QUO VADIS: MACROECONOMICS IN THE 21ST CENTURY

by

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ABSTRACT

This paper explores the new frontiers and evolving transformation of macroeconomics in the 21st century. It confronts the challenges and underlines the opportunities during the decades ahead. The context of this transformation in macroeconomics will be dictated by the realities of the new global economy.

The new economy is comprised of a trilogy of interactive forces that include globalization, trade liberalization and the information technology and communications revolution. Globalization has melted national borders and redefined macroeconomic policy. Free trade has enhanced economic integration and extended the macroeconomic architecture. The information and communications revolution has made geography and time irrelevant and enhanced the reach of macroeconomic parameters.

The 21st century will lead to a rediscovery of Schumpeterian theory. Indeed, the pivotal role that Schumpeter assigned to entrepreneurship and innovation will underline the relevance of his economic theories and intellectual vision for the new global economy. In addition, Schumpeter’s theoretical framework will become the catalyst for linking microeconomic foundations with macroeconomic theory.

The new global economy will influence in a profound and indelible manner the scope and substance of macroeconomics in the 21st century. It will also define the role that macroeconomists will play in the context of the structural transformation of the academic landscape and the emerging new institutional architecture. Alternative macroeconomic approaches will become more prominent. This transformation of macroeconomics during the 21st century will lead to the rediscovery of the value of institutional economic history and the history of economic thought. It will contribute to resolving the confrontation and the dichotomy between the quantitative school and the qualitative approach. This paper will also analyze the distinctive role that macroeconomics will play in the resurgence of interdisciplinarity and the emergence of new disciplinary synergies.
Retrospective

In order to look to the future one must necessarily glance at the past. This paradigm has stood the test of time. Indeed, it is not coincidental that the Roman god Janus, after whom the first month of the calendar year January is named, is always depicted with two faces, one in the front of his head looking forward and one in the back looking backwards. He was the guardian of doors and gates who presided over new beginnings.

It is appropriate that we commence this prospective analysis of macroeconomics with a retrospective glance at the past. There is no denying that macroeconomics has always been in a constant state of evolution, transformation and technical refinement. The history of macroeconomic thought attests to the structural changes in philosophical orientation and theoretical direction that have taken place over the past centuries. Indeed, I would be remiss if this retrospective did not underline the pivotal contributions of the economic giants who shaped the theoretical transformation and temporal evolution of the discipline through the centuries. Intellectual visionaries such as Adam Smith in the 18\textsuperscript{th} century, David Ricardo in the 19\textsuperscript{th} century and John Maynard Keynes and Joseph Alois Schumpeter in the 20\textsuperscript{th} century.

The classical roots of economics in the 18\textsuperscript{th} century were the brain child of Adam Smith who set the foundations for modern day economics. His seminal work under the title of “An Inquiry into the Nature and Causes of the Wealth Nations” (1776) captures the essence of his contributions to economic theory. In this book he proposed the benefits of the division of labour (specialization) and developed the theory of laissez-faire economics through the workings of the market mechanism (price system). He is widely known as the originator of the concept of the invisible hand where markets would guide economic activity like an invisible hand in the efficient allocation of resources. Prices would be the instrument for achieving this process. A center piece of Smith’s economic theory was the pivotal role of economic self-interest. This along with the theory of utilitarianism that Jeremy Bentham developed around the same time was instrumental in launching the neoclassical theory of the 20\textsuperscript{th} century. The neoclassical theory emphasized the allocation of scarce resources among competing demands. In this felt swoop, economics was transformed into a science of “rationality”. During this journey economics embraced the application of mathematical models and modern statistics. Furthermore, in its contemporary version, neoclassical theory maintains that individuals, households and corporations pursue their best interests in a rational manner and that competition is the catalyst that forces prices, wages and the markets for goods and services to gravitate towards equilibrium.

David Ricardo developed two important economic theories that have stood the test of time, the distribution theory and the international trade theory. He argued that an increase in population would lead to the cultivation of more land. However, the return from this land would not be constant as the amount of capital available would not grow at the same rate. In consequence diminishing returns would set in. Ricardo introduced the concept of economic rent whereby extra land that was brought into cultivation would become more and more marginal in terms of profitability and eventually returns would not be enough to attract any additional capital. In short, the allocation of each factor of production to each area of economic activity would therefore be determined by the level of economic rent that could be earned. As the economic rent declined due to diminishing returns, capital would shift to more profitable activities. In his parallel theoretical contribution, Ricardo’s theory of international trade concentrated on the concept of comparative advantage. A country would gain from international trade if it was more efficient and incurred a lower cost in the production of some goods and services. Ricardo proved that if one country
produced a good at a lower opportunity cost than another country, then it should specialize in that good. The other country would therefore specialize in another good and the two countries could then trade. If all countries specialized in producing those goods and services where they had a comparative advantage, then world economic welfare would be enhanced.

John Maynard Keynes became the most prominent economist of the twentieth century. His best known work was “A General Theory of Employment, Interest and Money” (1936). This book marked the birth of modern macroeconomics. His economic theories were a blueprint for post World War II economic policies. He introduced a greater role for government in the economy through fiscal and monetary policy in order to avoid the Great Depression of the 1930s from ever happening again. Keynes’ publications are considered the most coherent critique of the classical economic theories at that time. Keynesian economics is primarily about demand-management policies whereby government should actively intervene in the economy to manage the level of demand. It can do this most effectively by implementing counter-cyclical demand management fiscal and monetary policies and in consequence mitigate the adverse effects of the business cycle on such economic variables as unemployment and inflation. Keynes is undeniably the founding father of modern day macroeconomics.

Joseph A. Schumpeter was a contemporary of Keynes who emphasized the importance of microeconomic theories. Author of many books including the “Theory of Economic Development” (1912) and “Business Cycles” (1939). He emphasized the role of innovation and entrepreneurship in contributing to economic growth and introduced such terms as business strategy and creative destruction to the economic literature.

The Monetarist school of thought emerged at the University of Chicago as the brain child of Nobel lauriat Milton Friedman. It advocates that changes in the money supply are the most effective instrument of government economic policy and the main determinant of the price level. Monetarist theories maintain that inflation is caused by expanding the money supply faster than the economy. This theory prescribes restraints in money supply growth and government expenditure as the cure for inflation, even though the immediate effect would be an increase in the unemployment rate.

The prevalence of neoclassical economics in the latter part of the 20th century precipitated the emergence of heterodox economics which included Marxist economics, the school of Austrian economics which does not subscribe to the neoclassical foundation that economies necessarily gravitate towards equilibrium, as well as post-Keynesian economics which underline the importance of uncertainty in economics. Furthermore, the incapacity of mainstream theory to address some of the contemporary economic and social issues has forced the development of sub-disciplines such as gender economics, environmental economics, transition economics, multicultural economics and the economics of jurisprudence to name but a few. Finally, among the array of modern economic theory schools is one that subscribes to the evolutionary theory which adheres to a vision of economics that is similar to the evolving biological systems and includes as one of its founders Thorstein Veblen.

**New Economy**

The new frontiers of macroeconomics and the role that macroeconomists will play in the 21st century will be determined by the evolving challenges and opportunities of the new global economy. Indeed, the new global economy will influence in a profound and indelible manner the scope and substance of macroeconomics in the 21st century. The new global economy has
transformed the economic, social, educational and political landscape in a profound and indelible manner. Never before in human history has the pace of structural change been more pervasive, rapid and global in its context. The new economy is composed of a trilogy of interactive forces that include globalization, trade liberalization and the information technology and communications revolution. Globalization has melted national borders and redefined macroeconomic policy. Free trade has enhanced economic integration and extended the macroeconomic architecture. The information and communications revolution has made geography and time irrelevant and enhanced the reach of macroeconomic parameters. Furthermore, the new economy is built on a culture of innovation. Indeed, the signature mark of the new global economy is new ideas, new technologies and new initiatives.

