entrant’s industry positively affects the length of survival.

3.28 Thomas Holmes and James Schmitz in “On the Turnover of Business Firms and Business Managers,” analyze the determinants of the length of survival and the likelihood of ownership transfers among U.S. small business mainly organized as sole proprietorships. They develop a model in which businesses are heterogeneous on two dimensions: the quality of the business, and the quality of the match between the skills of the owner/manager of the business

and the needs of the business, with both subject to temporary random shocks over time.

- 3.29 They show that the model can explain detailed aspects of how the age of the business, the tenure of the current owner, and whether the owner was the founder affect the hazard of discontinuance of the business and the hazard of an ownership change in the business, suggesting that heterogeneity among small businesses plays a key role in shaping their fates.
- 3.30 In the last paper of this section, “The Role of Technology Use in the Survival and Growth of Manufacturing Plants,” Mark Doms, Timothy Dunne, and Mark Roberts exploit data on 17 advanced production technologies to analyze how technology usage affects survival and growth among manufacturing plants in five two-digit SIC manufacturing industries in which the technologies are used.
- 3.31 Similar to other studies, older and larger firms have higher survival rates and lower growth rates, and this persists even after controlling for differences across plants in their capital intensity, productivity, and technology usage. Larger firms tend to be more advanced technologically, more capital intensive, and more productive, all of which

independently contribute to longer survival and greater growth.

3.32 A possible explanation for all these findings which is reminiscent of Walter Oi's model is that firms differ in terms of managerial efficiency, which conditions their size, productivity, and technology choices.

3.33 Productivity

Improvements in productivity drive economic growth. At the aggregate level, growth results from “active learning,” which contributes to productivity improvements within firms, and from market selection or “passive learning”, which leads to reallocation of output across firms.

3.34 The papers in this section explore these two mechanisms. They analyze the effects of entry, exit, and differential firm growth rates on aggregate productivity growth. They also probe the factors that influence productivity growth within firms, including industry conditions and ownership changes.

3.35 Martin Neil Baily, Charles Hulten, and David Campbell in “Productivity Dynamics in Manufacturing Plants,” decompose total factor productivity growth in manufacturing industries into productivity growth of continuing plants, entrants, and exits. Although surviving

entrants eventually have greater productivity than exiters, initially their productivity is comparable to exiters.

3.36 Combined with the relatively small outputs of both groups, exit and entry contribute little to aggregate productivity growth. Among continuing plants, they find that the productivity rankings of plants persists over time, which is consistent with plants differing in terms of management quality as discussed in the papers by Oi and Doms, Dunne, and Roberts. Over time, continuing plants with higher productivity gain market share, which is an important contributor to aggregate productivity growth along with improvements in productivity within plants.

3.37 In “Productivity Growth in Chile and Columbia: The Role of Entry, Exit, and Learning,” Lili Liu and James R. Tybout examine total factor productivity growth in manufacturing industries in Chile and Columbia in the late 1970s and early 1980s. During this period, Chile experienced a severe recession and experienced a financial crisis whereas Columbia experienced more mild cyclical swings.

3.38 Their findings are similar to Baily, Hulten, and Campbell in that continuing plants differed considerably in productivity and output was allocated over time to higher

productivity plants, and entry and exit did not contribute much to growth in aggregate productivity. In contrast to Baily, Hulten, and Campbell, however, they find some periods in which higher productivity firms were more likely to exit.

3.39 This may reflect that financial factors such as liquidity are more determinative of survival than productivity during business cycles and financial crises. They also find that reallocations of output among continuing plants contributed less to aggregate productivity growth than in the United States.

3.40 In “Entry, Innovation and Productivity Growth,” Paul A. Geroski explores the factors that account for differences in total factor productivity growth across U.K. manufacturing industries over the period 1970-1979. He finds that total factor productivity growth varied greatly within industries over time, suggesting that high industry productivity growth did not persist over time.

3.41 Industries that introduced more innovations and secondarily experienced greater domestic entry on average sustained higher productivity growth, whereas industries subject to greater international entry sustained lower

productivity growth. Entry was interpreted as a measure of competition, and the effects of domestic entry were interpreted as indicating that greater competition spurs productivity growth. Various explanations were offered to reconcile why international entry was associated with lower productivity growth if entry in general spurs innovation.

3.42 In the final paper of the section, “Productivity Changes in Ownership of Manufacturing Plants,” Frank R. Lichtenberg and Donald Siegel analyze the relationship between total factor productivity and ownership change. Focusing on relatively larger U.S. manufacturing plants that continued producing over the period 1972-1981, they find that the total factor productivity of acquired plants was below their industry average prior to acquisition and declined relative to the industry average for a number of years prior to acquisition.

