Sustainable Development, the Knowledge Society and Higher Education Policy in Europe : Where are the linkages?

by

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The many limitations that this paper has, are of course, entirely my own.

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Making the Case for Sustainable Development as a counter hegemonic Knowledge Society Discourse.

This thesis examines the concepts of Sustainable Development and the Knowledge Society. It makes a case for recognising Sustainable Development as a counter hegemonic Knowledge Society discourse, as the concept of Sustainable Development rests on new knowledge that will drive a circular economy. Hegemonic Knowledge Society discourse, this thesis argues, not only ignores the core question of the characteristics of the knowledge that are the hallmark of the Knowledge Society, but is also framed in terms of national sovereignty, economic gain and isolated practice of techno-economic science in relation to Higher Education Policy and Practice. As a result, it does little to further the cause of Sustainable Development.

The thesis also undertakes to examine ways of facilitating knowledge that can provide for stronger Sustainable Development – Higher Education linkages. It suggests that greater multidisciplinarity and interdisciplinarity informed by a paradigm shift in favour of systems thinking is particularly relevant. In a global scenario where the notion of what constitutes worthwhile knowledge is being constrained by narrow economic interests, the thesis argues, facilitating such a shift will reclaim the university and higher education as a space for innovation and change in the interest of a critical modernity.

The policy recommendations it concludes with to help strengthen Sustainable Development–Knowledge Society linkage via Higher Education include restructuring curriculum and syllabi at the university level in favour of greater multidisciplinarity and interdisciplinarity, facilitating greater international student exchange and

participation in pursuit of Higher Education for Sustainable Development to bridge development gaps and share benefits, and forging meaningful partnerships between businesses and governments to further research for Sustainable Development.

Knowledge Society discourse: knowledge for what and why?

Talk of the 'Knowledge Society' has gained currency in 21st Century tracing its roots to social theorists Daniel Bell (1974) and Manuel Castells (1996) who theorised on post-industrial societies and the coming of the information age. Castells' definition of informationalism is "a technological paradigm based on the augmentation of the human capacity of information processing and communication made possible by the revolutions in microelectronics, software, and genetic engineering" (2004:11). Whilst information processing and communication, through media like the press, radio, and televisions, have been around for many years, these information technologies were not central to the development of industrial economies. However just as electricity was at the heart of the expansion of the industrial society, in the 21st Century the capacity provided by the new wireless and cyber information technologies, and networks has made the new post-industrial economy operational (Castells, 2004).

Terms such as the information society, global village, digital society, wired society, post-industrial society, and network society have gained wide spread acceptance since. While many of these terms are closely related and similar in meaning and also aligned to what later became Knowledge Society discourses, they are not really synonymous with the concept of the Knowledge Society. It is perhaps through the work of Peter Drucker (1994), that the term 'Knowledge Society' and talk of

knowledge and not just *information* acquired salience in relation to economies and international relations.

Drucker makes the case for a society where 'knowledge workers' replace the other kinds of workers who have been historically significant and numerous – the domestic workers of feudal/agrarian societies and the industrial workers of the post-Industrial Revolution era, to become the most significant and visible group of the developed/ post industrial societies (1994: 2). Connected to this observation, he makes the case for school becoming the most important institution, with questions on quality in learning and teaching, and what knowledge is appropriate becoming very political issues (as they indeed have, with the past several years of Education for All (EFA) conferences and resulting country policies show) (1994:2). Departing from the overriding influential 'practice' pertaining to knowledge, as a repository of information and skills that are handed down, he also conceives of the knowledge of the knowledge society as being about 'learning to learn' and 'life long learning' (which again have found a home in the EFA, Millennium Development Goals, and other policy speak of international organisations) (1994: 3). He also categorically states "In the knowledge society, knowledge basically exists only in application'' (1994:4).

Can the KS promote Knowledge for Sustainably Developing Societies?

Sustainable Development (henceforth SD) as a concept gained currency following the publication of the Brundtland Commission Report (1987) and the World Summit for Sustainable Development in Johannesburg in 2002. The report described SD as balanced social, economic, ecological development that is long lasting, the converse

of unsustainable development or as development that will ensure good living standards to present and future generations (*Our Common Future*,1987: 8, 43). Sustainable Development, as Gro Brundtland rightly puts it in her forward to the report, is nothing less than "a global agenda for change" (p.ix). What makes it interesting in relation to KS discourse is that it assumes the nature of a project that "cut(s) across the divides of national sovereignty, of limited strategies for economic gain and of separated disciplines of science" (p.x). As a body of scholarly thought and later as a grounds for policy making and international mobilization SD has given the environment-development connection a visibility that challenges both the trivialization of 'environmental issues' in political circles, and limited focus of 'development' as 'what poorer nations ought to do to become like the rich' (p.xi). Yet, its charm and potential lie in its being very much about development, as much in the interests of the socially and economically marginalised as of the well-off, and fundamentally about "a new era of economic growth – growth that is forceful and at the same time socially and environmentally sustainable" (p.xii).

SD has fed into Futuristic thinking in Environmental Studies and shaped concepts like 'Natural Capitalism' (Hawkins, Lovins and Lovins, 1999)and 'Cradle to Cradle' (http://www.product-life.org/en/cradle-to-cradle) that suggest that education, research and innovation system will be the harbingers of Sustainable economies and societies provided they are directed towards radical rethinking of knowledge and processes of knowledge production itself. Techno-scientific R&D for radically increased resource productivity, consuming less material and energy per product is a first step (thereby meeting needs of the excluded majority among the 6.7 billion citizens of the earth today and projected 9 billion by 2050). Redesigning industry on biological models

with closed loops and zero waste; shifting from the sale of goods (for example, light bulbs) to the provision of services (illumination) with industries assuming life cycle responsibility for their products; and reinvesting in the natural capital that gets used up are other key elements. Technological innovation based on bio-mimicry, and an examining of the fundamental premises of economics and commerce education, even while ensuring profitability, suggest themselves. Greater *trans and multi disciplinarity in how learning is organised* and *differentiation in the sites in which such learning can take place* are key areas for how Higher Education is to be organised and managed, if this is to become a reality. Thought leaders have already begun theorising along these lines, the key ideas of two books "The new production of knowledge" by Micheal Gibbons and his colleagues, and "The Fifth discipline" by Peter Senge offer valuable leads. SD can thus be understood as a KS discourse, albeit a counter hegemonic and marginalised one. It is exploring the degree of influx of its counter hegemonic but nevertheless crucial influence on Higher Education Policy and Practice as it is being shaped in the EU that is one of the key foci of this thesis.