Economic growth and development in the new global economy has been preceded by a complex structural realignment of the investment streams, the clustering of business enterprises, the transformation of the production process, the adoption of a niche marketing approach and the emergence of a new landscape of economic architecture. Furthermore, it has necessitated the effective integration of state-of-the-art technologies in the domain of information and communications in order to enhance competitive advantage in the forum of international trade. All of this has resulted in the fundamental restructuring of economic society. The role of innovation as a catalyst that drives the engine of economic growth needs to be acknowledged as a fundamental postulate of the new global economy. Furthermore, the pivotal role of a country’s human resources and the unique economic value of its human capital endowment reflected in the educational attainment and technical skills of its population is an essential prerequisite for empowering the new economy and facilitating the integration of labour in the knowledge based industries. Life long learning and the continuous upgrading of skills as well as the structural reorganization of the work place have become essential parameters of a country’s contemporary economic profile. The knowledge based economy is fuelled by technology, human capital and research and development which contribute to accelerating levels of productivity and economic performance. In short, the fuel of the new economy is technology and its currency is human capital. The product of the new economy is knowledge and its market is the virtual marketplace of the internet. Global opportunities require competitive tax levels, investment in research and development, an emphasis on education and training and industrial clusters of excellence all geared towards world wide niche markets of the new global economy. All of this delineates the new intellectual parameters for macroeconomics in the 21st century.

The structural transformation of the new global economy has not been confined to the economic parameters. It is equally pervasive in the way we live, learn, work, invest, provide for our health care, entertain ourselves, exercise our democratic responsibilities, influence the formulation of public policy and communicate with each other. Public services, banking, education, health care and electronic commerce are at the forefront of the Information Revolution with the capability of accessing information, services and products from around the world almost instantaneously. The rapidity of change and the magnitude of the structural transformation are the hallmarks of this new economic revolution. A pace of change that is unprecedented in the history of humankind. The information and communications technology of the 21st century has made possible the contraction of time and space. The new information and electronic capabilities are defining the new parameters and advancing the frontiers of economic connectivity.

Globalization
Globalization is not a new concept. It has evolved and mutated over the centuries to reflect the priorities and ambitions of different generations. The global outreach of nations for geopolitical, economic, military and trade benefits has transgressed the centuries and embraced almost every country in the world. From time immemorial the process of globalization has taken different forms and proceeded in different directions. Through the discovery and exploitation of new found lands, through the military conquest and annexation of adjacent territories and through the signing of contemporary multilateral free trade agreements, the process of globalization has been an uninterrupted continuum in the evolving history of mankind. This steady progression of globalization has found expression in the geopolitical and economic ambitions of military, economic and political superpowers by means of wars, mercantilism, colonization, political and economic supremacy and more recently through international economic liaisons and multilateral trade agreements. In short, history bears testimony that the pursuit of globalization was at times accomplished with the power of the sword on the battlefield, or through a coup d’état that sent tanks rumbling down the streets, or more recently through the stroke of a pen on an international agreement. The contemporary phase of globalization reveals that it has many dimensions - economic, social, political, cultural, religious and environmental. All of these dimensions are congruent to the new thrust of globalization in a borderless world with a tremendous capacity for virtual connectivity.

A working definition of economic globalization can be summarized as the global integration of economies through trade and investment flows as well as the internationalization of the production of goods and services in order to enhance global competitiveness. Other capsulated definitions include the process of accelerating international integration of markets that result in an integrated global market without national economic borders. More specifically the economic profile of globalization includes the development of global corporations and global networks, the widespread internationalization of all forms of economic activity in production, marketing, consumption, capital, standards and tastes, a rapid growth in intra-firm and intra-network trade of components and sub-assemblies as well as finished products leading to a much higher level of specialization, the development and wide diffusion of lean production methods and a much greater disaggregation and even disintegration of production, the migration of labour-intensive, standard-technology production, - including components, sub-assemblies and finished products - to low-wage economies, the “brain drain” or migration of highly educated and skilled labour to countries of advanced information technology, the successful integration of a multinational and multicultural workforce in order to strategically deploy the economic and social benefits of diversity, the re-orientation of large-scale production in high wage economies from economies of scale to economies of scope; the shortening of product cycles, placing a high premium on innovation, product quality and niche marketing; the integration of outside financial and other services into the production cycle; and the rapid growth and diffusion of service and knowledge-intensive activities—both products and processes—particularly in advanced industrial economies.

Globalization has been driven by technological change and financial liberalization and sustained by an appreciation among policy makers that an open, liberal and rules-based international trading and financial system is essential to global economic progress. The new economy has become truly global in scope and substance. The free flow of capital, labour, goods and services within free trade regions, the development of new financial instruments and institutions, instantaneous access to information and communication through the new digital networks, have created a fully integrated global economic system of tremendous scope and
opportunity and achieved a higher level of international economic inter-dependence and linkages than ever before.

**Trade Liberalization**

The second axiom of the new economy is trade liberalization. The prevailing philosophy in favour of trade liberalization is based on the export led growth model which espouses the economic benefits of exports to the national economy in the form of employment creation, income generation and as a contributor to economic growth. Indeed, the concept of trade as an engine for growth has been an economic paradigm with a long history and an endowed legacy that has been passed down from the trade theorems of the nineteenth century.

There is no denying that in the contemporary context, most countries around the world have endorsed the principle and signed on to the potential economic rewards from global trade liberalization. This has taken the form of a strong policy commitment toward public declarations that protectionism is over and a strong expression of intent to dismantle the walls of protectionist tariffs, quotas and all forms of barriers to international trade. The contemporary vision of the new global economy embraces the promotion of a free trade environment that encourages trade across national borders of goods and services, the transfer of intellectual property and the unregulated flow of capital. In this respect, the modern phase of free global trade promotes an ambitious agenda that includes not only trade and payments, but the whole gamut of international transactions that will effectively create an open, competitive and stable international environment.

One of the most striking differences between the new economy and the one that preceded it is found in the magnitude and rapid movement of international capital flows. Capital account liberalization, the development of new financial instruments and the new digital technologies have created a fully integrated capital market of tremendous scope and substance. Indeed, a major force driving the growth of international trade and investment has been the liberalization of global financial transactions as well as exchange and capital controls. Furthermore, technological and financial innovation has triggered a demand for more appropriate international exchange and payment systems. It has also necessitated a more acute emphasis on the development of sound financial systems, compliance with the principles of good governance and the implementation of sound fiscal and monetary macroeconomic policies. In some countries, such as transition economies, this has meant adopting a comprehensive program of economic reforms that involved the development of domestic financial markets and institutions and the adoption of consistent macroeconomic policies. This in sharp contrast to historical precedent that relied heavily on administrative controls to regulate international exchange and payments as well as capital transactions.

The larger volume of private capital flows has generated a greater reliance on interbank markets to coordinate the supply and demand of foreign exchange. The trend toward adopting more flexible market based exchange rate arrangements has been partly responsible for the contemporary movement towards currency convertibility. As countries eliminated exchange restrictions for current international transactions and liberalized capital movements, they created conditions conducive to the development of domestic foreign exchange markets where exchange rates could be determined more flexibly. The increase in capital flows has placed a premium for countries to adhere to consistent monetary and exchange rate policies, in most cases, the policy response to capital inflows has involved allowing more flexibility in exchange rate arrangements.

Trade liberalization is predicated upon a favourable domestic economic climate and
enhanced international competitiveness for domestic products. In this regard, national attentiveness to a balanced approach of government revenue and expenditures within its fiscal policy and the pursuit of a monetary policy that aggressively monitors inflation levels within a predetermined acceptable corridor is perceived as the most appropriate policy mix for promoting economic growth and enhancing free trade. In short, the complementarity of an enlightened approach to both fiscal and monetary policies can enhance the international competitiveness of domestic products in the global economy.

Trade liberalization has been aggressively pursued in the recent past at the multilateral and bilateral level. The cumbersome and time consuming process of reaching agreements at the multilateral level particularly through United Nation institutions such as the World Trade Organization (WTO) and its predecessor the General Agreement on Tariffs and Trade (GATT) has led to the exploration of alternative forums for international trade agreements. Countries have found it more convenient and expedient to organize their multilateral free trade agreements within geographic regional trading blocks. In addition, to regional trading blocks such as the European Union and the North America Free Trade Agreement there are several other regional common market trading blocks. The Common Market of South America, the Andean Pact, the Central American Common Market, the Caribbean Common Market, the Southern Africa Customs Union and the Common Market for Eastern and Southern Africa. In addition regional economic agreements include the Asia-Pacific Economic Cooperation and the Association of South East Asia Nations.

Regional free trading arrangements such as those mentioned above can contribute to economic efficiency, trade, investment and economic growth. They are also substantial contributors to structural reform by creating incentives to eliminate restrictive trade practices and licensing procedures, streamlining customs procedures and regulations and integrating financial markets. Also regional trading blocks can promote the simplification of transfers including payment and procedure policies related to transportation, infrastructure, labour and immigration and in some countries harmonizing investment regulation incentives, tax treatment, as well as standards and technical regulations.