3.43 In contrast, after acquisition the total factor productivity of the acquired plants increased relative to their industry average for a number of years. Similar to the matching model in Holmes and Schmitz’s paper on small businesses, they attribute these patterns to a process in which plants are transferred to new owners to improve the match

between the skills needed to manage the plant and the skills of the owner of the plant.

3.44 Persistence

Are industry leaders better able to retain their positions over time in certain types of industries, and if so why? Are there particular circumstances that undermine the leaders? The selections in this section explore these questions, focusing particularly on how innovation affects the persistence of leadership.

3.45 In “Preemptive Patenting and the Persistence of Monopoly,” Richard Gilbert and David Newbery explore the circumstances under which a monopolist will preemptively patent an innovation to deter entry by a challenger. They consider innovations that are not drastic in that both the challenger and incumbent would compete if the challenger innovated first.

3.46 For such innovations, they show that the incumbent will commit to an R&D strategy in which it develops and patents the innovation first assuming that the incumbent earns greater profits from monopolizing the innovation than allowing the challenger to innovate first and then competing with the challenger. To be credible, such a strategy may require the incumbent to commit to the R&D

needed to develop the innovation even if it is profitable not to employ the innovation once produced.

3.47 In “Uncertain Innovation and the Persistence of Monopoly,” Jennifer Reinganum introduces uncertainty regarding when the incumbent’s and challenger’s efforts to develop the innovation will succeed, with greater spending expected to speed up the time of successful innovation. Prior to successful innovation, the incumbent enjoys monopoly profits and thus has a greater amount to lose than the challenger from earlier innovation.

3.48 Consequently, for drastic and near-drastic innovations, the incumbent spends less than the challenger on R&D and therefore is less likely than the challenger to innovate first. Thus, uncertainty in the innovation process can undermine the incentives for industry leaders to maintain their leadership over time.

3.50 In “Uncertain Innovation and the Persistence of Monopoly: Comment,” Richard Gilbert and David Newbery argue that in Reinganum’s model it is not uncertainty per se that undermines the tendency for incumbents to maintain their leadership, but rather other assumptions that differ from theirs, especially regarding the timing of moves in the R&D game. Reinganum

assumes simultaneous R&D choices by incumbent and challenger. They show this renders entry deterrence unprofitable and consequently Reinganum's conclusions follow even with no R&D uncertainty.

3.51 “In “Uncertain Innovation and the Persistence of Monopoly: Reply,” Jennifer Reinganum acknowledges that the order of play is the key distinction between her model and Gilbert and Newbery's, but questions the usefulness of modeling incumbents as having first mover advantages. Even if incumbents can make preemptive commitments, she argues *it* is the mechanism underlying such commitments and not the patent system, as Gilbert and Newbery claim, that is responsible for the persistence of industry leadership.

3.52 Finally, in “Preemptive Patenting and the Persistence of Monopoly: Reply,” Richard Gilbert and David Newbery show that allowing the challenger to be more efficient at R&D than the incumbent will not necessarily undermine the incumbent's incentive to preempt the challenger. They assume that the incumbent can bargain with the challenger over monopoly rights to the product and also over the sources of the challenger's advantage.

- 3.53 Assuming the transaction costs of the latter do not exceed the transactions costs of the former, the incumbent will secure the basis for the challenger's advantage and preempt the challenger as long as transaction costs do not exhaust the benefits of preemption.
- 3.54 In excerpts from his book, "Profits in the long run," Dennis Mueller investigates empirically the extent to which industry leaders maintain their profitability over time. He finds considerable persistence in above and below average firm rates of return over the period 1950-1972 among the largest firms in the U.S. economy.
- 3.55 Estimated long-run firm rates of return were regressed on industry concentration and estimated firm long-run market shares, entered both alone and interacted with industry advertising and R&D intensity, to explore the determinants of persistent profitability. The estimates indicate that firms with greater market share earned persistent above average returns in (only) advertising and R&D intensive industries.
- 3.56 These findings suggest that R&D (and advertising) competition contributes to greater persistence in industry leadership.

- 3.57 In “Explaining the attacker’s advantage: technological paradigms, organizational dynamics, and the value network,” Clayton Christensen and Richard Rosenbloom consider the kinds of innovations in disk drives that favored entrants over industry leaders. In contrast to various theories, they find that nonincremental innovations that required new types of technical expertise or that altered the interrelationship of components did not consistently undermine the leaders.
- 3.58 Industry leaders sometimes pioneered these innovations and entrants and lesser incumbents later adopted them, suggesting that it was not the ability of the leaders to preempt challengers, as in Gilbert and Newbery’s model, that enabled them to maintain their position. Innovations that were pioneered by entrants and undermined incumbents were ones that led to new types of disk drives that appealed primarily to new users.
- 3.59 In contrast to Reinganum’s model, these innovations were not drastic in that they did not challenge the sales of incumbent firms, and thus incumbents did not have less incentive than challengers to develop them. Christensen and Rosenbloom explain their findings as reflecting that the attention of firms tends to be captured by their customers, which makes incumbents slow to pursue

innovations opening up new markets.