The first traces of a clear SD – KS connection are to be found in the report *Our Common Future* which makes Sustainable Development much less of an oxymoron and more of a concrete project of envisioning change. The report draws an analogy and describes natural endowments as '*natural capital*' similar to the capital that individuals or firms may accumulate and urging human societies to live off the *interest* and not eat into that capital, necessitating both revolutionary technological and social change in order for this to be actualized. The report dedicates an entire chapter (pp: 206-234) to rethinking industry, particularly manufacturing as a sector with the key theme being 'producing more with less'. Literally sustainable development is change in a desirable direction (of which levels of material well being

are a key feature) that can be sustained into the future, with the inter-generational feature being prominent. One key question that emerges is : Is growth brought about through consumption of resources, several of which are limited or non-renewable, suffering strain already, sustainable? Even in an ideal scenario where the world manages to replenish the stocks of each and every resource that it uses up, or find substitutes, the discussion is not meaningful unless it encompasses the objectives of broadly inclusive and participatory social welfare. Equity and social justice are key elements, just as much as a desirable level of material consumption is. Hence the relevance of not only producing, but producing more with less.

Such a motto, to my mind, has the potential to be at the fulcrum of a Knowledge Society. Vis-à-vis its relationship to production systems it veritably calls for a paradigm shift. More importantly, it is about reclaiming attention for modes of production in a globalised world where cost cutting through outsourcing with existing wasteful production systems, and a focus of financial markets rather than production is driving economies. At a more fundamental level, it is also about reclaiming the university and higher education as a space for innovation and change in the interest of a critical modernity. The concept of SD has spurred a new thrust area of 'Education for Sustainable Development' (ESD) and numerous international conferences exclusively focused on Higher Education within the UN.

Higher Education as impacted by KS and SD discourses

The United Nations declared 2005-2014 The Decade of Education for Sustainable Development with UNESCO as the lead agency. The stated goal of the decade was to integrate the principles, values, and practices of 'sustainable development' into all aspects of education and learning (http://portal.unesco.org/education/en/ev.php-

URL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html). In the early statements it was mooted as an educational effort would encourage *changes in behaviour* that would create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations. The role of Higher education in this effort was couched in terms of universities and higher education institutions being engaged with the creation of *responsible citizens*, of training young people in the *values which form the basis of democratic citizenship* in a context of cultural pluralism and diversity, and of contributing to such development through the training of teachers.

While there is much to be said for all of these goals, they circumvent the core issue of sustainable development being about prevailing material consumption levels and the inability of the earth to sustain the level of resource use that it requires, or deal with the by-products of most production processes. Stressing values, responsibilities and behaviour changes hardly seem viable or practical in the prevailing scenario. While they may seem unpalatable to the global North that over-consumes when going by indicators such as the Ecological footprint, they hardly address the deprivation of the global South with legitimate aspiration for goods and services. That SD is fundamentally a KS discourse, with 'the new production of knowledge' (Gibbons, 1994) at its core does find mention in obtuse ways from time to time in international conferences (such as in World Conferences in HE in 1998 and 2009, http://www.unescobkk.org/education/apeid/resources/past-events/higherdistance-ed-workshops/macao08/) , but continues to be 'lost in translation' to HE policy.

A parallel disturbing development is that of the language of sustainability being appropriated with mutations vis-à-vis HE policy by the EU and various Global Governance actors. The strategic goal for Europe set for 2010 in the Lisbon Agenda in March 2000 was *"to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion."* If in effect this means, through a debatable understanding and application of the concept of 'sustainable' and a rather exclusive focus on economic growth, talk of competitive societies sustained by what are seen as knowledge-based sectors like Information and Communication Technologies and the life sciences (as against processing of raw materials or manufacturing), the current environmental and development crises will be hardly addressed.

Higher education management and change in Europe in relation to the knowledge society discourse that has been the organising point for such events as the Bologna forum on higher education in 1999 and the Lisbon Agenda in 2000 is mainly harmonization in the structures, processes and experience of European Higher education. The discourse is closely tied to that of the quality of education, and the manner in which standardization would facilitate the exchange of students (and future workers) between the nation states of Europe. In the light of the rather late but very seriously understood importance of internationalizing Higher Education for its potential to generate very high revenue from other parts of the world 'competitiveness' (particularly in relation to the United States) is also a key focus. The linkages between industry and tertiary education have also attracted considerable attention in the policy level discussions at the European level. One point of emphasis has been increasing resource commitments in line with what the United States has.

Less evident are policy level commitment or policy-initiated facilitation for a two way communication regarding *what* (a socially/ critically informed) higher education especially in relation to production processes will look like and *how* it will be organised. This is what the paper seeks to draw out through an analysis of relevant policy documents and problematise in terms of the 'missing linkages'. In what seems an overwhelmingly pragmatic, instrumental and narrowly economistic approach to Higher Education Management and change, the question this paper engages with is, can there be space for more social visioning for a SD-KS?

Research Objectives and Methodology

The paper proceeds in three parts.

1. Chapter 1 will examine the concept of 'Sustainable Development' in some detail and also how it can/ ought to be the fulcrum of a 'Knowledge Society'.
2. Chapter 2 will speculate on the desirable implications and impacts of this discussion for Educational Management and Change, such as the case and space for Mode 2 (trans-disciplinary, as against exclusively Mode 1, with strong disciplinary orientations of the traditional university) Science in European Higher Education based on a review of relevant thinking in the field.
3. Chapter 3, will examine the policy speak of key conferences/ documents on the Knowledge Society and Higher Education at the Global level and in the EU (in relation to the former), identifying the dominant frames and narratives within which the Knowledge Society discourse is presently framed.

Document Analysis is the methodology I choose for this study. I will attempt to demonstrate that national sovereignty, economic gain and isolated practice of

