European Innovations/Integration within the Global Context: An Inquiry into the Long Cycle and Post Industrial Society

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D E C L A R A T I O N

Certified that the dissertation entitled "European Innovations/Integration within the Global Context : An Inquiry into the Long Cycle and Post Industrial Society". Submitted by Shri Deepak Singh is for the award of the degree of Master of Philosophy of the University. This dissertation has not been previously submitted for any other degree of this or any other University and is his own work. We recommend that the dissertation be placed before the examiners for evaluation.

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[DEEPAK SINGH]

INTRODUCTION

METATHEOPETIC MODES OF INQUIRY

METATHEORETIC MODES OF INQUIRY

Introduction

The Humean view of causation postulated a regular conjunction between events, thereby subsuming events to causal laws. This concept of causation implied an infinite regress in which no first or ultimate cause can be found. Kant had attempted to resolve this paradox by proposing the Principle of final causation by inversing the relationship between cause and effect.[1] The concept of final causation confronts us with the difficulty of an infinite regress in reverse. Would then there be a system which could synthesise efficient and final causation in a way which avoided the problem of infinite regress and infinite progress?

The concept which unites the two types of causation is through the conceptualisation of the 'Absolute Idea' as a process. In a process one cannot vary the sequence and nature of cause and effect without altering the configuration of the process. A 'Process' therefore determines and is determined by its constituents. The 'Historical process' in International Relations can be visualised as a Hegelian resolution of the dichotomy between causes and effects of Technological progress. The structural transformation within the world system could then be visualised as 'higher order Markov chains, (where) the probabilities of transition from one period to another depend not only on the current state of the system but also on its earlier states'.[2] In contradistinction to this, First Order chains embody

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1. Making the effect the cause of the causes leading to it.

2. Elster Jon : Explaining Technical Change. [Cambridge : Cambridge Univ press] 1983, p 29 .

the 'Markovian assumption' that transaction probabilities depend upon the current system state only.

The causal relations are determined by the following principles:

1. **Determinism** postulates that any event is conditioned by its antecedents cause.*
2. **Spatial Contiguity** a cause must act upon an event contiguous to it in space and time.
3. **Temporal asymmetry** assumes a cause must precede its effect.

However, in social sciences one constantly encounters the phenomenon of simultaneous causation. Here it becomes essential to distiguish between exogenous and endogenous variables and the effect produced by a change in the former upon the latter, thereby illustrating the illusion of an effect being simultaneous with its cause.

To the principle of causation the ultimate resolution is provided by the extension of the thesis of the Kantian Antinomy. The 'Third Antinomy' deals with causation. Kant percieved it impossible to concieve of any joint link in the chain of causation. Contrary to this, the chain must possess a first link, for if no first cause exists there is no sufficient reason for the causal series to exist. Again, since the first cause like this would be causeless, it would be an inexplicable event. It follows that we cannot concieve of a causeless or first cause standing at the beginning of the series of causes. It is then logically impossible as it is logically necessary to assert its existence.

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3. Fuller BAG: A History of Philosophy; [New Delhi: Oxford and IBH Publishers] APPENDIX VI ; 1969; p XXXVI.

THE KANTIAN RESOLUTION OF THE ANTINOMIES

The **'Antinomies'** emerge from an improper extension of the term **'totality'** beyond its spatio-temporal limits. Totality is not a phenomenon applicable to the phenomenal world. Since time is a process of accretion to the end of which we can never come, the idea of totality predicates an existent, complete and whole universe which is contradictory to the evolutionary and dialectical order of the universe. This appreciation of the erroneous and fallible attribution of totality to experience translates into a solution of the antinomies.

THE LONG WAVE PERSPECTIVE :

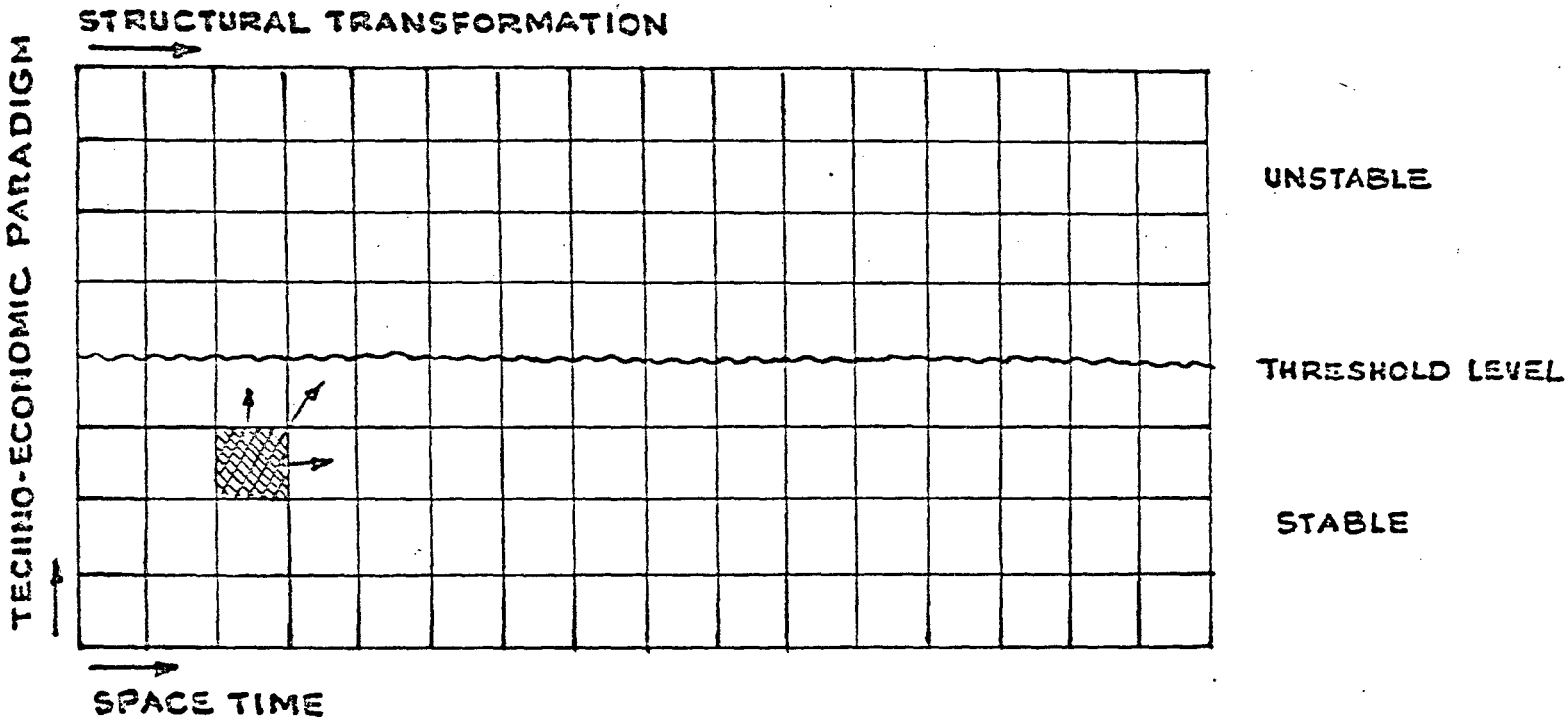
The long Wave theory could be viewed as a constrained cycle whose causes, effects and the generating structure, whether exogenous or endogenous to the Capitalist World System, will impact upon the development and simultaneous resolutions of the capitalist system. The unravelling of the causal linkage determining the fluctuations or dynamics of capitalist development, will enable us to determine probability distribution of future developments of the capitalist world system. Once the mechanism of the Long Waves are known, would this not result in their negation? Many would theorise the Long Waves then as an abbreviation, for which no comprehensive theory is required. Whatever are the linkages behind the Long Waves and the causality of these waves, the explanation of the phenomenon must arise from either exogenous or endogenous process of capitalism. It will be towards this end that my research would be directed.

SYNOPTIC OVERVIEW :

The present study has been divided into four chapters along with a conclusion. **Chapter I** deals with the four contending approaches to the study of the long waves with an exhaustive appraisal of the Innovations School. The myth of

postindustrialism is also analysed in this chapter. **Chapter II** attempts an interpretation format based upon an independent set of axioms and postulates which will help in causally determining the periodicity of the long waves and its impact on the process of system transformation within the capitalist world system. **Chapter III** deals with the socio institutional and techno-economic paradigms and a theoretical transformation process initiated by them within the politico-economic system. **Chapter IV** comprises two parts :- **Part I** deals with aspects of Integration Theory; whereas **Part II** takes the specific case of the Integration proclivities within the European area with specific emphasis upon the **European Common Market** - 1992. The conclusion endeavours to draw the essential variables together to assess the impact of systemic integration upon an actor's hierarchical ordering within the world system and amalgamate this to the historical evidence garnered by the long wave theory which will enable us to understand the dynamic interplay of structural relationship and the patterns of interactions which will emerge within the world system following the ascendance of the fifth Kondratieff resulting in the genesis of the age of industrilisation.

WORLD SYSTEM GRID



CHAPTER ONE

THEORETICAL FORMULATIONS

CHAPTER 1

THEORETICAL FORMULATIONS

TRANS-HISTORICAL STRUCTURES CONTEXTUALISED

The capitalist world system is percieved to be enmeshed in a paradigm, which upon a trans-historical evaluation generates a process of system level dis-equilibrium which dynamically catalyses the evolution of this system.[1] In contradistinction to the above, the dominant paradigm in the fields of International Relations and Economics were built upon postulates of implicit systemic levels of equilibrium, and any departure from this equilibrium level was considered an aberration and the resolution of this aberration was through a process of auto-regression of the system to its equilibrium point. In economics the dominant 'Equilibrium paradigm,' covers a 'wide range of models from the partial equilibrium methods of Marshall to [the] general inter-temporal international equilibrium in the Walras-Arrow-Debreu framework'.[2] These equilibrium models assumed that the achievement of hypothesised equilibrium levels would generate a situation, where the capitalist world system would at that specific spatio-temporal moment[3] optimise the allocation and utilisation of exploitable systemic resources permissible within the pre-ordained constraints of technology and thereby maximise its utility.

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1. This evolutionary process is characterised by periodic structural crises of adjustment.

2. Benassy JP : The Economics of Market Disequilibrium [UK : Academic Press Inc] 1982, p 1-2.

3. The spatio/temporal moment in the Newton-Cartesian framework determines the co-ordinates of equilibrium.

Equilibrium as defined in the physical sciences determines a 'state of rest' for the system. More precisely an equilibrium state is defined as "a constellation of selected inter-related variables, so adjusted to one another that no inherent tendency to change prevails in the model which they constitute."[4] In the field of International Relations, the dominant paradigms have stressed the criterion of equilibrium from the mechanistic Newtonian balance of power to the General System Theory[5] based upon the principle of 'equif-inality'. These theories, even though they were developed through rigorous mathematical and logical formulations progressively distanced themselves from realities within the functioning real world system. The researchers within this tradition shared the premise that the world system was no more than an inchoate social structuring, which required artificial ordering to generate any substantive insight into the functioning of this system. This form of knowledge building though not falsifiable through the refutation of the intrinsic logics of the models developed would nonetheless succumb to "adversary" methodologies contesting its artificiality.

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4. Machlup F: 'Equilibrium and Dis-equilibrium : Misplaced concreteness and disguised politics.' ECONOMIC JOURNAL 68 ; 1958; P 7.

5. Capra. F : 'Criteria of Systems Thinking '. FUTURES: Vol 17, No 5; 1985; p 475-78.

My evaluation of the above paradigms, though far from exhaustive is not posted to challenge the 'existing dominant paradigms in International Relations[6] but rather to propose a paradigm shift which develops upon the principle of dis-equilibrium'. The theoretical propositions articulated must then focus on, 'the tensions between change and continuity built into the inter-structural dynamics of trans historical relations[7]..' Therefore, implicit to this conceptualization is anassumption of a trans-historical logic or historicism[8], the understanding of which lies in the study of the dichotomies and antagonisms existent in the capitalist structure which itself has subsisted over a period encompassing a long historical duration or as specified by Braudel. 'the longue duree'. The manifestation of these antagonisms in the socio-economic system is through a dis-equilibrated state of functioning of the system. Again it is the ,"Historical knowledge of what actually happened at any time in the industrial organism ...[which] reveals first the existence of the Long Wave"[9]

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6. Martin Wight emphasised the following pattern in IR :
   (a) Machiavellian or international anarchy
   (b) Groitian or international intercourse.
   (c) Kantian or community or mankind."
   Hollist WL and Rosenau JN : "World Systems Debates" INTERNATIONAL STUDIES QUATERLY VOL 25; NO 1; 1981 p10
7. Hollist WL and Rosenau JN; op.cit; 1981; p10
8. Historical contents and long evident transhistorical structures are considered essential to explaining Int. Relations. The above is with due apoligies to Kark Poppers (1961) arguments concerning the poverty of historicism.
9. Schumpeter JA : "The Analysis of Economic Change." THE REVIEW OF ECONOMIC STATISTICS VOL XVII,4.May 1935; p 7.

My conceptualizations then emphasize a rhythm in the capitalist mode of production which accrues from a dyadic interaction betwen the socio-political and the techno-economic paradigm. It is in this context that the world-market plays an essential role in the integration and a concomitant juxtaposition of the market forces with the intra-systemic units the resultant of which is a revelation of dynamic sinusoidal periodicity with the progressive evolution of capitalism.

THE ENTREPRENEURIAL STATE AND THE WORLD SYSTEM EXEMPLIFIED

Capitalism can be hypothesised as a " socio-economic system with a deep structure [and] a set of causal tendencies of development." [10] This assumption will become essential if we are to discern the underlying logic of each historical socio-economic system. It is my contention to concieve of capitalism as a singular process which incorporates both economic and political dynamics. It is important to cast this argument in the context of the attempt to develop the world system perspective into a formalized theory of "Long Waves of Capitalist Development".[11]

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10. Chase Dunn C and Sokolowsky J : " Interstate System and Capitalist World Economy : One logic on two". INTERNATIONAL STUDIES QUATERLY 25(1), 1981; pg 21.

11. A comprehensive over-view of all Long-Waves theory is presented below.

It is in view of understanding the emergent,"spatial structures"[12] and "temporal dynamics" [waves or pulsation][13] of the capitalist mode of production which makes it imperative to amalgamate the two disciplines of Economics and Political Science under one sub-heading of Political economy for studying the above phenomenon. "Thus, the interaction of world market and state system is fudamental to an understanding of capitalist development and its potential transformation into a more collectively rational system".[14]

The world system theory maps global history within a triepochal perspective dominated by three social systems : "1. reciprocal mini-system;2. redistributive world empire 3. and the capitalist world economy"[15] encompassing with continuity all dimensions of space and time.

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12. Core, Semi-periphery and periphery
13. Pieterse JPN : Empire and Emancipation ; [USA; Praeger Press Ltd]1989, p 29.
14. ChaseDunn C and Sokolowsky J : op.it.; 1981, p 24.
15. Wallerstien I: The Politics of World Economy [Gr. Britain; Cambridge univ. press] ; 1989, p 147.

Wallerstienian perspective percieves the nation-states as a creation of the world economy.[16] The evolution of the world economy from its mode of primitive accumulation to its current highly specialised and complex production relations has been facilitated by the dis-equilibrium existent between the political, economic and social system. In its spatio-temporal context the evaluation of the capitalist mode of production, determined through the exploitative aspects of capital relative to labour preculuded all but a particular vectorial aspect of development of the sub systemic units [17] comprising the capitalist world system.

Capitalism as a system mystifies the evaluation of profits from the normal to supernormal amounts[18] and the calculation of Pareto-optimal social welfare needs. The Nation-state, characterised by its highly impervious boundary, was then created to constrain the free mobility of labor and thereby accentuate the exploitative prerogative, of the entrepreneurs. The osmotic behaviour of labor ie. its movement From a region of high-concentration [low wages] to one of low concentration [high wages], would dictate a universal equalisation of wages.

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16. This is an inversion of the classical view of the emergence of Nation-States prior to the world economy.

17. I refer to the emergence of nation-states. The term vector is used to specify the magnitude and direction of change experienced by the unit within the world system.

18. The theorising on entrepreneurial and firm objectives alsouses an abstruse concept, namely "maximisation of profits"

The emergent Nation-states suitably pre-empted the evolution of such tendencies[19] and hence my insistence on a "vectorial aspect" to the development of capitalism [20].

Nonetheless, I stress [lest I be misunderstood], that an excessive dependence on mechanical determinism or even narrow historicism would be quite contrary to the development of the perspective envisioned by me.

THE LEVEL AND UNIT OF ANALYSIS ; Since I perceive the world system as "interstructural dynamics "[21] I hope this conceptualization will help in the catalysis of a "Long Wave" theory synthesis. The nature of my dissertation necessitates my study to proceed at the level of the capitalist world system. Further, the long wave phenomenon is not limited by the discrepancies of relative development of the Core countries as opposed to the Peripheries . The idea of the level of analysis was introduced by K. E. Boulding who introduced the idea of system rings or levels by advocating "the arrangement of theoretical system and constructs in a

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19. The Nation-States will therefore be contra-integrationists, which entails development contrary to the hopes of functionalists.

20. McGowan PJ and Kordan.B ; argue that out of certain critical structures, world inequality was generated as a secondary structure which consequentily reinforced the initial world division of labor, organisations of markets and fragmentation of political power.pp43-68

21. Hollist WL : "Conclusion; Anticipating World System Theory Synthesis". **INTERNATIONAL STUDIES QUATERLY** Vol 25 (1), 1981, p 149.

hierarchy of complexity roughly corresponding to the complexity of individuals of the various empirical fields " and the development of "a level of abstraction appropriate to each."[22] With the application of the system's theory to politics K.W. Deutsch [23] set out a ten level political system. Since International Relations should be investigated systematically at each level of relationship where transactions occur this upon induction converges upon the level of analysis at which my dissertation would have to progress. My study would also focus upon the dominant system and its recessive sub-systems.[24]

In all branches of knowledge there are several levels of analysis, each with distinct concepts, research questions and methodologies. To be able to provide insight into a part or level of any such discipline is admirable. However, the ultimate challege is to link the findings at all levels into an agrregative structure. To provide such an aggregative picture, my study shall be inclusive of the recessive level of analysis, the subsytemmic unit. The unit level analysis shall be undertaken in detail in the latter part of my dissertation which shall be dealing with a case study.[25] It thus becomes essential to specify my unit of analysis.

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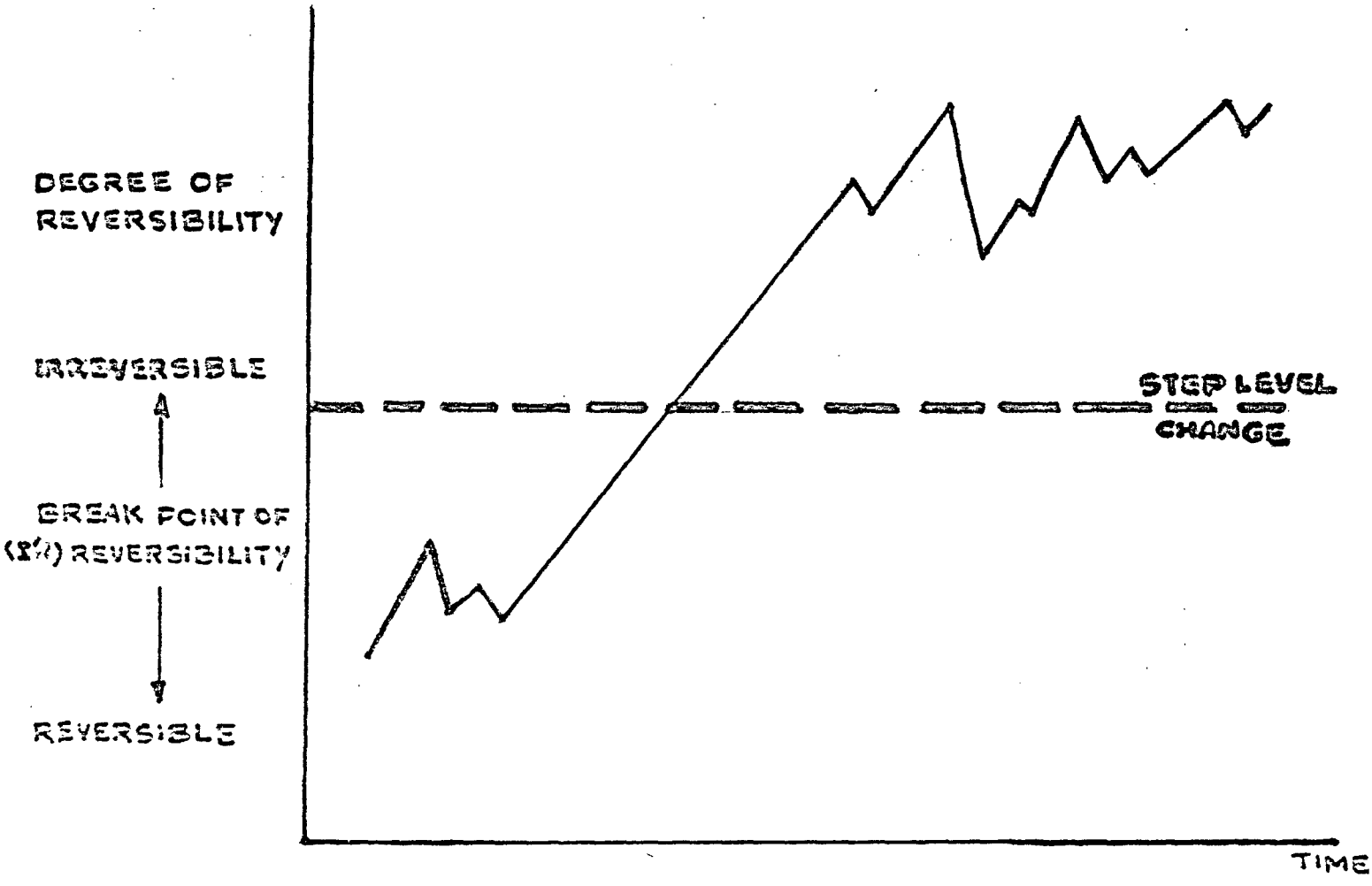
22. Boulding KE :1956, p 201-2.

23. Deutsch KW: 1974: 152-56; The levels in ascending order are :- individuals, nuclear families, extended kin groups, villages, towns, cities relevance to Int. Politics) small nation-states, middling nation-states, large nation-state amd the United Nations.

24. Which I have stated above avoided be the capitalist world system.

25. The **European Common Market** -1992.

EQUILIBRIUM : QUALITY (TYPE) OF CHANGES



The traditional unit of analysis in international relations has always been the nation-state. In the requirements of my dissertation it however emerges an incomplete entity to fully discern the finer dynamics of the phenomenon under appraisal. The incompatibility of the nation-state with the Long wave phenomenon emerges from the fact "that the nation-state is still the only unit in International Relations which has any real political as opposed to economic significance"[26]. Since the study reinforces the economic aspects in contra-distinction to the political, the socio-institutional unit must embody predominantly economic attributes. The conceptualisation of an unit displaying the above intra-subsystemic attributes implies a socio-economic environment which would have to focus upon the critical role of geographical spatio-temporal co-ordinates and the contingent access to empirical data which would facilitate the progress of the study. The subsystemic units displaying these properties would converge to probabalistic "Markowian aggregate states" depending upon the distribution of initial states of the subsystems and possible thresholds and triggering events constraining deviant components to align themselves with the rest of the system.[27]

THE SUB-SYSTEMIC UNIT CONCEPTUALISED:- I postulate a presentation of the world system and its interacting components through two alternative formats. The first develops by a division of the world into an uniform grid stucture where the summation of the units within the grid could be assumed as representative of our nation-states.

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26. Lord Gladwyn: "World Order and the Nation State; A Regional Approach."; DAEDALUS: Spring 1966, p 694.

27. Silverberg G :"Modelling Economic Dynamics and Technical Change ." in Dosi G et al [ed]: Technical change and Economic Theory . [London: Pinter Publishers];1988,p 533.

The fix of these nation states could be arrived at by specifying the relevant spatio-temporal coordinates of the summated units comprising the grid. This would not only specify the units structural configuration but would also consider the variant time and there by present a dynamic schematic view of the world system along with its specific vectorial movements. The control variable being the technological variant, which would be the determinant regarding the units relative stability at that spatio-temporal moment or its elevation to excitable transitionary period representing a period of altering structural configurations. The transformation vector thereby determinies the subsystemic unit's transition pattern and its systemic impact.