3.60 *Evolution and Horizontal Market Structure*

A number of the papers attest to the considerable turnover of firms that typically occurs in industries. They also indicate that in certain types of industries a few firms capture a large market share and maintain it over time. The papers in this section explore the factors which affect the number of firms in an industry and the market share of the leading firms.

3.61 In “The Evolution of New Industries and the Determinants of Market Structure,” Steven Klepper and Elizabeth Graddy analyze the evolution of the number of producers and industry output and price in 46 narrowly defined new product industries.

3.62 Characteristic of the product life cycle, the products exhibit an initial rise and then shakeout in the number of producers and also a dampening over time in the percentage growth in output and fall in price. These patterns are explained using a model that features random, persistent firm cost differences, limited firm growth and imitation of more efficient rivals, and sunk entry costs.

3.63 The share of output accounted for by the industry's leaders in the model is determined by the pace and severity of the evolutionary process, which is shaped by systematic factors governing firm growth and imitation and stochastic factors conditioning the cost advantage of the early leaders.

3.64 In "Industrial Organization and New Findings on the Turnover and Mobility of Firms," Richard Caves notes how the new findings on business turnover suggest, consistent with Klepper and Graddy, the importance of both stochastic and systematic factors in shaping an industry's market structure. Industries that are R&D and advertising intensive appear to be especially susceptible to becoming oligopolies.

3.65 In Sutton's model of endogenous sunk costs the returns to both R&D and advertising depend on the size of the market, which is similar to Klepper's model of the industry life cycle in which the returns to R&D depend on the size of the firm. In both models, an escalation process occurs in which successful firms expand their R&D and/or advertising, enabling only the largest firms to survive and thus contributing to the evolution of an oligopolistic market structure. Both models are consistent with

Mueller's findings on the persistence of firm profits.

- 3.66 As Sutton recounts in Chapter 4 of his book, *Sunk Costs and Market Structure*, his model implies that as the size of the market increases, the share of output accounted for by the leaders will decline to zero in industries characterized by production scale economies but will be bounded away from zero in advertising intensive industries. He tests this prediction by examining the market structure of 20 food and drink industries in six countries of varying size.
- 3.67 Consistent with the theory, in the largest countries the lower bound of the share of output accounted for by the leading firms approached zero in the less advertising intensive industries but remained well above zero in the advertising intensive industries.
- 3.68 In chapter 2 of his book, *Scale and Scope*, Alfred Chandler recounts the emergence in the late nineteenth and early twentieth century of the large industrial enterprise. Such enterprises were concentrated in the food, chemicals, petroleum, primary metals, machinery, and transportation equipment industries. They exploited economies of scale and scope made possible by new methods of production and integrated into marketing and distribution, the supply

of inputs, and R&D to exploit fully the potential of the new production technologies.

3.69 Firms that were first to make the large capital investments and establish the necessary organizational structures to manage the new large scale enterprises were difficult for latecomers to compete with because of the large investments needed to match their efficiencies and the uncertainty inherent in such investments. Their industries evolved to be oligopolies which they dominated for many years, pointing again to the role played by marketing/advertising and R&D in shaping industry market structure.

3.70 In the last selection in this section, “Technology and market structure,” John Sutton explores why all R&D intensive industries do not experience an escalation process that leads to an oligopolistic market structure. He shows that such a process will not necessarily occur if besides improving the quality of existing products, R&D can be also be used to develop new product varieties with distinctive markets.

3.71 This is consistent with Christensen and Rosenbloom’s findings that incumbent firms are slow to develop new product variants appealing to new users. Consistent with

the theory, the four-firm concentration ratio among R&D intensive manufacturing industries is consistently high when the leading product of the industry accounts for a large percentage of its sales but can be quite low in industries in which no product commands a large share of the industry's sales.

3.72 Regional Evolution

The preceding sections provide both a theoretical framework as well as empirical evidence suggesting that the evolution of firms and industries play an important role in generating new knowledge and commercializing that new knowledge.

3.73 It is the drive to deviate from the existing products and processes — to innovate -- that makes what appears to be a stable industrial structure when viewed from a static framework actually remarkably turbulent when viewed through the dynamic lens described in the previous sections.

3.74 In fact, the capacity for an economy to generate and commercialize new knowledge is the driving force in the new economic growth theory. This new growth theory, posited by Paul Romer and Paul Krugman, among others,

focuses on the positive externalities associated with knowledge.