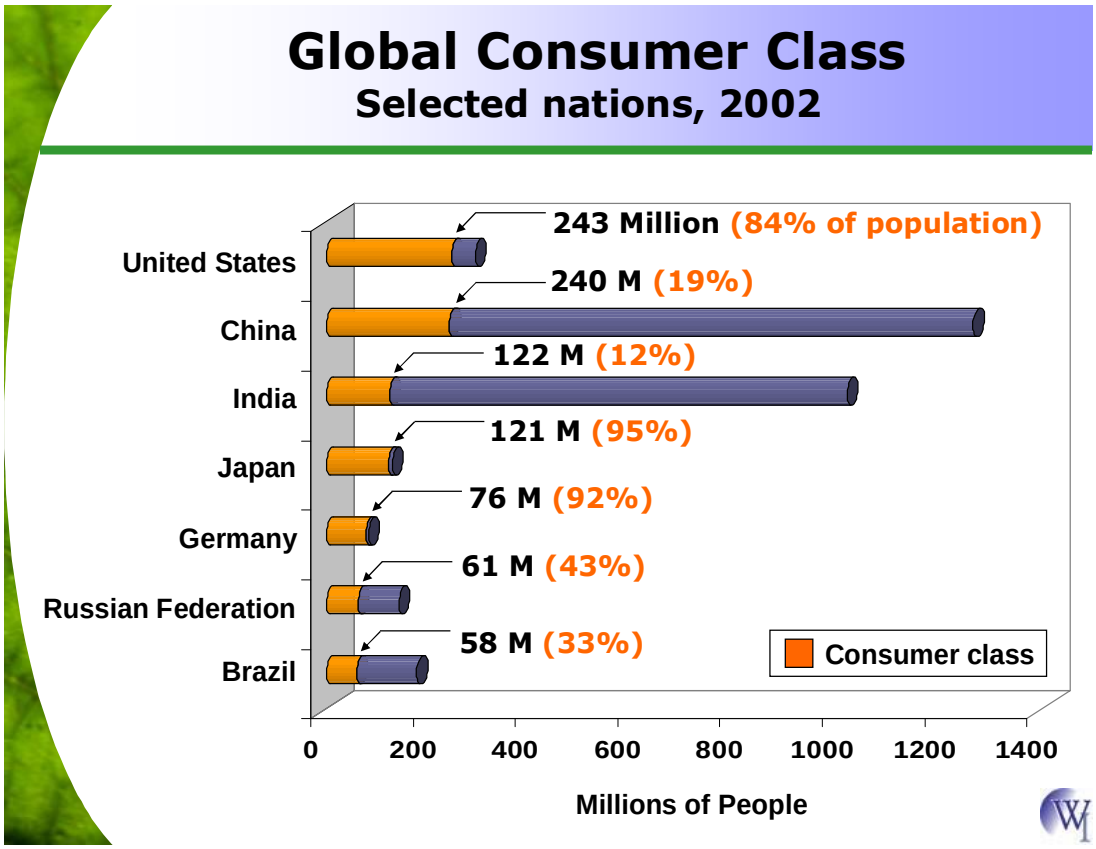
techno-economic science are the recurrent themes/ frames in hegemonic KS discourses, and this being the case works against the structures and strategies for Sustainable Development. Discourse is a term that has and will continue to occur frequently in this paper. Discourse, as I use it here, is easily defined as an ensemble of ideas, concepts and categories through which meaning is given to phenomena (of the project of creating/ furthering Knowledge Societies in this case) (Hajer, 1993: 45 cited in Gasper and Apthorpe, 1996: 2). Discourses frame certain problems; that is to say, they distinguish some aspects of a situation rather than others (Hajer, 1993: 45 cited in Gasper and Apthorpe, 1996: 2). I also borrow the concept of frames/framing used in discourse analysis for document analysis, which describes metaphorically how a certain deliberate selection gets highlighted and promoted through inclusion within the frame while other aspects are relegated to the background (Yanow, 2008).

Chapter 1: Sustainable Development: The Concept and why it is about new Knowledge

The phrase Sustainable Development is most commonly taken to mean sustaining economic growth that will achieve traditional objectives of increased incomes and welfare but together with ecological and social sustainability. In this, the concept itself is sometimes regarded as contradictory and trivial by those emphasising its environmental and social pillars. At other times it is regarded as mainstream and meaningful by allowing economists to appear as having found common ground with environmentalists without having to compromise their position on the centrality of economic growth for development. Yet the absence of conceptual clarity hampers an understanding of the positions in the debate and its implications for a Knowledge Society (henceforth KS) discourse.

Literally sustainable development is change in a desirable direction that can be sustained into the future, with the inter-generational feature being prominent. The challenge for a concept such as SD is that growth brought about through consumption of resources, several of which are limited or non-renewable, is not sustainable. Even in an ideal scenario where the world manages to replenish the stocks of resources that it uses up, or find substitutes, social welfare that is much more broadly inclusive and participatory than it is today makes existing ways of providing goods and services unable to deliver. Equity and social justice are key elements with serious implications for any meaningful commitment to increase in overall welfare. The enormity of this one aspect is captured well by the following figure:

Fig. 1.1: Resource Consumption in some major countries



Source: Rethinking Consumption: From Wealth to Well-being
Gary Gardner, Erik Assadourian, and Radhika Sarin
State of the World 2004
World Watch Institute, c.f. Webster, 2003

In the figure, the lighter portion marks the already unsustainable consumption by sections of the world. Within the South countries there is a North that matches the consumption patterns and lifestyles of the North countries. That the excluded – the majority – can be somehow included in the welfare offered by such exclusive consumption, defying the odds of resource scarcity and environmental externalities, is the promise contained in the vision of Sustainable Development.

In addition to the equity imperative there are ecological conditions that form the basis of sustainable development. The concept of sustainable development originated in the context of the environmental movement coming of age, and the recognition that the existence life on earth itself is sustained by taken-for-granted ecosystem services of forests, water bodies, soil and the like. Sustainable Development is thus development where the conditions necessary to support life on earth (of all species given their interconnected and crucial role in ecosystem services) at a specific level of well being through future generations.

In 1987 the Brundtland Report, also known as *Our Common Future*, alerted the world to the urgency of making progress toward economic development that could be sustained without irrecoverably depleting natural resources and also *without harming the services nature provides to life*. While its key statement on sustainable development, defining it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (1987: 8), is fairly well known, less known is that it clearly articulates how to go about doing so, describing natural endowments as '*natural capital*' and urging human societies to live off the *interest* and not eat into that capital, necessitating both revolutionary technological and social change in order to be actualized. Such revolutionary technological and social change is very much a knowledge society project, and the chances of it being realised rest on the KS discourse emanating from 'Education for Sustainable Development' (ESD) and the manner in which these inform Higher Education Policy.

ESD , The Knowledge Society and Higher Education Policy

The idea of ESD can be traced back to Agenda 21 – the blueprint for sustainability in the 21st century – the main outcome of the 1992 United Nations Conference on Environment and Development, or "Earth Summit", in Rio de Janeiro, Brazil. The main thrusts of Education for Sustainable Development, originally identified in Chapter 36 of Agenda 21, were expanded upon in the Work Programme of the UN Commission of Sustainable Development (CSD) throughout the 1990s as: (http://www.gdrc.org/sustdev/un-desd/intro_un-desd.html, italics mine)