ALTERNATIVE UNIT:-

In the case where the important determining factor is adherance to the specific traditional theoritical position, I shall then be compelled to use the stylised unit "Nation-state". The predominant influencing factor in this case being to prevent the emergence of any "cognitive dissonance" between my formulation and that which is understood in the classical school of thought in International Relations.

SYNTHESIS:- The transposing of the latter formulation upon the former[28] provides an overview of the structural indicators of system change. Change in Technology threshold, change in actors spatio-temporal coordinates, the crossing of the technology threshold level causing systemic instability and shift in the economic determinants of the system.

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28. The subsystemic units.

The composite of consequences for a system after the end of a crises"[29] precipitating structural change and a consequent alteration of the systemic spatio-temporal or techno-economic coordinate will not be considered as an unidirectional component of vectorial time. The system will posses an ability to regress back to an earlier spatio-temporal or techno-economic coordinate due to a negative effect of a potential shift in the techno-economic paradigm or due to the genesis of a transformation process[30] which by its inherent nature is auto-regressive.

GENERAL DISEQUILIBRIUM ANALYSIS:

The capitalist economy is fundamentally a dis-equilibrium system, which frequently alters its spatio-temporal coordinates due to its changing internal rules of surplus generation and the frequently altered technology threshold[31]. The complexities of capitalism evolve from non-linear interactions among its constituents and 'disequilibrium micro-states.'[32] The catalytic agent in the evolution of capitalism then emerges as the "waves of creative destruction" which initiates a disequilibrium process thereby generating periodic structural transformations in capitalism.

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29. Brecher M and James P : Crisis and Change in World Politics [Boulder USA : Westview Press] 1986, p 32.

30. The case to be cited are the catastrophic wars which have spelled the end of great civilizations.

31. The alteration of the 'technology threshold' becomes essential if capitalism is to progressively increase the surplus value to be extracted from labor.

32." This is a vision consistent with Prigogines theory of dissipative structures in chemical reaction". Clerk N and Juma C : in Doi. G et al:[ed] : op.cit, 1988, p 199.

If "equilibrum ...[is] defined as a steady state of a system below the threshold of reversibility. [Then] Disequilibrium designates a stage beyond the threshold of reversibility"[33] The theoritical heuristics indulged in while posing the "Equilibrium - Disequilibrium" enigma emerges as of fundamental importance in resolving the issue for "if the system is unstable then the existence of an equilibrium solution [becomes] irrelevant, since it will never be found."[34]

In our schematised world system lattice, if due to certain exogenous factors[35] or internal variations in the coordinates of the socio-economic unit, the technology threshold is lowered, the unit will then enter into the disequilibrium performance mode and would then perform in either an episodic vectorial manner or in a 'Sine' curve variation determinate manner. Therefore, the introduction of one or more significant technical improvements constitutes the creation of a dis-equilibrium state, since the previously existing prices and outputs correspond to a technology no longer extant.

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33. Brecher M and James P: op.cit 1986 ;p 17.
34. Goodwin RM and Punzo LF : The Dynamics of a Capitalist World Economy. [UK : Basil Blackwell Publ.] 1987, p 138.
35. Innovative advances, entrepreneurial vitality, prevailing global environment, access to investible resources etc.

In this dis-equilibrium simulation the J Von Neumann[36] inequalities cease to be binding as cost is not constrained by price, nor demand by output. The resultant cost processes at constant existing prices, generate higher profits for sectors with the improved technologies. "The emphasis should then be in analysing the consequences for a given system of repeatedly changing initial premises."[37] The social foundations of capitalist production encourage technological dynamics of the system, which in turn generates new product process and input characteristics of industrialization. But "industrialization, as linked to capitalist competition and the dynamics of capital accumulation also generates a highly dis-equilibrated form of growth that repeatedly destabilises the existing economic order."[38]. The argument then expands upon the developmental dynamic of capitalist industrialization and not the allocative function of its markets, which drives geographically uneven development in capitalist society and within this context of 'laissez faire', capitalism evolves a system geared to the destruction of the old and the creation of the new forms, linking greed to the innovative variant. It is within this frame work, that we must dispense with the von Neumann's single constant growth rates for all sectors and replace it with a Schumpeterian innovative imperative which translates into the diverse growth rates of the different sectors within the capitalist economy.

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36. For an exposition on Jvon Neumann refer : Dore M et al: [ed] 1989: especially page 69-125. Also see: von Neumann J: "A model of Economic Equilibruiiim". REVIEW OF ECONOMIC STUDIES XIII(1): 1945-46;p 1-18.

37. Goodwin RM and Punzo LF : op.cit.;1987, p 144.

38. Storper M and Walker R : The capitalist Imperitive : Territory, Technology and Industrial Growth[USA : Basil Blackwell Publ.] 1989,p 8.

This developmental dynamic is specific to capitalism."[39]. The economy can then be viewed as an oscillator or a pulse generator. The pulse generator model percieves the economy as functioning after an initial large shock, by the generation of a rising peak of growth followed by a subsequent decline in the growth level. The crucial parametric determinants which emerge as saliant are technological change and labor productivity. With each new innovative impulse, the system transform into an unstable mode, reaching a higher level of output, where it is again constrained by the labor productivity and diminishing returns to the techno-economic paradigm. Along the temporal vector, the capitalist system is characterised by continuous transformations thereby negating a constant specified structural parameter.

Therefore, to historically integrate the empirical data with a formal but qualitative analysis of dynamical systems, we must visualise the capitalist world system as a series of successively transforming and evolving structures which in the long run exhibits an oscillatory steady state growth characteristics. This system, epitomised by" a succession of vigorous expansions, punctuated by short sharp contractions will give rise to long waves associated with the name of 'KONDRATIEFF'."[40]

THE LONG WAVE RHETORIC:-

The World system theory[WST] functions upon the premise that intra-systemic dynamics are of negligible consequences as long as the system itself does not change.

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39. ibid , 38 : p 8.
40. Goodwin RM & Punzo LF : op.cit :1987 p 150.
41. Brecher M and James P : op.cit ;1986 p 18.

It matters little in WST which "unit occupies a particular world market niche[42] since the system as a whole creates a pressure to maintain a certain mix of core, semi-peripheral, and peripheral activities."[43] Because of its system totalitarianism and assumed 'curculation premise', WST is incapable of prioritization of inter-unit dynamics and conceptualise on the interplay within the hyperplanes[44] of social dimensions. It is here that the superiority of the long wave theory is revealed at both the system and sub-systemic level. Traditionally, the Long Wave has been viewed as an economic phenomenon but the fact remains that the Long Waves contain key political elements. In all existing research on long waves the predominant thesis have dealt with :-

a. "Economic cycles of 50 year [approx] duration, Kondratieff or Long Waves.

b. Longer cycles of hegemony and hegemonic war of about 150 years."[45]

My thesis will explicitly deal with the former, ie: Long Waves or Cycles of economic activity.

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42. Pieterse JPN : op.cit. ;1989, p 38.
43. Wallerstien I : op.cit; 1984, p 108-109.
44. A hyperplane is a N dimensional generalization of a straight line [x,y] . A line in three dimensions is a plane, therefore in 'n' dimensions a hyper plane.
45. Goldstien JS: Long Cycles: Prosperity and War in the Modern age [USA: Yale Univ Press] 1988, p 7.

HISTORICAL OVERVIEW :-

The idea that history repeats itself in the rise and fall of civilizations is no means an invention of our times. The Stoics, Machiavelli and Montaigne held convergent opinions, but none tested these ideas thoroughly against the facts of "history". The first to elaborate slightly on this theme was Giovanni Battista Vico, who developed the [theme] theory of ricorsi [or] historical returns.[46]

From the French Annales School of History, Francois Simiand, made use of statistics, especially long series of prices and wages to document 'mouvements de longue periode'or'longue duree'. Simiand further attempted to establish a causal connection between the 'K' waves and socio-institutional developmental dynamics.

The study of long Waves is not a recent phenomenon, "Jevons (1884)refers to an article on long waves written by Clark as long ago as 1847 ..van Gelderen [1913] quotes evidence from Jevons [1884] on a period of rising[47] and declining[47] prices."[48] The most important factors underlying the long wave process according to van Gelderen [1913] can be summarized as :-

a. Capital investment hypothesis
b. Innovation hypothesis

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46. de Beus JG : Shall we make the year 2000?[Gr. Britain: Sydney and Jackson Inc] 1985, p 9.
47. Rising Prices 1790-1818; Declining Prices 1818-1849
48. KlienKnencht A : Innovation patterns in Crisis and Prosperity.[Gr Britain : The MacMillan Press Ltd] 1987 p 2.

c. Monetarism[49]

d. Gold production

e. Migration waves

g. Periodic scarcity and abundance of raw materials.[50]

The K waves should be distinguished from other postulated cycles :-

a. Business (or 'trade' or 'Juglar') cycles of about 5 years duration

b. "Kitchin" cycles of 10 years durations, thought to be based upon depreciation of short term capital investments.

c. "Kuznets" cycles ("building cycles" or "long swings") about 20 years long, based on waves of migration and the construction boom.

d. Very long cycles; Forrester refers to an S-shaped " Life cycle of economic development lasting over 200 years".

THE FOUR THEORETICAL SHOOLS :

"The 1920's witnessed a surge of interest in the documentation of long term economic changes."[51] The first few scholars to devote attention to the existence of the long waves were Nikolai Kondratieff, Joseph Schumpeter, Leon Trotsky and a group of mostly European scholars. The emergent schools of thought centred around these scholars may be classified as :-

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49. Periodic credit expansion and subsequent financial crises.

50. This can be linked to the migration waves because human migrations paved the way to the opening of new frontiers and a consequent access to a new and unexploited source of raw materials.

51. Kondratieff, Leontieff, Kuznets etc attempted such empirical documentation of the world economy.

I. **The Capital Investment Theory:-** Nikolai Kondratieff.

II: **The Capitalist Crisis Theory:-** Leon Trotsky

III. **The Innovations Theory :-** Joseph Schumpeter

IV. **War Theory:-** J Akerman.

We shall highlight the four theories briefly and then deal in detail with the Innovations paradigm.

I THE CAPITAL INVESTMENT SCHOOL:

[A] DOMINANT PARADIGM :N KONDRATIEFF

The causation of the long waves is attributed to periodic excessive investments and consequent depreciation of capital goods.[52] "In the analysis of investments a distinction is made between replacement of existing capital goods, and new or autonomous investments"[53] Prosperity periods exemplify an over investment in capital goods, which catalyses the austerity phase where excess capital is depreciated, which itself paves the way for a new period of massive investments and the consequent genesis of the new prosperity period. The investments are financed through "saving accumulated during an economic down-swing"[54] The emergent Kondratieff causal linkage is :-

I PROSPERITY: Increased construction of capital for primary industries; Excessive capital investments; Increased demand for capital; Capital price increase.

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52. The life cycle of the capital goods is exceedingly large. eg. railroads, canals and factories.

53. Tinbergen J in Freeman C: [ed] Long Waves in the World Economy.[Gr. Britain; Butterworth and Co. Publ] 1983 p 14.

54. Goldstien JS : op.cit.; 1988, p 42.

II INFLEXION POINT : Exorbitant capital price; Dampening of capital investment.

III AUSTERITY:[55] Decreased Investments; Fall in price of capital; Accumulated saving invested; Initiates prospe-rity period.

CONVERGENT PARADIGM J FORRESTER

CONTEMPORARY PERIOD

The Systems Dynamics National Model [NM] of Forrester exhibits the interesting feature of it being" a quasi-complete endogenous model of growth dynamics "[56]. The NM was designed to dis-entangle complex socio-economic interactions within industrial economics and also for evaluating alternate coorporate and national policies. It further incorporates the behavioural attributes and destabilizing constraints of human actions such as perception delays.

Let me paraphrase, Forester, to explicate the manner in which the NM directed the MIT group to study the literature and formulate a theory of the Long Waves.

"The National Model [NM] was not undertaken for the purpose of studying Long Wave behaviour ...[on] assembling a consumer durables section ...[and] a sector producing capital equipment, ...the Model exhibited strong fluctuating growth and collapse in the capital sector..fifty years between peaks of capital output....unanticipated model berhaviour ..suggests new insights about actual economic behaviour... [on] analysing the reasons for the fifty year mode of behaviour in the NM ... the underlying assumption still seemed reasonable. It is only then that the literature on knondratieff cycle became a part of our investigation."[57]

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55. The entire wavelength is of a time period -45-60yrs
56. Delbeke J in Freeman C: [ed] op.cit. 1983, p 7.
57. Forrester JW in Freeman.C. [ed]; op.cit 1983,p 128-129.

The general approach of Forrester is conservative in emphasizing the management of social systems stressing multiloop nonlinear feedback systems. Forresters views align with Kondratieff, in that he sees long waves as endogenously generated within a fixed system structure"[58] The fifty years 'K' cycles arise from the structural setting of the capital equipments sector"[59] and is therefore "explained by the Capital investments theory"[60] Forrester, further hypothises the Kondratieff waves as capable of producing "long term shifts in un-employment.... moving short term Phillips Curve horizontally."[61]

Forresters theory has been rejected by most liberal economists, since it uses deductive as opposed to inductive reasoning.[63] Alternative theories from this school include:-

a. The "over-investment hypothesis" Van der Zwan[64]

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58. This is a conservative equilibrium view of denying structural transformations within the systemic unit and also negating the accrual of dis-equilibrium within the social structure.

59. Forrester JW : "Business Structure, Economic Cycles and National Policies" FUTURES 8,3 : 1976, p 196.

60. Goldstien JS : 1988: op.cit.;p 49.

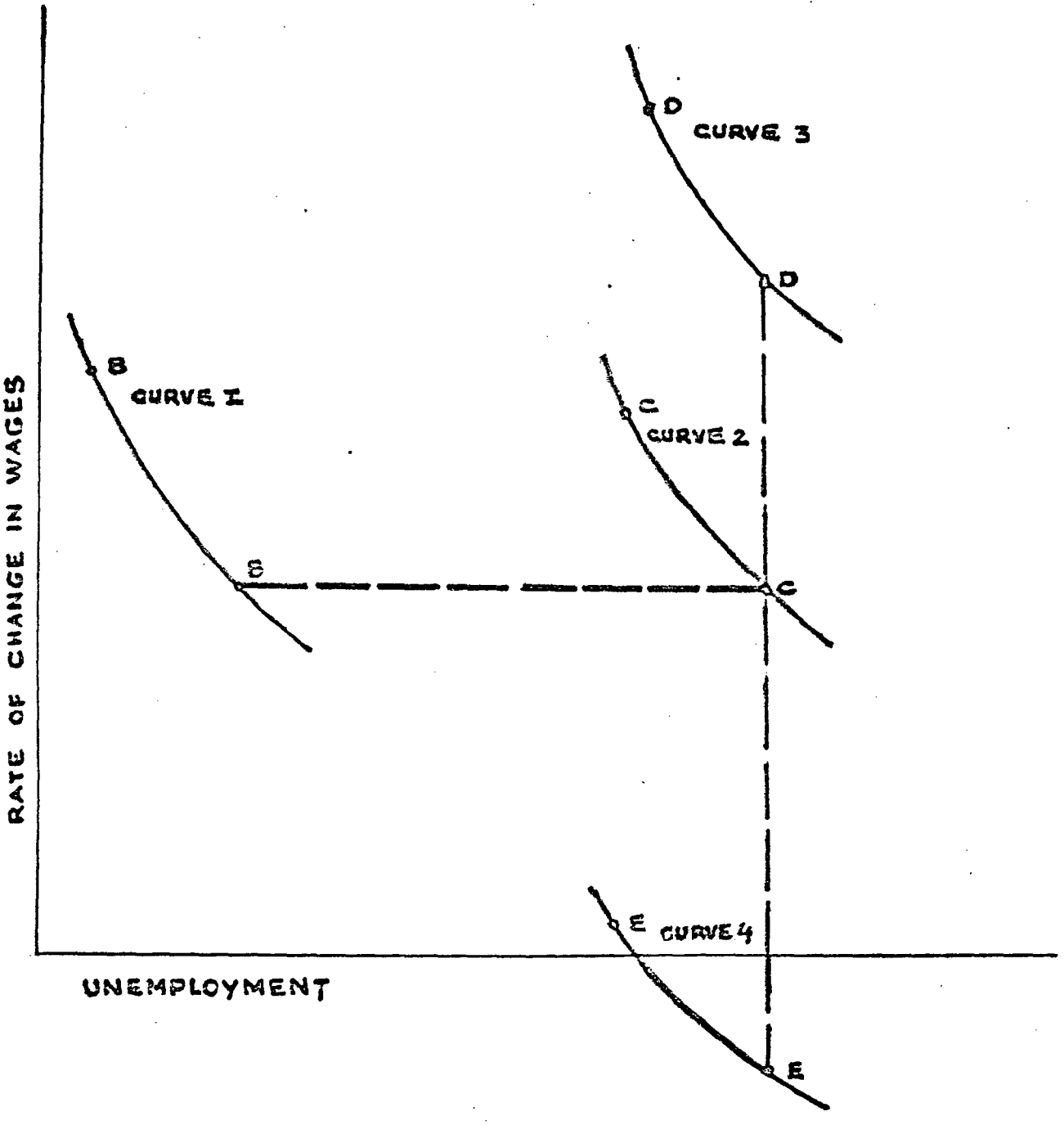
61. Forrester JW : 1976 : op.cit.; p 210.

62. Forrester JW : 1976: op.cit. p 209.

63. Liberal economics is based upon inductive reasoning

64. Van der Zwan: "On the Assessment of the Kondratieff Cycle and Related Issues". in Kuipers.SK.and Lanjouw GJ:[ed] Prospects of Economic Growth [UK : North-Holland]; 1980, p 183-222.

PHILLIPS CURVE AS MOVED BY LONG TERM EMPLOYMENT AND MONETARY POLICY[62]



II THE CAPITALIST CRISIS SCHOOL

DOMINANT PARADIGM : LEON TROTSKY

"The capitalist crisis school argues that the Long Waves defined by recurring major crisis in capitalism, arise from a tendency of the rate of profit to decline."[65] Trotsky's work must not be taken as a response to either J.van. Gelderen (1913) or N.Kondratieff's (1935) work. It was arrived at independently.

The recovery of capitalism from periodic crisis is dictated by exogenous factors [such as imperial expansions constrained labor mobility, wars etc]. Further , the outcomes of crisis is not predetermined but is related to class struggles and historical conditions, Trotsky concluded that long waves were not inherent to the capitalist system but accrued from factors exogenous to capitalism. The key issue remained [ie: To substantially disprove systemic stability within capitalism] for Trotsky. The extant reality, today, paradoxically is the instability of the socialist system, existant for the last 75 years. The issue which emerges is that do universal crisis threaten the stability of capitalism[Trotsky] or are they only a transitionary stage leading to a more stable capitalist dynamic [N Kondratieff].

The Marxist debate on Long Waves lay dormant from the time of Kondratieff's arrest[66] to its revitalisation by Ernest Mandel[67] who developed explicitly on Trotsky's approach.

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65. Goldstien JS: op.cit. ; 1988, p 24.
66. In 1930 (under Stalin) Kondratieff was officially repudiated arrested and subsequently died in a Siberian Prison camp. Trotsky was banished from the Soviet Union in 1932 and murdered in 1938 outside the Soviet Union.
67. Mandel Ernest: [1975, 1980, 1981]

CONVERGENT PARADIGM, ERNEST MANDEL

CONTEMPORARY PERIOD

Mandel's discourse relates the "main cause of fluctuation in the system... to fundamental features of the capitalist mode of production".[68] Whereas the upper inflexion points are determined largely by exogenous factors (growth of capital intensity), the lower inflexion points are determined by exogenous system shocks of social and political struggles. The long term changes in the average rate of profit predominantly generate the episodic fluctuations in the capitalist system. Mandel delineates the historical factors behind each long wave upswing as follows:-[69]

"1. Revolution of 1848 and the discovery of gold in California.

2. Growth of imperialism after 1813.

3. The historical defeat of the international working class in the 1930's and 1940's "[70]

All this increased the rate of surplus value extracted from labor.[71] Mandel in convergence with Kondratieff's view held "technological change as an effect rather than a cause of the long waves."[72]

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68. Mandel E in Freeman C:[ed];op.cit. 1983, p 95.
69. The other exogenous factors are Fascism, Mc Carthyism, cheap Middle East oil and, profits from the armaments sector.
70. Goldstien JS: op.cit.1988 ,p 42.
71. The increased productivity of labor had a positive impact rate of profit.
72. Goldstien JS: op.cit.1988, p 43.

Mandel asseverated that large scale innovations can only create a long wave of sustained growth if and only if the systemic market is enlarged. Contrary to this, however, "innovations can lead to increased unemployment and a stagnating market for final consumers goods and overall investments"[73]

During the positive inflexion point of the Long Waves there is a radical change in the overall socio-political environment within which the system operates. The predominant systemic activities would be directed toward outward access and expropriation policies resulting in the integration of various markets into an aggregated whole. Further," destruction of trade unions, elimination of bourgeois democracy, atomisation of the working class, impossibility of collective sale of the commodity-labor power."[74] all catalyse a process which results in long term neutralization of factors which depress the average rate of profit thereby initiating the properity phase.

THE ORGANIC COMPOSITION OF CAPITAL

With accelerating technological progress the organic composition of capital tends to increase over time. This develops from the premise of a labor saving bias in technical progress. In the Cobb-Douglas production function the factor intensity is measured by the ratio b1/b2 with technological progress this rates get progressively smaller: along the unidirectional vectorial time trajectory.

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73. Mandel.E.in Freeman C : [ed] op.cit. 1983, p 197.
74. ibid ; p 199.
75. Koutsoyiannis A : Modern MicroEconomics [London : Macmillan] 2nd ed 1979, p 76.

This implies that 'Innovations'not only cut production costs but also simultaneously increase the labor supply by reconstituting the industrial reserve of labor. This formulation visualises capitalist development along a linear trend of increasing productivity and exploitable profits.

"MODERN WAR-INNOVATIONS PAR EXCELLENCE"[76]

DOMINANT PARADIGM J AKERMAN: WAR THEORY

War theory of long waves was first expounded by J Akerman, a Swedish economist.[77] Long Waves were deemed to reflect the periodicity of war."Wars spark a sudden and powerful increase in demand which cannot be matched by supply thereby triggering of a strong wartime inflation."[77] The dis-equilibrium created results in a dampening of growth over the decades following the war,causing a downswing in the long wave.[78]

CONVERGENT PARADIGM :- MONETARISTS:

Closely connected with the war school, was a theory based upon monetary fluctuations which exogenously drive the long wave. Gustav Cassel [1918,1932] was the celebrity of the "monetarist group". Cassel argued that within an exchange economy based on private enterprise, an expected future scarcity resulting from resource depletion would actualise into higher expected future prices, which ceteris paribus, reduces current production. This reduced current

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76. Rose A: " Wars, Innovations and Long Cycles." AMERICAN ECONOMIC REVIEW 31; 1941, p 105-7.

77. Akerman J [1932:79] Economic Progress and Economic crisis [London, Macmillan Press Ltd] reprinted edition 1979 [Philadelphia; Porcupine Press]

78. This characterises a long wave upswing

79. A theoritical stand espoused by Norman Sibberling.

production will, cet.par.,increase current prices rather than prices remaining constant for a time and then showing significant rise consequent upon the depletion induce future scarity they would rise at a uniform rate. Cassel concluded that "current prices reflect future scarcities."[80]

Cassel's reasoning, logically progresses to the above conclusion. But the theory's logical infallibility does not reflect its consistancy in the real socio-political scenarios.[81] This model is predetermined by excessively simplifying assumptions and parameters, especially within the interaction zone between politics and economics which go a long way in determining the prices of exhaustible resources. In the world system, the exogenous political factors impinge upon the "action vector" deflecting its trajectory and consequently invalidating the theoritical predictions from purely hypothetical models.

Cassel states that besides changing prices," Uncertainty" can impact upon production decisions there by favouring " present over future production"[82]. These interacting changes in prices and production decisions result in episodic pulsations which sustain the development of capitalism.