The dynamics of contemporary trade flows are significantly different from the traditional patterns of international trade. The world has witnessed electrifying changes in the nature and character of international trade. By and large, international trade in its contemporary phase has been dominated by transnational corporations which account for more than two-thirds of world trade. Consequently, there has been a significant increase in intra-firm trade which amounts to about 40 per cent of total trade. Furthermore, the internationalization of production has resulted in a growing vertical specialization in world trade. As a result, there has been a marked increase in the use of imported inputs or components in the production of goods exported from developing countries. In this respect, if an increase in exports is the result of an increase in imports, then the net effect of trade would largely depend upon the structure of exports and imports, import content of exports, terms of trade and crowding-out effects, among other things. In short, the traditional theoretical models of international trade require a measure of renewal in order to reflect the current nature and dynamics of trade flows.

The increasingly interconnected global economy requires the active promotion of international economic cooperation, free and fair trade opportunities for developed and developing countries, the reform of the international financial system, maintaining the momentum for structural economic reform and encouraging economic growth and the eradication of poverty.
in the poorest countries. All of this within the overriding objective of sound macroeconomic conditions and strong non-inflationary growth.

**Information Technology**

The information technology revolution has profoundly altered the structural parameters and the modus operandi of most national economies. Indeed, the transformation from the industrial age to the information age has resulted in the restructuring of the work environment, the creation of new economic institutions and a reconfiguration of the macroeconomic system. There is no denying that the role of information and communications technology in the new economy has been pivotal. This is particularly true of the changing structure of international production. In this context, firms are integrating the production and marketing of goods and services across national borders. International economic transactions that were formerly conducted between independent entities are now being internalized within a single firm or multinational corporation. The new technological infrastructure has empowered services to be delinked from production and traded or performed remotely. In this contemporary venue the market for a growing number of internationally integrated but geographically dispersed business enterprises is global, rather than national or regional. Indeed, the collapse of time and space through the medium of information/communications technologies has displaced the physical market with the virtual market of the internet for business to business and business to consumer transactions.

The production of goods and the provision of services in the new global economy continues to be dictated by the economics of profitability. In other words, the high cost of the information technology infrastructure and highly skilled labour used in the production process require a marketing niche that caters to a large global market than a small national market. It has also necessitated the introduction of the concept of mass customization and sensitivity to cultural diversity. This in addition to the logistical benefits of integrating production globally and forming international economic liaisons in a passive or aggressive manner through mergers, acquisitions, hostile takeovers, alliances and networks in order to bring under administrative control economic transactions that were previously conducted at arms length in external markets.

The new economy has precipitated a dramatic face lift in the workplace structure. It has replaced the rigid, hierarchical, top-down structure with a more flexible, horizontal, integrated workplace model. It has also spotlighted the three essential skill requirements of the information age. First, academic skills that provide the basic foundation to get and keep a job and to achieve the best results. Those include an ability to communicate effectively, think critically and continue to learn for life. Second, personal management skills such as the combination of positive attitudes, responsibility and adaptability. Those would include time management, individual accountability and meeting deadlines. Third, teamwork skills which require a personal disposition to work with other members of a diverse and varied group of individuals. Indeed the greatest challenge and the most unique opportunity for new age managers is to garner the tremendous potential and remarkable creativity of a workforce environment that brings together human diversity as well as professional and occupational dissimilarity in a harmonious and productive workplace structure.
At the very heart of the information and communications revolution is the vital process of the commercialization of scientific discoveries and new inventions. There is no denying that the road well travelled from invention to innovation is long and fraught with many obstacles. It is not unusual for many inventions to be left behind because of obstacles in securing the necessary financial capital or adapting an invention to the economic realities of mass production. Indeed an invention that is the product of a new idea, extensive research and a successful laboratory controlled experiment does not guarantee that it will result in the launch of an innovation. An idea for a new product, a better product or a new process that meets all its specifications as a blueprint and results in a successful invention in a controlled environment may turn out to be an unprofitable undertaking in the world of mass production and global competition. Furthermore, in the modern world the Graham Bell’s, Thomas Edison’s and Guglielmo Marconi’s who endowed us with path breaking inventions practically singlehanded, are few and far between. Inventions today are more likely to be the product of a team effort and a concerted research and development initiative of some government laboratory, academic institution or a major corporation.

Economists are divided into two schools of thought regarding the process of inventions. The first school subscribes to the notion that inventions are an incremental and marginal process. The second school of thought argues that some inventions are the catalyst for abrupt structural change that permeates the economic landscape in a tidal wave of production realignments and technological clustering. Regardless of what school one subscribes to, there is no denying that the great inventions that took place during the Industrial Revolution between 1860 and 1900 had a profound impact on economic productivity and personal lifestyle. These inventions included electricity, the internal combustion engine, radio, the telephone, phonograph, motion pictures, the chemical and pharmaceutical industries, advances in entertainment, communications, urban sanitation and travel in the form of air and motor transportation. The Information Revolution has resulted in a new spurt of inventions with expansive structural changes and a significant economic transformation. It should be noted that at the start of the 21st century we are simply at the doorstep of a second significant cluster of innovations with a far reaching economic and social impact. The list of inventions ascribed to the new economy is still in its infancy but already it includes such significant inventions as computers, the internet and wireless telecommunications devices.

The impact of the Information Revolution has not been limited to the restructuring of the economy. It is equally pervasive in the way we conduct our social and personal lives as well as interact on a political and cultural level. The restructuring of the workplace has individualized the nature of work and has led to the disaggregation of labour. The nature of work has undergone radical change from permanent, full-time with very few job changes, to part time, contract work, responding to private and public sector out-sourcing, and a large number of job changes during one’s working career. In turn, this transformation of the work environment has diluted the concept of the welfare state and punched holes in the social safety net. The challenge facing macroeconomic public policy in the new economy is to find a way for flexible work and flexible employment to continue to support social security entitlements and programs.
Internetization

Internetization is a word that I have coined to capture the pervasive influence of the internet and the world wide web on all aspects of human endeavour for our society in the 21st century. It is a process that is empowered by the information and communications technology in a borderless world with a tremendous capacity for virtual connectivity. Hardly a day goes by when our individual and collective lives are not touched by some aspect of the information technology and communications revolution. From the way we shop, eat, dress, invest, travel, entertain ourselves, communicate with each other, access health care, or pay our bills. These are just a few of our routine daily functions that have been profoundly influenced by the process of internetization. We shop on-line, we access government services on-line, we book our travel itinerary on-line, attend church services on-line, we pay our bills on-line and we do our banking on-line. The electronic prefix that is appearing before an increasing number of our daily activities such as e-commerce, e-mail, e-learning and e-government is a tangible expression of the pervasive influence of the internet.

At the very heart of the information technology applications for the knowledge based sector of the economy is the widespread use of computers and robotics. A collateral benefit of this transformation has been the extraordinary scale of research and development in the quest for new applications to the advances in information and communications technology, the phenomenal growth of the software industry and related business services, the scale of investment in computerized equipment and in the telecommunications infrastructure as well as the rapid growth of niche markets for satellite and peripheral industries supplying information and communications technology products, specialized components and services.

Computers and avant garde software will play an increasingly important role in the intellectual transformation of macroeconomics and the statistical and mathematical applications of macroeconomic analysis and programming. This will be facilitated by data compression, high speed analysis and sophisticated programs. Indeed, the internetization of economics will pick up speed in the 21st century as research tools, electronic publishing and electronic communities become the standard for research methods, academic enquiry and the dissemination of knowledge.