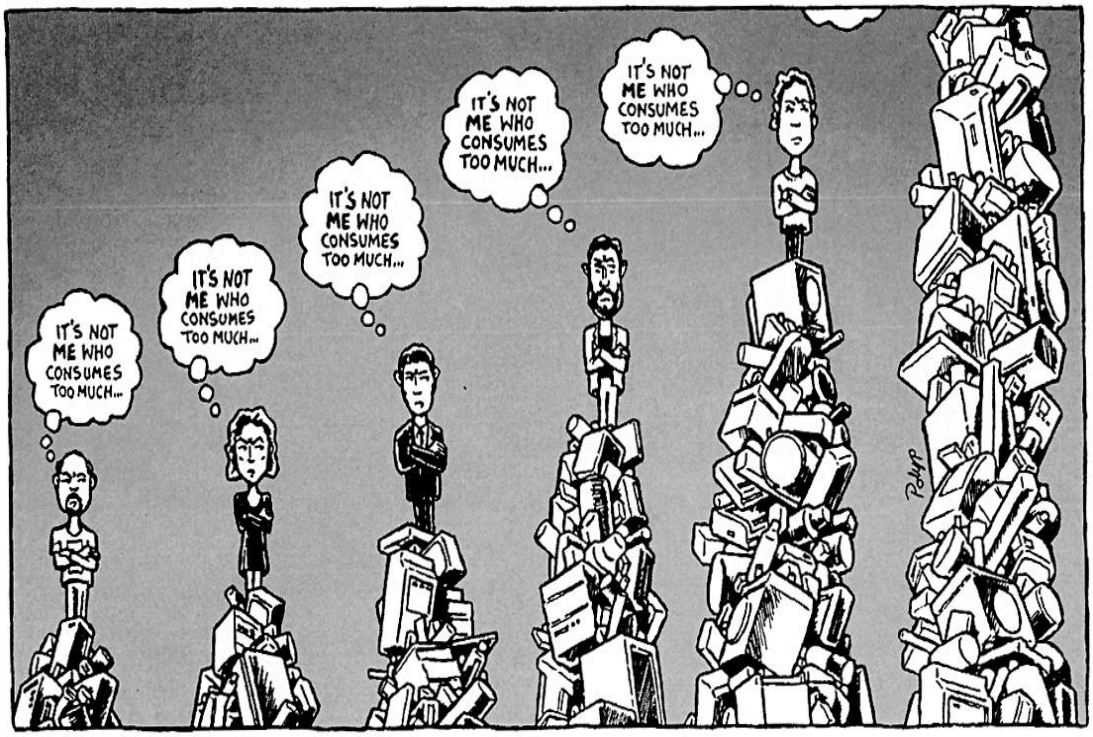
1. "Enhancing public understanding of the principles behind sustainability, furthering the discussion of sustainability itself and the evolution of the concept from a vision to its practical application.
2. Mainstreaming ESD. This social process needs to be *mainstreamed into all sectors including business*, agriculture, tourism, natural resource management, local government and mass media.
3. Lifelong-learning for all. Based on the belief that society has to adapt to a phenomenal rate of change in knowledge –so the know how and capacity of individuals and organisations to be able to continuously learn is a most precious asset for the future.
4. *ESD as relevant to all nations*. The realization that the reorienting of existing education programs in all nations to address the social, environmental, and *economic knowledge*, skills, perspectives, and values inherent in sustainability is imperative.
5. Specialised Training Programs. The development of specialized training programs to ensure that all sectors of society have the skills necessary to perform their world in a sustainable manner."

Based on the proposals by Japan and Sweden, the United Nations General Assembly, at its 58th Session in December 2002, adopted a resolution to start the Decade of Education for Sustainable Development (DESD) from January 2005 (http://www.esd-world-conference-2009.org/en/background-information/desd.html#c991). DESD has its points of overlap with other international initiatives that were already in place, in particular the Millennium Development Goal (MDG) process, the Education for All

(EFA) movement, and the United Nations Literacy Decade (UNLD). But if EFA focuses on ways of providing educational opportunities to everyone, and if the UNLD concentrates on literacy as the key learning tool for all forms of structured learning (both of which are aspects to the social pillar of SD), DESD was in addition concerned with the content and purpose of education.

Despite the concept of SD pointing to the fundamental reorientation required in concepts and ways of thinking particularly in disciplines like economics and business, education more as a moralising (and not radical) influence that will be the panacea to the prevailing scenario of unsustainable development is what came upfront in formal declarations of the DESD. The dedicated UNESCO portal states 'The DESD educational effort will encourage *changes in behaviour* that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations' (http://portal.unesco.org/education/en/ev.php-URL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html). The basis for and validity of such an assumption is rightly caricatured in the figure that follows:

Fig 1.2: Changes in Behaviour – How realistic?



'Its not me who consumes too much'

Source: Polyp cited in Webster (2003)

Continued emphasis on *values and behaviour*, but additionally an emphasis on *knowledge* on as the driver of SD become evident as Higher Education for Sustainable Development(HESD) acquired prominence as a separate thrust area in the policy speak of UN agencies. The first initiative towards uniting higher education stakeholders as major drivers of the sustainable development came at the World Conference on Higher Education in 1998. A thematic debate was organised at the World Conference *Preparing for a sustainable future: Higher education and sustainable human development* (please see under 'Links to Key UN Conferences related to HESD' at http://www.unesco.org/iau/sd/sd_leadership.html). The Rector of

the United Nations University, Mr. Hans van Ginkel, made a clear case for this focus on knowledge by drawing attention to four key questions of:

- "How can interdisciplinarity be developed and managed?
- How can theoretical knowledge be better linked to its potential practical applications?
- What changes will be necessary in higher education programmes and institutions to prepare future generations better for complex situations and problems, including ethical dilemmas?
- How can cooperation between national, regional and international institutions be promoted?"

The thematic debate made reference to "coping with complexity, inculcating a new way of thinking, and translating interdisciplinarity into practice" (Summary of the thematic debate: Preparing for a sustainable future: Higher education and sustainable human development, http://www.unesco.org/iau/sd/sd_leadership.html) as a key focus for HE. The challenge of facilitating of interdisciplinarity when the existing institutional framework favoured specialisation and fragmentation was highlighted. Rigorous evaluation of existing curricula and the importance of the future orientation was stressed. The 'relevance' of higher education as something that cannot be an abstract concept was emphasised. Relevance assessed in terms of the "fit between what society expects of institutions and what they do" (ref as above) was seen as crucial. In particular, relationships with the world of work based on long-term orientations and societal aims and needs, including environmental protection was seen as important.

The Task before a Relevant Higher Education for Sustainable Development

Based on all of the above, it appears logical that concepts of limited Resources - materials and energy, the use of Nature as a source and sink, Global Citizenship premised on equality and social justice and Ecological Entitlement defined by all of

the above offer the fundamental guidelines in relation to which 'worthwhile knowledge' of a radical KS discourse for ESD must be defined.

The concept of the 'Ecological Footprint' conceived in 1990 by Mathis Wackernagel and William Rees at the University of British Columbia measures how much land and water area a human population requires to produce the resource it consumes and to absorb its wastes, using prevailing technology. All the earths productive land and sea space, divided between the global population (more than six billion people) gives each person an entitlement of 1.8 hectares. In 2003, the actual global ecological footprint was 2.2 global hectares per person. A country wise break up showed that the ecological footprint (2003 figures) of the average Indian was 0.8 hectares, average Chinese 1.6 hectares (clearly indicating how averages gloss over the gross disparities and deprivation in these populated countries). In USA it is 9.6 hectares and in the U.K and France 5.6 hectares each. The EF is perhaps more interesting, in the light of Figure 1, for rethinking what knowledge does Sustainable Development need, and for having spurred exactly this line of thought.