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80. Robinson TJC : Economic Theories of Exhaustible Resources [Gr. Britain: Routledge Publ.]; 1989, p 162.

81. The fallacy can be easily determined by performing a simple comparative cost study of oil/gallon vis a vis pepsi-cola/gallon.

82. Robinson TJC : op.cit.1989, p 162.

IV. THE INNOVATIONS SCHOOL

DOMINANT PARADIGM : JA SCHUMPETER

JA Schumpeter attempted to construct a tentative theory of business cycles based primarily on the concept of 'innovations' and the 'leading sectors' of the economy. Western liberal economist at the time were toying with the idea of long term capitalist stability. Schumpeter constructs his theory as a long economic cycle in an evolving system- "Economic evolution"[83] The emphasis is upon the "leading sector"[84] which drives a powerful expansion of the economy until it runs into diminishing returns to scale and is eventually supplanted by a new leading sector. Schumpeterian listing of these innonative drives is :-

1780-1842 The Industrial Revolution.

1842-1897 The age of steam and steel.

1898-? Electricity, chemistry and motors.[85]

Simon Kuznets[86] elaborated these as :-

The Industrial Revolution Kondratieff [cotton textiles, iron, steam power]

The Bourgeois Kondratieff [railroads]

The Neo-Mercantilist Kondratieff [electricity, automobiles]

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83. For a detailed study of Evolutionary theories specific to innovations refer to :Elster J 1983, p 131 -157.

84. Meier GM [1984] :p 97-100. Referent is Walt Rostow's theory of the stages of economic growth and the emphasis upon the 'leading sector analysis.'

85. No ending date was clear as of 1939.

86. Kuznets Simon [1940] quoted in Goldstien JS op.cit.;1988, p 32.

To this can be added the fourth :-
The Informations Kondratieff [Micro-chips, bio-technology]

CONVERGENT PARADIGM : GERHARD MENSCH

CONTEMPORARY PERIOD ; THE METAMORPHOSIS MODEL :- The world economy has evolved through a"series of intermittent innonative impulses that take the form of successive S shaped cycles "[87]

THE METAMORPHOSIS MODEL OF LONG TERM INDUSTRIAL FLUCTUATIONS[88]

G Mensch's metamorphosis model offers two advantages over a mechanistic wave model ; Indeterminism"[89] as discussed by Mensch, during the trend period of stagnation on a high plateau numerous viable alternative patterns can be envisaged for the progression of the long wave . "A sudden collapse or depression [Keynes], a uniform decline or a temporary equilibrium state of retardation [Mensch]"[90]

Our axiomatization of the dis-equilibrum principle stands vetted as indeterminism is an aspect of dis-equilibrium. The second advantage concerns," structuralism: [implies] at any time, the short term economic performance of a firm, a branch, or an industrial sector can be compared cross sectionally .. relative to some long term average or trend."[91]

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87. Mensch G : Stalemate in Technology: Innovations overcome the Depression [USA ; Ballinger]; 1979, p 73.
88. Mensch G et al "Changing Capital Values and the Propensity to Innovate." : in Freeman C: [ed] 1983, p 32.
89. Mensch G : **FUTURES** 13 (4); 1981, p 278.
90. Mensch G et al : in Freeman C: [ed]op.cit.; 1983, p 33. For a bibliography of the relavant writings of AF Burns and JJ Van Dhijn, refer notes 4 and 6; p 46.
91. Mensch et al in Freeman C: [ed] op.cit.1983 , p 33.

The long waves then emerge not strictly as an economic phenomenon, but rather as a politico-economic manifestation measurable in economic terms, reflecting harmonious or disharmonious proclivities of the total socio-economic and institutional systems. Carlota Perez,[92] a Venezulan scholar proposes that capitalism contains two "sub-systems" one "techno-economic" and the other "socio-institutional"[93]

The dominant techno-economic paradigm generates a dynamic complementarity between the techno-economic and the socio-institutional factors thereby sustaining the long upswing. On achieveing a growth plateau a restructuring is required between the two sub-systems which then culminates in a structural crisis. The current restructuring in WEurope[94] perhaps reflects such an equilibrating phenomenon currently in process.

COMPLEMENTARY PARADIGM- CHRISTOPHER FREEMAN

C Freeman et al,[95] in contrast to Mensch argue that deep depresions inhibit rather than stimulate new basic innovations. They stress the role of public policy in leading the way out of a depression by stimulating an increase in the general level of profitability.[96]

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92. An associate of C Freeman, the research group is primarily policy oriented and historical research on the long waves remains the personal interest of a few scholars.

93. Perez C : "Structural change and the Assimilation of New Technologies in the Economic and Social Systems" FUTURES 15, no 5, 1983, p 359.

94. Especially the Common Market - 1992

95. Includes John Clark and Luc Soete [1982]

96. Convergent paradigm - Trotsky and Mandel stating an exogenous causation of the long upswing.

C Mancheti[97] proposes an 'S' shaped growth curve of a particular technology[98]. Global overcapacity through systemic market saturation creates the long wave down-swing. The 50 year amplitude reflecting the time required for a new technology to reach market saturation.

This paradigm requires to give an explanation of why the temporal regularity is determined by the macro-effects of the timing of innovations and why do the waves repeat themselves? We shall now delve into the constituents and characteristics of a post-industrial society.

POST INDUSTRIAL SOCIETY- MYTH OR REALITY

Engels Law[99] states that as the National Income rises the proportion of income spent on essentials progressively declines. The accruing marginal increments in the expendable income are consequently utilised in the purchases, initially of durables [clothing, housing, automobiles, etc] and on the satiation of these needs there emerges an implicit consumption shift towards luxuries [education, recreation, travelling, etc] . It therefore becomes imperative for a society to experience this employment translocation from the secondary to the tertiary or services sector.

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97. Associated with the International Institute of Applied Systems Analysis in Vienna.

98. Like the "Biotic Interactionists", innovations are equated to species in a habitat, filling an ecological niche vacated by the extinct, previous population. [Substitute technology for species.]

99. Christian Engel,a German statistician of the latter half of the Nineteenth century

An economy exhibiting this employment variance is stated to be undergoing a structural transformation from the industrial to a services system ie. **"post-industrialism."** Engels Law, which was initially applied to the proportionate transfer of expenditure from food to manufactured goods is now restructured to include a similar transfer from manufactures to service."[100] This change in consumption propensities reflects "a fundamental change in the nature of economic activities, [therefore] instead of capital investment taking place exclusively in industry and industry providing services for individuals and households,"[101] a tertiary sector emerges which caters to the exponential growth in demand for services. The growth in 'service' employment becomes a manifestation of a novel process in the division of labor"... as societies develop, the planning , forecasting, and organisational functions are renamed from the individual artisans and passed on to the workers, ... hence the growth of the 'white collar' clerical administrative and management occupations."[102] It is this metamorphosis within the nation-state, which upon a comprehensive summation within the world system has been eulogised as the "Post-Industrial Society."[103]

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100. Gershuny JI : "Social Innovations : Change in the mode of provisions of services."; FUTURES Vol 14 (6), 1982; p 496.

101. Gershuny JI : "Post-Industrial Society : The myth of the service Economy.; FUTURES Vol 9 (12), 1977; p 108.

102. Gershuny JI :1977 : op.cit.; p 109.

103. The usage of the term ,"post-industrial society" is attributed to Daniel Bell; he however acknowledges Arthur J Penty, a British guild socialist, as the first writer to use the term "post-industrial" in a 1917 publication: "Old Worlds for New :A study of the Post Industrial State".

Our society has been given innumerable cognomens to describe its past, present and future states. "A total of 350 titles have geen identified for our modern society"[104] Our society in its present spatio-temporal coordinates has been refered to as "the stalled society" [Michel Crozier][105]; "the entropy state" [Hazel Henderson]; the un-prepared society [Donald Michael].

In the conceptualised World system grid, the periodic coordinate shift for the socio-economic unit triggered during the lower inflexion point of the long wave must por-tend the transition of certain static units from the "entropy state" to the "post-industrial" society. The "event which will catalyse the shift of the spatio-temporal societal coordinates will itself be determined by rapidly altering techno-economic paradigm and the vectorial transfer of the unit above the technology threshold initiating the dis-equilibirum mode and consequent structural transforma-tions within the unit which will synchronise the destabilis-ing factors and bring the unit back to the level below the technology threshold. This new threshold, and the socio-economic units new structural configuration has been referred to as, "the post-civilised society" [Kenneth Bould-ing] ; prefigurative culture [Margaret Mead] ; " the age of equilibrium" [Lewis Mumford]; and as "Conciousness III" [Charles Reich][107]

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104. Marien M : "The two Visions of Post-Industrialisation Society".;FUTURES Vol 9 (5), 1977, p 416.

105. A French sociologist.

106. An event will be defined as a permanent modification be localised in the time period of the systems under study.

107. For a comprehensive survey of literature on theoriti-cal and societal imaging refer to : Marien M : op.cit. 1976, p 415-431.

It now becomes essential to emphasize the factor and characteristics of a society performing within the coordinates of post-industrialism. We can then subsequently deal with the probability densities of events occurring which transform the world threatre to the performance threshold of post-industrialism. The transition matrix computed would be crucial in the elucidation of our initial premises.

SOCIAL CHANGE AND SECTOR SHIFT

The emphasis has been on a sector perspective for social change in the contemporary period. For a classification of post-industrial society, an extensive study and analysis of sector shifts at the macro level is imperative. Jean Fourastic put the sector perspective in a historical context."with the climax of industrialization ...[emergence] of a post-industrial phase.,... The service sector ... dominant employer...80 % .... of total employment... industrial employment declined from a peak 50-60% down to only 10% "[108] The knowledge factor dominates in the post-industrial society and also facilitates the control of social and technological reorganisation.

The causation for the transition is determined predominantly by the relative discrepancies[109] in price and income elasticities, technical development and the relative factor intensities of production. The transition from goods to services represents a global structural reorganising tendency in all highly developed and industrialized countries.

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108. Nilsson JE : "The Sector Perspective in Social Development." FUTURES Vol 15 (2), 1983, p 130.

109. Intrasectoral discrepancies within agriculture, manufacturing and services.

The service sector displays a vibrant dynamism as compared to the other sectors thus exacerbating the already present discrepancies between the developed and underdeveloped nations. The services sectors high income elasticity increases its demand relative to the demand for other industrial goods. This relative demand variation is the genesis of the initiation of the transformation vector signalling an alteration of the societal coordinates.

"[The] importance of structural /transactional bases, shared political/economic values or ideologies and innovative roles of the political-economic elities"[110] determines the ordering of the subsystemic units under study. In this context a synthesis of Long cycle and World Systems theory and its extension to the systemic and sub-systemic levels determines our conceptualization on the present world domain. The structural transformation of the European unit and its changing techno-economic paradigm can now be understood in its totality and this novel theoritical formulation helps us fix Europe's system level coordinates vis a vis the other actors in the world systam.

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110. Alker HR in Rosenau JN [ed] : <u>In Search of Global Patterns</u>; [USA ; The Free Press];1976, p 42.

CHAPTER TWO

ALTERNATIVE STRUCTURAL CONFIGURATION

CHAPTER 2

ALTERNATIVE STRUCTURAL CONFIGURATIONS AND LONG WAVE PERIODICITY :-

In contradistinction to the coherent wave pattern approach, I emphasize a perspective which integrates techno-economic structural changes to the idea of rythmicity of economic development even as it contradicts the emphasis on a well defined periodicity," A purely cyclical picture [would] neglect the significant qualitative changes that take place from upswing to upswing"[1] The society which develops through a successive series of techno-economic cultures incorporates the Long Waves as an integral determinant and indicator of this evolutionary process.

Central to the interpretation format is the concept of the 'process'; the dynamic transformation of the system from one state to another," The structure of a system is a manifestation of the underlying process, ... emphasised in.. systems theory by F. Capra. and decision related sciences by TC. Miller".[2] In the mechanistic classical scientific paradigm the dynamics of the system was understood from the properties of the parts. This Democritan procedure was formalized by Descartes and Newton. The present dominant interpretation format must highlight the "shift from thinking in terms of structure to thinking in terms of process."[3] The Democritan paradigm considered fundamental structures. which through interacting forces and mechanisms gave rise to processes. The contemporary paradigm shift emphasises the primacy of the process and every structure is considered a manifestation of this underlying process.

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1. Moskilde E etal, in Vasko T :[ed] op.cit.:1985, p 258.
2. Gault FD et al : "The Design Approach to Socio-Economic Modelling" FUTURES; Vol 19,(1); 1987, p 5-6.
3. Capra. F: op.cit.; 1985 , p 476.

"The material universe is seen as a dynamic web[4] of interrelated events."[5] The theories then developed are a limited and approximate descriptions of reality.

This neo-perspective by a redefinition of the parameter of long wave theory will preclude its proclivity towards, 'determinism.' In addition to this the incorporation of a meta-theoritic 'generating structure,'[6] based upon an independent set of axioms and postulates combined, according to certain formal rules which are logically consistent will help in the deciphering the operating 'interaction laws'. The interaction laws operating within the capitalist system would generate outcomes and causally determine the process of system transformation, which within a strictly formalistic logic could be interpreted as feasible system states. Structural transformations work under the assumed principle of a dynamic dis-equilibirum state necessitating certain properties of the system under study into transcribing to a 'generic'[7] mould. The long waves, in this context, emerge as generic to the capitalist world system.

Before we embark upon an analysis of the altered spatio-temporal coordinates of the sub-systemic units, an over-view of the periodicity of the Long Waves as determined by most scholars in this field becomes essential.

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4. This philosophy negates the existence of fundamental entities, fundamental constants, laws or equations. It considers the overall consistency in the interrelations of the parts , which determines the structure of the entire web.
5. Capra F : op.cit.; 1985, p 177.
6. Dore M et al : op.cit.; 1989, p 45-47.
7. A property is said to be generic when it is shared by almost all the structurally altered configuration of the original system.

BASE CHRONOLOGY[8]

INFLEXION POINTS	1st wave	2nd	3rd	4th	5th
PEAK	(1495)	1529	1559	1595	1650
TROUGH	1509	1539	1575	1621	1689
INFLEXION POINTS	6th	7th	8th	9th	10th
PEAK	1720	1762	1814	1872	1917	1968[9]
TROUGH	1747	1790	1848	1893	1940

N KONDRATIEV[10] :

PEAK	1810/17	1870/75	1924/20
TROUGH	1787/90	1844/51	1890/96

JA SCHUMPETER. Lower inflexion points[11]

TROUGH	1787	1842/43	1848

S KUZNETS : Modification of the Schumpeterian scheme.[12]

PEAK	1814	1870	1925
TROUGH	1787	1843	1898

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8. Goldstien JS : op.cit.;1988, p 67.
9. This is modified by Goldstien. JS [1988] to 1980 in chapter 10 of his book.
10. Kondratieff ND 1935 "The Long Waves in Economic Life" **THE REVIEW OF ECONOMIC STATISTICS**; Vol XVII(4); 1935,p 111.
11. Young M.S. and Schuller T:[ed] ;The Rythms of Society [Gr.Britain : Routledge.];1988, p 41.
12. Goldstien JS : op.cit.;1988, p 70.

VAN GELDEREN General economic movement of various countries.[13]				
PEAK		1873	(1913)	
TROUGH	1850	1895		
FRANCOIS SIMIAND Prices and Production, France:[14]				
PEAK	1815-1820	1875	1928/29	
TROUGH	Late 18th century	1850	1896/97	
E MANDEL World trade.[15]				
PEAK	1820	1870	1913	1968
TROUGH	1840	1891	1938	
JJ Van Duijn : World Industrial production.[16]				
PEAK	1872	1929	1973[17]	
TROUGH	1845	1892	1948	

13. Goldstien J.S.; op.cit.1988, p 69.
14. ibid; fn13; p 69.
15. E Mandel : p 141-142 quoted in Goldstien JS : (1988) ; 1975 p 68.
16. Goldstien JS: op.cit.;1988, p 69.
17. JJ Van Duijn, projects a longwave chronology based upon the Schumpeterian differentiation of the Long Wave into four phases of prosperity, recession, depression and recovery. This chronology is also elucidated below.

JJ VAN DUIJN[18] :

1st KONDRATIEV	2nd KONDRATIEV	3rd KONDRATIEV	4th KONDRATIEV
prosperity(p)1782-1792	(p) 1845-1857	(p) 1892-1903	(p) 1948-1957
prosperity(p)1792-1802	(p) 1857-1866	(p) 1908-1913	(p) 1957-1966
[war(w) 1802-1815]	(w) ----	(w)(1913-1920)	(w) ----
recession(r) 1815-1825	(r) 1866-1873	(r) 1920-1929[19]	(r) 1966-1973
depression(d)1825-1836	(d) 1873-1883	(d) 1929-1937	(d) 1973-1988
recovery(rv) 1836-1845	(rv)1883-1892	(rv)1937-1948	(rv)1988-1995[20]

PRE-INDUSTRIAL AGE- BRAUDEL[21]:

peak	1483	1529	(1559)	1595	1650
trough	1460	1509	1539	1575	1621

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18. JJ Van Duijn :"Fluctuation in Innovation over time " in Freeman C: [ed] Long Waves in the World Economy. [Britain: Butterworth Co. Ltd.;1983 p 23.

19. The data remains biased both for and contrary to the Long Waves hypothesis. The reconstruction effect after WWI [the golden twenties] & Hitlers armament boom caused an exaggeration of growth rates during the interwar B period [1920-29]. Similarly, the pre WWI armaments race and the Marshall Plan reconstructionist effort yielded higher levels of growth rates in the A periods of the third and fourth kondratieff [1903-1913];[1948-1957].

20. A galloping recession from 1973-1988 followed by a recovery period 1988-1995 and then post 1995 could be viewed as the onset of the 5th kondratieff.

21. Goldstien J.S.: op.cit.;1988, p 72.

22. This chronology is based upon the periodization of the dynamics in the European economy. The source is normally qualitative and relies upon price histories.

GASTON IMBERT :- Prices[23]

FRANCE

PEAK		1817	1872	1926	(1954+)
TROUGH	1787	1851	1896	1935	

GERMANY

PEAK		1808	1873	1925	(1954+)
TROUGH	(1792)		1849	1895	1933

ENGLAND

PEAK		1810	1873	1920	(1954+)
TROUGH	1786/89		1849	1896	1933

YOSHIHRO KOGANE : Based upon appearance of new Technological Paradigms.[24]

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23. Goldstien JS : 1988, p 68-69.
24. Yoshihiro Kogane : 1988, p 536.

LONG WAVES AND TECHNOLOGICAL REVOLUTIONS

ERA	ACTORS	TECHNOLOGICAL REVOLUTIONS	HISTORICAL LANDMARKS
1770's-1820's	UK	Factories(mines,farms)with machines driven by energy extracted from mineral fuels in place of 'natural' energy of man,aerial wind water and so on.	Industrial Revolution US Indepe-ndance French Revolution Wealth of Nations (1776)
1820's-1870's	Europe	Railway network as transpo-rtation infrastructure int-egrating production units, markets and residence of workers.	American civil war Formation of German Empire.Me-iji Revol-ution Das Kapital (1867)
1870's-1920's	Europe USA Japan	Electric power network as energy infrastructure	Germany & the USA catch up with UK First wor-ld war Russian Revolution

1920's-1970's	Europe USA Japan NIC	Automated(with conveyor belts)in place of factories which are not simply containers of machines	-------- Second World War with Europe Independence of excolonies Oil crises
1970's-2020's	Europe USA Japan NIC's Some LDC's	Information-Communications network as information infrastructure integrating producers and users of information and services	Comunication Satelites Financial Revolution ?[25]

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25. To this can be added **European Common Market** 1992 and the genises of unipolar Int. Relations with US as dominant hegemonic power following the Gulf war 1990-91.

The above data cites comprehensively the Long Wave chronologies[26] as determind by the major scholars working in the four different schools[27], currently studying this phenomenon.

INTERACTION LAWS CONSIDERED

J Von Neumann, demonstrated that decentralized capitalist economy had to grow at a 'determinate constant rate to clear its markets,'[28] The theory was how-ever based upon two unacceptable assumptions:-

a. No Technical progress;

b. Constant real wage.

This type of theory emerges as profoundly unrealiable when applied to the turbulent history of industrial capitalism. How-ever a cyclical dynamic fused with this steady state growth model could demonstrate a viable and realistic solution. The long cycle should then reflect a 'dynamic instability' but be structurally stable'[29] and the system[30] should continuously evolve structurally.

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26. Klienknecht A : op.cit.;1987, p 24.

27. Capitalist crisis, Capital Investment, Innovation and War schools.

28. Dore M etal: op.cit.;1989, p 125.

29. Goldstien JS : op.cit. ;1988, p 132.

30. The system is characterized by a point in the state-space (spatio-temporal coordinates) and its motion, behaviour and transformation is pictured by a trajectory in the space-time format.

INTERACTION LAWS POSTULATED

1. The propensity towards a continuous increase in the organic composition of capital and concomitantly its accumulation within the spatio-temporal constraints of technology necessitates a fall in the profit rate and a simultaneous increase in unemployment.

2. The capitalist world system maintains the rate of profit through the socio-techno-economic institution of the Nation State.[31]

3. The Law of value determines both the spatial and sectoral shifts within the socio-economic mechanism and consequently indicates a potential structural transformation of the politico-economic system.

4. "Prolonged depressions not only trigger a reallocation of innovative resources but also creates a strong pressure towards social, political and institutional change."[32]

5. The behavioural assumptions of the decision makers rests upon the principle of bounded rationality.[33] Satisficing behaviour[34] becomes essential, given the information and time constraints and the human processing ability, the classical view of global rationality has to be abandoned, per se.

6. Innovation diffusion follows a characteristic logistics curve and provides the endogenous catalyst to the Long Wave. How-ever technology substitution emerges when a saturation

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31. The fragmentation of the labor market and constrained mobility prevent an osmotic movement of labor and consequently the equalisation of labor wages.

32. Klienknecht A : op.cit.; 1987, p 206.

33. Koutsoyiannis A : op.cit.;1979, p 258, p 289-90.

34. Simon. H. (1957); p 198; summarised the essence of the theory of bounded rationality. How-ever a variance requires to be introduced namely, as the system evolves towards the Informations society, the information and processing constraints progressively diminish .

plateau is reached for the existent dominant technology. This brings it in conflict with the law of value and returns thereby paving the way for a comprehensive market dominance by the emergent new technology facilitated by its inherent performance superiority. The constraints to the growth rate and ascendance of the long wave being imposed by the dischronocity emergent between the "socio-institutional" and"techno-economic"[35] paradigms and not by the classical view stating the causative event being "resource depletion".[36]

GENERATIVE STRUCTURE

The dynamic complementarity between the emergent techno-economic paradigm[37] and the extant socio-institutional paradigm attempts to propel the existing politico-economic structure from its position of inertia. The resultant entropy in the system manifests itself by an aggregate structural crisis in the politico-economic unit, which following a series of adjustment (political and economic), generates the impetus for the next economic upswing in the 'K' wave. "A structural crises is a logical outcome of a 'technological revolution'...[38] (making) it important to understand the mechanism by which changes in technology are transformed into long waves and structural transformations."[39] The 'Generative Structure' encapsulates the essence of this mechanism. A detailed appraisal of the theory behind this phenomenon is elucidated below.

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35. Perez C : op.cit. :1983, p 358.
36. Nakicenovic. N. in Vasko. T:[ed] op.cit.;1985 p 85.
37. The techno-economic paradigm includes technological social, institutional and political innovations.
38. Also a Techno-economic paradigm shift.
39. Menshikov.S . in Vasko T:[ed] ; op.cit.;1985 p 71-72.

SPATIAL INNOVATION DIFFUSION :-

I hypothesise an uneven spatial distribution of innovations with tremendous growth possibilities, geographically, which would be based upon the profitability of the innovation. An array of delaying mechanisms is introduced by the politico-economic unit, which would enable it to distort the time lapse between the act of information acquisition[40] and delayed [actual] transference of the solicited technology. "This delaying mechanism must comprise economic and psychological components. The salient characteristics of the innovation diffusion process can be described as follows :-

"STAGE I-Local concentration of initial acceptances [initial agglomerations].

STAGE II:-Radial dissemination outward from the initial agglomeration is accompanied by the rise of secondary agglomerations, while the original centers simultaneously continue to condense.