Rediscovering Schumpeter

The ascendance of the new economy will lead to a rediscovery of the contemporary importance of Schumpetarian theories. Eclipsed during the second half of the twentieth century by John M. Keynes, Schumpeter’s theories will witness a revival on the economic landscape as a consequence of the recognition of the pivotal role for entrepreneurship and innovation in the new global economy. I predict that economic theory in the 21st century will harness Schumpeterian theories towards developing a new theoretical framework by linking Schumpeter’s microeconomic derivatives to the macroeconomic postulates for economic growth and development. This century will witness a renaissance and a rekindled academic interest in the intellectual vision and theoretical legacy of Joseph A. Schumpeter. It will also serve as a confirmation that at the dawn of the 21st century, Schumpeter’s intellectual and theoretical legacy on the pivotal role of entrepreneurship and innovation remains a vibrant analysis and laudable framework for determining the causal factors that promote economic prosperity and
Joseph A. Schumpeter along with John M. Keynes are widely regarded as the intellectual economic giants of the twentieth century. While Keynes may have received more intense recognition in the western industrialized countries, Schumpeter’s theories were applied with much success in Japan’s post World War II economic development. Schumpeter’s economic analysis is a bottom-up microeconomic interpretation of the business cycle, as opposed to the Keynesian top-down model, which accords transcendent importance to money, employment and other macroeconomic variables. Whereas Keynes emphasized monetary and fiscal policies as the tools for influencing the course of economic events, Schumpeter concentrated on the economic contributions of leading industrial sectors such as textiles in the eighteenth century, railroads in the nineteenth century and electricity in the twentieth century. There is another significant difference between these two economic philosophers. Keynes emphasized the role of government as an agent for economic stability and a positive and constructive force creating an appropriate fiscal and monetary environment that was conducive to economic growth and development. In this regard, Keynes introduced a revolutionary economic concept that opened the door for government intervention in combating the excesses of the business cycle by allowing fiscal and monetary policy to reduce inflationary pressures during boom periods and creating employment opportunities during economic recessions. Indeed, Keynes is aptly lauded for laying the ground work and articulating an economic blueprint which would influence future generations of economists and international policymakers. Schumpeter, on the other hand, was a more rigorous economic theoretician who was adamantly against applying economic theory prematurely to economic policy. Schumpeter, perhaps influenced by his personal experience as well as his trials and tribulations in government, felt that Keynes was exceedingly naive and that effective government action was far more tortuous than the Keynesian model postulates. That is why Schumpeter emphasized the predominance of sectoral economic analysis and the paramount importance of the entrepreneur as a catalyst for innovation and as the engine that drives economic growth and development. In his microeconomic scenario, innovation in the Schumpeterian model consisted of new products, new processes, new qualities of products, new sources of supply and new forms of business and industry organization.

**Scholarly Publications**

In 1912, Schumpeter published his second book *Theorie der Wirtschaftlichen Entwicklung* (The Theory of Economic Development). This was a pathbreaking book that linked Schumpeter’s name permanently with the pivotal role of the entrepreneur in contributing to economic growth within the capitalist system. McCraw captures the essence of Schumpeter’s theoretical model in this manner:

“In the hypothetical system he (Schumpeter) describes in this book, which begins with a ‘circular flow’ analogous to the static system of Walras and other neoclassicists, economic routine is periodically interrupted by bursts of entrepreneurial energy. These bursts come in clusters. Together they disrupt equilibrium, and this dynamic process, says Schumpeter, is the basis of economic development. More than that, it embodies the essence
of capitalism. Here, as in his later work, Schumpeter is primarily concerned with the phenomenon of economic evolution. Most economists, then and to this day, have contented themselves with the study of static systems of exchange governed by ‘laws’ of supply and demand. Schumpeter, on the other hand, as he himself later put it in a rare autobiographical letter, ‘began at an early age to look upon economic life essentially as a process of change, and I tried to make the main features of this change the center of my own type of theory.’ Hence his preoccupation with entrepreneurship. Hence also his careful specification of broad categories of development: the opening of a new market, the conquest of a new source of supply, the reorganization of an industry, the introduction of a new good or new way of production” (McCraw, 1991, 373-374).

Schumpeter’s third publication, The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle brought him international recognition for his intellectual vision and articulate expression of a systematic set of ideas regarding the role and contributions of entrepreneurship to the process of economic development. In his conceptual framework entrepreneurial initiatives would disrupt the tendency toward routine equilibrium by thrusting the economy towards a new plateau of economic linkages that was conducive to economic growth and a more prosperous standard of living.

In the Schumpeterian intellectual world the process of structural change is propelled by industrial activity. Hence the industrial structure has evolved over time through organizational development in a series of long evolutionary steps from crafts to factories to oligopolies. Essentially, it is a:

“process of industrial mutation .... that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one” (Schumpeter, 1942, 79).

It is in this context that he gives birth to his most famous phrase “creative destruction” by which he means the replacement of old products, old enterprises and old organizational forms by new ones. In his own words:

“This process of creative destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in” (Schumpeter, 1942, 83).

He also invented the term “business strategy” which is widely used to the present day in the board rooms of business corporations:

“Every piece of business strategy acquires its true significance only against the background of that process and within the situation created by it. It must be seen in its role in the perennial gale of creative destruction; it cannot be understood irrespective of it or, in fact, on the hypothesis that there is a perennial lull... In other words, the problem that is usually being
visualized is how capitalism administers existing structures, whereas the relevant problem is how it creates and destroys them” (Schumpeter, 1942, 83-84).

He goes on to explain that:

“In capitalist reality as distinguished from its textbook picture, it is not competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization” (Schumpeter, 1942, 110).

The rewards for this economic initiative are “entrepreneurial profits which are the prizes offered by capitalist society to the successful innovator” (Schumpeter, 1942, 132).

Economists regard *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capital Process* (1939) as Schumpeter’s most seminal contribution to economic theory. In this book, Schumpeter analyses the role of innovation as the foundation of the capitalist process. Indeed, he defines capitalism as a system in which innovation is the dynamo that leads to structural change and economic growth. Schumpeter charismatically articulates this concept in this manner:

“Without innovations, no entrepreneurs; without entrepreneurial achievement, no capitalist returns and no capitalist propulsion” (Schumpeter, 1939, 104).

**Schumpeterian Model**

Schumpeter was the first economist to challenge the classical model for economic growth in a systematic and profound manner. Classical economists from Adam Smith, David Ricardo and Thomas Malthus onwards promoted a model of economic growth that assumed the productive capacity of the national economy was characterized by a constant returns to scale production function (i.e. a doubling of factor inputs will yield a doubling of output) with diminishing returns to capital and labour setting in after a certain point. The second assumption was that firms operate in a world of perfect competition where business enterprises are price takers in a highly competitive market and whereby no individual firm has any influence over market prices and possesses absolutely no market power. The third assumption was that technological change is an entirely exogenous phenomenon, on par with wars and plagues, which is readily available to all countries at no cost.

In addition to challenging the first two assumptions of constant returns to scale and perfect competition, Schumpeter made a significant contribution to the economics of innovation and technological change. It was his pathbreaking economic vision that set the stage for a new perspective on innovation which embraces technological progress and new knowledge. In Schumpeter’s conceptual framework innovation accounts for any growth that cannot be explained by increases in capital and labour. It is noteworthy that
technological know how, manufacturing experience and research and development are acquired at considerable cost and once acquired such proprietary knowledge is valued as trade secrets or hedged in by patents and other intellectual property rights. There is no denying that economic history attests to the important role played by innovation in contributing to employment creation, income generation and the overall process of enhanced economic growth.

The Schumpeterian economic model rests comfortably within the parameters of the capitalist system. He postulated that capitalism provided the most effective means for realizing economic progress. In his own words:

“Capitalism is by nature a form or method of economic change and not only never is but never can be stationary. And this evolutionary character of the capitalist process is not merely due to the fact that economic life goes on in a social and natural environment which changes and by its change alters the data of economic action; this fact is important and these changes (wars, revolutions and so on) often condition industrial change, but they are not its prime movers. Nor is this evolutionary character due to a quasi-automatic increase in population and capital or to the vagaries of monetary systems of which exactly the same thing holds true. The fundamental impulse that acts and keeps the capitalist engine in motion comes from the new consumers’ goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates” (Schumpeter, 1942, 82-83).

Schumpeter promoted an economic vision that embraced a free-market entrepreneurial capitalism, characterized by minimal government intervention and an emphasis on technological innovation and savings rather than consumption. The operating mechanism that leads to productivity gains and economic growth is induced by technological innovation. There is no denying that improvements in technology such as the introduction of the internal combustion engine, electricity, semi-conductors, computers etc. have resulted in substantive increases in total factor productivity.

The economic forces that promote total factor productivity are many and varied. They encompass 1) better machines, tools and equipment 2) enhancing the education and specialized skills of the labour force 3) organizational changes and improvements in processes 4) more efficient ways of motivating workers to perform productive tasks and improvements in teamwork and 5) the reform and renewal of the institutional infrastructure can also lead to an increase in the overall productivity of the economy. This is by no means an exhaustive list. It does however, capture the essence of the extent, variety and importance of causal factors that contribute to enhanced productivity. In the same vein, it highlights the crucial role of public policy in facilitating an environment that is conducive to capturing productivity gains and consequently achieving higher levels of economic growth.