- 3.75 In these theories, which have been supported by a wave of empirical studies, there is an important paradox associated with the knowledge externality. This paradox involves the geographic dimension. Knowledge spills over from the source where it is produced, but at the same time the geographic extent of the spillover is geographically bounded. An important implication is that geographic proximity is important in accessing knowledge spillovers.
- 3.76 This insight from the new economic growth theory means that geographic space, as well as product space, plays a key role in the production and commercialization of new economic knowledge. In particular, regions represent a different unit of observation in which knowledge is organized and innovative activity occurs.
- 3.77 The first article in this section focuses on “Growth in Cities” and is by Edward L. Glaeser, Hedi Kallal, Jose A. Scheinkman and Andrei Schleifer. They link the performance of economic activity to the organization of economic activity for a geographic unit of observation — the city. Economic performance is measured by the growth rate of the city.

3.78 They provide systematic evidence that the growth rates of cities are shaped by the underlying organization of economic activity. In “Innovation in Cities: Diversity, Specialization and Localized Monopoly,” Maryann P. Feldman and David B. Audretsch provide systematic empirical evidence demonstrating that the dynamic economic performance of cities, measured in terms of innovative activity, is shaped by the underlying structure of economic activity in terms of (1) greater diversity and less specialization, and (2) a greater degree of competition within the city.

3.79 Diversity apparently promotes innovative activity because it is complementary differences that generate valuable knowledge spillovers across economic agents. Competition among firms for the ideas embodied in these economic agents results in a greater degree of innovative activity.

3.80 The final paper of the section, by Glenn Ellison and Edward L. Glaeser, examines “Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach.” Ellison and Glaeser introduce a model in which localized industry-specific spillovers, natural advantages, and pure random chance all contribute to geographic concentration.

3.81 They then test the hypothesis that observed levels of geographic concentration exceed those expected to occur solely due to random chance. The empirical evidence provides a strong confirmation that localized spillovers play an important role in shaping the geographic concentration of industries.

3.82 As for the first two papers of this section, Ellison and Glaeser's results suggest that the geography plays an important role in explaining the evolution of industries, especially in industries where knowledge plays an important role.

3.83 Learning and Adaptation

The performance of firms can improve over time as firms learn about how to perform better and also as the mix of firms changes. The former type of improvement has been dubbed "active learning." It can result from "learning by doing" in which firms discover how to do things better through experience in production. It can also result from firms exploring how to improve their performance through activities such as research and development.

3.84 The latter type of improvement has been dubbed “passive learning.” As modeled by Jovanovic, it can occur through a process of selection in which less efficient firms exit as they learn through experience about their relative efficiency. The papers in this section explore these two types of learning.

3.85 The first article is a seminal contribution by Michael Spence on “The Learning Curve and Competition.” Spence considers the nature of firm and industry evolution when firms learn by doing, which causes the firm’s unit costs to fall over time as a function of its cumulative output.

3.86 Spence shows that the true marginal cost of production in each period for a monopolist with a limited horizon and a zero discount rate is its marginal cost of production at the end of its lifetime, which it should equate with its marginal revenue in each period to maximize its profits. He considers the evolution of the number of producers when there are multiple potential entrants with exogenously determined entry times and bounded learning. Using different equilibrium concepts, he shows that a moderate rate of learning yields the most concentrated industry structure.

- 3.87 In “The Learning Curve, Technology Barriers to Entry, and Competitive Survival in the Chemical Processing Industries,” Marvin Lieberman considers the importance of learning by doing in the entry and survival of producers in 39 chemical product industries. If costs decline with experience, then potential entrants should be at a greater disadvantage the larger the cumulative output of incumbent firms.
- 3.88 The likelihood of entry, however, was not related to the cumulative output of incumbents, which Lieberman attributes to widespread technology licensing in most of the products. The hazard of firm exit was greater the larger the cumulative output of the leading producer, though, suggesting that learning did affect firm performance.
- 3.89 In “Selection versus evolutionary adaptation: Learning and post-entry performance,” John Baldwin and Mohammed Rafiquzzaman consider how learning affected the survival and growth of *de novo* entrants in the Canadian manufacturing sector. They find that the performance of entrants improved through the greater exit of less efficient entrants and to a limited extent through the improvement in the performance of surviving entrants. The latter type of

learning was greater in industries in which the initial performance of entrants relative to incumbents was worse.

3.90 In “New Firm Survival and the Technological Regime,” David Audretsch also considers the survival of *de novo* entrants into the U.S. manufacturing sector. He finds that over a 10-year period the survival rate of entrants was lower in industries which were more capital intensive and in which the leading firms were larger (a proxy for the degree of production scale economies).

3.91 Alternatively, survival rates were greater in industries in which smaller firms had higher innovation rates relative to larger firms, suggesting that technological opportunities play an important role in enabling entrants to compete with incumbent firms. These effects were not apparent for shorter periods, suggesting that it takes some time before entrants can assess their competitive standing.