STAGE III- The growth ceases [saturation stage]."[41]

What Hagerstrand has highlighted is an interacting diffusion process[42] which is characterized by agglomeration and then by radial dissemination and a simultaneous internal densificaton.

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40. Hagerstrand T : Innovation Diffusion as a Spatial Process ; [USA Univ. of Chicago press]; 1967, p 149.

41. ibid: Jn.40; p 133-134.

42. This diffusion process is controlled both by the innovating entrepreneur and the dominant politico-economic elite of the subsystemic unit in which the innovator is spatially located.

Manufacturing innovations, specifically, through the investment in transport inputs, would be instrumental in the elimination of inefficient producers (locations) elsewhere.[43] Therefore, "the diffusion of production innovation has ramifications for the location of manufacturing, and through multiplier effects,... the stunting of development of what where once potential sites."[44]

Since the radial dissemination of the innovation is lagged between the core and the periphery, the restructuring of the politico-economic unit begins in the core and subsequently transfers itself to the periphery as the adjustment between the Techno-economic paradigm and the socio-institutional framework is performed. Therefore, ' a lagged correlation should logically emerge in the structural crisis experienced by the system whose causative vector is reflected by the spatio-diffusion of the dominant technological paradigm. Since, an added aspect of the technology transfer would be the profit incentive; a measure of the altered structural configurations could be related to the diminishing profitability of the radical innovation. A positive relationship between innovations and the time paths for structural change is established "In the long run, innovations... change the nature of the economy's outputs and capital output coefficients."[45] The spatio-diffusion process of the innovation also contributes profoundly to changing the structure of the politico-economic unit. Capitalism does not then undergo a single crisis of adjustment but is dominated by a series of crisis determined by the spread effect of the techno-economic paradigm.

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43. This dominates specifically in the periphery.

44. Hagerstrand T : op.cit.;1967, p 322.

45. Thomas MD :"Growth and Structural Change : The role of technical innovations." in Amin A and Goddard JB (ed) ; : op.cit.; 1986, p 118.

Within the Schumpeterian framework "economic growth.... [is] a process of reallocation of resources between industries... [this] process necessarily leads to structural changes and dis-equilibrium if only because of uneven rate of technical change between different industries."[46] Whereas, Schumpeter, stressed the aspect of clustering of innovation, he explicated a diffusion process which was inherently uneven because "first a few and then many firms follow in the wake of successful pioneers."[47]

Schumpeter attributed this to the changing profit expectations during the growth of an industry, as the major determinant for a sigmoid pattern of growth. Market saturation and the tendency for a technical advance[48] to approach its limits, changing costs of inputs and the bandwagon effect, all tend to reduce the level of profitability and with it the attractions of further investments and signal the approach of a growth plateau and the recession phase.

NATION-STATE'S ECONOMIC RATIONALE BEHIND LONG WAVES OF TECHNICAL CHANGE

"The assumption of exogenous factors behind the long waves is consistent with the waves being historically unique events that neednot necessarily be repeated in future; an endogenous explanation imply a regular occurance and some prognostic significance of the long waves."[49]

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46. Freeman C in Amin A and Goddard JB (ed) : op.cit.; 1986, p 102.
47. Koutsoyiannias A : op.cit. ;1979, p 102-3.
48. The Techno-economic paradigm undergoes a continuous process transformation.
49. Klienknecht A : op.cit. : 1987, p 13.

It is in this context that the relationship between technical change[50] and economic development must be understood. The Schumpeterian view holds the long wave as a by-product of growth, contrary to this Kaldor asserts that the Long Wave "is causally efficious in inducing growth."[51] Capitalist innovation, for Schumpeter, is defined as the carrying out of new combinations of the means of production. The Schumpeterian entrepreneur/innovator, embodies the dilemma; that by maximising utilities rather than profits, he prevents the realization of efficient states. However, the Tocquevillian "principle of the long term"[52] makes him quint-essentially the prometheus of growth. In this context even though innovation reduce employment in the short run, due to their inherent labor saving bias, they create employment in the long run.

The static efficienty of system may in the long run be inferior to the dynamic efficiency of a [capitalist] system which allocates a part of its resources to the generation of new knowledge"[53]

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50. Also the innovative ability.
51. Elster J : op.cit. ;1983, p 123.
52. Liebniz stated the principle with unsurpassable precision "The infinite series of all things may be the best of the possible series, although what exists in the universe at each particular instant is not the best possible".
53. Klienknecht A : op.cit. ; 1987, p 124.

It is these cosiderations which provide the economic rationale for states intervene with the fundamental components of technical change. In this context, "the case of differential roles of technical change between nations"[54] result in geographically diversified patterns of diffusion of technologies, resulting in decline of some regions and nations; while differential access to new technologies have profound military implications and increase the power of particular nations vis a vis others. These aspects of 'REALIST' thinking requires us to briefly deal with the role of geographical diffusion of innovations on the pattern of structural transformations and its impact upon the Long Waves of technical change.

The disturbances engendered could be sufficient to disrupt the existing system and signal the genesis of a transformation vector portending considerable change in the structural configuration ofthe politico-economic unit.[55]

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54. Coombs. R. et al : Economics and Technological Change. [Gr.Britain : MacMillan Education Ltd.] 1987,p 20.

55. All diffusion processes stressed by most innovation and long waves theorists emphasize intra/inter industry diffusion of the innovation. I have come across no long wave material dealing with the spatial aspect of innovation diffusion. This oversight has introduced a modicum of fallibility into the theorising on structural transformation. I have attempted to correct the same by emphasizing spatial innovation diffusion.

Let us consider the period of the fourth Kondratieff[56] to systematically format a global structural transformation process to substantiate our theorizing. The early 1950's recovery from the ravages of war was slow in most industrialized parts of the world . As the decade progressed the tempo of growth with respect to manufacturing production grew rapidly in the USA, W.Germany and Japan . The multinational era of the high technology firms was ushered in by the increasing volume of US exports to Canada and W Europe. By the 1960's offshore direct investments in developing countries by the US multinationals was at a significant level. By the mid 1970's the pace of growth of the manufacturing sector had begun to decline appreciably in most industrialized countries. The shift was towards the newly industrialized countries, namely, Brazil, Taiwan, Korea, Singapore, Hong Kong and Mexico which underwent spectacular structural transformations and phenomenal growth rates. The diffusion process had taken twenty years, but the transferred techno-economic paradigm was already a recessive variant within the dominant core. The transfer was hence motivated by the profit principle.

The 1980's became a period of structural change even as energy costs rose and the growth potential of the old leading sectors was partially exhausted a new techno-economic paradigm emerged based upon the Information Technology Revolution and Bio-technology. This period also witnessed considerable structural transformation of the politico-economic units located in the core of the world system.

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56. The 1948-1990 period; the startdate is based upon JJ Van Duijn's data. Goldstien JS : op.cit.;1988, p 72.

"In this perspective the structural crisis of the 1980's like those of the 1880's and 1930's was a prolonged period of social adaptation to a new paradigim."[57] This new technological system satisfied all the requirements for a Schumpeterian revolution in the economy. Third world countries how-ever "require some resolution of the basic structural problems[58] confronting the entire world economy."[59] It has been stated that the UDC are already experiencing difficulties in developing a globally competitive new Informations Technology industries. The technology transfer can be facilitated only when the core countries start experiencing diminishing profits from the "Sunrise Sector" [60] and are then willing to transfer the know-how to the LDC's.

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57. Freeman C :" Technical Innovations, Long Cycles and Regional Policy" in Chapman K and Humphry G. [ed] : Technological Change and Industrial Policy [Gr. Britain : Bosil Blackmell Publ.] ; 1987, p 17.

58. These problems are related to transfer of technology, Debt trap etc.

59. Freeman C in Chapman K and Humphry's G : [ed] ; op.cit.;1987, p 23.

60. This is indicative of an approaching growth plateau of the present techno-economic paradigm and the initiation of a 'substitution effect', which signifies the emergence of a new dominant technology sphere.

THE THESIS OF SELECTIVE GROWTH PATTERNS :- Within an interacting system and an expanding space economy the diverse growth momentum may be construed "as geographical expressions of initial advantages"[61] translating into a spatial manifestation of the economy's industrial location. This spatio-distribution pattern is one of cumulative technological advancement and industrial concentration through a tendency for sustained agglomeration,[62] in the centre. These specific spatial manifestations of the economy represent a circular cumlative process.

The obvious question to the above would be; what determined the spatial choices made for industrial location in particular geographical areas? Two polar viewpoints emerge representing the dichotomy between purely random and economically rational forces.

1. **ADOPTIVE APPROACH** :- Spatial survival "doesnot require proper motivation but may rather be the result of fortuitous circumstances,"[63] The emphasis is upon the 'spatial satisficing'[64] principle.

2. **ADAPTIVE APPROACH** :- Economic activites rationally adapt themselves to the conditions of the society.

The two processes representing theoritical extremeties

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61. Pred.AR : The Spatial dynamics of US Urban Industrial Growth. [USA : The MIT Press]; 1966, p 49.

62. Consistent with the Weberian assumption that small production units will concentrate whenever the minimum requirements for large scale production are satisfied.

63. Alchian AA :"Uncertainity, Evolution and Economic Theory". JOURNAL OF POLITICAL ECONOMY Vol 58, 1950, p 211-221.

64. Wolperts J "The Decision Process in spatial context" ANNALS OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS Vol 54, 1964, p 533-558.

65. Pred AR:op.cit.; 1966, p 45.

should be conditioned realistically as operating concurrently, through permutations, combinations and attendant multiplier effects to determine industrial location. This," perpetuates the circular and cumulative growth processes, even before higher thresholds are attained or new innovations become economically sound."[66]

Technological innovations not only foster expansion within a single industrial category but also dictate the establishment of linked industries, thereby resulting in locally concentrated, rather than geographically dispersed, multiplier and a quickened achievement of higher thresholds and new industrial injections. The process provides accessibility to larger market areas [export hinterlands] the multiplier and invention/innovation cycles impact upon the 'generating structure' resulting in the stepping up of the velocity of the growth process. The economy persists in reiterating itself without the aid of an external stimulus and the resultant impact determining the progress of the Long Wave from the initial trough to a period of sustained ascendance.

Once convergance of technology to specific spatio-temporal coordinates within the world system occurs, then there emerges a period of persistent relativistic socio-techno-economic inertia between the Techno-dominant and 'Techno-recessive' regions of the world. A dyadic system emerges in which the retarded growth regions experience a fractionised and non-transformative structural coordinates.

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66. Pred AR : op.cit.; 1966, p 146.

"The technologically advanced nations... prevent changes from occuring within these [retarded] societies...[as] this is likely to conflict with western interest."[67] The momentum of structural change and innovational catalysts will further accelerate the extant discrepancies between the A and B[68] regions and simultaneously enhance the retrogressive proclivities within the B regions. In this context the development in the NIC offers an interesting case study. "The timing of technical change turns to a very considerable extent upon the rate of adoption of innovations and perhaps upon the links between innovation producers and users".[69]

THE HISTORICAL SYSTEM'S IMPACT UPON LOCATION

Historical reality, with its spatial differences in population density, topography and natural resources highlights the areas of the traditional sources of supply and thereby limiting the number of possible location of the industries. Periodic 'condensing' [agglomerations][70] occurs to forestall the disruptive influence of structural transformation within the economy. This agglomerative tendency as " seen from the standpoint of the economy as a whole

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67. Hetzler SA : Technological Growth and Social Change; [Gr.Britain Routledge and Kegan Paul];1969, p 44.

68. 'A' regions refer to the economically advanced and dominant areas in the world system and 'B' regions to the recessive and backward areas.

69. McArthur R: "Innovation Diffusion and Technical change : a case study." in Chapman Kand Humphrys G : [ed] : op.cit.; 1987, p 30.

70. Neccessarily of different enterprises through interrelationships.

[translates into] the tendency for maximization of the number of independent economic units."[71]

Moving from the consideration of the characteristics of the economy to the higher level of its impact upon the relations between nation-states, our premises stand us in good stead. Economic subjugation by the dominant politico-economic unit has existed since the emergence of a substantive exploitable economic domain.[72] "Great colonial empires were created by the Pheonicians, the Greeks, the Romans and the Carthagians. The Indians, the Chinese, the Arabs and the Turks..."[73] The Europeans over the last 400 years subjugated two thirds of the world. The end of the pre-industrial age saw a shift of power and the consolidation of a new Euro-centric World order. The world system has since been dominated by this centre [euro-centric] of activity. There have how-ever been two[74] tangential shifts away from this centre. Namely, the emergence of USA in the 1920's[75] and Japan 1905-1940;[76]

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71. Losch.A : The Economics of Location [USA : Yale University Press]; 1954, p 94.

72. More specifically through the emergence of technological capabilities permitting such exploitation.

73. Organski AFK : World Politics [USA : AA Knopf Inc.];1958 pg 224.

74. I havenot listed the USSR in this categorisation because I percieve the USSR as predominantly an European power; since the 1860's USSR has conditioned her responses by emulating the west. The coalescing of USSR with the "west" emerges from her geographical location of being partially in Europe.

75. Organski AFK: op.cit.: 1958, p 356 : "England leader of the world until after WWI but..., USA probably passed her in power some years before WWI began."

76. This period saw the emergence of Japan as a military power.

Post 1960.[77] The donning of the mantle of leadership by USA was not accompanied with a period of accentuated conflict between England and the USA . This anomaly is explained by the fact that."the United States had accepted the Anglo-French international order".[78]

The global ordering since the emergence of the industrial era has been accomplished from a predominantly Eurocentric perspective I shall deal in detail with this aspect in Chapter four of my dissertation. Having digressed briefly we must now return to the locational aspects of technology and its impact upon regional development and structural change.

THE POLITICO ECONOMIC LOCATION PROBLEM :

Political frontiers are relatively more inflexible and impervious vis a vis economic areas. Within economic landscapes, transitional areas are possible which derive no benefit from definite orientation vis a vis two antithetically ordered economic systems. This principle on extension to interacting political units actualises into valid biases and attitudes which determine the political units orientation with respect to a politically ordered system characterised by a dyadic polarisation in the intra-systemic behavioural pattern. In this context the principle of non-specification of some units behavioural patterns and spatio-idealogical coordinates is necessarily motivated by the desire of achieving that 'Pareto Optimal' state[79] which would maximise the political units satisfaction.

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77. The post 1960's period saw a shift in Japanese power structure from a military to a first order economic power.

78. Organiski AFK : op.cit.: 1958, p 362.

79. " This Pareto optimal state would be dictated by the following salient attributes : continuance, power, kultur and prosperity ". Losch A : op.cit.;1954, p 199.

On economic landscape boundaries the prevailing tendency is to close " unavoidable gaps" and espouse a vectorial process of outward expansion; on the state frontier the tendency is in opposition to the above attempts to open " avoidable gaps" where ever possible thereby accentuating and demonstrating the imperviousness of the subsystemic unit's [Nation states] boundaries. Nation States also discourage industries from settling near the borders from where their access to the market remains only unidirectional and directed towards the center.

The natural corrollary to the above is that ," after a shifting of political frontiers the new border regions..... become depressed regions."[80] In the context of the European common market the dissolution of the loci of impervious points[81] between the 12 members of the EEC neccessitates a shift outwards and ocean-wards in three directions. These new points, interestingly, instead of becoming depressed regions as visualised by our theoritical formulations emerge as both entry and exit points for international trade between nations. This by itself generate heightened economic activity specific to these areas and a consequent increase in prosperity for these areas. Furthermore the primal loci points also see a shift of industrial location towards these recessive locational positions[82] and increased economic

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80. Losch A : op.cit.;1954, p 200.
81. This loci formats the boundaries traditionally imposed between the 12 member states of the EEC.
82. The referent is the spatio-temporal coordinates existent at the time period To, when the recessive loci points still existed.

activity[83] which portends greater access to profits which could be extricated from here.

In totality an integration which presages a border shift constrained by the ocean also culminates in an overall increased benefits relative to costs for this new emergent entity. These spatial coordinates limited by oceans would translate into the genesis of a number of sea routes converging towards this particular region.

SPATIO STRUCTURAL TRANSFORMATION: A REFORMULATION

All existing subsystemic actors[84] have experienced some alteration in their spatial coordinates necessitated by numerous exogenous and endogenous factors. In the specific case of an expansion of the territorial area possessed by a subsystemic actor, if the changed spatial coordinate are subject to a limit, which is an exogenous variable[85] namely an ocean and further expansion is not attempted beyond this boundary then the subsystemic actor functioning within these new transformed spatial coordinates, will function at a supra-optimum level and thereby maximise its prosperity in the long run.

This spatio-structural transformation in the actor would result in its ascent in the World System.

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83. Which should catalyse a prosperity phase for these specific loci recessive point regions.
84. I am referring to the Nation-State in the form it emerged post- Peace of Westphalia.
85. The coordinates should enclose the converging point of most major sea-trade routes in use world wide.

CHAPTER 3
THE IMPACT OF THE INNOVATIVE VARIANT

EMPIRICS

The outcome of the discussions above implies the existence of a number of factors forcing technology to causally impinge upon the politico-economic structure.

"Work on explaining changes in firm concentration has centered upon the relative contribution of mergers and differential internal growth rates of firms,"[1] to the extent that mergers is a reaction to achieving firm level scale economies.[2] The significant principle emerging that whenever a stimulus variate[3] takes on a value exceeding the critical level, the subject of the stimulation responds by initiating a transformation process. The above process in isolation from the inclusive aspects of socio-institutional change projects an incomplete picture. It becomes specious to refer to a "society's trajectory towards institutional change in divorcement from , or prior to the appearance of the new behaviour or physical item which is to be socially accommodated".[4]

It therefore becomes essential to incorporate a part of the society's techno-economic paradigm in our study. Since, the change process generates dis-equilibrating forces which impact upon the systemic units, it then becomes appropriate to consider" the modern industrial society... as

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1. Stoneman. P : The Economic Analysis of Technological change [Gr. Britain: Oxford Univ. Press] 1983, p 244.
2. One can argue that technological change has affected firm concentration levels.
3. The stimulus variate signifies the genesis of a process culminating in either systemic or structural alterations.
4. Hetzler SA : op.cit.; 1969, p 159.

CHAPTER THREE

THE IMPACT OF THE INNOVATIVE VARIANT

a model of instablity... kept in constant dis-equilibrium by deliberate internal change."[5]

If technical change is considered the major force for structural reconfiguration, then the consequent economic growth can be understood to be the resultant of structural change. The emergent 'New Technological System'[6] contemporaneous to the genesis of the long wave emerges in incepient small firms or branches of larger firm with negligible economic and employment significance in the context of the aggregate economy. The impact of this new technology initiates labor substitution. The stimulus variate, catalysing the next long upswing, on crossing the critical threshold initiates a process, whereby," the new sectors of the industry may generate substantial employment opportunities and also stimulate employment growth[7] in existing industries upstream and downstream of the new industries."[8] The downswing in its turn is characterised by diminishing returns to technological trajectories, market saturation and exhausted economies of scale. Yet upward wage increases due to institutional factors creates an inflationary spiral which negatively effects both corporate and state policies.

The refined technologies become more captial intensive and necessarily labor displacing . Investments are directed towards rationalization and vertical intra-sector integration as opposed to the earlier horizontal, integrationist/ expansionist phase.

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5. ibid; fn4 ; p 91.
6. Coombs R et al : op.cit.; 1987, p 184.
7. Supply shortages of skilled labor in the new industries will also push the wage rate up. This will increase savings thereby raising investments which through a feedback mechanism will accelerate the long waves upswing.
8. Coombs R et al : op.cit.; 1987, p 184.

This transition from the virtuous to the vicious circle epitomises the completion of a long wave.

This multifaceted approach, which abstracts from the assumption of constancy of both the structural and institutional parameters has helped in the deciphering of this economic phenomenon. The long term evolution of the politico-economic system becomes an important determinant of the long waves.

The "New Technology System" [NTS] of Freeman et al can be treated as a set of new natural trajectories created by some core advances in technology. The NTS also emphasizes the "diffusion process for these innovations..... [besides being] a stimulus to the long wave upswing."[9]

PROCESS OF CATACLYSMIC TRANSFORMATIONS

"In the past 1500 years , European countries[10] have been through four epochs : 'agrarianism' (500-1500), 'advanced agrarianism' (15-00-1700),'merchant capitalism' (1700-1820), 'capitalism' (1820-1980)."[11] My study has concentrated predominantly upon the fourth epoch with slight digressions to the third epoch. The primary and predominant referent for our study is the temporal dimension of the political process and to what degree that process is differentiated through time.[12]

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9. Coombs R et al: op.cit.; 1987, p 180.

10. All advanced industrial countries are European or European off-shoots [like Australia, Canada, and the USA] with one salient exception-: Japan.

11. Maddison A : Phases of Capitalist Development. [USA : Oxford Univ. Press] 1982, p 4.

12. Modelski G. (1987) defines this field as "chronomacro politics," the study of the rythms of large political systems.

It is within this chapter that the last half millennium of the historical existence of the capitalist world system will be interfaced with the long cycles to dicipher potential periodicities of integrationist tendencies within the world system with that of the rythmic development of world capitalism. The data appraised in its 'systemic' mode will emphasize "system time"[13] over chronological time. A "periodic pattern of events"[14] concept in effect can be conceptualised as a rudimentary method of measuring system time.

The world hegemony theory posits "that over each long cycle the global political system moves, along the polarity dimension, from a position of low-to high-to low-power concentration."[15] These phases of capitalism emphasize geographically uneven economic development and shifting relationship of political and economic power with its locational impact upon space economies and the emergent integrationist proclivities. The locational *dynamics of* capitalism have resulted in unforseen geographical power shifts and its resultant impact upon the regional development of capitalism.[16] The international nature of the long cycle remains beyond doubt, however locationally the effects on kondratieff cycles have been considerable in regions which for a variety of reasons experienced industrialisation first.[17] In Britain, " the period of the upswing (1790-1815) industrial production rose

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13. Thompson WR (1983) & Goldstien JS (1988).
14. Modelski G : op.cit.; 1987, p 4.
15. Modelski G : op.cit.; 1987, p 5.
16. "The geographical industrialization has four principal moments : localization, clustering, dispersal and shifts." Storper M and Walker R: 1989; p 9
17. Industrialization started first in Britain and the impact of the first Kondratieff upturn was strongest there.

by about 200 per cent."[18] In the same period French industrial output rose by only 60%. In the above context the geographical proximity of the two regions in divorcement of their socio-institutional antagonism and insularities would have projected an incomplete rendition of the causation behind the stated discrepancies in industrial production. The salient feature to be discerned from this geographical paradox being that even though the techno-economic paradigm generates structural transformation
in the socio-institutional unit, it however remains subservient to the socio-institutional unit as the "spread effect" of the changing techno-economic parameters is controlled by dominant politico-economic unit in which the emergent change is geographically located.

Evidence indicates that countries possessing a technological and research infrastructure above a certain threshold level, new technologies and improved know- how diffuse rapidly from outside their borders. How-ever, for countries below the critical threshold of scientific awareness and industrial infrastructure, diffusion is slow and uncertain.

APPROPRIATE TECHNOLOGY : ALLOCATION EFFECTS :-

"For forty years the development and diffusion of new technologies[19] have been a major stimulus to economic growth and an important factor contributing to the economic and

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18. Ray GF: " On Long Cycles: Kondratieff and All That" in Hieronymi.O.[ed] : Technology and International Relation [Gr.Britan: The Macmillan Press Ltd] 1987, p 48.
19. Technology in opposition to the classical definition of identification with the hardwares of production is extended to encompass all skills, knowledge and processes incorporated in product marketing and services sector.

political integration of the Western World."[20]

Technology known to the world may be formally symbolised as :-

WT= { Ta, Tb, Tc, Td.... Tn}[21]

For a country the technology available for adoption is that subset of world technology known to the country :-

cT={Ta.....Tn}[22]

C denotes the country and the bar denotes the techniques known and available to the country.

Therefore: cT C wT.

"The technological shelf is composed of the complete set of such actitivities or technologies which have been demonstrated to be feasible somewhere in the advanced countries at some historical point in time, including the present."[23] The technological shelf becomes increasingly complex and capital intensive along the vectorial time component. Though theoritically an LDC is free to use any particular unit activity from anywhere along this shelf, the ultimate consequences of this choice impinges upon the secondary processes which are sparked off by this choice.[24]

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20. Hieronymi O : "Reflections on Technology, International Order and Economic Growth " in Hieronymi O [ed]:1987: op.cit.; p 69.