National economies have finite amounts of capital and labour. Without technological progress the opportunities for growth would eventually run out. Growth can be sustained only by finding new and better ways to utilize our limited resources. In this respect, technological progress has always been an ingrained feature of national
What has changed in recent times is the pace of technological innovation. Schumpeter’s explanatory model for economic growth focused primarily on the role of technological innovation. He proposed a model that postulated growth through the interaction of bursts of technological development and competition between firms. Schumpeter saw capitalism as moving in long waves: every 50 years or so, technological revolutions would cause “gales of creative destruction” in which old industries would be swept away and replaced by new ones. Each wave of technology would fuel an upsurge in investment and create an impressive amount of job opportunities in new industries.

Schumpeterian Entrepreneur

In his two seminal books *The Theory of Economic Development* and *Business Cycles*, Schumpeter articulated his pathbreaking analysis on the role of the entrepreneur in economic growth. To this day, his body of work on entrepreneurship remains the most authoritative analysis on this subject area. According to Schumpeter, innovation is what determines the value of entrepreneurship to economic society. Schumpeter embraced the principle that innovation precipitates a change in the production function and the entrepreneur is the catalyst that brings it about. In this context entrepreneurship takes on added significance as the engine of growth and a contributor to the wealth of nations.

The role of the entrepreneur in the progression of the technological cycles was paramount. Schumpeter explained this process in the following manner:

“The function of entrepreneurs is to reform or revolutionize the pattern of production by exploiting an invention or, more generally an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on. Railroad construction in the earlier stages, electrical power production before the First World War, steam and steel, the motorcar... This kind of activity is primarily responsible for the recurrent ‘prosperities’ that revolutionize the economic organism and the recurrent ‘recessions’ that are due to the disequilibrating impact of the new products or methods” (Schumpeter, 1942, 132).

This is perhaps an opportune time to draw a distinction between management and entrepreneurship. The manager has more limited, confined and static responsibilities in the day to day operation of a business enterprise. The entrepreneur, on the other hand, is more of an economic visionary. The functions of an entrepreneur are more dynamic and risk loving which embrace attempting new ways of doing business, trying new ideas or new production methods, introducing new products, new processes and new structural forms of business organizations. In short, managers improve a company that has already been established, while entrepreneurs create successful corporations.

Innovation Axiom

The process of “creative destruction” that contributed to the structural change of the economic landscape and promoted economic growth was attributed by Schumpeter to:
“innovations do not remain isolated events, and are not evenly distributed in time, but... on the contrary they tend to cluster, to come about in bunches simply because first some, and then most firms follow in the wake of successful innovations” (Schumpeter, 1939, 100).

These long term innovation cycles are driven by different clusters of industries. The pattern that each cycle unfolds starts with the adoption of a set of innovations that are introduced into general use and subsequently lose momentum as the technologies mature and their profitability to investors decline with the contraction of business opportunities. This decline in economic growth associated with the loss of economic potency of innovation technologies subsequently to be followed by a new wave and new clusters of innovations which repeat the process of contributing to the structural transformation of the economy and lead to an upswing of economic opportunities and an upward trend in economic growth. This cyclical process of “creative destruction” was made possible according to Schumpeter by the proactive role of the entrepreneur. In Schumpeter’s model the entrepreneur’s profit is temporary because by adopting innovative technology the entrepreneur enhances the cost-effectiveness of an existing product placing that firm at a competitive advantage over firms in the industry. The entrepreneur makes an abnormal profit because he sells the product at the market price which reflects the higher cost structure of the old firm in the industry. This profit margin will gradually disappear as other firms adopt the state-of-the art technologies.

The evidentiary support for Schumpeter’s long term innovation cycles commenced in the late 18th century with water power, textiles and iron. It was followed by steam, rail and steel in the mid 19th century. At the turn of the 20th century innovations in electricity, chemicals and the internal combustion engine took place. The third cycle peters off in the 1950’s, with the ascendancy of electronics, aviation and petrochemicals. The decade of the 1990’s ushers in the information age of the new economy with breathtaking innovations in digitalization, software, new media, genetics and fiber optics. It is worth noting that the duration of the innovation cycle appears to be contracting over time from an initial 50 to 60 year duration to a shorter 30 to 40 year period. In part this outcome is a recognition of the Schumpeterian importance of technological innovation to the process of enhanced productivity, as a contributor to economic growth as well as promoting business profitability. This recognition by both the private and public sectors has been most influential in increasing investment in research and development which is an essential prerequisite to facilitating technological innovation.

A central feature of Schumpeter’s concept of creative destruction is the recognition that innovation is an endogenous process rather than an external and exogenous happenstance. In his intellectual vision, it is driven primarily by the competitive environment within which entrepreneurs pursue the profit motive. In this economic scenario, the adoption and implementation of innovation enhances market dominance and leads to abnormal profits.

In Schumpeter’s own words:

“What we, unscientifically, call economic progress means essentially putting productive resources to uses hitherto untried in practice, and withdrawing them from the uses they have served so far. This is what we
call ‘innovation.’” (Schumpeter, 1928, 64).

He goes on to say:

“Successful innovation…is a feat not of intellect, but of will…and appeals to, only a distinct type which is rare…It is this entrepreneur’s profit which is the primary source of industrial fortunes, the history of every one of which consists of, or leads back to, successful acts of innovation. And as the rise and decay of industrial fortunes is the essential fact about the social structure of capitalist society, both the emergence of what is, in any single instance, an essentially temporary gain, and the elimination of it by the working of the competitive mechanism, obviously are more than ‘frictional’ phenomena…” (Schumpeter, 1928, 66-67).

The extrapolation of Schumpeter’s microeconomic theories has the potential to form the theoretical construct for linking microeconomics with macroeconomics in the context of the new global economy of the 21st century. In this context, innovation and technological progress are an inherently microeconomic phenomenon, which are in turn a consequence of optimum resource allocation and the profit oriented pursuits of economic activity. However, special mention should be made of the fact that they also result in the Schumpeterian waves of innovation and technological progress that have long term macroeconomic impact and consequences. In this regard, short run business fluctuations are in effect predisposed to contribute to long run growth and development:

“Economic progress, in capitalist society, means turmoil… [I]n this turmoil competition works in a manner completely different from the way it would work in a stationary process, however perfectly competitive. Possibilities of gains to be reaped by producing old things more cheaply are constantly materializing and calling for new investments. These new products and new methods compete with the old methods not on equal terms but at a decisive disadvantage that may mean death to the latter. This is how ‘progress’ comes about in capitalist society” (Schumpeter, 1942, 32).

It is worth noting that the economic environment whereby products and processes emerge, peak and decline, i.e. innovation and obsolescence takes place in an environment of imperfect competition. Schumpeter underlines that:

“The introduction of new methods of production and the new commodities is hardly conceivable with perfect competition from the start. And this means that the bulk of what we call economic progress is incompatible with it. As a matter of fact, perfect competition is and always has been temporarily suspended whenever anything new is being introduced” (Schumpeter, 1942, 105).

In its microeconomic constructs, Schumpeter’s concept of creative destruction embraces a multitude of features including imperfect competition, innovation and
obsolescence, the rise and fall of products and processes, entrepreneurial functions, risk and uncertainty, short term market advantage and abnormal profits. All of these microeconomic antecedents result in the process of endogenous innovations. However, that is not the end of the story. They also lead to long term macroeconomic consequences in the form of economic growth and development. Indeed, this is the construct that should be amplified by way of creating the missing link between microeconomics and macroeconomics in the evolutionary development of economic theory in the 21st century.

**Historical Context**

History provides us with a constant and a sense of permanence. There are two parallel considerations that should be investigated in defining the historical context in economics. First, an appreciation of the history of economic thought and second, the historical context for economic events or institutional economic history. It is a sad commentary that on both counts the historical potency of the discipline of economics is found lacking. The historical backdrop has become an increasingly neglected dimension in the contemporary evolution of the discipline of economics.

If there is one glaring omission in the contemporary economic landscape it is the neglect and atrophy of all things historical. There is no denying that history is a social and economic resource. There is an urgent need to rediscover the value of economic history for future generations of economists. The latter half of the twentieth century in particular witnessed a marked devaluation in the appreciation of the professional benefits, rigorous appreciation and the value of a well-grounded knowledge of economic history for economists. In many respects, economics cannot have universality without history. History is not static, it is fluid, and forms a bridge to the present and the future. Historical specificity places the complex story of humankind in a proper intellectual context. Economic history enables us to analyse and explain the concrete and historical specific dimensions of economic life. History and economics are in many respects complementary and inter-dependent with strong structural linkages. On the other hand, the history of economic thought introduces a critical and contextual appreciation to modern economic theory. In effect, the history of economic thought provides us with the genetic topography and the DNA composition for the discipline of economics. In many respects, the imprint of history defines the character of economics.