3.92 In the last paper in this section, “Empirical Implications of Alternative Models of Firm Dynamics,” Ariel Pakes and Richard Ericson consider the importance of active and passive learning. They distinguish between the two types of learning according to whether cross-sectional variations in firm size are related to initial firm size after controlling

for cross-sectional variations in firm size in the immediate past.

3.93 Using data for Wisconsin firms in the manufacturing and retail sectors for the period 1978-1986, they find support for passive learning in retailing and active learning in manufacturing, which suggests greater volatility in relative firm profitability over time in manufacturing than retailing.

3.94 In summing up it has been empirically shown that innovation plays an integral role in the performance of an industry as it improves the production systems and in turn lowers the cost of production. It has however been equally shown that firms are more innovative in an environment where there is competition, in other words when the market is more free.

4.0 The case for Zimbabwe

4.1 Zimbabwe's manufacturing sector has historically played an important role in the economy. As a well diversified and strongly linked with other sectors of the economy, particularly agriculture, mining and construction,

manufacturing has been contributing significantly to gross national output, export earnings and employment.

4.2 The diversity of the sector has a historical legacy which came as a response to international sanctions, imposed in 1965 to the Rhodesian regime. The sanctions compelled the regime to embark on widespread controls on both external and internal trade. At independence in 1980, the new Government thus inherited a highly controlled economy.

4.3 During the rest of the decade after independence, most of these controls were maintained. In practice, the policy was one of import substitution (IS) similar to that of many other developing countries. The centerpiece of the IS policy was regulation of foreign trade. All foreign exchange earnings and capital inflows had to be surrendered to the Reserve Bank, and the distribution of foreign exchange to importers was mainly done administratively through the Direct Local Market Allocation (DLMA).

4.4 Companies were allowed to apply twice a year for the right to import certain goods and services. The DLMA worked as a system of import quotas where the size of the

quotas varied over time. One consequence of the DLMA was that once companies were in the system they could be quite certain to continue receiving foreign exchange allocations. The reason was that imported inputs are required for production so removing companies from the DLMA for a year would have had devastating effects on the manufacturing sector.

- 4.5 Since there by definition was a shortage of foreign exchange, this made entering the DLMA quite difficult. As a result there were relatively few firms entering and exiting the manufacturing sector, making turnover-based productivity gains small or nonexistent.
- 4.6 Since practically all investments in Zimbabwe require imported capital goods, a consequence of the import controls was that the authorities effectively controlled investments as well. In view of the excess demand for foreign currency generated by the IS strategy, the only sensible investment policy was to channel import licenses to a limited numbers of producers of each type of good.
- 4.7 This resulted in the creation of a number of oligopolistic and monopolistic markets; in mid-1980s about 50% of all goods manufactured in Zimbabwe were produced by one

company and 80% by three companies or less (UNIDO 1986). Hence, Zimbabwean producers were not only protected from international competition but also from domestic competition. To restrain firms from taking advantage of their market power, price controls were widely used.

4.8 These were in general based on cost-plus, and permissible margins were gazetted. An implication of the price controls was that for many firms higher costs meant higher profits in dollars. Selling the goods was usually not a problem because rationing generated excess demand. The economic structural adjustment program was launched at the end of 1990. Two of its major components were trade liberalization and deregulation of domestic markets.

4.9 Government control over allocations of foreign exchange and import licenses was to be dismantled gradually over five years by sequentially putting import goods on an Open General Import License (OGIL) list; such goods could be imported in any quantity without import permits.

4.10 However, the original plan was altered after a couple of years and OGIL was replaced by the Export Retention Scheme (ERS) as the main policy instrument. The ERS

allowed exporters to retain part of their export earnings in the form of import certificates and sell these at a market-determined price. During the course of the reform the foreign exchange allocations were reduced, and in January 1994 the DMLA, ERS, and OGIL were all abolished. Since then the exchange rate has been determined largely by market forces, although with occasional interventions by the Reserve Bank.

4.11 The creation of a foreign exchange market implied that restrictions on domestic demand for imports disappeared, and that local companies became exposed to foreign competition. Nevertheless, some protection remained in the form of import tariffs, although they had played a minor role before liberalization.

4.12 The average tariff rate was only about 20%, but the structure was complicated and the maximum rate was 90% (for cars). In addition there was an import surtax of 20% (RPED, 1993). Apart from a reduction in the surcharge to 10% in 1994, there was little advance in tariff reform until 1997 when a new tariff system was introduced with the aim of removing distortions in the old regime.

4.13 The deregulation of the domestic markets included removal of the price controls in the goods market, reduction of government's involvement in wage setting and introduction of new labor regulations making it cheaper and easier to retrench employees, and liberalization of the financial markets. Substantial progress was made in all these areas: Almost all price controls were abolished during the first years of ESAP.