21. Constitues the world technology.

22. Stewart F:"Transfer of Technology." in Meier GM [ed]: Leading Issues in Economnic development. [New York: Oxford Univ. Press];1984, p 345.

23. Ranis G:" Industrial sector Labor Absorption." ECONOMIC DEVELOPMENT AND CULTURAL CHANGE : April 1973 ; p 392-7.

24. These are all a part and parcel of the innovation process taken as a whole.

The role of innovation is then intimately related to the stage in which the developing economy finds itself. The shift from the phase of import substitution and the entrance into the second phase of libralization or export substitution results in a type of innovation, namely a reduction in the type of in-efficiency of the original transplanted technology.[25] The entrepreneurial knowledge on the 'shelf' of techniques is dependent upon a biased channel of information towards technology currently in use in the supplying country.[26] An unmodified transfer of these techniques to LDC's "result [in] a concentration of resources of savings,..... Incomes tend to become concentrated in this area, ... resources under-utilised, including raw materials as well as labor,"[27] generating considerable inefficiencies. The emergent dual economy generates considerable structural friction and heightened dissatisfaction amongst the polity creating chronic unrest and a volatile cauldron of potential crisis trigger points.

How-ever with a shift to the second phase for the LDC a period of 'innovation assimilation'[28] starts. As the economy shifts from a natural resource based growth pattern in the import substitution phase to a human resource based system in the export substitution phase. There is an increasing sensitivity

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25. Also called " X-efficiency."

26. Namely the Developed or Advanced countries Therefore, older techniques or techniques recently developed in LDC's are less well promoted.

27. Stewart .F. in Meier GM [ed] : op.cit.; 1984, p 346.

28. Meaning innovating "on top of" the imported technology in the direction of using the relatively more abundant unskilled labor supply.

to the continuously changing factor endowment, first in the terms of efficient utilisation of the domestic unskilled labor force, and later in terms of the incorporation of growing domestic skills and ingenuity. In other words the appropriate technology finally in place must be one in which not only the initial choice from the shelf but also the adaptations and adjustments consciously made thereafter, in response to changing domestic resource base and capability constraints become important determinants of future structural transformations.

TECHNOLOGY DIFFUSION AND ECONOMIC GROWTH :

In retrospect it has become evident that international diffusion of advanced technologies between the USA , W Europe and Japan, and increasingly also to the LDC's has been one of the main factors for the rapid growth both in the countries exporting and those which were importing technology, and in the world economy as a whole. "The process of international economic integration- the reduction.... of barriers to the free movement of goods labor and capital"[29] also stimulates and accelerates the diffusion of new technologies. Post war economic history exemplified the belief that trade in goods and technology flows helped in reinforcing elements of international economic integration.[30] The neo-schumpeterians are involved in a debate which though of academic relevance bypasses a major issue refferent to the importance of technological innovations on the relations amongst the nation states constituting the world political economy.

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29. Hieronymi O. in Hieronymi O [ed] : op.cit.; 1987, p 77.

30. This process of world wide liberalization and integration of technology diffusion and economic growth in the post WW II scenario had much in common with the expansion of the world economy in the second half of the nineteenth century.

Atleast, what is of importance is the acceptance by the neo-schumpeterians of technological innovations as the primary motor of economic growth and also of the long waves.

In the above context" in the relations between countries, what is essential is economic power."[32] Other analytical tools[33] linked to the analysis of structural aspects of national production processes and its ability to analyse the bargaining capacities which technological leadership empowers the dominant hegemonic regimes both economically and strategico-militarily becomes ineluctable.

For example in a system of welfare states " the formidable potential of free markets to generate economic wealth"[34] results in top priority being given to the removal of all obstacles detrimental to the functioning of competition in national markets and in inter-nation trade. The dominant regimes attempt to structure a new world order centred around these premises. It is of relevance that even today USA pursues this policy of no barriers against free trade.[35]

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31. The debate centres around the issue of innovations clustering during the depression or the prosperity phase of the long waves

32. Fontela E "Technology as a Factor of Economic Leadership in 'Hieronymi O [ed] : op.cit.; 1987,p 98.

33. One must then extend the arguments of Mensch, Freeman and Klienknecht, going beyond the first stages of acceptance of an innovation to its final impact upon the production structure and international economic manipulations indulged in by the great powers.

34 Fontela E :op.cit.; fn 31, p 97.

35. The Super 301 , is instance of US punishing those nations it feels is embarking upon restrictive trade practices.

The long term dynamics of these steps were incentives for production technology to evolve faster to the summative benefit of all the nations involved in the hegemons league.

A country having "a market ready to accept the innovation, with all its sociological and economic conditions....."[36] establishes through the " demonstration effect, the international leadership of the first innovator."[37] The US leadership in the consumer market is possible due to its large market, a high level of income and a relatively open distribution of income which generates demand at all levels. Therefore a Consumption Matrix for the US becomes the guiding beacon of all innovational developments in regions outside the US.[38]

In case of an Investment Matrix the emphasis is upon the capacity of production, the supply side. It becomes impossible to establish an undisputed leadership in all technological fields based upon the dominant supply factors. With the relative ease of technology transfers this scenario is always in a state of flux.[39]

In Europe, the development of the integrative process of the EC has in principle created a market as large as the American one; however for cultural reasons it remains a market with a low capacity to absorb innovations.

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36. Fontela. E. in Hiernoymi O [ed] : op.cit.; 1987, p 103.

37. ibid ; fn 35; p 103.

38. It is exceptional today to establish major innovation in the household consumption sector without its prior acceptance by the US market.

39. The technologically successful countries being USA , Japan & Germany. The Japanese with the additional benefit of the penetration into US markets.

A RECONSTRUCTION OF THEORY :-

The industrialization of the Western World ,.....[is] conceived as a process of continuous technological innovation.[40] .A characteristic feature of the industrial age was the rise of the industrial sector and with it the emergence of a linear evolutionary progression, exemplifying transitionary politico-economic sytems.

Robert Wuthnow characterised the following distinguishable type of dynamic world systems:

"1. Expansionary systems,

2. Polarized systems;

3. Systems in the process of reintegration."[41]

Here we attempt to ascertain how the long cycles interface with the world system. The specific issue of interest would be area integration and its effect upon innovation diffusion process.

WORLD POWER AS CENTER OF INNOVATION[42]

The active zone of the world system becomes a source of innovations for the entire system.

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40. Huppes T: The Western Edge: Work and Management in the Information Age. [Netherlands : Kluwer Academic Publishers]; 1987, p 23.

41. Wuthnow R :"Cultural crises" in Bergesen A [ed] 1983: Crisis in the World system. [USA : Sage Publ]; p 62.

42. Modelski G:"Dependency Reversal in the Modern State System: A Long Cycle Perspective." in Doran CF et al.[ed] North/South Relations, Studies of Dependency Reversal. [USA ; Praeger Publ]1983, p 52.

The hegemon[43] concentrates "global political and economic innovations in a quasi-monopolistic fashion."[44] It emerges then that it is through the cojoining of politics and economics, which defines the characteristic role of the world power and its enduring influence on the world system. "The modern world system exhibits.....(1) the recurrence of long cycles; and (2) the occurrence of irreversible evolution."[45] The formation and spread of the Nation-state at the World System level is the result of this evolutionary process. The Kondratieff's reflected the relative abundance or scarcity of the resource base that could be directed towards economic activities. The nation states which emerged as the most superior form of political organisation swiftly subjugated all other types of system to itself. Simultaneously, the most superior nation-state heirarchically, emerged as the predominant source of global order and development within the world system.

The attributes required for selecting the global hegemon emerged as ;[46]

a. more substantial resource base;

b. innovative capacity capable of meeting demands of the changing era ;

c. ability to carry out structural reform within the world system;

d. allegiance to the former dominant power.

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43. Hegemony is essentially concerned with the ability to dominate or dictate

44. ibid; fn 42; p 52.

45. Kumon S :" The Theory of Long Cycles Examined" in Modelski G [ed] : Exploring Long Cycles [Gr. Britain; Frances Pinter Publ.] 1987, p 61.

46. Refer Modelski G for 1987 an overview of the Hegemonic stability theory.

The development of the global super structure could be interpreted as a sequential process of concatenated social games. The hegemonic power, desirous of maximising its national interest attempts an ordering of the systemic interests to converge with its own. For this it attempts to integrate the world regions and bring them under its run influence. Therefore a period of hegemonic war is followed by an integration of the world system under the hegemon and its allies to further the interests of this enclave.

ASSIMILATION TREND:

The emergence of the world power generates a period of high order in the world system. The degree of entropy declines at the world power stage, subsequently reemerging later as the cycle moves to the process of delegetimisation. Since order is given a quantitative dimension. We are in a position to determine the period characterizing an all pervasive order or an international anarchy.

HEGEMONIC STABILITY CYCLE :-

HEGEMONIC WAR — HEGEMONIC POWER

AMPLITUDE : 100 Yrs

DECONCENTRATION — DELEGITIMISATION

The long cycle reflects a predominant feature of entropic decay for the politio-economic structure it represnts, war concentration is known to occur on long waves upswings and clusters at the inflexion point. Innovations cluster at the lower inflexion point. As we have stated earlier, Innovations, political, social or technological are predominantly localised in the area of the systemic hegemon.

Innovation diffusion emerges in the period of deconcentration when the world power attempting to maintain its leadership lets some of the benefits accrue to the dissatisfied members of the system.

The analysis on being transposed on a cobweb model structure reveals the 'K' wave as "composed of two cobweb cycles of two phases,each, ... comprising one sequence of order surplus and (one) of order shortfall."[47] The four phases of the double cobweb may be identified as :-

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GLOBAL ORDER [48] :-

	PHASES	AVAILABILITY	PHASE CAHRACTERISITICS
1.	World Power	Surplus	Reaping the fruits of post-war settlements
2.	Delegetimi-sation	Deficit	Nationalistic reactions; intermediate warfare
3.	Deconcent-ration	Surplus	Multipolar power structure; power equalization oligopolistic rivalries
4.	Global War	Deficit	Opening for new leadership

On dividing each hegemony cycle of amplitude 100 yrs into two 'K' waves of amplitide 50 yrs we get four quarters (Q1, Q2, Q3, Q4); in which the net supply of order in phases Q1 and Q3 would be significantly greater than Q2 and Q4.

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47. Modelski G and Thompson R "Testing Cobweb Models" in Modelski G : [ed] : op.cit.; 1987, p 97.

48. Modelski G [ed] : op.cit.; 1987, p 97.

The quarter Q1 is characterised by accentuated area integration [49] following the establishment of a new world order by the dominant hegemonic power. Innovation diffusion is curtailed enabling the world power to consolidate upon its victories. The peak of the economic cycle generates a horizontal expansion of the firm and the initiation of a perpheralization or dependence syndrome for the peripheralized actors.

In the history of the modern state system no country has remained at the apex of the system permanently. "Dependecy reversal is built into the structure of the international system".[50] The reveral of dependency may emerge due to considerations internal to the core state as well as external to it.[51]

The downswing of the K wave initiates vertical integration in the enterprise enabling it to optimise profits in the recessionary phase. The quarter Q2, generates a period of intermediate wars and a general environment deterimental to the development and growth of the industries and therefore also for the nation states. In this period emerges the initial chanllenge to the supremacy of the global power and the initiation of the dependency reversal process.

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49. The effect upon industrial agglomeration is increased and this envisages the genesis of a period of declining productivity.

50. Doran CF :" Structuring the Concept of Dependency Reversal." in Doran CF et.al.[ed] op.cit. : 1983, pg 7.

51. Growth in relative power and diffusion of power from the core, rigidity and overcentralization in the core, inhibiting savings, investments and overall efficiency.

The quarter Q3, witnesses a resurgence of the dominant power, which through libralization and opening of trade barriers, attempts to re-integrate the dissident regions. The firms having increased in economic strength following the input of fresh innovations have already undergone a period of rapid expansion. They exist in a multipolar global environment highly conducive to their growth, further the cyclical upswing is an added input to their vibrancy. The period Q3, therefore experiences a period of economic integration of the world system, initiated by these dominant firms whose source of origin remains motly the dominant hegemon. The MNC investments results in initial growth spurts for the periphery. On summation however, " MNC penetration has a significant negative effect on subsequent ecnomic growth."[52] Results of the interaction analysis by Bornschier (1983) on MNC penetration concluded[53] "that the generally harmful effect..... on subsequent growth of GNP per capita"[54] is not altered for the peripheries.

The quarter Q4 initiates a hegemonic war with the consequent emergence of a new world power and also a new altered world order.

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52. Bornschier V :" Dependent Reproduction in the World System : A study on the Incidence of Dependency Reversal." in Doran CF [ed] op.cit.; 1983, p 105.
53. The conclusion is based upon a world sample of 50 countries that underrepresents LDC's.
54. ibid; fn 52; p 113.

SYSTEMIC INTEGRATION AND THE LONG WAVES :

PHASES OF THE LONG CYCLES[55]

Long Cycles:	I	II	III	IV	V
Cycle Phases	1518-1608	1609-1713	1714-1815	1816-1945	1946-?
Q1	1518-1539	1609-1634	1714-1738	1816-1840	1946-1970[a]
Q2	1540-1561	1635-1661	1739-1763	1841-1866	1971-1995[b]
Q3	1562-1584	1662-1687	1764-1789	1867-1892	---
Q4	1585-1608	1688-1713	1790-1815	1893-1945	

Since we are dealing with a pair of Long Waves the four

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55. The cycles mentioned are Hegemonic cycles of 100 yrs amplitude and must not be confused for the 'K' waves.

a. 1946-1970 represents the average length of the first quarter of the four earlier long cycles.

b. 1971-1995 represents the average length of the second quarter of the four hegemonic cycles.

T1 = Q1+Q2= T2=Q3+Q4

SOURCE : Modelski G: 1987, p 104.

phases are :-

LONG WAVES	ENTROPY	PHASE	INNOVATIONS	INTEGRATION
Upswing I	High	Q4	Political	Negetive
Downswing I	Low	Q1	Economic	Positive
Upswing II	High	Q2	Political	Negetive
Downswing II	Low	Q3	Economic	Positive

The emphasis is upon innovations as the driving force behind the Long Waves. Modelski (1987) distingushed between :- "economic and political innovations alternate (ing) on successive phases of the long waves."[56] The expansion phase of the wave is interfaced with political innovations while the stagnation phase of the wave inerfaces with economic innovations. Vernon has emphasized that the "firm tends to become a multinational at a certain stage in its growth."[57] In the early stages, the initial expansion into overseas markets is by means of exports. The technology gap making available new markets through the demonstration effect. The multinational coorporations are able to secure their lines of supply by investing in the production of foreign raw materials or inputs initiated through vertical integration.

The long wave upswing II, stylised by "international economic and political instability, generates a surression of political alignments within core countries."[58] results in "movements of accomodation such as mergers..."[59] these reintegration patterns which characterize a world system that has recently passed through a period of polarization and contraction, result in the construction of a stabilized world order, in which the dominant institution (MNC, Cartels, technology transfer mechanisms,etc) enjoy the support of legitimate moral communities.

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56. Goldstien JS : op.cit.; 1987, p 129.

57. Vernon.R quoted in Sodersten B : International Economic [London : MacMillan Education Ltd] ; p 297.

58. Withnow R.in Bergesen A : op.cit.; [ed] 1983,p 69.

59. ibid ; fn 58. p 69.

The emergent conclusion is that the control over the world production process exerted by the most advanced coorporations of core capitalism is the essence of the basic dominance-dependence relationship within the world economy. The evolutionary outcome of monopoly capitalism in the economically advanced countries resulted in historical waves of the spread of core business all over the world, resulting in an economic stratification of monopoly capitalism superimposed on less developed or pre-industrial structures in the periphery.

THE DIALECTICS OF THE WORLD SYSTEMIC DICHOTOMY:

On the national as well as the world level, a dualistic structure has emerged, consisting of a super-imposed system that is hierarchically organized and which represents the world wide spatial economic heirarchy governed by the core countries, and of the super-imposed segment that is marginal to this system but spatio-temporally comprises the larger part of the world system.[60] An important distinction has to be made with regard to different co-existing hierarchical structures within the world-economy. The older static form is characterised by the specialization of the core in industrial products, the periphery in raw material production. This is the classical economic dependency of the periphery which often goes together with the export enclave syndrome. The new form of hierarchy involves a core-periphery distinction within industrial production itself. The core specializes in control over technology and the innovation process as well as the production of the most technologically sophisticated high wage industrial products at the begining of the product cycle and in the production of the more sophisticated capital goods. The periphery is engaged in a standardized industrial production for either domestic or world market.

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60. Two-thirds of the world states rémain in the periphery.

EXCHANGE ON THE WORLD MARKET :

These two sets of processes reinforce each other converging upon a single logic of the development of the capitalist world economy. These processes" in conjunction with national scale and imperial scale political processes;"[61] have produced and are producing the historical development of the North Atlantic and European states and the historical under development of the African, Latin American and Asian states.

I shall in the next section synthesize the discussions above into a unitary thesis of capitalist development within the world economy.

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61. Hopkins TK and Wallerstien I :" The study of the capitalist world economy : Some Introductory considerations" in Hopkins TK and Wallerstien I : World System Analysis. [USA : Sage Publ.] 1982, p 42.

CHAPTER FOUR

THE EUROPEAN THEATER
CASE STUDY : THE DYNAMICS
OF EUROPEAN INTEGRATION

CHAPTER IV

THE EUROPEAN THEATRE

Peace of Westphalia(1648) signified the birth of the modern nation-state in Europe. Today, 300 years later, Europe that epitomised the essence of the Nation-state, is well on its way to rejecting it in practice. "The Treaty establishing the European Economic Community (EEC) , signed in Rome on March 25, 1957 represents.... a breakdown.... of European national separatism."[1]

The consequences of a fusion of national markets can be but imperfectly explained under static assumptions,[2] since within the European theatre the impact of integration on economic growth and structural transformation assumes great importance. [Economic] and Political integration as emphasised by Haas, should be interpreted and defined as a process: "Political integration is the process whereby political actors in several distinct national settings.... shift their loyalties, expectations and political activities toward a new centre, whose institution possess or demand jurisdiction over the preexisting national states. The end result.... is a new political community, super-imposed upon the pre-existing one."[3] The process as envisaged by Haas moves towards a 'political community'. Lindberg, developing tangentially upon the Haas definition determines the development of "devices and processes"[4] enabling "collective

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1. Lindberg LN: The Political Dynamics of European Integration [USA : Stanford Univ. Press] 1963, p 3.
2. Most contributions concentrate on problems of resouce allocation in a static framework paying no attention to the dynamic effects of integration.
3. Haas EB: The Uniting of Europe :Political . Social and Economic forces, 1950-1957;[USA Stanford Univ Press]; 1958, p 16.
4. Lindberg LN : op.cit ; 1963, p 5.

decision making procedures involving a significant amount of political integration"[5] without moving towards a political community. Political integration thereby evolves into a process where nations forego the desire and ability to conduct foreign and key domestic policies, independently of each other and simultaneously shift their activities to a new centre.

With the accumulation of capital and the spread of new technologies, there has been a convergence in the basic characteristics of production amongst nation-states at equivalent coordinates in the world system grid. In the West, the proliferation of the multinational firms resulted in a rapid movement of capital and technical knowledge across national frontiers, thereby narrowing the comparative cost differences. The relative development of the countries would also be indicative of their proclivity for integration.[6]

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5. ibid; fn 4.

6. Economic integration would effect the general economic welfare strictly within the Pigovian tradition, of all the nation-states involved.

The more developed a country is," the higher its technical level and more elastic its economic structure, with the ability to produce different kinds of goods[7] ..... [therefore] greater will be the relative advantages gained."[8]

The process of economic integration would translate into political integration to enable a maximisation of the exploitable gains of integration. As a great deal of coordination in economic policies would be required to make the integration viable, supranational political institutions would evolve to accomplish this.[9] The paradox emerges in the actual historical integration paths followed which conflict with the theorised ones.

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7. The developed countries produce high value added goods which have a relatively greater demand globally.

8. Simai M and Garam K : Economic Integration, concepts, Theories and Problems. [Hungary: Akademiai Kiado] 1977, p 14-15.

9. The history of the EEC since 1957 has contradicted the validity of this conceptualization.

INTEGRATION PATHS :-

Historically outbursts of military force has resulted in setting up of vast political units. These units exceeded the needs of current economic activity and their organizations therefore exceeded its means. Consequently these units were highly susceptible to fissiparious tendencies and the establishing elite hegemons periodically encountered delegitimi-sation and deconcentration phases which marked a dissolution of these monolithical structures. With the industrial revolution emerged a world system in which the framework set by military events emerged as extremely narrow and limited in determining the transformation process in the socio-economic unit . Whereas "the national integration process appeared indestructible, this process intrinsically obviated the need for international integration. However, during this period the intra- and inter-systemic effects of integration were overlooked because of the general satisfaction with the functoning of the 'extended'[10] nation-state. None-the-ess" since every integration is a phase in history, its advantages and disadvantages cannot be gauged from short term evaluations...."[11]

ECONOMIC GAINS FROM INTEGRATION :-

At the customs unions [CU] and free trade area [FTA] level, the possible sources of economic gain can be attributed to :-

i. enhanced efficiency in production made possible by increased specialisation in accordance with the law of comparative advantage;

ii. increased production levels due to better exploitation of economies of scale made possible by the increased size of

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10. I use the term 'extended',as the nation-state had established vast peripheral areas to service it in the varied modes of exploitation.

11. Simai M and Garam K [ed] ; op.cit.; 1977,p 41.

the market;"[12]

iii) an improved international bargaining position, made possible by the larger size leading to better terms of trade;

iv) enforced changes in economic efficiency brought about by enhanced competition;

v) improved innovative potential and its change affecting both the amount and quality of the factors of production.

If the level of economic integration proceeds beyond the CU level, to the common market level (CM)[13] then further sources of gain become possible :-

vi. "factor mobility across the borders of member states;

vii. the coordination of monetary and fiscal policies

viii. the goals of near full employment, higher rates of economic growth and better income distribution becoming unified targets;"[14]

ix. "income redistribution within individual countries."[15]

Membership of an economic grouping must not be mistaken as a guarantee of satisfactory economic performance. The static gains from integration are often swamped by the influence of factors of domestic or international origin that have nothing to do with integration. A large integrated market in itself is no guarantee of performance as the experience of India suggests when contrasted to small countries like Singapore, Taiwan and Korea.

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12. El-Agraa AM; The Theory and Measurement of International Economic Integration. [Gr.Britain;The Macmillan Press Ltd] 1989, p 10.

13. Also referred to as the Economic Union level [EU]

14. El- Agraa AM : op.cit.; 1989, p 11.

15. Balassa. B: The Theory of Economic Integration [Gr. Britain; George Allen and Unwin Ltd] 1962, p 11.

INTEGRATION AND TECHNOLOGICAL CHANGE :-

Whereas, direct causation was established between increased market size and induced technological change, autonomous technological improvements bear no direct relationship to increased market size. Neverthless an indirect causation can be established between the two variables via expenditure on exports. The relationship between market size and research activity can be demonstrated by :-

a. postulating large - scale economies in research.

b. an enlargement of the market bringing a more than proportional increase in research expenditures.

On the freeing of tariff barriers, economies of scale will be realized in a number of industries, thereby increasing the share of large firms in the market. The increase in the average size of the firm may contribute to technological progress through large scale economies in research and through a more than proportional increase in the firms research activities.[16] The large firm possesses the additional advantage of a diversified portfolio, where basic research insights can be utilised in a wider field, depending upon its product portfolio.[17]

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16. Small firms are unable to bear the fixed costs required in conducting a research and development project.

17. Large, scale firms have the additional advantage of possesing vast resources, better access to the capital market, longer time horizon and greater risk taking ability.

Similarly, in case of two countries of dis-similar sizes, spending the same proportion of their national income on research activities, the lower aggregate amount puts the smaller country at a dis-advantage. Therefore a larger and more diversified economy can make better use of its basic research and innovations made in its individual industries. It can therefore be concluded that integration will be conducive to autonomous technological improvements, since large scale economies can be reaped on both the national and the firm level.[18]

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18. This conclusion is reinforced by the prospect of accelerated growth in an integrated area.