Despite the contemporary prominence of neoclassical economics, the current generation of economists are better versed in the “neo” component of their subject matter than the “classical” dimension. Indeed, most contemporary economists are illiterate in the history of economic thought and have not read Adam Smith, David Ricardo and John Maynard Keynes. All of whom made major contributions to the evolution of economic theory in the 18th, 19th and 20th centuries. In many respects, the contemporary generation of economists is practising their profession in an intellectual vacuum that is void of the significance of the history of economic ideas and the profound theoretical legacies of the economists of previous generations.

Baumol proposes that economic history should, once again, become a more prominent milestone on the economic landscape.

“It seems to me that many institutional areas lend themselves to study
via historical materials, and in some it may not even be possible to carry out effective research without them. Besides, for those whose forte is not a high level of abstraction, history is apt to prove a very good source of ideas and is apt to contribute considerably to general understanding. It should also provide vital practice in the empirical analysis of messy and complicated problems of which economic history has an endless supply” (Baumol, 1991, 2).

The emphasis on quantitative economics in the latter half of the twentieth century cast a long shadow over the sub-discipline of economic history. In some cases it was exiled to history departments in the academy. There is no denying that economic history has been undervalued as a tool of economic analysis. I believe the intrinsic value of economic history will be rediscovered in the twenty-first century and like the prodigal son will make a triumphant return to the family of economics.

It is worth noting that economic history is not simply about the past, it is important for the present and the future. Indeed, history is a continuum from the past to the present and into the future. It illustrates the lessons of hindsight and prevents us from repeating the errors of the past. It also serves to shed light on the present and helps us chart an enlightened course for the future.

Economic history is the record of collective memory for homo economicus. It is important for the present and the future. Indeed, history is a continuum from the past to the present and into the future. It illustrates the lessons of hindsight and prevents us from repeating the errors of the past. It also serves to shed light on the present and helps us chart an enlightened course for the future.

Economic history is the record of collective memory for homo economicus. It is the context for contemporary economic issues and events. It is also a valuable tool for predicting the future evolution of economic science. Indeed, economic history can be a valuable analytical tool for a proactive approach that averts crises and defines new opportunities.

In the context of the new economy, economic history is the foundation stone for the new economic institutions of the 21st century and the fountain of human creativity which is a catalyst for structural change, innovation and the opening up of new frontiers. In this regard Buchanan wrote:

“…the subject matter of our discipline was, indeed, influenced strongly by the events of history, and, to some much lesser extent, these events were themselves influenced by the scientific inquiry of economists. But history, inclusively considered, also embodies technological change. And who could question the critical importance of the information processing revolution in shaping the very questions that economists ask and attempt to answer?” (Buchanan, 1991, 21).

Perhaps the most penetrating observation regarding the value of economic history was offered by Joseph A. Schumpeter. This is recorded in Schumpeter’s last book, History of Economic Analysis published in 1954, four years after his death, from typescript and manuscript assembled by his wife. At the start of the book, Schumpeter emphasizes his eclectic view that the proper study of economics requires three elements: theory, statistics and history. In this book, his last testimonial, he places history on a special pedestal saying: “If, starting my work in economics afresh, I were told that I could study only one of the three but could have my choice, it would be economic history” (Schumpeter, 1954, 12).
Interdisciplinarity

Economics is the brain child of interdisciplinarity. By that I mean the discipline of political economy which was born in the 18th century with three intellectual parents, more specifically, Adam Smith, David Ricardo and John Stuart Mill, evolved and developed into three separate disciplines, viz, economics, political science and sociology. This by way of emphasizing that interdisciplinarity is not new for economics. It has a long and distinguished presence in the subject matter of economics. It is only recently, during the latter part of the 20th century, that economics has embraced a uniform direction towards increasingly more discipline specific and academically insular specialization. In part this is largely the result of breakthroughs in scientific discovery and the evolution of the scientific method in the Newtonian tradition, as well as the prominence of the industrial and information revolutions and more recently the embracing of technological and electronic advances which have enhanced the process of specialization and led to more focussed academic work.

I believe the 21st century will be a catalyst for a turn around in this discipline specific direction. In many respects the new century is on the cusp of a renaissance of interdisciplinarity that acknowledges the importance of interdependent variables and the intellectual interface of academic enquiry. I also believe that the early part of this century will witness an expansion of applied interdisciplinary studies and research which will move decidedly away from discipline concentrated specialization and create new disciplinary boundaries as well as crossing old disciplinary borders. We should not conclude from that that single-scholar discipline research will become extinct. That is not the case. Single discipline research will remain one of the cornerstones for the creation and dissemination of knowledge. Indeed this type of research will feed into modern interdisciplinary scholarship. This in recognition that there can be no real interdisciplinarity unless there are healthy and flourishing disciplines. Furthermore, there is a lot of work to be done on expanding disciplines i.e. developing and encouraging mutations and variations, as well as, the need to work on the contemporary problems that face society – in most cases in applied research. In short, interdisciplinarity should not exclude or diminish single discipline growth.

To my way of thinking there is a lesson to be drawn between interdisciplinary research and the changing structure of the workplace from a top down to a flat structure. This modern structure is conducive to team work and team effort which in turn is congruent with the new architecture of the global economy. Furthermore, academies of higher learning are primarily publicly funded research institutions with a mission and mandate to develop cutting edge scholarship and come to grips with current challenges and opportunities. These contemporary realities dictate an enhanced responsiveness to society’s priorities on the part of the academic research agenda. In this context, it is imperative that academic institutions strive to facilitate the transfer of human knowledge and information developed in the academies into practical applications that benefit all of society. They should also take advantage of the opportunities to partner with public and
private sector institutions, without diluting their academic integrity, in order to focus their research and contribute to the development of enlightened policies and practices in the social, cultural and economic sphere.

There is no denying the value of academic research which is community motivated and embraces a pragmatic dimension becomes a stepping stone for interactive development. It becomes in turn a catalyst for public education and progressive social change. In this context the synergies between interdisciplinary research and macroeconomic applications are significant. Furthermore, macroeconomics lends itself to an interdisciplinary mission and mandate with important contributions to the role and potential of civil society, the political infrastructure, the dynamics of institutional change and many other parameters of the new global economy.

The contemporary recognition of the important role of interdisciplinarity is a response to societal pressures on intellectual discourse and scholarship in general. It is pivotal in the context of relevance. In particular, in a pragmatic approach, society has now become more complex and multifaceted that it is rarely possible to understand it from within the boundaries of one discipline. Indeed, some many even say that applied single discipline research is becoming, in some areas, dysfunctional. In short, social, economic, political, demographic and cultural dimensions, to name but a few, are part of the contemporary setting of most academic issues. These are all interdependent variables. It is one of the tasks of interdisciplinary applied research to build intellectual bridges and close academic gaps. There is no denying that interdisciplinary research broadens one’s intellectual horizons, challenges one’s perceptions, induces a sparkle of fascination, promotes constant new learning, and has pragmatic appeal and practical usefulness. It also goes a long way towards filling policy gaps of a social, economic, political and demographic dimension.

Interdisciplinary work can be as far reaching as to encompass the humanities, social, educational, natural and health sciences or as narrow and focused as history and demography, and anything in between. It can be research accomplished in an entirely integrated manner, or it can be one’s scholarly output is another’s input, in as many different combinations and permutations as appropriate. It is worth noting the distinction between interdisciplinary, which is the passive cross-fertilization of ideas and metadisciplinary which is the more aggressive integration of the research agenda.

There is no denying that collaborative scholarship and applied research with a strong dose of pragmatism can explain and demonstrate the value of academic research to society and offer mature reflection on difficult issues. Interdisciplinarity facilitates thinking outside the box and can provide historical depth, cultural sensitivity, social context, policy focus, ethical implications, statistical inquiry and much more. The sine qua non of the interdisciplinary approach is the acknowledgement of disciplinary complementarity.