4.14 The labor market underwent profound changes already in 1990, as wages in general became determined by collective bargaining and retrenchment no longer required ministerial approval (Ncube, 1998). And in the financial markets, the majority of the interest rates were deregulated already by 1991. A remarkable improvement was realized as industry responded to the regulation. Manufacturing contributed close to 30% OF GDP by 1992.

4.15 However, from the late 90s, Zimbabwe's industrial sector like any other sectors of the economy has been swimming through a frozen ocean making her manoeuvring techniques fall short from being able to take her to the shores of the sea. The Zimbabwean economy is now currently getting close to a decade in a recession, with no signs of recovery.

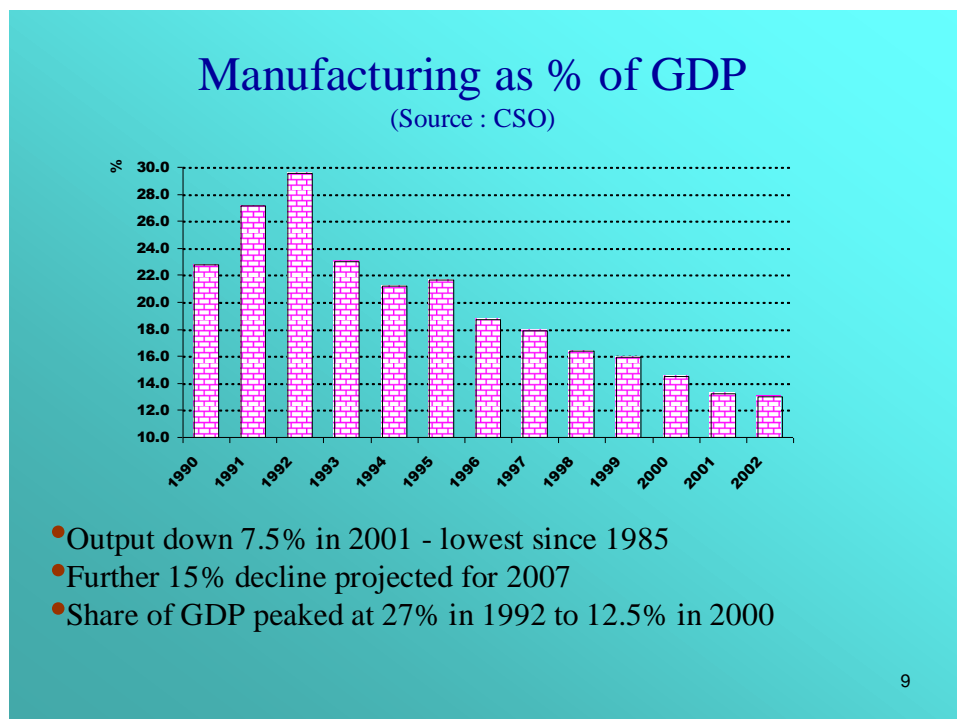
4.16 The causes of the crisis are complex, as they have economic, political and social dimensions. Unemployment is currently estimated at a historic high of over 70 percent, while year-on-year inflation is over 1200%. These problems have negatively affected the operations of the manufacturing sector,"

4.17 The industrial sector has been seeing its contribution to the GDP falling with each successive year. Several reasons have been cited include *inter-alia*

- Poor economic policy choices
- Policy inconsistency
- Constraints from poor state or inadequacy of infrastructure – roads, electricity, coal, railways, fuel
- Continuing suspicions between Business and Government
- Low business confidence
- High country risk factor
- Excessive foreign currency shortage making procurement of raw materials difficult
- Successive droughts which have seen the limited foreign exchange being prioritized for importation of food than raw materials
- Unutilized industrial capacity

- Uncertainty on property rights
- Uncertainty surrounding the land reform
- Poor performance of the agricultural sector

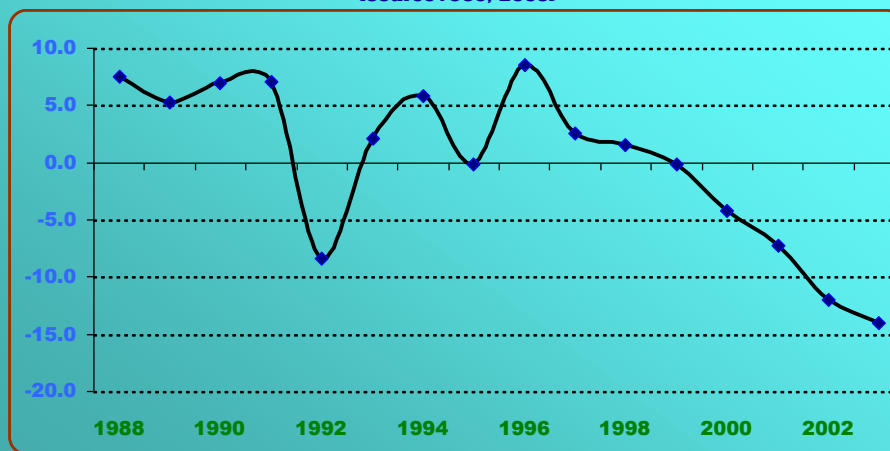
4.17 The figure below indicates the performance of the manufacturing sector from 1990.