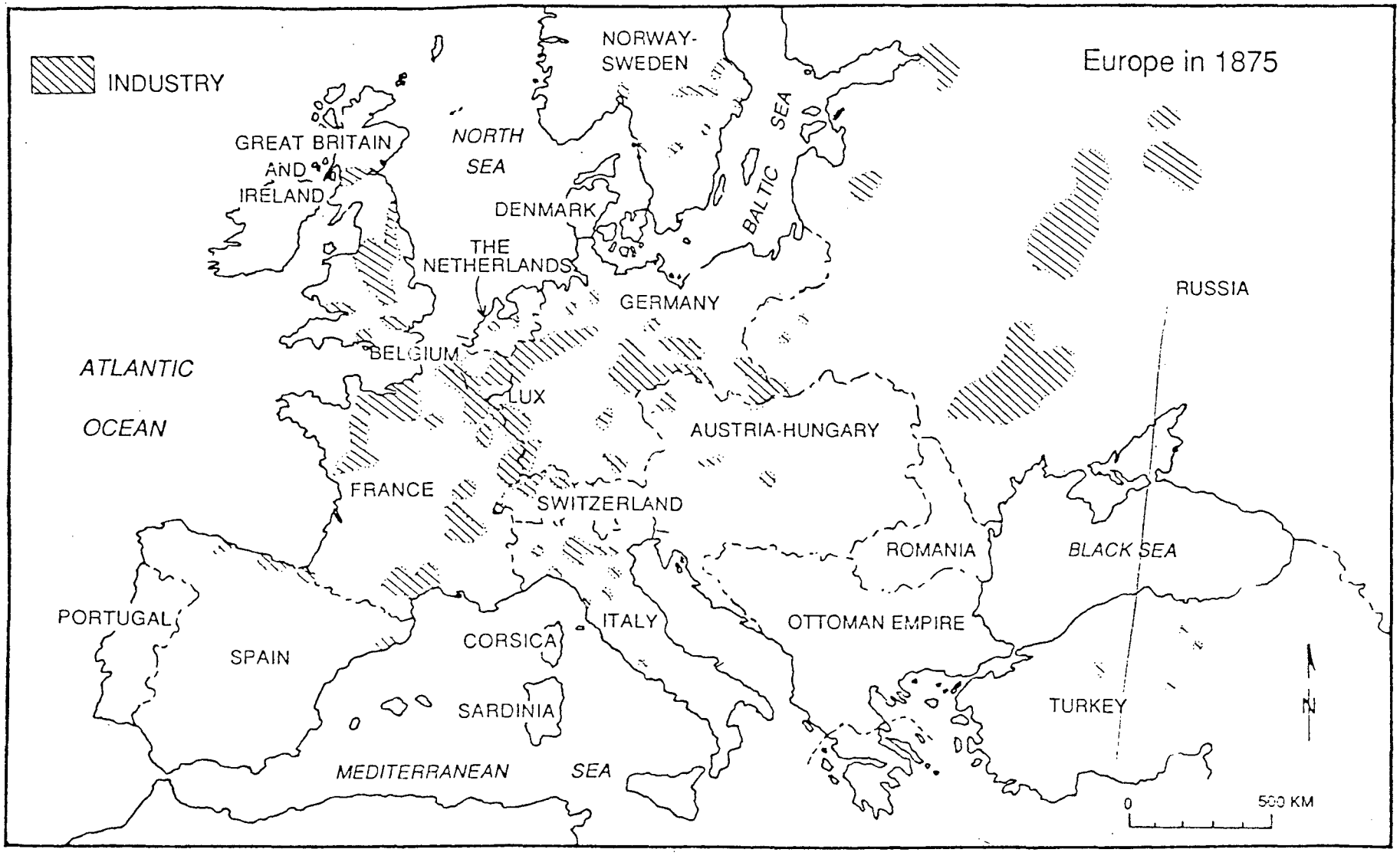

Figure 1.2(a,b) *Spread of industrialization in Europe, 1815-1875* The new Industrial Revolution, centered on textiles and iron-making, spread from its point of origin in Britain to a few places in Belgium, eastern France, western Germany, and Catalonia. From there it exploded across Europe, to such distant peripheries as Sweden, Russia and northern Spain. (After Pollard, 1981)

EFFECT ON LONG WAVES :-

We have from our analysis of long-waves concluded that the clustering of innovations takes place at the lower inflexion point of the wave. Further, integrationist tendencies are maximum in the region between the upper and lower inflexion points of the long wave.[19] This implies that the dominant hegemon orders the world, following a global war over the downswing of the kondratieff. The clustering of innovations helps propel the world economy from the lower inflexion point into the next upswing. This period signifies the completion of the 'World Power' phase and the initiation of the 'Deconcentration' phase.

The global power in an attempt to maintain its hegemony, initiates a spatial dispersion of innovations which had been kept initially specifically within the core regions. These innovations help in the growth of firms in the periphery and begin a period of multipolar but neo-economic integrationist phase. The multipolarity reflects the strengthening of the world powers allies and the rise of a potential challenger from amongst the semi periphery of the world-system.

Therefore during the period of delegitimisation, the world power through innovation diffusion is able to maintain low entropy within the world system by tempting the recalcitrant challengers into falling in line through the distribution of economic largess.

Therefore, not very much unlike the higher order Markovian chains, the transition probabilites of the system are dependent not only upon the current state of the system but also on its earlier states.

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19. Integrationist tendencies diminish at the clustering zone of innovations in the long waves.

"The theoritical claim [expounded] is that processes are singular and each structure is produced as a part of a larger process."[20] In this context from a historical point of view economic integration of dispersed units has been a continuous process within the world economy.

It embodies the establishment of "a secular tendency towards a reduction of 'economic entropy', towards higher and higher levels of organisation, regulation and control in the working of economic systems."[21] The process of economic integration has achieved a state where the entire globe comprises divided national economies.[22]

The present stage of the world history is characterised by a tendency to carry on integration to the next area, that of integrating national economies into larger groupings of nation-states forming supra-national entities.

INTEGRATION AND NATIONAL SOVERIEGNTY :-

The characteristic feature of present stage of integration processes between national bodies is the prevailing tendency for the national bodies of economic control to preserve their soveriegnty. However, "when capital operates in an area which is wider than that which can be controlled by political units at the national level, the traditional relation between capital (economics) and the state (politics) is reversed,...."[23]

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20. Bach RL : "On the Holism of a World System Perspective" in Hopkins TK and Wallerstien I [ed] 1982: op.cit.; p 170.

21. Ostrowski M and Sadowski Z : "An approach to Cost-Benefit Analysis of Economic Integration." in Simai. M and Garam K (ed): 1977: op.cit.; p 77.

22. Each of the national economies represent a certain level of internal integration.

23. Vogler CM : The Nation State: The Neglected Dimension of Class. [England: Gower Publ. Company] 1985, p 18.

States no longer remain as only purely political units; but emerge as important economic actor whose political autonomy is mediated by market forces at the international level. Since, capital operates in an area wider than the nation-state any action weakening the operation of capital within the state is counter productive, as this reduces the nation's international competitiveness and therefore the level of investment (and employment) within the nation.

It is in response to these constraints that the state attempts to mediate its economic position in the world market by acquiesing to participate in the systemic integration without jeopardising its percieved national sovereignty. Therefore through integration the politico-economic unit achieves a "high degree of structural correspondence of subunits in a static sense and operational interdependence in a dynamic sense."[24] On a hypothesised integration gradient, the institutionalization of a collective goal directed, decision making system, achieved through the formation of political organizations marks the threshold of political amalgamation.his reformist interpretation rejects the view of nation-states as a 'natural' form of political organisation , thereby relegating the nation state to a subservient position in the " reciprocal relation between the states financial demands.... and the development of capitalism as an economic system."[25]

Emergence of capitalism in the pre-existing multi-state system, took the form of many separate systems of production, within disaggregated political units, rather than a single economic system at the global level. Economic forces were therefore national rather than international.

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24 Chadwick RW :"Steps towards a Probabilistic Systems Theory of Political Behaviour, with Special Reference to Integration Theory." presented at IPSA Congress in Munich; 1970, p 12.

25. Vogler CM : op.cit.; 1985, p 65.

The history of capitalism until 1945 , is one of oscillatory/ episodic territorial covergence and divergence between economic integration and political integration.

The present negation of nation-states as the 'essential' unchanging political grouping enables us to view the process of periodic territorial divergence and convergence as the essence of the dynamics in the development of capitalism, even as international economic integration contests political integration at the national level as the dominant system state and process for the post-industrial age.

The emergence of the supra-systemic units shouldnot be deduced solely from the 'needs' of capitalism as an economic system but rather as the result of a territorial disjunction between economic forces which are able to operate internationally, and political units which remain divided and national. Changes in the economic system now presuppose changes in the multistate system itself, since the only way in which internationally mobile capital can now be regulated is by transferring economic soverignty to political units at the supra-national level.[26]

SPATIAL SCHEMATISATION OF INTEGRATION[27]:

"Each of the zones, A,B,C,D, etc , have attained a certainlevel of "partial " integration[28]...., in the areas where the

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26. Impediments to the emergence of supra-national political units continue to be the 'dependencia' type economic ordering within the world system and nationally owned capital.

27. Shiskov Y :" Some Methodological Questions on Measuring the Degree or Progress of Economic integration " in Simai M and Garam K [ed]; 1977; op.cit.; p 89.

28. The density of the " partial' integration processes is not uniform in all the areas of the given zone.

zones overlap.... , a more comprehensive process [results]"[29] In the central zone X. where the partial integrations coincide there takes place the process of comprehensive political amalgamation. Sishkov Y [1977] has recommended the use of gravitational models to measure the degree of economic integration within regions. However, he specifies that "it is only the aggregate indices of a large number of "partial" integration..... that can give an accurate notion of the regional economic integration process."[30]

This would require a very complicated and vast statistical investigation using econometric methods of analysis, specifically the multifactor analysis method. Having dealt with the theoritical and methodological issues involved in measuring regional and international economic integration, I now propose to take up a case-study involving a qualitative appraisal of the integration process in W. Europe. culminating with the emergence of the Common Market in Europe-1992 and its global impact.

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29. ibid.; fn .27.

30. ibid.; fn 27 ; p 91.

CASE STUDY : THE DYNAMICS OF EUROPEAN INTEGRATION

Transformations, of an unprecedented nature are influencing the capitalist and socialist world system. These developments will go a long way in undermining the positions of the traditional leaders in the world system. "The EC-92 is a strategic response of the European community to various developments in its changing internal and external economic, technological and political environment. "[31] Conjointly "Eastern Europe and the Soviet Union have started preparation to derive benefits from this process and also to integrate themselves in the West European economy".[32]

Europe, which for centuries experienced unabated social, economic, cultural, political and religions upheavals is now emerging as the new dominant economic hegemon in the world-system. Given the fact that the European Union is going to change the economic, political and security complexion of Europe and the world, scholars are contemplating the implications of the union on different parts of the world-system.

A brief survey of the "European Economic Community leading to the formation of a single European Union, would help in developing a conceptual framework on this topic.

TREATIES OF ROME :- With the Peace of Westphalia, 1648 signifying the emergence of a fragmented European theatre, comprising sovereign nation-states; a period characterised by endemic crisis [resultant due to an attempt to unify Europe] was initiated. However, it was only with the enunciation of

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31. Wadhwa CD and Mitra S.K. "EC-1992 and future of India's Exports: A Competitive Strategic Perspective." from JNU : FES : ICRIER Int. Seminar on " European Union in 1992; p 3.

32. Jayashekar Dr.:"India, United Germany and The Soviet Union : Issues in Trilateral Cooperation." from JNU :FES : ICRIER ; ibid.:fn 31; p 1.

the "Schuman Plan"[33] that the first concrete step in the direction of a "Union of Europe"[34] was taken. Monnet realised that the erection of a supranational edifice for achieving" a risen and reconciled Europe,"[35] would be condemned from the start, as none of the European states would consent to such massive transfers of sovereignty.[36] Success could only be achieved through lowering of specific targets and targeting only those with enormous psychological significance.

"The treaty establishing the European Coal and Steel Community [ESCS] was signed on the 18TH april,1951 for a period of 50 years by "Belgium, France, Germany, Italy, the Netherlands and Luxembourg ['the Six']."[37] The Treaties establishing the European Economic Community [EEC] and the European Atomic Energy Community [Euratom] entered into force from 1 Jan 1958."[38] The Treaty of Rome emphasized the achieving of an EEC customs union, in contradistiction to this the desire of the national government to control their own nuclear programmes hampered the progress of Euratom.

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33. 9th May 1950; prepared by J Monnet, E Hirsch, P Reuter and P Uri.

34. Stated in Minister Briand's speech, delivered at the Assembly of the League of Nations in 1929.

35. Fontaine P:"Europe-A Fresh Start: The Schuman Declaration 1950 - 1990": EUROPEAN DOCUMENTATION ;: Periodical 3/1990; p 10

36. This would be especially so due to their injured sensitivities and national pride, only a few years after the end of WWII.

37. Harrop J : The Political Economy of Integration in the European Community. [England: Edward Elgar] 1989, p 11.

38. Groeben von der H : The European Community: The Formative Years ; [Belgium :European Perspectives.] ; 1985, p 23.

The discrete and muted [though ultimate] objective was the creation of a continuously evolving organisation, which through an accretive process of agglomeration would succeed in achieving a political union through the diversionary medium of economic union.

While the difficulties of working towards an economic and ultimately political union were sufficently recognised, the actual process has entailed numerous delays and difficulties in the envisaged time schedule. The Expansion of the membership from the "original Six" in 1957 to "EC-9" in 1973 and to "EC-10" in 1981 and further to "EC-12" in 1986[39] added to the complexities of forging unity on economic and political fronts."[40] with the East European countries opting for a new economic order based on free market forces, there is all possibility of some of these CMEA countries amalgamating economically with the EC. We can consider the following alternative scenario's of increasing degree of integration of East and West European countries;

i) The EC could remove measures which have resulted in trade dis crimination against the East European countries;

ii) The EC and CMEA countries could come to an agreement facilitating free trade between them as in the case of the six EFTA countries

iii) The EC could have association agreements with the

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39. Within the "Original Six" Belgium, Netherlands and Luxembourg were closely knit through the Benelux Union: Three new members namely, UK, Ireland and Norway joined the EC in 1973; Greece became EC's tenth member in 1981; Spain and Portugal joined the EC in 1986.

40. Wadhwa CD and Mitra SK : op.cit.; 1990; p 3.

market oriented CMEA countries [41] with the ultimate goal of economic integration.[42]

Which ever method the EC adopts it shall imply detrimental effect on the Developing countries preferential arrangements with the EC and thereby influence their development programmes. Therefore, the widening of the EC-EFTA framework towards a European Economic Space[43] would produce fundamental changes in the merger process now underway.

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41. As in the case of Turkey.

42. Linnemann. H and Sarma A :" Economic transformation in Eastern Europe: Its Genesis, Adjustment Process, and Impact on Developing Countries." JNU : FES : ICRIER; ibid; fn 31 ; p 18.

43. This would include E Europe.

THE COMMON MARKET

Through the process of " decentralization and liberalization a single European market bythe beginning of 1992 could be envisaged."[44] The European Union[45] of 1992 calls for a free movement of goods, services, capital and labor among the EC member countries. With a "Frontierless Europe" of 12 nations and 320 million consumers, the world will witness the emergence of the single largest trading bloc in the capitalist system.

Macro economic consequences of completion of the internal market accompanied by economic policy measures (medium term estimates for the EC of twelve member states)

Policy measures	Economic Consequences				
	GDP as %	Consumer Prices	Employment (in millions)	Public deficit % point of GDP	External balance as % point of GDP
No change	4.5	-4.1	1.8	2.2	1.0
Fiscal policies	7.5	-4.3	5.7	0	-0.5
External position	6.5	-4.9	4.4	0.7	0
Disinflation	7.0	-4.5	5.0	0.4	-0.2

Source : Cecchini-report, p 165.
Note : the margin of error is apr. 30 percent.
The table summarizes the gains estimated by the Cecchini Report[46] Briefly, this report predicts that EC -92 will lead to an additional EC GDP growth of 4.5 percent ; a 6.1 percent decline in consumer prices in the EC and additional employment generation in the EC by about 2 million.

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44. Ahmar M :"European Union as a model for SAARC: Pakistan's Perspective." JNU:FES:ICRIER; ibid; fn 31; p 5
45. The core of EC's support for a European Union comes from France and Germany.
46. The benefits calculated by the Cecchini Report cited above are of the nature of "static gains" resulting from better allocation of given resources.

The longer term dynamic advantages of EC-92, could be even more impressive if one takes account of the dynamic resource augmenting gains through investment and growth. Capital stock growth incorporating the multiplier effect would constantly enhance productivity of total factor use. This 'new growth economics' emphasizing EC economy wide increasing returns to scale would be essential in sustaining the ascendant trend of the European community within the world system's hegemonic ordering.

THE ECONOMIC AND MONETARY UNION [EMU] :-

The report of the Delors Committee proposed concrete steps leading to "European monetary integration comprising of total and irrevocably fixed excchange rates with no fluctuation margin between members' currencies."[47]

The report envisaged the creation of an economic and monetary union (EMU)[48] in stages.

STAGE I: Emphasises the full liberalization of capital movements and a simultaneous strengthening of the economic and monetary policy coordination needed to secure greater convergence of economic performance in all key area.

STAGE II: It envisages the establishment of the European System of Central Banks [ESCB] . Exchange rate adjustments would be allowed in only exceptional cases.

STAGE III: The irrevocable locking of exchange rates.

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47. Rao V.L: "Financial and Banking Aspects of EC 1992" JNU:FES:ICRIER: ibid: fn 31; p 4.

48. Britain has forwarded an alternative proposal for an evolutionary monetary union via ECU, existing parallelly along with national currencies of the member states.

A short transitional period between stage 1 and 2 is being proposed to avoid the risk of instability within the European Monetary System [EMS]. The major argument against a rigid exchage rate is that as long as member countries monetary policies and inflation rates diverged, exchange rates should be left free to adjust the system. The crucial question that persists is : What is the appropriate exchange rate mechanism that has to be followed?

DISTORTION OF INTERNATIONAL TRADE :-

EC dependency on international trade remains considerable. "Exports to third countries account for ....12 percent of EC, GNP..."[49] Efficient international suppliers in the rest of the world naturally resent any displacement of their own sales by the EC. The satisfactory completion of the Common Market in 1992, will result in a loss of many of their exports to the EC itself, and this would then be compounded by their further displacement from other world import markets.

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49. Faber.G "Completion of the Internal Market of the EC:The External Consequences." JNU :FES: ICRIER; ibid. ; fn.31 ; p 2.

Contrary to the widely prevalent "Europhoria" today",the general picture is that the EC lost market shares in all sectors except those with a weak growth of demand over the period 1973-1985."[50] The large market and the common external tariff to outsiders have encouraged the growth of inward investments, mainly from the USA... [also] Japan."[51] simultaneously,the deteriorating, position of the community's industries in world trade in manufactures continues to grow. The threat of American and Japanese industrial hegemony was reduced by reciprocal investments on a large scale by a number of large European companies. With an increase in national merger[52] activities there has emerged a tendency to create national monopolies. Pressures on companies to combine have continued in order to obtain economies of scale and to finance the costs of R & D. With 1992, the ability of European firms to achieve cross frontier link will be greatly enhanced much to the detriment of the rest of the world.

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50. ibid. ; p 2.

51. Harrop J : op.cit.; 1989, p 90.

52. Mergers with Japanese or American companies would lead to a fragmentation of European cooperation.

TRADE EFFECTS :

Static effects comprisees those on trade creation, that is more intra- EC trade to the detriment of domestic producers and trade diversion, that is more intra- EC trade to the detriment of extra- EC suppliers. The Emerson Report Predicts" a decline of extra- EC imports of about 10 percent.... this figure [applied] to developing countries total exports to the EC in 1985... would mean a decline by about 10 billion US $ or 2 percent of developing countries world exports."[53]

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53. Langhammer CJ :"EC Integration Deepening and Widening; The External Dimension of EC 1992 Program and of the German Monetary Union ." JNU :FES:ICRIER; ibid ; fn 31; p 11.

There emerges a consensus in literature that a positive trade effect is expected following the completion of the Common Market. In a static scenario, one would expect a balance in tradeshift away from the low income countries vis a vis middle income countries outside the EC. The export redistributive effect might become stronger due to accelerated resource saving technological progress in a single market for the EC countries and because of very limited management capacities in the LDC's reflecting an inability for them to respond quickly to new challenges posed by the EC Market.

A general pattern which seems to emerge from studying import elasticities is that elasticities for manufactured products and fuels are above unity, while elasticities for commodities (excluding fuels) are below unity. With regard to the manufactured exports to the EC, using a 5 percent rise in GDP and an elasticity of 2, one can conclude that EC imports of manufactured goods will rise by $ 24 billion, of which $5 billion would accrue to the developing countries [excluding centrally planned economies and China]. With regard to the exports of primary products to the EC, there emerges an estimated increase of approximtely $5 billion [$4 billion to fuels] calculated on the basis of 1987 exports to the EC and an induced GDP increase of 5 percent[54].

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54. This is a conservative estimate, as the rise of GDP may be higher according to the Cecchini Report. The elasticity of imports of manufacturs may also be substantially higher.

ELASTICITIES OF IMPORT WITH REGARD TO INCOME[55]

Importing Region/Product	Balassa	Author		Houthakhon
OECD	1963-84	Riedel 1960-78	Rollet 1960-78	
Fuels	1.90		1.02	
Food & Beverage	0.60	0.60		
Raw Materials	0.30	0.80	0.37	
Non Fer Metals	0.70			
Non fuel prim. Commodities	0.50			
Manufacturers	3.80			
United States				1.51
United Kingdome				1.66
Japan				1.23
West germany				1.80
France				1.66

SOURCE: Faber G:" Completion of Internal Market of the EC: The External Consequences"; JNU:FES:ICRIER ;14-17 Sep 1990; ibid.; fn 31,

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55. Income elasticity is defined as : (M/M):(Y/Y)

The cumulative trade effects should providentially add up to a positive sum game of net trade creation for the world system as a whole.

Even if the fears of "Fortress Europe" are exaggerated, the average non-associate developing country [excluding NICs] is unlikely to benefit automatically from the expansion of EC markets for improrts through the dynamic growth effect. The presence of the EEC's new harmonised standards will add to its difficulties. These standards will increase the entry barriers and act as uncrossable Non Tariff Barriers for most less developed countries. The LDC's will also be facing stiff competition from the NIC's as also from the southern European members of the EC[eg:Spain and Portugal] for exporting labor intensive products to the EC. after 1992.

It becomes clear from the analysis of this section that "most developing countries on the basis of their own financial resources, managerial skills and other severe handicaps are likely to be losers in the inherently unequal competitive game being played in the EC'92 context " [56]

USA AND JAPAN :-

The Community has progressively lost market share in high-technology products and has a particular lag in electronics and information technology. Very few W. European companies "are internationally competitive in information technology."[57] An index of technological specialization,[58] revealed a continuous reduction in the EC share in the world market.

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56. Wadhwa CD and Mitra SK : op.cit.; 1990, p 12.
57. Harrop.J : op.cit.; 1989, p 95.
58. The index is defined as the share of each bloc in world trade in high technology products divided by its share of world trade in manufactured products.

INDEX OF TECHNOLOGICAL SPECIALIZATION

	1963	1980
EC	1.02	0.88
JAPAN	0.56	1.41
USA	na	1.20

SOURCE:Heertje.A.(ed) (1982): Investing in Europe's Future [Gr. Britain; Blackwell Publ.] ; pg 102

The EC showed a deficits on its trade in high-technology products both with the USA and Japan. "Between 1978 and 1991 Europe will have spent ECU 450 000 million on research, against ECU 330,000 million for Japan and ECU 1000 000 million for the USA."[59]. The most progressive countries in terms of innovations have traditionally captured the largest share of the world market. The table indicates that Europe in this context continues to lag behind USA and Japan.

In a theoritical sense, it could be argued that Europe after 1992 could itself become a superpower and act as a check on American power. However while this may be true at the economic level; at the political and military level it remains an improbability.