To begin with, Webster (2003) offers an oversimplified answer for conceptual ease, where

O is the net output utilising limited resources

P number of people, or Population

c How much each person consumes, per capita Consumption

and T Technology or how efficiently resources are used , we have

$O = c \times P \times 1/T$ and the SD imperative is to increase O so as to include the excluded in Figure 1.

Assuming consumption that meets the aspiration level of welfare is that of the middle class person of the Global North, and that population is expected to grow at the steady rate, the goal of SD requires a revolutionary change in Technology to produce more goods and services per unit of resource consumed, with less waste, to fulfil all that SD as a concept takes into account.

Counter hegemonic Knowledge Society discourses inspired by this very vision exist on the margins, outside the portals of mainstream academe. 'Natural Capitalism' (Hawkins, Lovins and Lovins, 1999; Rocky Mountain Institute http://www.rmi.org/) is one such concept that directs education and research towards radical rethinking of material production processes. Techno-scientific R&D for radically increased resource productivity, consuming less material and energy per product is a first step. Technological innovation based on biomimicry, redesigning industry on biological models (calcium carbonate as produced in an egg shell as against in furnace) with closed loops and zero waste; shifting from the sale of goods (for example, light bulbs) to the provision of services (illumination); and reinvesting in the natural capital that gets used up are key elements. Also required is a fundamental rethinking of the premises of economics and commerce education, and the way in which they can connect seamlessly to the sustainable development imperative of business and industry.

Thus there is a fundamental need to reflect on the characteristics of *Knowledge*, its whys and hows, for the Knowledge Society for Sustainable Development. The next chapter examines *multidisciplinarity*, *interdisciplinarity*, *paradigm shift* as very exciting and promising theoretical formulations pertaining to which excellent

scholarship is already available. Against the backdrop of the discussion on what is Sustainable Development and what it entails to move towards it, my central argument is that these three concepts/ or what they point towards, as applied to higher education hold the key for SD infused KS discourses.

Chapter 2: Knowledge for Sustainable Development

The understanding that Knowledge has to be at the core of a meaningful discourse on Sustainable Development, and discussions of what are/ought to be its characteristics has found mention outside the portals of formal academe. Peter Senge's work 'The Fifth Discipline' is pre-eminent in this regard. The book offers an interpretation of how the way organisations work must change. It shows an awareness of challenges such as the need for industry to produce more with less, and provides parables such as that of the unsuspecting frog that boils to death in a beaker when the latter is heated gradually, in contrast to the alarmed and fast response of one put in boiling water, to the issue of institutions refusing to pre-empt and react to a predicament that is not yet upon them but can be suspected. Senge is unhappy with the linear reasoning that makes people 'prisoners of their own thinking ' (1990: 27) and calls for a 'shift of mind' (1990: 68). The new kind of learning organisation that he envisages facilitates this process. While he alludes to businesses and their innovations, formal education structures, except for their end product of the graduate students who enters the loop, hardly feature as a 'learning organisation'.

Gibbons resonates this thinking and takes it further when he delineates the pragmatic considerations that have informed this shift in terms of the need to go beyond the disciplinary boundaries that inform the production of knowledge in the traditional university set up. The term Mode 1 is what he describes this traditional pursuit of science within the traditionally delineated fields of enquiry. Gibbons sees disciplinary structures as providing "the guidelines about what the important problems are, how they should be tackled, who should tackle them, and what should be regarded as a contribution to the field" (p.77). In this, it is limiting and not facilitative of the desired

new social contract between science, university and society. This is where the 'new knowledge' that he terms Mode 2 in contrast to mode 1 comes in.

Gibbons and Mode 1 and Mode 2 Knowledge

Theorising on the differences of Mode 1 and Mode 2 knowledge constitute the key idea of his book "The new production of knowledge". It begins with the assertion that there is definitive change in the mode of knowledge production today. It contrast to what was the norm (Mode 1) where knowledge was pursued within traditional disciplines, Mode 2, the current mode, begins with the consideration of a problem at hand. And arising from the nature of its core concern with a real world problem, its approach is informed by the fact that such problems often transcend disciplines… ie: a transdisciplinary approach to problem solving.

The authors characterise Mode 2 knowledge as 'socially accountable' and 'reflexive' in comparison to its predecessor, Mode 1. The transdiciplinarity of Mode 2 knowledge is qualified further. The first of these is that the framework that such knowledge develops in, is in the context of trying to solve a real world problem. It is in a sense the opposite of what is the case with frameworks in Mode 1,which are first developed as 'theory' and then applied. In this, it can afford to be little heretical and exercise a creativity outside of the 'known' and 'accepted ways' of thinking. Secondly it does borrow from all the disciplines as required, but combines knowledge in hitherto unknown permutations and combinations in order to address the problem. Diffusion of transdisciplinary knowledge in Mode 2 is also less formalised than is the case with Mode 1 which resorts to the well established routes of journal publications or conferences. Diffusion is seen, in contrast, to occur when the knowledge so produced is applied successfully to other problem contexts, as a 'by the way thing' in

the process. And, it is also described as dynamic. Given its close ties with its performance in a problem solving context, it relies on this process itself as a source of validation and does to return to any pre ordained theoretical frameworks in order to do so.

All these features of Mode 2 knowledge make is eminently suitable to conceptualise knowledge envisaged for production systems favouring Sustainable development. Yet the same features highlight how uncomfortably the model (and its task in the interest of furthering sustainable development) sits with the conventional discipline bound university systems. While Gibbons circumvents this issue indicating the multiplicity of sites within which Mode 2 knowledge production takes place, the puzzle for Thinkers, Practitioners and Policy Makers in Higher Education would be whether or not these institutions can claim a significant, if not exclusive place in the process. That the social accountability and reflexivity that are the hallmarks of Mode 2 thinking can be stifled by the modes of organisation of syllabi and curriculum within existing higher education institutions, or not lend themselves easily to existing methods of assessment seems to be a neglected challenge.

Gibbons in a later paper 'The University as an instrument for the Development of Science and Basic Research: the implications of Mode 2 Science' draws attention to efforts at the policy level in Western Europe and the US that are increasingly causing research to move away from universities to industry affiliated or other private sector research institutes. While he reads the mainstream reaction to this phenomena as that of fear and concern pertaining to whether the universities are become merely teaching institutions, deprived of their dual traditional role of both teaching and research, he also offers that at a more pragmatic level it merely reflects the need to build "a new

social contact between science, universities and society" (p. 76) – precisely what sustainable development requires too.