4.18 Overallly the GDP figures of the country have also been falling in tandem with the poor performing manufacturing sector. This is shown by the figure below.

Overall GDP Growth 1986 - 2003

(Source : GSO, 2003)



7

4.19 In concluding this section, the Zimbabwean manufacturing sector does not have any better prospects for as long as the economic environment has not been improved to ensure the existence of basic conditions that promote the venturing into acquisition of technology which improves the production systems.

5.0 Implications on policy

5.1 Poor industrial performance is easily noticeably as its effects tend to impact more on economic development through depleted production base which protrude out of the bag through increasing inflation levels, company closures, high unemployment, a huge budget deficit as the

tax base shrinking. However the process of poor industrial performance cascades from our basic conditions, market structure, conduct performance paradigm.

5.2 I am certainly sure that it will become the first miracle in the world if we put through soil into a grinding and we get maize-meal as our output. In the same way, an upset of the basic conditions under which industry performs results in alterations to the existing market structure which in turn affect the conduct of the firms and overall we get poor performance.

5.3 All the problems that have been sited above as some of the problems affecting the manufacturing sector in Zimbabwe fall under the basic conditions as identified by Bain(1956) in the seminal theory of Industrial economics-the **Structure-Conduct-Performance –Paradigm.**

5.4 The preceding sections of this volume have laid out the building blocks of a strikingly different view of the organization of firms and industries than is offered by conventional economics. A coherent framework emerges where the evolution of firms and industries over times is shaped by the drive to innovate. At the heart of this new framework is the process of change.

- 5.5 What emerges is a view of the organization of firms and industries in motion, where new firms are started to commercialize new ideas, many of those new firms fail, fewer of them survive and prosper, and even fewer rise to become dominant firms in new industries.
- 5.6 How does the role of public policy differ between the more conventional view of industrial economics and the evolutionary framework provided in this volume? Under the traditional view, the role of public policy is to provide a mechanism for reaping the gains yielded by large-scale production while mitigating abuses associated with market dominance.
- 5.7 The policy debate in the literature has focused on antitrust (competition policy in Europe), regulation, and public ownership. What these three instruments have in common is that they all constrain the freedom of firms to contract.
- 5.8 The role of public policy towards business is strikingly different when viewed through the dynamic lens of this evolutionary framework. Rather than focusing on mechanisms to constrain firms, public policy is oriented towards creating institutions and linkages that generate and commercialize new knowledge. Thus, in the evolutionary

view the role of public policy is essentially enabling in nature.

5.9 This very different view of public policy becomes clear in the final section of the Volume, which is devoted to the role of public policy. The first paper, by Wesley M. Cohen and Steven Klepper, examines “The Tradeoff between Firm Size and Diversity in the Pursuit of Technological Progress.” Cohen and Klepper identify a potential role for public policy in generating a diversity of approaches by facilitating the startup of new firms.

5.10 They suggest that diversity or heterogeneity across firms is an important force in generating innovative activity. However, given the scale advantages associated with size, industries will tend to have too little diversity without the injection of diversity by new firms. Public policy can make an important contribution in generating diversity by promoting the startup of new firms. In “Some Lessons from the East Asian Miracle,” Joseph Stiglitz explains how public policies in East Asia contributed to rapid growth and development.

5.11 Stiglitz points out that public policy in most East Asian countries had three essential goals — developing technological capabilities, promoting exports, and building

the domestic capacity to manufacture a range of intermediate goods. He then argues that a set of policies were implemented that rather than trying to replace markets, as has been the case in the former Soviet Union, public policy was instead oriented towards creating markets where they did not exist and complementing existing markets. In addition, there was targeted investment in education and the production and commercialization of knowledge.

5.12 The final paper is a summary of a series of studies investigating the impact of national systems of innovation on the dynamic performance of countries. In “National Innovation Systems: A Retrospective on a Study,” Richard R. Nelson describes how national policies help shape the dynamic performance of countries.

5.13 There are three important lessons learned from Nelson’s collection of studies that are instructive for the role that public policy can play in guiding the processes of innovation, industry evolution, and economic development.

- The first is that the innovative capacity of a country is shaped not by a narrow technology policy but rather by a much broader range of institutions and

policies influencing a broad spectrum of the economy.