In the Economic sense also, it can be identified that European supremacy in this realm would be totally determined by how it succeds in capitalising upon the innovation possibilities made available at the lower inflextion point of the present kondratieff with , 1994 posed as the completion of the present kondratieff.[60]

Europe will be posed to re-establish its position as the next contender for the niche of the dominant hegemon. The conclusive outcome would only be revealed on the completion of the common market and the subsequent steps taken by Europe to assert its dominance.

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59. Fontaine. P: op.cit.; 1990, p 29.

60. Refer Chapter Two, for data on the periodicity of the kondratieff waves.

CONCLUSION

THEORY SYNTHESIS : A HOLISTIC APPRAISAL

CONCLUSIONS

THEORY SYNTHESIS : A HOLISTIC APPRAISAL

PHASE SYNCHRONISATION :-

The period 1940/45-94, signifying the tenth kondratieff[1], is entering the final and probably the most dramatic downturn indicating the culmination of this wave. This period symbolised a world-system consolidated upon an alliance system between the industrialised nations of the world on the one hand and an economic ideological dichotomy on the other. This period [1940/45-1994] also marks the completion of the first two quarters of the Vth Hegemonic wave.[2]

Q_1	World Power	'K' wave downswing	I	1946-1970
Q_2	**Deligitimisation**	'K' wave upswing	II	1971-1994[3]

I have noticed a dis-synchronisation between the phases of the Hegemonic Waves [HW] and the 'K' waves for the period begining 1940/45 through to 1994. Let us try and determine the salient temporal rhythms, between the periodisations of the 'K' waves and the HW. The discernible pattern is-:[4]

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1. Refer Appendix I for chronology and Chapter two, for the long wave periodicity.

2. To arrive at these dates, I have averaged the lengths of Q_1 and Q_2 of the earlier four hegemonic waves .

3. For a comprehensive listing of the IVth *HW refer:*
Modelski G: op.cit; 1987, p 104.

4. Refer to Appendix I for detailed periodicity.

Q_4 + Q_1 = K_1 $\quad\quad$ Q_2 + Q_3 = K_2

HW_0 $\quad\quad$ HW_1 $\quad\quad$ HW_1

Q_4 + Q_1 = K_3 $\quad\quad$ Q_2 + Q_3 = K_4

HW_1 $\quad\quad$ HW_2 $\quad\quad$ HW_2

Q_4 + Q_1 = K_5 $\quad\quad$ Q_2 + Q_3 = K_6

HW_2 $\quad\quad$ HW_3 $\quad\quad$ HW_3

Q_4 + Q_1 = K_7 $\quad\quad$ Q_2 + Q_3 = K_8

HW_3 $\quad\quad$ HW_4 $\quad\quad$ HW_4

$[Q_4 = K_9]$ $\quad\quad$ $[Q_1 + Q_2 = K_{10}]$

HW_4 $\quad\quad$ HW_5

CODE: HW : Hegemonic Wave

HW = $Q_1+Q_2+Q_3+Q_4$

Q : Quarter

K : Kondratieff wave

The pattern which emerges is :-

$K_a = Q_4 + Q_1$; $K_b = Q_2+Q_3$

However, in the case of the Vth HW, Q2 which normally synchronises with the 'K' wave upswing extends to the downswing. This initiates an alignment of Q_3 with the upswing of the 11'K' wave. By refering to Modelski's data[5] we have:-

Q_4 1893-1945 IVth HW 52 yrs

Q_4 has an amplitude of 52 yrs where as the average length for this quarter in the earlier HWs is 24.33 yrs

Q4[HW4] Amplitude =52 yrs

Avg. Amplitude : $\frac{Q_4[HW_1+HW_2+HW_3]}{3} = \frac{73}{3}$ yrs = 24.33 yrs

$Q_4[HW_4]-Q_4$ avg.= 52-24.33 =27.77 yrs

This discrepancy of 27.77 yrs. creates a lagged correlation of one quarter between the HW_1, HW_2, HW_3, HW_4 and HW_5 with an

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5. Modelski G :op.cit:1987, p 104.

identical impact upon the 11th K wave. By incorporating the above figure [27.77 yrs] to generage a hypothesised altered periodicity we have:-

IVth	HW:	Altered V HW		Modelskis V HW	
Q1	1816 - 1840	Q1	1918 - 1944	Q1	1946-1970
Q2	1841 - 1866	Q2	1945 - 1966	Q2	1971-1994
Q3	1867 - 1892	Q3	1967 - 1994	Q3	1995-2020
Q4	1893 - 1918[6]	Q4	1995 - 2018	Q4	2020-2044

The discrepancy on comparison of the two waves becomes easily discernible.

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6. The Modelski periodisation for Q_4 is 1893-1945.

RESOLVING THE HISTORICAL ANOMALY:-

It is now universally acknowledged that the period 1945-90, was the era of US hegemonic dominance in the world-system. The US power based on "an overwhelming edge in economic productivity as of 1945 and an alliance system with W. Europe and Japan reached its apogee circa 1967-73.[7]" The other salient characteristic of this period being the ideological war between the US and the USSR since 1945, manifesting itself through the cold war. The depth of the ideological cleavage was loudly proclaimed through the now famous Dulles declaration that "Nuetralism is immoral".

I feel that most of the interpretation of history for the V HW has been so written that it is able to incorporate the glaring anomaly of WW II (1939-45). The most salient and disturbing fall out of this has been an erroneous periodisation of the quarters comprising the V HW. I attempt by furnishing a neo-perspective for interpreting this period, to set the record straight.

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7. Wallerstien I :"The Cold War and the Third World : The Good Old days." ECONOMICS AND POLITICAL WEEKLY , Vol XXVI (17), April 1991; pg 1103.

VTH HW : 1918-2018

The period following the Global War [Q4] 1893-1918 brought to an end the British cycle and saw the emergence of USA as the dominant hegemon.

The US since 1865 had been improving its capacity in both the processes of production and technological innovations. The US has had the added advantage of freedom from serious military expenditure, atleast until 1941, and the absence of wartime destruction of its infrastructure.[8]

Q1: HEGEMONIC POWER : 1918-1944

Following the Peace of Versailles, the US arraigned Europe as a perversely war loving, decadent, politically orthodox and an economically chaotic entity. Also by renouncing any international responsibilities corresponding to its power dimension, the US invoked an intense isolationist posture vis a vis the rest of the world thereby exacerbating global conflictual proclivities. Paradoxically," American power was so great that the US found itself inevitably involved in world affairs, even though against its will."[9] The resultant being that by 1924, USA was running the financial policies of ten Latin American countries. "By 1929, the National Income of the United States was greater than..... Gr. Britain, Germany, France, Canada, Japan and seventeen other nations combined."[10]

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8. Eurasia suffered enormous destruction of infrastructure and human lives over the period 1939-1945.

9. Leuchtenberg WE : The Perils of Prosperity: 1914-1932. [USA : Univ. of Chicago Press.] ;1958, p 107.

10. ibid ; fn 9; p 108.

The stock market crash of 1929 and the withdrawal of American investments from Europe initiated world economic disaster, such was the US influence. The market crash of 1929 emphasised the weakness which underlay the prosperity of the 1920's -: the over-expansion of major industries, maldistribution of income, weak banking structure and the over-dependence of the economy upon consumer durable goods. The Great Depression witnessed the end of the system of international exchange of the nineteenth century capitalism.[11]

The Great Depression was followed by WWII. While dealing with WWII. I emphasize the neccessity of attaching less weight to the duration of 'events'. Events remain as surface manifestations of slower underlying structural movements and therefore have transient effects which tends to mislead the researcher. Only on plotting the structures and conjuctures is it possible to establish the significance of these transient events. Within this context, WWII overcame the peculiar difficulties created by the incepient reordering of the American industrial structure in the 1930's. The war provided a two fold stimulus. The more mature industries of the interwar period were brought out of the doldrums by the particular demands of making war. The war also revealed the enormous destructive potential made available to the nations through technology and the unacceptability of Global War as the mechanism for the selection of the systemic hegemon. The 1940's thereby laid the foundation of the prosperity of the 1950's and 1960's.

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11. With Britain abandoning the gold standard in Sep 1931, this system came to an end

Q2: DELEGITIMISATION : 1945-1966

The period 1945-1966 [Q2] witnessed the ascendance of the tenth 'K' wave and the emergence of the primary opposition to the US hegemonic dominance, namely the USSR. The US to maintain its hegemony innovated politically, attempting to transform, "USSR as a sub-imperialistic agent of the United States."[12] The World system was divided into two zones with the USSR maintaining political dominance in the East and the US in the West. The two zones were to observe absolute interstate peace in Europe and were to abstain from any attempt to subvert governments in the other zone. The resultant was a shift of the US-USSR ideological conflict into the Afro-Asian and Latin American regions of the world. The USSR in an attempt to ensure stability within its zone, foreclosed all opportunities for the spread of US imperial dominance worldwide. Even then USSR was unable to subvert the US economic dominance of the world.

The Q2 period saw the stagnation in the hegemonic positions of the two adversarial blocs with niether of them making any significant headway in establishing their respective imperium.

Q3: DECONCENTRATION : 1967-1994

This period marked the beginning of a sustained economic stagnation phase which inevitably follows a long wave of economic growth and market expansion. To reverse the decline of US economic hegemony a decentralization of hegemonic production was initiated though innovation diffusion from the core to the periphery "The shift of transnationals had begun." [13] The trends towards transnationalization of capital, increased integration of the world economy and a reorganisation of the international division of labor was all attempted to create an aggravated economic dependency of the systemic peripheral

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12. Wallerstien I : op.cit; 1991, p 1103.

units upon the US and also to simultaneously renegotiate and retard the decline of US hegemony vis a vis the other Core powers; W Europe and Japan.

The US by its 'low posture' policy offered the West Europeans and the Japanese-Trilateralism[14] , USSR was offered Detente and the Third World a reformist post-Vietnam international system.

With the increasing homogenisation of the recessive techno-economic paradigm between the core economies and their peripheral enclaves, the core transnational corporations were able to internalise these regions within the international regulatory regime of the US. This marked a reassertion of the US hegemonic role in the politico-economic affairs of the world-system.[15]

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13. Bergesen A & Boswell T [ed] America's Changing Role in the World System. [USA: Praeger Publ.]; 1987, p 22.

14. Trilateralism promised more consultation in the world policy making to W. European nations and Japan.

15 The Super 301, Special 301, the American success in putting together an international coalition and leading it are all cases to point.

HEGEMONIC WAR : 1995-2018

The crisis in American hegemony made visible in the early 1970's with the strains on the international economic system, the technological challenge from W.Europe and Japan and the apogee of Soviet military power, all presaged a shift into the present multicentric world system with no recognisable hegemon. A world system in which power:economic, political and military is increasingly fragmented.

Germany and Japan are economic giants but remain strategic pygmies. Russia and China are military powers without the economic clout. The United States is the most balanced of all the great powers, but it is in no position to unilaterally determine the structure of new world order. It needs widespread international support even to lead, let alone to dominate.

Although the US has won the Cold War, it has been at the cost of running down its own economic and industrial/technological vitality. In sector after sector of high technology industry, America is losing ground. The economic and technological challenge from Europe and Japan is far more severe than the military challenge from Moscow in the past, or threats from regional powers in the future. The completion of the European Common Market in 1992, will further exacerbate the US position in the world hierarchy of Nations.

WORLD WIDE DISTRIBUTION OF R & D EXPENDITURES: [%age]

REGIONS/COUNTRIES	1970	1975	1980	1983
1. WORLD TOTAL	100	100	100	100
2. DMEC's	77.5	70.2	72.7	69.0
EEC	20.3	21.6	21.5	20.9
JAPAN	6.7	9.5	11.7	12.6
USA	39.9	33.3	33.7	33.1
3. SCEE[16]	25.2	27.1	24.4	24.0
USSR	19.4	20.9	17.6	18.0
DEV. COUNTRIES	2.3	2.7	2.9	7.0

SOURCE: Monkiewicz J (1989) International Technology flows and the Technological Gap. [USA: Westview Press]; pg 88.

THE WORLD SYSTEM. Continuity and change

The contradictions of the changing international political conflicts and economic policies, reflect responses to the underlying course of world capitalist development. The illusions about the efficacy of economic policy and the confusions of its cause and effects are particularly visible in the succession of keynesian, monetarist, supply side, and incepiently industrial policies in the West, all of which have been incited in turn by the same course of world economic development that also limited their effectiveness.

The accendant 11th Kondratieff [1994 ?] sustained by investments based on new technology of micro electronics and the information revolution in the service industries will witness the initiation of world-systemic trade wars. Innovations in the use of micro computers as the basis of new systems of industrial production and new systems of communication, Biogenetics and possibly nuclear fusion will all accrete to catalyse the characteistic accendant of the next 'K' wave.

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16. SCEE: Socialist Countries from Eastern Europe

The Japanese are the most advanced in the major field of research on super-computers, bio-technology and nuclear fussion. The US has been progressively losing its position of global supremacy in these areas of advanced research to Japan and W Europe. [17] With the internalisation of the new techno-economic paradigm into the world capitalist super-structure a new interdependent synergistic society will evolve which will function in a highly polarised North/South scenario. The Japanese technological dominance and the North/South polarisation will catalyse trade wars[18] between US [Recessive hegemonic power] and the challengers Japan and SE Asia. The actual war threat will emerge in typical North/South wars, even as the South is denied the economic benefits from the North and fights for the same. The period of the hegemoic wars will culminate as EEC[19] replaces the United States as the dominant hegemon even as the delinquished challengers begin to reconstruct their politico-economic systems.

The long wave theory helps us discern the deep structural logic of capitalism and an accurate specification of the processes that help maintain the systemic features of the modern world system. Ironically it also posits the necessity of deep economic crisis to initiate the process of regenerative inventions and innovations.

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17. Refer Appendix III.

18. The instrument used to determine the successor power in the global hierarchy of world hegemony will increasingly become Economic wars as opposed to military conquests.

ORDERING IN THE INTERNATIONAL SYSTEM :

	INTERNATIONAL SYSTEM	FORM OF NATION-STATE	TYPE OF NATIONALISM
1780-1830	Mercantilism	Monarchical State	Economic and Political
1840-1860	Free Trade imperialism	Bourgeois nation state	Cultural and political
1870-1940	Seperate national capitalist system	Reformist nation state	Economic,political and cultural
1950 1980	International economic interdependence	Corporatist nation-state	Increasingly economic
1990-?	Sybsytemic integration	Informations state	Technological specific economism

Our understanding the mechanism determining the rhythms and the functioning of the 'Capitalist World System' emerges as the primary pre-requisite for resolving the endemic crisis and chaotic inter-state relations which threaten the stability of this system. It is the Long Wave theory which attempts to understand, interpret and discern the process of formation of the major institutional structures of the contemporary world system: the capitalist mode of production and the statist mode of polity, and its probable future states.[20]

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19. In whatever form it takes by the year 2010.

20. This is possible by studying the system in its evolutionary mode.

APPENDIX I

INTERFACE ANALYSIS :- HEGEMONIC WAVES AND THE KONDRATIEF WAVES :

CHRONOLOGY :-

1494 - 1539
$Q_4 + Q_1 = K_1$
$HW_0 \quad HW_1$

1539 - 1575
$Q_2 + Q_3 = K_2$
HW_1

1575 - 1621
$Q_4 + Q_1 = K_3$
$HW_1 \quad HW_2$

1621 - 1689
$Q_2 + Q_3 = K_4$
HW_2

1689 - 1747
$Q_4 + Q_1 = K_5$
$HW_2 \quad HW_3$

1747 - 1790
$Q_2 + Q_3 = K_6$
HW_3

1790 - 1848
$Q_4 + Q_1 = K_7$
$HW_3 \quad HW_4$

1848 - 1893
$Q_2 + Q_3 = K_8$
HW_4

1893 - 1940/45
$Q_4 = K_9$
HW_4

1940/45 - 1994
$Q_1 + Q_2 = K_{10}$
HW_5

This chronological analysis is dependent upon the specific periodicities of the 'k' waves as stated in our base chronology in chapter two. The quarters are matched only approximately.

CORRECTED CHRONOLOGY :

Kondratieff's corrected to match the quarters of the Hegenomic waves

1494 - 1539
$Q_4 + Q_1 = K_1$
$HW_0 \quad HW_1$

1540 - 1584
$Q_2 + Q_3 = K_2$
HW_1

1585 - 1634
$Q_4 + Q_1 = K_3$
$HW_1 \quad HW_2$

1635 - 1687
$Q_2 + Q_3 = K_4$
HW_2

1688 - 1738
$Q_4 + Q_1 = K_5$
$HW_2 \quad HW_3$

1739 - 1789
$Q_2 + Q_3 = K_6$
HW_3

1790 - 1840	1841 - 1892	1893 - 1940/45
$Q_4 + Q_1 = K_4$	$Q_2 + Q_3 = K_8$	$Q_4 = K_9$
HW_3 HW_4	HW_4	HW_4

1940/45 - 1994

$Q_1 + Q_2 = K_{10}$

HW_5

CODE: HW : Hegemonic Wave

HW = $Q_1+Q_2+Q_3+Q_4$=HW

Q: Quarter

K = Kondratieff Waves

$K_1=Q_4+Q_1$; $K_2=Q_2+Q_3$

APPENDIX II

CHRONOLOGY OF THE MODERN WORLD SYSTEM 1494-1992

KONDRATIEFF 1: 1494-1539

1494 Treaty of Tordesillas (June 7) :Spain and Portugal divide New World between them. Charles VIII begins invasion of Italy, enters Florence, deposes Piero de' Medici, and enters Rome : Pope Alexander VI takes refuge in Castel Sant' Angelo.

1495 Charles VIII enters Naples, is crowned king of Naples. Pope Alexander VI forms Holy League, which aims at expelling Charles VIII from Italy; its forces defeated at Battle of the Fornovo, the Holy League ends; Charles VIII returns to France. Ferdinand II reconquers Naples; French army capitulates at Novara. Peace between France and the allies; foreshadows idea of 'balance of power' in European politics.

1496 James IV of Scotland invades Northumberland.

1497 Rising in Cornwall, Lord Audley's rebellious army defeated by Henry VII at Blackheath

1498

1499 War between Swabian League and Swiss cantons; ends with the Peace of Basel, the Swiss establishing their independence.

1500 Diet of Augsburg establishes council of Regency for administering the Holy Roman Empire and divides Germany into six regions.

1501 French enter Rome; the Pope declares Loius XII, king of Naples. Peace of Trent between France and Emperor Maximilian I; French conquests in upper Italy recognised

1502

1503 Spanish victory at Battle of the Garighiano; defeats France, enters Naples.

1504 Maxmilian I begins reformation of the Holy Roman Empire

1506

1507 Diet of Constance recognises the Unity of the Holy Roman Empire.

1508 Maxmilian I assumes title of Emperor.

HEGEMONIC WAVE I: 1518-1608 comprises two K Waves- $K_1 = Q_4+Q_1$

$K_2 = Q_2+Q_3$

Q1 1518-1539 WORLD POWER ENTROPY LOW INTEGRATIONIST PROCLIVITY.

1518 Peace of London between England, France, Emperor Max imilian I , the Pope, and Spain.

1519

1520 Christian II of Denmark and Norway defeats Swedes, crowned king of Sweden.

1521 Hernando Cortes assumes control of Mexico after destruction the Aztec empire.

1522 Spanish Forces conquer Guatemala

1523 Portugese expelled from their settlements in China

1524 French driven out of Italy. Treaty of Malmo; Denmark confirms independence of Sweden under Gustaves I.

1525 German and Spanish defeat French and Swiss at Pavia.

1526 Battle of Mohaes: Turks defeat Hungerians.

1527 The sack of Rome; Pope Clement VII imprisoned

1528

1529 Treaty of Cambrai between Francis I and Charles V

1530 Charles V crowned Holy Roman Emperor and King of Italy

1531 Henry VIII recognised as the supreme Head of the Church of England.

1532

1533 Pizarro execute the Inca of Peru.

1534 Final rift between England and Rome

1535

1536

1537

1538

1539 Spain annexes Cuba

1540-1561- Delegitimisation Entropy High Disintegration

1562-1584 Deconcentration Entropy Low Integration

03 1562-1584 DECONCENTRATION ENTROPY LOW INTEGRATIONIST PROCLIVITY

1562 Holy Roman Emperor Ferdinand I signs eight year truce with Suleiman I of Turkey.

1563 Peace of Amboise

1564 Peace of Troyes ends war between England and France

1565 Turks abandon siege of Malta.

1566 Turko-Hungarian war renewed; inspite truce of 1562.

1567

1568 Peace between Selim II and Maximilian II.

1569 Sigismund II of Poland unites Poland with Lithuania Union of Lublin.

1570 Peace of St German-en-Laye ends third civil war in France. Peace of Stettin; Denmark recognises independence of Sweden.

1571 Don John of Austria defeats Turks.

1572 Dutch War of Independence begins, fourth civil war in France begins.

1573 Peace of Constantinople ends war between Turks and Venice.

1574 Spain loses Tunis to Turks.

1575 State bankruptcy in Spain.

1576 Act of Federation between Holland and Zeeland.

1577

1578

1579 Eng-Dutch military alliance signed; signing of union of Utrecht marks foundation of the Dutch Republic; Francis Drake proclaims sovereignty of England over New Albian, Calif.

1580 Spanish invade Portugal.

1581 Russian conquest of Siberia.

1582 Peace of Iam-Zapolski- Russia loses access to Baltic.

1583 William of Orange accepts soverignty of Netherland.

1584

04 1585-1608 GLOBAL WAR ENTROPY HIGH DIS-INTEGRATION

1585 Sir Francis Drake attacks Vigo and Santo Domingo.

1586 Pope Sixtus V promises financial aid to send Span Armada against England.

1587 Pope Sixtus V proclaims catholic crusade for invasion of England.

1588 "Invincible" Span. Armada; defeated by the English under Charles Howard.

1589 Sir Francis Drake with 150 ships and 18,000 men, fails to capture Lisbon.

1590 Henry IV lays siege on Paris.

1591

1592 Portuguese settle in Mombosa.

1593 Rudolf II revives war against the Turks.

1594

1595 Henry IV declares war on France.

1596 English sack cadiz ; Spanish take Calais.

1597 Second Span Armada leaves for England.

1598 Treaty of Pontes de Ce ends; civil war in France.

1599

1600 Maurice of Nassau defeats Archduke Albert's army at Nieuport.

1601

1602 Span. army, after landing in Ireland [Sep 1601] surrenders to English at Kinsola.

1603

1604 Peace between England and France

1605 Barbados, W Indies, claimed as English Colony

1606

1607

1608 $K_1 = O_4+O_1$

LONG WAVE II 1609-1713; Comprises two K Waves $K_2 = O_2+O_3$

O1 1609-1634 WORLD POWER ENTROPY LOW INTEGRATIONIST PROCLIVITY

1609 Twelve year truce between Spain and Holland.

1610

1611 Archduke Matthias crowned king of Bohemia.

1662 Treaty betweenthe Dutch and king of Kandy in Ceylon.

1613 Peace of Knarod ends Dan-Swed war of Calmar.

1614 Virginian colonists prevent French settlements in Maine and Nova Scotia.

1615 Dutch sieze the Moluccas from Portuguese.

1616

1617 Peace of Stolbolus ends war between Russia and Sweden

1618 Peace of Madrid; ends war between Venice and Austria
Defenestration in Prague: begining of 30 year war (1648)

1619

1620 Revolt of Fr. nobles against Loius XIII, Richelieu makes peace. War between Sweden and Poland.

1621 Twelve year truce between Holland and Spain[see 1609] : war resumed.

1622 English capture Ormuz from Portuguese.

1623 Commercial treaty between Holland and Persia.

1624 England declares war on Spain.

1625 French occupy the Antilles and Cayenne.

1626 Treaty of Monzon between France and Spain.

1627

1628 Dutch occupy Java and Moluccas

1629 Peace of Susa ends war between England and France

1630 Sweden attacks Germany

1631

1632

1633 Fr. army occupies Lorraine.

1634 Island of Curacao captured by the Dutch.

O_{α} 1635-1661 DELEGITIMIZATION ENTROPY HIGH DISINTEGRATION

O_{β} 1662-1687 DECONCENTRATION ENTROPY LOW INTEGRATIONIST PROCLIVITY

1662 Charles II sells Dunkirk to France forL400,000.

1663 Turks declare war on the Holy Roman Empire.

1664 Swedish colonies on Gold Coast sold to Dutch.
British annex New Netherlands from Connecticut to Delaware.

1665 Allied Brit and Portuguese defeat Span. army; securing independence of Portugal.

1666 France and the Dutch declare war on England. Quadruple alliance between Holland, Brandenberg, Brunswick and Denmark to secure safety of Holland.