Knowledge, Development and the OECD

Interestingly, what Senge and Gibbons were saying in the 1990's, the OECD was saying in the 1960's, and different ways of thinking about knowledge and institutional frameworks to facilitate Development can thus be understood to have been in vogue even before SD as a concept gained currency. The OECD is what the Organisation for European Economic Co-operation (OEEC) , established in 1948 to organize and distribute aid as per the Marshall Plan in Europe, became in 1961, with an enlarged mandate that moved from Aid to 'co-operation and development' (Benum, 2007). In the period spanning from the1960s to the late 1980s, the OECD together with the Council of Europe, UNESCO, and NATO is seen to have taken the lead in intellectual and conceptual development of Science Policy in Europe, and whilst "OECD policy proved incapable of fitting all the circumstances of all member countries…persuasive and pervasive its influence remained, notably on the universities and institutions for fundamental research" (ibid: 365).

Benum refers to the commonly acknowledged three distinct periods of OECD influence over the three decades of the 1960s, 1970s, and 1980s. The Piganiol report (1963) is held out for having brought to the forefront discussions on 'policy for science' and 'science for policy' as distinct foci in the first decade. While the former supported fundamental research, the latter was about a more instrumental use of science and research for the economy and society. It promoted the setting up of ministerial level agencies to guide science policy in several countries impacting the different sectors of government, university and industry in various ways. Towards the

middle of the decade, the ascendance of the United States and the technology gap added fuel to the fire of the search for 'relevant science'.

Informed particularly by the work of sociologist Joseph Ben-David and his report, *Fundamental Research and the Universities: Some Comments on International Differences* which attributed the 'research gap' to structural faults and failures in the European system that in the changed scenario made them outdated and rigid, costing European universities the cutting edge intellectual leadership that had been their hallmark in the seventeenth century in the process, the OECD made three key recommendations (Benum: 369-370). These were that fundamental research be strongly oriented towards serving national goals, that such research required organisation and that it was the role of Governments to be looking into this matter, and finally that practical problem solving required going beyond narrow disciplinary boundaries and therefore that there be a strong focus on interdisciplinary research (ibid: 360-371).

Subsequently "the OECD Directorate moved in the late 1960s from the idea of science policy as a sphere in itself, to science policy as embracing a set of ideas useful in other spheres, including economics, industry, trade, education, and health" (ibid: 371). If relevance and planning were the key traits of the first decade of OCED led knowledge-related developments, the political climate of the 1970s saw social priorities clamouring for space. The environmental movement was beginning to pose serious questions on the effects of science and technology and technology assessment, and socially grounded innovation became the new imperatives. Within Europe, Benum notes, the Nordic countries, the Netherlands and Yugoslavia which had a

strong tradition of social science research were more responsive to these challenges. While the oil crisis of 1973 added to the urgency of innovation and new ways to power the entire industrial-technological enterprise on the one hand, it also posed a constraint through the international economic slowdown. By the 80s it was back to economic sense and effectiveness in HE in the context of unemployment and stagflaction. Thus the call for the 'new' production of knowledge is not that new. It can perhaps be captured well between the concepts of interdisciplinarity , multidisciplinarity and paradigm shift.

Interdisciplinarity , Multidisciplinarity and Paradigm Shift

Klein (1990, 1996) details how interdisciplianrity emerged in the context of industrialisation and the need to have knowledge in the context of practical application. In the United States, researches attached to universities were able to patent their knowledge related to such products/ processes or technologies and the process became more or less a self reinforcing virtuous cycle. She makes a case for the recentering of such a practice based on the economical and ecological imperatives.

Multidiciplinarity in relation to Higher Education as explained by Stephen J Kline of Stanford University's Science, Technology and Society program immediately comes across as an endearing concept for a KS discourse aiming for Sustainable Development. What makes it so is that is presented at the process of erecting an overview of the human intellectual enterprise, born out of the need to do so. Multidisciplinairity is rooted in teasing out and weaving together with ease several aspects that are taken for granted in the way disciplinary knowledge is organised in the world today. The first point of departure that it offers to conventional ways of

thinking is: understanding the world as organised in systems. Knowledge within traditional disciplinary boundaries is selective both in terms what systems it chooses to see (for instance ecology will see food webs or chains, while the sociologist will see systems of agrarian land use) and in terms of the variables included within each of these systems for the sake of reducing complexity and facilitating theorising. Kline points out that especially in the natural and physical sciences, this post Newtonian epistemology has had a resounding success. However, today the pressure of what was missed out (the interconnectedness of systems and each system beyond the reductionism it is often subjected to) also claims attention.

To capture this complexity he coins the neologism 'sysrep' to mean the human representation of the system and points out that just as the map is not the territory, the sysrep is not the system. The sysrep however operates as a domain in which certain truth assertions are seen to hold. These truth assertions are experimentally established in the natural and physical sciences (which govern the systems of human designed hardware and socio technical systems) and normatively enforced in the social-human systems. However, what is missed out is that the truth assertions hold actually only for the *sysreps* and *not systems* in every case – it is the way human affairs are organised that conflates the two.

A further level of complexity, and simultaneously strengthening of the case for Multidisiplinarity comes in with Kilnes observations on hierarchies as a structural feature (pp.101-109). He explains all systems as related to other systems by virtue of their relative position in hierarchies which may have either a 'tree' structure or 'ladder' structure or combination of these. The tree structures is for instance

exemplified by the mountain – layers of rocks/ (strata) – rocks – elements that constitute the rock – subatomic particles. Each is a system in its own right. The ladder structure is represented by the sub assemblies of a car of laundry machine, each of which may have a tree structure too, demonstrating the mixed type. Given that human intervention in all of these systems work on the base of syreps and not the actual systems themselves, the reductionism that operates is often unmindful of crucial interfaces and mutual constraints that actual systems exert on each other.

This apart, Kline introduces a 'theory of dimensions' to demonstrate the complexity of modelling with sysrepses even beyond what is required because of interconnectedness in hierarchical structures. This has to do, simply put, with the several 'dimensions' in relation to which systems are liable to change as a result of their interaction with other systems. To make this concept more comprehensible, Kline provides the example lower lever naturally occurring inert systems as understood in terms of six primary dimensions in classical physics – mass, length, time, temperature, volt and electric charge (ibid: 123-124). As a result, for more complex systems, behaviours are even more prone to vary.

The clarity that Kline's theorization offers to Multidisciplianarity lends itself to obvious connections and implications beings drawn for a knowledge enterprise like Higher Education, more so if it is to be about Sustainable Development. As stated earlier, if facilitates creating an 'overview of the intellectual enterprise', recognising (alongside the strengths) the limitations of bounded disciplinary knowledge. This is not to say that the concept is not quite complicated to translate into practice. Kline offers the concept of 'integrated control information' (p.129) to refer to the feedback

loops coming from systems via the backing of highly specialised computer programming to address how exactly multidisciplinarity will be realised in practice.