- The second is that the process by which firms and industries evolve over time is strongly influenced by that national system of innovation.
- The third is that there is no singular superior national system of innovation; rather each country tends to develop a unique set of institutions that yield a particular innovative advantage.

5.14 Taken together, these three articles included in this section make a strong case not only that public policy can play an important role in shaping the direction of economic development, but that the appropriate role of public policy is very different in an evolutionary context than in a static one. These papers show that public policy needs to.

5.15 In light of the empirically approved role of public policy in ensuring greater industrial performance, it is proposed that:

- The authorities take it upon their shoulders to create an environment that promotes the continued existence of industry.
- Improve efficiency in transport services and utilities

- Improve link between SIRDC and industry to translate research into commercial products
- Restore business confidence through policy consistency
- Adopt tariff structure that supports import substitution & value addition through enhancing importation of technology
- Revamp the agricultural sector to ensure its feeding role to the manufacturing sector is restored thus promoting growth
- Establish a clear exchange rate policy that is fair for all economic agents that are part to the transaction.
- Removal of price distortions

6.0 Conclusion

6.1 From the afore-analysis it has been ascertained that though economic development takes a whole lot of achievements ranging from health, leisure, low infant mortality rates and equity among a battery of other requirements, economic growth as measured by the real changes in Gross domestic product remains an important indicator of the subject. In that regard there is great need that Zimbabwean authorities

realize the role played by industrialization in achieving economic growth.

The country has not much to show in the way of contemporary industrialization, including agricultural development. The attainment of food security has remained elusive, because the country has not reached adequate levels of agricultural productivity, nor made significant investments in downstream processing or other related agro-based industries.

6.2 The lack of industrial development results in high levels of unemployment which have led to the brain drain of varying magnitudes in different sectors of the economy. A large number of universities have been established at great national cost, but lack of industrialization makes it impossible to offer to the high level of trained manpower relevant employment opportunities to sustain or retain them. University graduates, if trained in science and technology (S&T) related disciplines and provided with adequate incentives and facilities, could constitute the national force for driving innovation.

6.3 The attainment of certain thresholds of scientific and technological competence enhances the innovation

capability of a country to compete globally and to rank among the leading global knowledge societies.

6.4 Successful modern day industrialization requires:

- an environment that promotes and fosters innovation;
- input resources, including scientific and technological expertise;
- investment capital; and
- narrowing the digital divide through acquisition of information and communication technologies (ICTs).

6.5 For a country to pursue an effective strategy toward industrialization, there is need to build consensus in policy formulation process so that all the requirements for policy implementation are identified and agreed upon by all stakeholders. Setting realistic priority targets should accompany the process.

6.6 It is important that all parties to the dialogue commit themselves to upholding the policy guidelines agreed upon. Relevant government departments should be assigned specific roles to play in furthering policy implementation.

6.7 The policy framework should make appropriate provisions to facilitate buy-in options for private sector stakeholders

and should include provisions for promoting and sustaining technological innovations to raise agricultural productivity and support downstream processing and other related agro-industries as these will in turn give the big push to industrialization-a pre-requisite for economic development

6.8 It is also important to launch a national industrialization drive which has to be under-girded by a strong innovation policy framework. There may be an initial requirement for a programme that facilitates capacity building in technological competencies that will support the absorption of imported technology to use under license or after paying patents fees.

6.9 There may also be a need to promote the diffusion of newly acquired/developed or adapted technology among the relevant stakeholder constituencies. The economic dividends accruing from such knowledge-based production systems can bring about economic development in a society.

6.10 The current aggressive competition in global markets can best be met by developing a strong national innovation culture. Most products now have short life cycles on the

market and need to be constantly upgraded so as to maintain their market appeal. The ability to constantly re-engineer product lines by innovation increases the prospects of scoring comparative market advantage.

6.11 A sustained innovation programme requires that R&D be promoted and adequately funded. Such a measure will sharpen the technical literacy of the country and more specifically R&D professionals. Adequate remuneration packages and other incentives would help to retain national talent so that they can focus on generating innovation products that can contribute to economic development.

6.12 The state should therefore provide an enabling environment to allow R&D institutions and industry to interact freely and creatively. A system of incentives, including tax incentives, should be used to encourage the involvement of the private sector in funding R&D work.

6.13 Universities, research institutions and entrepreneurs should be encouraged and supported to access overseas training to develop the expertise and technological capacity to meet the national requirements for innovation. This goal can be attained if the policy and priority instruments are supported at the highest levels of government.

6.14 To ensure that the innovation system operates to facilitate sustainable economic and industrial development, the policy framework must ensure that there is a balance between basic, applied and nationally targeted research. National needs are best met if innovation stimulates greater productivity and diversification of product lines.

Without industrialisation economic development shall remain elusive.

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