1667 Secret treaty between Loius XIV and Charles II against Spain, War of Devolution begins as French troop invade Netherlands

1668 Alliance of the Hague signed by English and the Dutch war of Devolution between France and Span ends; Treaty between Louis XIV and Leopold I concerning future partition of Spanish realms.

1669

1670 France occupies Lorraine; Treaty of Dover between England and France.

1671

1672 Britain declares war on the Dutch; France declares war on the Dutch; Louis XIV rejects Dutch peace offer.

1673 Emperor Leopold I declares war on France.

1674

1675 War between Sweden and Denmark.

1676 Danes defeated by Swedes at the Battle of Lunden.

1677 Duke of Orleans defeats Dutch at Cassel.

1678 Peace of Nijmegen between France and Dutch : also France and Sweden.

1679 Hapsburg influence reestablished in Madrid by Queen Mother. Marie of Austria.

1680 Fr. Colonial empire reaching from Quebec to the mouth of the Mississippi River is organized.

1681

1682 La Salle claims Louisiana Territory for France and takes possession of the Mississippi valley.

1683 Dutch traders admitted to canton: Spain declares war on France. League of the Hague: Emperor Leopold I and Charles II of Spain join Dutch-Swed alliance against France.

1684 Bermudas become crown colony.

1685 All Chinese ports opened to foreign trade.

1686 French annex Madagascar, League of Augsburg against Loius XIV.

1687 -

O. 1688-1713 GLOBAL WAR ENTROPY HIGH DISINTEGRATION

1688 the "Glorious Revolution". :War between France and the Empire.

1689 Louis XIV declares war on Gr.Britain; German diet declares war on France, Natal becomes Dutch colony.

1690 Spain joins Great Alliance against France, Turks recon quer Belgrade.

1691 Hapburgs recognized rulers of Transylvania; New East India Company formed in England.

1692 -

1693 Battle of Lagos: Franchdefeat English merchant fleet, National Debt Begins in England.

1694 -

1695 -

1696 New coinage in England carried out by John Locke and Isaac Newton.

1697 French attempt to colonize W Africa.

1698 -

1699 Denmark and Russia sign mutual defence pact; Treaty of PreobrazhensKoe signed by Denmark, Russia, Poland and Saxony for the partition of the Spanish Empire.

1700 King Charles II of Spain dies: end of Spanish Hapsburgs, Great Northern War begins. Charles XII of Sweden defeats Peter the Great at Narva.

1701 War of Spanish succession begins(-1714) ; Charles XII of Sweden invades Courland and Poland.

1702 Charles XII takes Warsaw, Cracon.

1703 Archduke Charles proclaimed king of Spain in Madrid.

1704 English take Gibraltor.

1705 Engligh Navy takes Barcelona.

1706 Marlborough conquers Span. Netherlands.

1707 Union between England and Scotland under name Great Britain "Perpetual Alliance" between Prussia and Sweden.

1708 British East India Company and New East India Company merged.

1709 Peace Negotiations at the League.

1710 Mauritius, formerly part of Dutch East Indies, becomes French

1711 War between Russia and Turkey.

1712 Peace congress opens at Utrecht.

1713 Spain agrees at Utrecht to cede Gibraltar and Minorca to Gr. Britain.

HEGEMONY WAVE III 1714-1815; comprises two K Waves: $K_1=Q_4+Q_1$

BRITISH CYCLE $K_2=Q_2+Q_3$

Q_1 1714-1738 WORLD POWER ENTROPY LOW INTEGRATION

1714 Peace of Rastatt between France and the Holy Roman Empire.

1715-

1716 Treaty of Westminster between England and the Emperor.

1717-

1718 Quadruple Alliance signed between France, the Empire, England and Holland; England declares war on Spain.

1719 France declares war on Spain.

1720 Spain occupies Texas (-1722) ; French National Bankruptcy.

1721-

1722 Hungary rejects Pragmatic sanction.

1723 -

1724 Austrian Netherlands agree to Pragmatic sanction.

1726 Alliance between Empire and Russia.

1727 War between England and Spain.

1728 -

1729 N and S Carolina become Crown colonies.

1730 -

1731 Treaty of Vienna between England, Holland, Spain and the Holy Roman Emperor.

1732 -

1733 Santa Cruz (W. Indies) comes under Danish control.

1734 -

1735 -

1736 -

1737 -

1738 Brit. troop sent to Georgia to settle Border dispute with Spain.

O_{2} 1739-1763 DELEGITIMIZATION ENTROPY HIGH DIS-INTEGRATION

O_{3} 1764-1789 DECONCENTRATION ENTOPY LOW INTEGRATIONIST PROCLIVITIES.

1764 Britain secures Canada, Nova Scotia, Cape Breton, St Vincent, Tobago, Dominica, Grenada, Senegal and Minorica from France andFlorida from Spain.

1765 Brit. Parliament passes the Stamp act.

1766 Stamp Act repealed, but Declaratory act states Britain's right to tax Amer. colonies.

1767 -

1768 France buys Corsica from Genoa

1769 -1772 -

1773 Boston Tea Party

1774 -

1775 America Revolution (-1783) ; England hires 29000 German mercenaries for war in N America.

1776 America Declaration of Independence.

1777 American Revolution.

1778 American colonies sign treaties with France and Holland.

1779 Spain declares war on Britain; siege of Gibralter (-1783) French forces take St Vincent and Grenada.

1780 Rebellion in Peru against Spanish rule.

1781 Dutch settlement at Madras, captured by British.

1782 Spain completes conquest of Florida.

1783 Peace of Versailles, Great Britain recognizes American Independence.

1784 Pitt's India Act.

1785 Warren Hastings, Governer General of India resigns.

1786 Lord Cornwallis, Governor General of India , takes over.

1787 -

1788 US constitution, ratified by New Hampshire, the ninth state, comes into force.

1789 US declare themselves an economic and customs Union; The French Revolution ; Austrian Netherlands declare independence as Belgium.

04 1790-1815 GLOBAL WAR ENTROPY HIGH DIS-INTEGRATION

1790 Supression of Belgian Revolution.

1791 Canada constitution act divides the country into two provinces Upper and Lower Canada, Fr. National Assembly dissolved.

1792 French republic proclaimed Sept.22. Denmark first nation to abolish Slave trade. France declares war on Austria, Prussia and Sardinia.

1793 First coalition [Britain, Austria, Prussia, Holland, Spain and Sardinia] against France formed; Holy Roman Empire declares war on France; US proclaim its Neutrality, Fr. troops retreat from Germany; second Partition of Poland. Britain sieges French settlements in India.

1794 French invade Spain and Holland : Britain takes Seychelles, St. Lucia Martinque. and Guadaloupe [later recaptured].

1795 Third Partition of Poland; Dutch surrender Ceylon to British, Brit. forces occupy Cape of Good Hope.

1796 N Bonaparte assumes command in Italy; Britain captures Demerora Essequibo, Berbice, St. Lucia and Grenada. Spain declares war on Britain.

1797 Peace of Campo Formio; Napoleon arrives in Paris for British invasion.

1798 French capture Rome, Geneva annexed to France, Malta

taken, Bonaparte occupies Alexandria and following Battle of the Pyramids becomes master of Egypt; French alliance with Helvetian Republics; Fr. force lands in Ireland [fails]; Naples declares war against France. Foundation of Second Coalition against France.

1799 Napoleon becomes First Consul; Austria declares war on France.

1800 Napoleon's army reconquers Italy.

1801 Peace of Luniville between Austria and France mark the actual end of the Holy Roman Empire; Cairo falls to British troops.

1802 Napoleon becomes President of Italian (formerly Cisalpine) Republic. Peace of Amiens between Britain and France.

1803 Loiusiana Purchase; Britain declares war on France; Britain obtains St. Lucia , Tobago and Dutch Guiana.

1804 Napoleon Bonaparte Crowned, Napoleon I ; Spain declares war on Britain.

1805 Treaty of St. Petersburg between Britain and Russia against France joined by Austria. Napoleon crowned King of Italy; Battle of Austerlitz : Napoleon's victory over Austro- Russ. forces.

1806 Joseph Bonaparte named King of Naples; Louis Bonaparte named King of Holland; Britain blockades Fr. coast. Prussia declares war on France; By the Berlin Decrees , Napoleon initiates the "Continental System". [CS]

1807 Austria joins" Continental System". :Treaty of Til sit, isolates Britain; Russia breaks relations with Britain amounting to Declaration of War. France invades Portugal for refusing to enter" continental system".

1808 Napoleons'Continental System' at is zenith.

1809 War between France and Austria; Austria joins the 'CS' Napoleon annexes the Papal States. French over-run all Andalusia apart from Cadiz.

1810 Napoleon's Zenith, annexes Holland; Venezuela breaks

from Spain. Guadaloupe, last Fr. colony in Indies taken by British.

1811 Paraguay independent of Spain; British occupy Java.

1812 US declares war on Britain; Napoleons Russian campaign begins (19th Oct) Napoleon's retreat from Moscow begins.

1813 Prussia declares war on France, Austria declares war on fr. The "Battle of the Nations" at Lipzig-Napoleon defeated. Fr. expelled from Holland.

1814 (30th-31st March) Allies enter Paris; Napoleon abd d is banished to Elba, Congress of Vienna opens; Treaty of Ghent ends Brit-Amer. War.

1815 Napoleons "Hundred Days" ends at Waterloo; banished to St. Helena. The Congress of Vienna settles the Map of Europe. Holy Alliance Formed.

HEGEMONY WAVE IV 1816-1945 comprising two K waves $K_1=Q_2+Q_3$ $K_2=Q_4$

Q_1 WORLD POWER 1816-1840 ENTROPY LOW INTEGRATION PROCLIVITIES

1816 Argentina declares Independence from Spain, Indiana be comes state of the US.

1817 Independence of Venezuela under Simon Bolvar, Missis sippi becomes state of the US.

1818 Chile proclaims independence; Border between Canada and US agreed upon (49th parallel), Illinois becomes a state of the US.

1819 US purchases Florida; British settlement at Singapore. Alabama becomes a state of the US.

1820 "Missouri compromise" - Maine enters US as free state and Missouri as slave state (-1821).

1821 Missouri becomes a state of the US ; Peru proclaimed independent from Spain followed by Guatemala, Panama and Santo Domingo.

1822 Brazil becomes independent of Portugal.

1823 The Monroe Doctrine; Confederation of United Provinces of Central America formed.

1824 Anglo-Burmese War; British take Rangoon.

1825 Independence of Bolivia and Uruguay.

1826 -

1827 Peru secedes from Colombia.

1828 Russo- Turkish War begins.

1829 -

1830 France captures Algeria; July Revolution in France.

1831 Seperation of Belgium from Holland; Union of Colombia (-1819) dissolved.

1832 Britain occupies Falkland Island.

1833 Prussia establishes Zollverein [Customs Union] in Germany, but Austria is excluded.

1834 Monopoly of China Trade by East India Company abolished, Slavery abolished in the British empire.

1835 Texas declares its right to secede from Mexico.

1836 Texas wins independence from Mexico and becomes a Republic, Arkansas admitted to the Union.

1837 Michigan becomes state of the US ; Natal Republic founded.

1838 -

1839 Anglo- Chinese Opium Wars (-1842).

1840 Lower and Upper Canada United by act of Parliament.

O_4 DELEGITIMIZATION 1841-1846 ENTROPY HIGH DISINTEGRATION

1848 Treaty of Guadulupe Hidalgo ends US-Mexico war; US gets Texas, New Mexico, Utah, California, Arzonia and parts of Colorado and Wyoming from Mexico in return for large indemnity.

1861 Outbreak of American Civil War (-1865).

O_5 DECONCENTRATION 1867-1892 ENTROPY LOW INTEGRATIONIST PROCLIVITIES

1867 Russia sells Alaska to US for $ 7,200,000 ; Nebraska becomes a state of the US ; Formation of the North German confederation, Garibaldi begins March on Rome.

1868 -

1869 Suez canal opened.

1870 Proclamation of the Third French Republic; Franco-

Prussia War begins.

1871 German Empire is incorporated; William I of Prussia proclaimed German Emperor at Versailles.

1872 Three Emperor's league established in Berlin; en tente between Germany, Russia and Austria Hungary.

1873 Financial crisis in Europe [Vienna, May] and America [New York, Sep]; Anglo-Ashanti War.

1874 -

1875 -

1876 Colorado becomes a state of the US.

1877 -

1879 Zulu War.

1880 France annexes Tahiti.

1881 -

1882 Triple alliance: Italy, Austria and Germany.

1883 French gain Control over Tunis and Britain decides to evacuate Sudan.

1884 Germans occupy SW Africa.

1885 Germany annexes Tanganyika and Zanzibar.

1886 -

1887 Britain annexes Zululand.

1888 -

1889 French Protectorate over Ivory Coast; Italy claims protectorate over Ethiopia.

1890 Bismarck dismissed by William II; Bachuana land and Uganda come under British control.

1891 Triple Alliance Germany, Austria, Italy-renewed for 12 years.

1892 Britain and Germany agree on the Cameroons.

O_4 GLOBAL WAR 1893-1945 ENTROPY HIGH DISINTEGRATION

1893 Hawaii annexed by treaty to US.

1894 Korea and Japan declares war on China.

1895 -

1896 Italy defeated by Abbysinians at Adowa; Utah becomes a state of the US; France annexes Madagascar.

1897 Germany occupies North China.

1898 US declares war on Spain over Cuba ; Treaty of Paris ; Spain cedes Cuba, Peurto Rico, Guam, and the Phil-lipines for $20 million.

1899 Anglo-Boer War begins.

1900 The Boxer Rising in China.

1901 -

1902 Triple Alliance renewed; end of Boer War; US acquires pepetual control over Panama Canal.

1903 'Entente Cordial' established.

1904 Russo - Japanese War.

1905 Morocco crisis.

1906 France and Spain get control of Morocco following al geciras Conference.

1907 Oklahoma becomes 47th state of the US; New Zealand be comes a dominion within the British Empire.

1908 Union of S Africa established.

1909 -

1910 Union of S Africa becomes a dominion within the Br. Em pire.

1911 Agadir Crisis; The Kaisers Hamburg speech asserts Germany's "Place in the Sun".

1912 First Balkan War; Triple Alliance Renewed.

1913 Second Balkan War.

1914-1918 WWI ; Bolshevist Revolution in Russia, Balfour Declaration.

1919 Third International founded in Moscow.

1920 Adolf Hitler anounces his 25 point programme, Birth of L. of Nation.

1921 Allies Jix Ger. reparations; Rapid devaluation of the Mark.

1922 Mussolini's March on Rome; forms fascist government.

1923 Hitler's coup de etat in Munich fails, Germany declares policy of passive resistance; USSR established.

1924 Pan American Treaty signed.

1925 Locarno conference and Treaties.

1926 Germany joins the League.

1927 Black FRIDAY IN Germany the economic system colapses.

1928 Kellog- Briand Pact.

1929 Wall Street crash.

1930 Allied occupation of Rhine land ends.

1931 Britain abandons the Gold Standard; Bankruptcy of German Danat bank. The Hoover Moratorium.

1932 -

1933 Hitler appointed German Chancellor; Japan withdraws from L. of Nations.

1934 Hitler becomes Fuhrer; Hitler and Mussolini meet in Venice.

1935 Italy invades Abyssinia; Ger. Luftwaffe formed.

1936 German troops enter Rhineland; Spanish civil war begins Mussoline and Hitler proclaim Rome-Berlin axis.

1937 Italy leaves the League; Japanese take Peking, Shanghai and Nanking. Aden becomes Br. crown colony.

1938 Germany annexes Austria- The Munich Crisis.

1939 Italy invades Albania- Dismemberment of Czechoslovakia. German invation of Poland begins WW II.

1939-1945 WWII

1945 Germany capitulates (May 7) ,"VE Day" (May 8) ends war. Allied control commission divides Germany in four zones.

Three power occupation of Berlin takes effect; IBRD founded.

HEGEMONY WAVE V : 1940/45-? comprising two 'K' waves : K_1-Q_1+Q_2

POSTULATED 'K' WAVE ; 1945-1995 (?)

Q_1 WORLD POWER 1946-1970 ENTROPY LOW INTEGRATIONIST PROCLIVITY

1946 UN General Assembly Holds first session; The Nuremberg Trials Britain and France evacuate Lebanon, Albania, Hungary, Bulgaria and Trans Jordan become independent states; Power in Japan transferred from the Emperor to an elected assembly.

1947 The Truman Doctrine enunciated; Marshal Aid; India proclaimed independent and partitioned into India and Pakistan; Belgium Netherlands and Luxembourg ratify the Benelux customs union. Burma proclaimed independent republic; The cominform founded.

1948 US congress passes Marshall Plan : $17 billion aid for Europe Berlin Blockade; The Jewish state comes into existence

1949 Communist People's Republic established inChina; Israel admitted to UN; US completes withdrawal of occupying forces in S Korea, Holland transfers sovereignty to Indonesia; France! to Vietnam, Aparthied programme begins in S Africa.

1950 W Germany joins council of Europe; Korean War begins; Schuman Plan anounced.

1951 France, W Germany, Italy, Belgium, Netherlands, and Luxembourg ('the six') sign Paris Treaty, embodying the Schuman Plan.

1952 European Defence Community Treaty signed.

1953 Korean armistice, Stalin's death and rise of Khruschev.

1954 Russians reject the idea of German reunification; SEATO established US signs pact with nationalist China.

1955 Italy, W. Germany, France establish European Union, W. German enters NATO.

1956 Suez crisis, Hungarian Revolution.

1957 Rome Treaty for Common Market signed by "the six"; "Eisenhower Doctrine".

1958 Egypt and Sudan form the United Arab Republic. Alaska becomes 49th state of the US.

1959 Castro becomes premier of Cuba; E.F.T.A established ('the Seven').

1960 Congo crisis.

1961 The Berlin Wall built; S Africa leaves the Common wealth.

1962 Cuban Missiles crisis; Independence of Algeria.

1963 Britain refused entry to Common Market [objection; De Gaulle] United Arab Republic- Syria and Iraq agree to union; Kennedy assassinated.

1964 China becomes Nuclear; US offensive in Vietnam.

1965 US offensive in Vietnam; India Pakistan War.

1966 Br. Guina becomes independent nation of Guyana.

1967 Six Day War between Israel and the Arab nations begins.

1968 Czechoslovakian crisis.

1969 De Gaulle resigns as President of France.

1970 S Allende elected President of Chile.

O. DELEGITIMIZATION 1971-1995 ENTROPY HIGH DISINTEGRATION

1971 Indo-Pakistan War;

1972 Bangladesh, established as soverign state; Watergate Scandal; Ireland, Britain, and Denmark agree to Full membership of the EEC; US petroleum product shortage first becomes apparent.

1973 Gr. Britain, Ireland and Denmark formally join EEC; US-S Vietnam /N Vietnam Vietcong ceasefire agreement signed Vietnam War [1965-1973]; 1st Oil shock.

1974 OPEC boosts prices heightening inflation; economic growth slows too near zero in most industrialized countries.

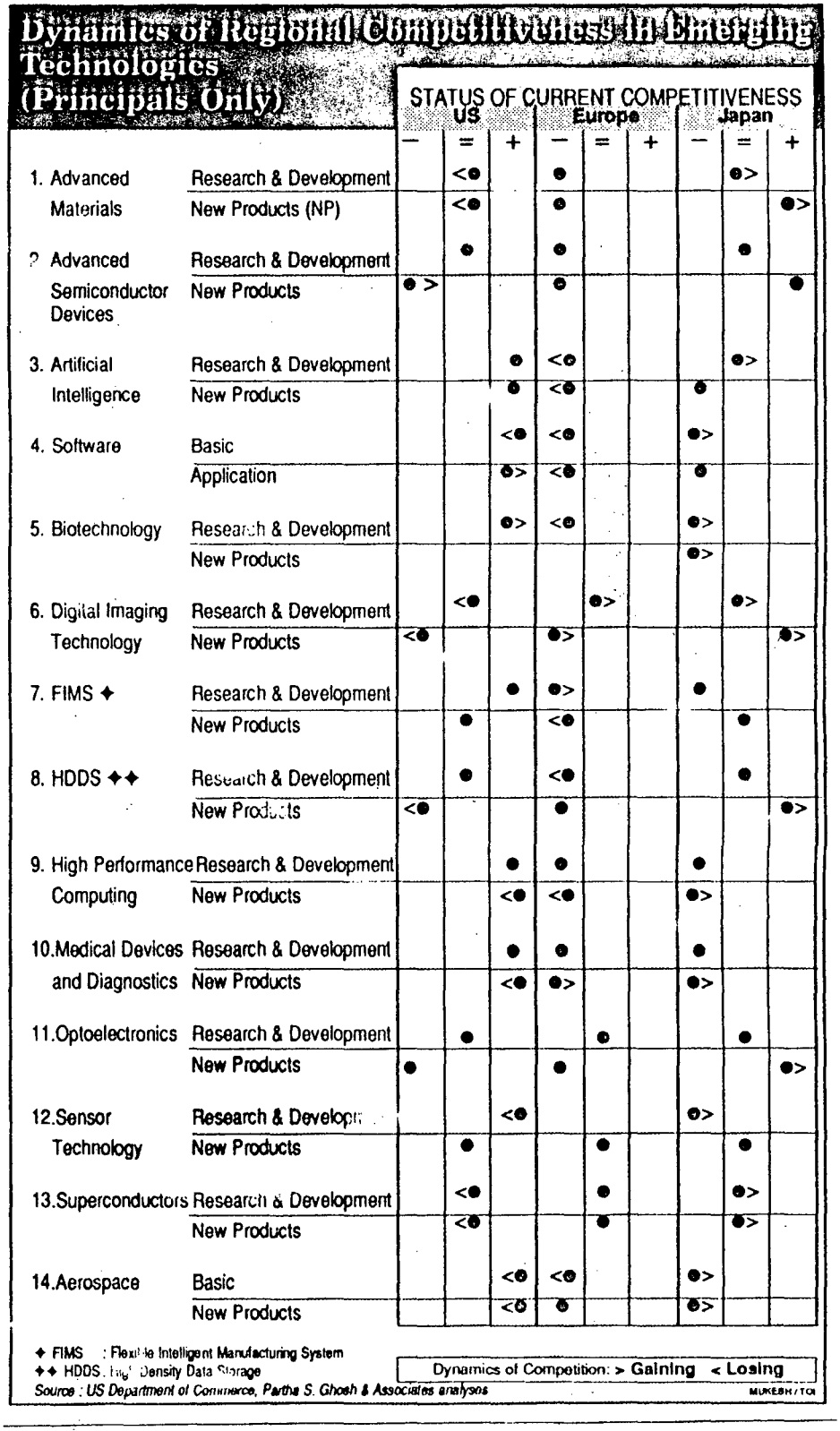
1979 Second Oil Shock.

1981 EC membership increases to 10.

1987 Collapse of communism in E Europe.

1990 Third Oil Shock, Unification of Germany.

1992 European Common Market.


Dynamics of Regional Competitiveness in Emerging Technologies (Principals Only)
STATUS OF CURRENT COMPETITIVENESS
US
Europe
Japan
− = + − = + − = +
1. Advanced Materials
Research & Development
New Products (NP)
2. Advanced Semiconductor Devices
Research & Development
New Products
3. Artificial Intelligence
Research & Development
New Products
4. Software
Basic
Application
5. Biotechnology
Research & Development
New Products
6. Digital Imaging Technology
Research & Development
New Products
7. FIMS ✦
Research & Development
New Products
8. HDDS ✦✦
Research & Development
New Products
9. High Performance Computing
Research & Development
New Products
10. Medical Devices and Diagnostics
Research & Development
New Products
11. Optoelectronics
Research & Development
New Products
12. Sensor Technology
Research & Development
New Products
13. Superconductors
Research & Development
New Products
14. Aerospace
Basic
New Products
✦ FIMS : Flexible Intelligent Manufacturing System
✦✦ HDDS : High Density Data Storage
Dynamics of Competition: > Gaining < Losing
Source : US Department of Commerce, Partha S. Ghosh & Associates analyses
MUKESH / TOI

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