Interdisciplinary work requires constant collaboration, feedback and coordination, a constant exchange of ideas, and one final unified ultimate goal tied to a shared vision that ensures cohesion. Good interdisciplinary output should be coordinated, creative and reflect the interdisciplinarity of the research work. It should also be accessible, by that I mean, applied interdisciplinary research is about improving the world around us and making a better world for people from many walks of life. It is about the cross-fertilization of ideas, and about vision that reaches beyond the old narrow perceptions of
the way things are. It is about communication, comprehension and sharing of one another’s knowledge and wisdom for a useful purpose. It is about wanting to be understood and wanting to understand others, in other words facilitating the process of mutual comprehension. It cannot be confined to opaque language, elitist impenetrable theorizing, or hiding behind the complex obscure jargons of the specialist.

Increasingly during the 21st century, economists will be called upon to play a leading role in interdisciplinary research and studies. This is due to the central role that economic science will be asked to perform in many aspects of human endeavour. In particular, economics has a central role and a pivotal function in the multifaceted, multidimensional and overarching reach of this discipline between the humanities and the social sciences. Indeed, interdisciplinarity requires economists to be fully cognizant of diverse schools of thought within their own discipline as well as developments in other related disciplines such as the social sciences and humanities. This in addition to the emergence of new research frontiers and new academic disciplines which will require collaborative research endeavours, multidisciplinary and interdisciplinary research teams and path breaking pedagogical techniques in response to advances in computer science and information technology. Indeed, we can anticipate that during the 21st century, a new disciplinary marriage will take place that will be consummated between economics and computer science. This will have important consequences in the academic discovery of domain specific knowledge and the dissemination of new ideas. Economics can be either central or supportive of an interdisciplinary research project. Enhancing the different perspectives around the table and contributing to the proper number of disciplines that constitute the required critical mass which contributes to academic synergy in an appropriate manner. All of this will reflect the fundamental nature of the academic mission encompassing a shared vision and the complementarity of ideas.

I expect macroeconomics to play a central role in the modern phase of interdisciplinarity because of its aggregate, institutional and contemporary context. A case in point is the study of economic growth which constitutes a common thread that pervades economics. It is interdisciplinary par excellence and has inspired a voluminous and exciting economic literature. That being said, the sources of economic growth remain elusive and economic development such as sustained progress in economic well being as well as inter-country convergence remain a distant objective. That despite the most sophisticated econometric models applied in our persistent attempts to understand the machinery of economic development and what its contributing sources are. This work is mostly of the ex post genre and therefore unremarkable because it is the ex ante format that is likely to bestow the most significant intellectual rewards. So far the interdisciplinary nature of the modern literature on economic growth has given us preliminary blueprints to foster growth and development through investment in education, enlightened macroeconomic policy, international trade, investment reform, institutional modernization and financial liberalization. However, much more needs to be studied, researched and analyzed from an interdisciplinary perspective.

**Quantitative Quagmire**

The 21st century and the machinery of the new global economy will bring a
greater recognition of the limitations associated with the extensive use of the mathematical approach in the study and application of economics. This is particularly true of macroeconomics with its central mission to enhance economic growth and development within a nation, within a region and among the international concert of nations. In addition macroeconomics is particularly susceptible to being influenced by collateral forces such as social, political, cultural and demographic variables.

The latter part of the 20th century witnessed a concerted effort to make the study of economics more of a science in an effort to upgrade its academic respectability. This was achieved by promoting the Newtonian approach developed for the hard sciences and embracing a rigid quantitative focus and application. Newton invented a scientific method which became the universal standard for scientific reasoning. In this respect, economics has attempted to mimic the hard sciences of physics, chemistry and biology.

Kenneth J. Arrow who shared the Nobel Prize in Economics in 1972 is widely regarded as one of the principal architects of the mathematical approach in modern economics. It also meant reinventing economic theories on the basis of assumptions and techniques developed by the University of Chicago school of economics and its founder Milton Friedman. These attempts have produced grand theories of economics supported by elegant mathematical models and empirical analysis that prima facie contain considerable scientific vigour.

There is no denying that a revolution has taken place in macroeconomic analysis in both the subject matter and the methods employed. “Old” macroeconomics, was principally about short-run stabilization policy, or how to smooth the business cycle. “New” macroeconomics is principally about long-run growth theory. In addition the techniques required for the new approach (non-linear dynamic programming, overlapping generations models, computable general equilibrium, vector auto regression estimation) are ones that were typically not used in the older approach.

At the same time, the quantitative focus has been criticized as being falsely scientific with no role for human intentionality or choice. It has been described as understating the potential downside to the inculcation and acceptance of economic language, assumptions and theory. It has also been suggested that these attempts have resulted in simplistic models of individual human behaviour in the genre of rational, self-interested, utility maximizing homo-economicus. Indeed, Arrow emphasizes that the extensive reach of modern neoclassical economics has transformed basic economic concepts such as rational choice and profit maximization among others into parameters with different mutations and more diverse interpretations. Furthermore, mathematics is not conducive to incorporating the social dimension of economic issues. The quantitative approach has made economics more model driven and hence less responsive to social issues that have an implicit qualitative focus and rigour. Mathematical formulation requires a degree of abstraction and technical rigidity that in consequence has contributed to the fact that the contemporary pedigree of economic models bear little resemblance to the real world or reflect the economic passion for developing a road map towards achieving the eternal human ambition for economic prosperity, improving the quality of
life and personal fulfillment. In short, economists have become so fascinated and awed with the mathematical application that they have lost sight of the fundamental mission and mandate of economics.

In many respects the founding fathers of modern economics had a visionary insight into the role and mandate of economics. Indeed it was an intellectual vision that has stood the test of time and placed the use of mathematics within the appropriate boundaries. It is worth noting that Alfred Marshall, one of the founders of the Royal Economics Society, put the role of mathematics in economics in its proper perspective:

“I know I had a growing feeling in the later years of my work at the subject that a good mathematical theorem dealing with economic hypotheses was very unlikely to be good economics: and I went more and more on the rules – (1) Use mathematics as a shorthand language, rather than as an engine of inquiry. (2) Keep to them till you have done. (3) Translate into English. (4) Then illustrate by examples that are important in real life. (5) Burn the mathematics. (6) If you can’t succeed in 4, burn 3. This last I did often.

I believe in Newton’s Principia Methods, because they carry so much of the ordinary mind with them. Mathematics used in a Fellowship thesis by a man who is not a mathematician by nature – and I have come across a good deal of that – seems to me an unmixed evil. And I think you should do all you can to prevent people from using Mathematics in cases in which the English Language is as short as the Mathematical ….

I find mathematicians almost invariably follow what I regard as Jevons’ one great analytical mistake, his eulogy of the Geometric mean in general: and do not see that, according to his use, erroneous weighting may do far more mischief with the Geometric Mean than with the Arithmetic Mean. I always have to spend some time in convincing them of the danger.” (Pigou, 1925, 427-428)

Nobel lauriat Milton Friedman articulates the historical context for the adoption of the quantitative approach in economics in the following manner:

“A century after Adam Smith came the marginal revolution and explicit general equilibrium analysis, bringing the first major expansion in the use of mathematics in economic analysis. Marshall became the authority, at least for English-speaking economists, and Walras and Pareto for mathematical-speaking economists. Another half century, and the Keynesian revolution changed the language and tools with which economists analysed the aggregate economy, though it changed their substantive conclusions about the aggregate economy to a much lesser extent. More recently, the theory of games and the computer revolution, both linked with the name of John von Neumann, changed the language of discourse and the tools of analysis even more drastically.” (Friedman, 1991, 37)

Friedman was not a forceful proponent of the quantitative approach. He captured the essence of the quantitative dimension in economics in the following paragraph:

“One major conclusion emerges from browsing through past Economic
**Journals** as a prelude to peering into the next century: the substance of professional economic discussion has remained remarkably unchanged over the past century while at the same time the language in which economic analysis is presented has changed so drastically that few economists who contributed to the early volumes would have been able to read most articles in recent volumes. In addition, the scope of economic literature has narrowed in some dimensions, widened in others.” (Friedman, 1991, 33)

He goes on to say:

“A similar criticism applies to the extensive use of mathematics, which again has greatly extended the power of economic analysis, but is often used to impress rather than inform. Results that might have been attainable only by sophisticated mathematics can nonetheless be explained in understandable English. Again and again, I have read articles written primarily in mathematics, in which the central conclusions and reasoning could readily have been restated in English, and the mathematics relegated to an appendix, making the article far more accessible to the reader.” (Friedman, 1991, 36)

In his seminal article entitled “Toward a Newer Economics”, William Baumol underlines that:

“There can hardly be any argument with the proposition that the use of mathematical methods has not solved all problems in economic analysis, and that some problems lend themselves more readily to statistical, experimental, historical or other lines of attack. While formal mathematical theory has made invaluable contributions in fields where its success might have caused considerable surprise in an earlier day – fields such as public finance and industrial organisation – each of these areas surely still leaves considerable scope for other research procedures. And there are still other areas, for example, labour economics, in which this is probably even truer. The trouble is that if individuals are not respected for the pursuit of alternative approaches, if only those whose writings are pockmarked by algebraic symbols receive kudos, one can expect a misallocation of resources like that which always results from a distortion of relative prices.” (Baumol, 1991, 2)

In regard to the modern quantitative approach Baumol concludes that:

“I am hoping that the future will bring some decrease in the display of technique for its own sake, with models constructed so as to increase what they tell us about the workings of the economy rather than just displaying the properties of some analytical procedure. This is not repetition of the ancient and tired demand for enhancement of the ‘realism’ of our models, for it is perfectly clear that there is a trade off between the analytic tractability of a model and the degree to which it incorporates the complex minutiae of reality, and that this trade off often does not favour the latter. The desire for
economic pertinence of our constructs is not tantamount to a wish for unworkable complication. The contrary is apt to be closer to the truth.” (Baumol, 1991, 6)

The upgrading of the discipline of economics through enhanced scientific rigour has had some serious negative side effects especially in terms of the contemporary realities of the new global economy. Indeed, the technical progression of economics has created barriers to political and social concerns and has emphasized the abstract to the detriment of the pragmatic. Economists cannot dismiss or assume indifference to the pragmatic reality of the political context and its social, cultural and human parameters. In other words, the quantitative approach has led to the adoption of simplistic assumptions and quantitative rigour has resulted in severe constraints in coming to grips with the real world economic issues. All of this resulting in a more abstract and simplistic economic modelling. Furthermore, it is worth noting that in 1998 the Committee on Journals of the American Economic Association reported that leading publications in the economics profession had too much theory and mathematics and too little empiricism, policy and history.

It is a sad commentary that despite the complicated mathematical modelling of contemporary economics it remains a simplistic and highly specialized attempt in as much as it fails to take a holistic approach that would include the elements of the political, social, psychological, moral and historical parameters. In short, two dimensional models that attempt to be scientific and rigorous often end up trading off the real world and a dose of realism and pragmatism. All of this brings into question the degree to which abstraction necessitated by mathematical rigour has resulted in a marked decline in the pertinence of economics. There seems to be a need for a broader vision from econometric technicians (the economic version of statistics known as econometrics) to become more inclusive of the qualitative variables that embrace the economic issues of the 21st century.

There is no denying that the enhanced processing power of computers has captured and promoted the quantitative focus of economics. In this scenario the social and political dimensions are excluded from enabling an analysis of the real world. In fact these altered realities are adversely defining the boundaries regarding the intellectual discourse affecting the real world of the 21st century.

In an incisive recent article Warren Gibson concludes:

“Mathematics can be very alluring. Professional mathematicians speak frequently of ‘beauty’ and ‘elegance’ in their work. Some say that the central mystery of our universe is its governance by universal mathematical laws. Practitioners of applied math likewise feel special satisfaction when a well-crafted simulation successfully predicts real-world physical behaviour. But while the mathematicians, some of them at least, are explicit about doing math for its own sake, engineers are hired to produce results and economists should be, too. It’s fine if a few specialists labor at the outer mathematical
Western civilization has brought us an explosion of human welfare: prosperity, longevity, education, the arts, and so on. We very much need the wisdom that economists can offer us to help understand and sustain this remarkable record. What good are engineers’ accomplishments in crash simulations if the benefits are denied to the world by trade barriers, stifling regulation, congested highways, or bogus global warming restrictions? What can mathematical economics contribute to such vital issues? Not much, if Deirdre McCloskey is right when she says, ‘economics has learned practically nothing from the dual triumph of mathematical economics and econometrics.’ What if, as she says, ‘The best minds in economics have been diverted into an intellectual game, I say, with as much practical payoff as chess problems’ (McCloskey 2000, 217). What if real answers to urgent problems could be delivered in plain English? Do economists have the courage to shun the romance of mathematics and produce such answers? Let us hope so.” (Gibson, 2005, 156-157)

The quagmire between contemporary relevance and scientific rigour is likely to be resolved by adopting an intellectual compromise. Mathematical sophistication and rigidity must be tempered in order to embrace the qualitative dimension of contemporary economic issues. This will undoubtedly enhance the role that economists will play in the 21st century by becoming more relevant and responsive to economic, social and cultural public policy issues.

At the end of the day, one of the central issues regarding the adoption of the quantitative approach is not how much mathematics to use and how often but rather what kind in order to avert coming to conclusions that do not reflect the contemporary and pragmatic nature of the economy and society. In doing so, a determined effort must be applied to avoid constructing a boxed in model that ultimately bears little resemblance to the real world. This can easily be resolved by concentrating on defining the economic parameters of an issue first of all and then proceeding to incorporate that form of mathematics that may be applied in order to solve it. It is worth noting that it is not entirely coincidental that the founding father of modern day macroeconomics, John Maynard Keynes, who was well versed in mathematics hardly used this medium.

Conclusion

In the preceding pages we explored the new frontiers and the evolving transformation of macroeconomics in the 21st century. The context of this transformation is dictated by the realities of the new global economy. The trajectory for the evolution of macroeconomics in the 21st century will be determined within the parameters of the new global economy. Indeed, economics in the 21st century will design the architecture and build a link between microeconomics and macroeconomics in the context of the new global economy and within the theoretical framework of Schumpeterian analysis.
The new economy is comprised of a trilogy of interactive forces that include globalization, trade liberalization and the information technology and communications revolution. Globalization has melted national borders and redefined macroeconomic policy. Free trade has enhanced economic integration and extended the macroeconomic architecture. The information and communications revolution has made geography and time irrelevant and enhanced the reach of macroeconomic parameters.

The 21st century will lead to a rediscovery of Schumpeterian theory. The advent of the information technology revolution and the important role of innovation in contributing to the economic wealth of nations in the new economy of the twenty-first century is forcing economists to rediscover the important academic contributions of Joseph Schumpeter. The economic profile of the new global economy has been driven by technology, fuelled by innovation and entrepreneurial initiative and based on new ideas, new perspectives and new business strategies. Indeed, the pivotal role that Schumpeter assigned to entrepreneurship and innovation will underline the relevance of his economic theories and intellectual vision for the new global economy. At the same time the new economy has altered the economic landscape and realigned the linkages between different sectors of the economy. In short, Schumpeter’s legacy of technological innovation and entrepreneurial initiative is alive and well in the new global economy of the 21st century. In addition, Schumpeter’s theoretical framework will become the catalyst for linking microeconomic foundations with macroeconomic theory.

The new economy has markedly transformed the structural parameters of the economic landscape and contracted the prism for time and space. Schumpeter’s economic theories are contributing to our understanding of the factors facilitating the wealth of nations and the process by which economic growth can be accelerated within the evolving structural parameters of the new economy. In Schumpeter’s conceptual framework, the process of structural change is propelled by industrial activity. The process of “creative destruction” is accomplished through innovation. Furthermore, innovation is what determines the value of entrepreneurship to economic society. Schumpeter articulated a pivotal role for the entrepreneur in contributing to economic growth and the wealth of nations.

The information technology revolution has profoundly altered the structural parameters and the modus operandi of most national economies. Indeed, the transformation from the industrial age to the information age has resulted in the restructuring of the macroeconomic system. There is no denying the importance of technological innovation as the economic heartbeat that propels economic growth and development in the new global economy. Furthermore, it also confirms that at the dawn of the twenty-first century, Schumpeter’s intellectual and theoretical legacy on the pivotal role of technological innovation remains a vibrant analysis and laudable framework for determining the causal factors that promote economic prosperity and contribute to the wealth of nations.

The new global economy will influence in a profound and indelible manner the
scope and substance of macroeconomics in the 21st century. It will also define the role that macroeconomists will play in the context of the structural transformation of the academic landscape and the emerging new institutional architecture. Alternative macroeconomic approaches will become more prominent. This transformation of macroeconomics during the 21st century will lead to the rediscovery of the value of institutional economic history and the history of economic thought. It will contribute to resolving the confrontation and the dichotomy between the quantitative school and the qualitative approach. It will also highlight the distinctive role that macroeconomics will play in the resurgence of interdisciplinarity and the emergence of new disciplinary synergies.

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