In the context of a discussion on Knowledge for Sustainable Development its implication for product innovation as Kline explains it, is particularly noteworthy (pp.180-183). He explains product innovation as a neglected area, left to be understood from the separate domains of science, engineering and economics. Of these, economics explains innovation as simply the result of competition between firms and leaves the actual process as a black box. Engineering is explained as having started out with a concern for both the social and technical systems of manufacture and use, but increasingly having then neglected the social (and other, importantly ecological systems?) to focus on incremental improvements on the hardware alone, most of the time. Science in relation to product design and innovation is similarly seen as engaged in a linear pursuit that is incremental and limited by the training in the old paradigms that the technicians working on it, know.

Really radical innovations enabled by science are stated to be as rare as twice in a decade as a result. The challenge for a multidisciplinary discourse is thus in principle, to deal with the concerns of conventional disciplines 'adequately' (distribution of goods and services, productivity of economies, viability of technologies) yet create more responsible and responsive systemic ways of doing so.

Both interdisciplinary and multidisciplinary are ways of looking at the world that contain in themselves the seeds of facilitating a Paradigm shift . As described by Thomas Kuhn in the path breaking 'The Structure of Scientific Revolutions' (1962)

they share an episteme of interconnectedness and system science, in contrast to the linear basic assumptions within most theories of natural science. Sustainable Development is very much about a scientific revolution heralded by such a change in paradigm. Issues like Climate Change and the Energy Crisis do indeed present anomalies and challenges which evade solutions within the linear dominant paradigm that ushered in most of the scientific progress and impressive inventions of our time.

Yet, as the next chapter will attempt to show, the dominant Knowledge Society discourse does not place interdisciplinarity , multidisciplinarity or the need for Paradigm shift at the centre. Instead, narratives of national sovereignty, economic gain and isolated pursuit of techno economic science which run counter to the vision of SD, dominate.

Chapter 3: Policy Speak and the Higher Education-Knowledge Society-Sustainable Development Linkages

The case Peter Drucker (1994) makes for a society where 'knowledge workers' replace the other kinds of workers as the most significant and visible group (p.2 herein) accurately describes societies of Western Europe and North America more than any other. The characteristics and trends that he foresees for the knowledge society, particularly when analysed through a Sustainable Development lens, offer what I see as recurrent narratives or frames that are common to all hegemonic KS discourses. These narratives – of economic growth along conventional lines, national sovereignty, and isolated pursuit of techno economic science –run counter to the vision of SD.

As Chapter 1 examined, SD requires that conventional economic growth needs to be replaced in favour of robust economic growth within a circular economy. The focus has to be radical redesign and re-conceptualisation of production processes and businesses to enhance both the availability of goods and services as also access to them, while conserving natural capital. National sovereignty has to make way for World System thinking to address the existing massive gap in technology and research capacity and iniquitous global resource and wealth distribution on the one hand and the human-centred focus on SD on the other. Whilst the population problem of the developing world hampers the ability of these countries to provide a good quality of life to vast numbers of people, over consumption (subsidised by underdevelopment elsewhere) and disregard for equity that conventional economic and business models have fostered in the global North make addressing the social pillar of SD even more difficult. *Our Common Future* (1987) urges :

> "From one earth to one world…We can see and study the earth as an organism whose health depends on the health of all its parts. We have the power to reconcile human affairs with natural laws and thrive in the process." (p.1)

More resource commitment to human development at a World Scale and facilitated migration to enable the best minds to both contribute to and benefit from a radically redesigned economic/production process, and from equitable per capita entitlement to the earth and its resources, are impeded by narrow nationalist HE-KS-SD discources. Similarly, the isolated pursuit of techno economic science being conflated with what 'knowledge' means in the KS, is symptomatic of both the deep rootedness of conventional economic thought and of economic prosperity being envisaged within narrow political boundaries of nation states.

Europe along with North America has the potential and historical advantage to be the vortex of a Sustainable Developing world. However, policy discourse framed both at the level of intuitions of global governance and at the regional level in relation to the project of a greater role for Europe in the world, has a decisive role to play if this is to be so. This section examines economic growth along conventional lines, national sovereignty, and isolated pursuit of techno economic science as unfortunately being the dominant frames.

Frame 1: Knowledge mainly in the interest of Conventional Economy and not so much of Society

Drucker (1994:3) sees the presence of knowledge workers leading to a new class conflict, rather than their knowledge being in the service of greater structural equity. The 'productivity' of non-knowledge work is further described as being 'abysmally

low' and an 'economic challenge' (1994: 3). Such formulations conceive of the 'knowledge' and the 'knowledge worker' as rather self serving entities within the conventional paradigm of work for economic reward. 'New knowledge' within an SD paradigm would in contrast have its 'productivity' understood in more holistic ways, in terms of facilitating more and better goods and services to all people. It would not have to be 'pitted against' productivity of non-knowledge work such as in the service sector or care work, as either high or low, as each would retain its own importance.

The World Bank report *Constructing Knowledge Societies: New Challenges for Tertiary Education*(2002) affords the post secondary sector a visibility and importance that stands out in relation to KS. The report repeatedly uses the term *knowledge economy/(ies)* (in lieu of society) and makes emphatic reference to the importance of "knowledge as the principle driver of *growth''* (p.1, italics mine). Towards this end it views several aspects of tertiary education as being of consequence, including curriculum, quality, institutional structures and financing. While there is nothing to be said against all this, even in the interest of SD, it soon becomes evident that it is the economic benefits of such education are pre-eminent and are used to tie up to a discussion of competition, commercializing knowledge, and comparative advantage. A spattering of its "critical humanistic and social capital building dimensions and role as an international public good" (p.4) also finds space.

The coming of the KS is also theorised seen to be transforming the university. While a dimension of adaptability and metamorphosis of the University inherent in Scotts (1998) visualisation is heartening, an element of determinism in relation to the linear

economy as against critical exchange that will facilitate a circular economy is less so. From the University's medieval origins, to becoming a home for experimental science after the Enlightenment, and embracing the imperatives of industrial and democratic societies in the C19th, he portrays the University's relationship with modernity as having brought it to yet another crossroad with the coming of the project of the 'Knowledge Society'. He identifies four key changes (pp.447-449). The first is that of Universities having to work in closer collaboration with non-university Higher education institutions. The dilution of binary systems such as those that had universities and polytechnics in the past, is offered as a case in point. The second aspect, emerging from knowledge being valid only in application, is of universities having to engage in radically new activities such as science parks where the products of their research can be better showcased. The third is of accountability coming in, in a big way. Review and regulation with state patronage no longer the norm is the order of the day. The fourth, perhaps overarching change in relation to all the other points is how the institutions themselves have changes, bigger, more tied to the market, and with a greater emphasis on managerialism. Points 2 and 4 especially can work either in favour of or against meaningful HE-KS-SD linkages, subverting it to a narrow economism in the latter case.

The Sorbonne Declaration's (25 May1998) vision of creating 'a Europe of Knowledge' and the Bolgna Declaration (19 June 1999) have fed into the strategic goal for Europe set for 2010 in the Lisbon Agenda in March 2000 *"to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion."* Concepts such as knowledge-based economies and sustainable economic growth are

very much at the heart of sustainable development, provided they actually deliver. If as already mentioned, in effect this means, through a debatable understanding and application of the concept of 'sustainable' and a rather exclusive focus on economic growth, talk of competitive societies sustained by what are seen as knowledge-based sectors like Information and Communication Technologies and the life sciences (as against processing of raw materials or manufacturing), the current environmental and development crises will be hardly addressed. As *Our Common Future* (1987) captures

> "Sustainable development involves more than growth. It requires a change in the content of growth, to make it less material and energy intensive and more equitable in its impact." (p.52) and "The objective of SD and the integrated nature of the global environment/development challenges pose problems for institutions, national and international, that were established on the basis of narrow preoccupations and compartmentalised concerns…Yet most of institutions facing those challenges tend to be independent, fragmented, working to relatively narrow mandates with closed decision processes. Those responsible for managing natural resources and protecting the environment are institutionally separated from those responsible for managing the economy. The real world of interlocked economic and ecological systems will not change; the policies and institutions must" (p.9).

Frame 2: National Sovereignty

In hegemonic KS discourses the 'Competitive position' of every country, industry and institution is emphasised (1994:3) rather than the co-operative. Assumptions of wealth creation and distribution considered in conventional ways as in the case of GNP and GDP are at the core. The discourse on competition is reiterated with the argument that there will be "no poor countries, there will be only ignorant countries"…who will be given "no excuses for non performance" (1994: 10). This picture of cut throat competition, leaving those who get left behind to fend for themselves is far removed from the vision of social and economic equity that go along with the ecological integrity that sustainable development envisions. Whilst the dynamics of population growth and imperative for its stabilization are largely the concern of developing

countries and imperative for Sustainable development, policies that promote more equitable sharing of resources across the globe by allowing people to participate in processes of wealth creation are also crucial (*Our Common Future,* 1987, 55-57*).* Yet the salience of formulations such as Drucker's that emphasise national identities in the mainstream Higher Education-Knowledge Society discussions at the Policy level in Europe is dominant.

The United Nations and World Bank as key international policy actors, who influence regional policy in significant ways, deserve attention for their policy speak on the Knowledge Society. A narrow nation-bound and economistic purpose for 'knowledge' emerges in the World Bank report *Constructing Knowledge Societies: New Challenges for Tertiary Education*(2002). The report states "economic growth is as much a process of knowledge accumulation as of capital accumulation" (p.8). As capital in previous eras, knowledge too is now something to be 'accumulated' rather than be the basis of a shared prosperity. Knowledge that will help design a completely closed loop (completely recyclable parts) and zero waste emitting car for instance, can be immensely profitable and more promoting of well being if it is shared among car manufacturers rather than 'accumulated'. Such aspects as patents and licensing (which commoditise knowledge, and may create wealth but not necessarily shared, sustainable, social and ecological well being) are cited in relation to the economic 'good sense' and worth of knowledge (p.9). It goes on to suggest that a lower ratio of foreign to local patent applications are a indicator of the innovative knowledge work within a country (p.10). That the idea of patenting knowledge that could expand welfare could itself be very alien or even unacceptable to most of the non Western world finds no space within such framing.

The discourse on knowledge for development and how it relates to developing country contexts is also indicative of the strong realist/ nationalist frame within which the challenge of SD is expected to be addressed. Developing countries are told that they "need to increase their capacity to use knowledge". The aspects in relation to which this is said – productivity in agriculture (p.9, 11), health indicators like infant mortality, nutrition and sanitation, (p.13) and adaptation and mitigation of the adverse effects of climate change (p.13) are however areas languishing more from structural neglect and the lack of resources than from lack of any kind of specialist knowledge (which other parts of the world demonstrably have) that can help solve them.

The report assumes a tone of impending doom on the "growing digital gap among and within nations" citing the example of Korea and Japan to suggest that a difference between the high income and low income countries is the digital connectivity expressed in per capita terms (p.14). This is a rather peculiar conclusion to arrive at as the infrastructure and affordability of personalised technology and gadgets is the preserve of the better off societies in any case. Moreover, that these technologies in themselves mean anything for the quality/ superiority of the knowledge these societies generate is rather presumptuous, they are perhaps best understood (especially if, as the report cites, the concern is with individualised/ per capita figures) as a correlate of societies where people have their basic needs being so well met so as to afford the privilege to apply their minds to higher order intellectual work and info-entertainment. To the extent that computers enable people to 'use/adapt/produce/diffuse knowledge' (p.14) access (even if at the community level, just like a good library) and not so much ownership in per capita terms is what assumes relevance. Elsewhere, the report does indicate awareness of this option in the

manner in which it calls for greater efficiency, effectiveness and accessibility within tertiary education systems (p.15).

'Global labour markets' are one aspect in which the nationalist frame seems to be transcended, yet here also the narrative is of what the OECD countries are 'doing right' to attract and retain the best minds (p.17). These include scholarship schemes and research grants that bring students overseas and direct investment by governments in R&D, besides tax incentives that promote investment in R&D by the private sector. The English speaking countries, USA, UK and Australia are shown to have an advantage here, with a quarter of the science and engineering graduates in US schools reported cited to be drawn from other countries. This having been said on the 'positive side', the narrative turns towards the 'brain drain' and its 'debilitating effects' (p.17).This is only one way of looking at the phenomena, particularly in the context of Sustainable Development which strives to show that 'the earth is one, though the world is not one' (*Our Common Future*, 1987: 1).

Countries like India and in Africa are increasingly moving away from the post cold-war focus on 'brain drain', to 'brain export', with its virtuous cycle of brain gain for receiving countries, strengthening of those economies, and positive externalities for sending countries through remittances and technological and cultural exchange. Seen in this light, it is not a "long term risk for tertiary education investments in many nations" (p.18) at all. If the task before 'The Knowledge Society' in more in sync with 'The Sustainably Developing Society' a lot more openness to give and take in the light of demographic shifts, population v/s landmass concentration, tangible benefits

for both sides, and the interest of equity is imperative. Stronger North-South dialogue and partnerships to make this possible may be the way forward.

In a chapter devoted to the 'Contribution of Tertiary Education to Economic and Social Development' in the World Bank report *Constructing Knowledge Societies: New Challenges for Tertiary Education*(2002), professionals for "sound macroeconomic and public sector management", to support the *national* innovation systems and those imbued with norms, values and ethics to build social capital are spelt out as what Tertiary education will contribute (p.23). The discourse here is again strongly centred on the 'nation' and people as its assets, as against that of a world system. Statements such as "unfortunately, the logical of national innovation systems favours the stronger becoming stronger" are not followed up with any feasible or constructive suggestions to address the imbalance, rather such statements as "Countries that want to improve their innovation capacity *have to make* significant efforts to acquire and maintain the critical mass of appropriate infrastructure, institutions, and human resources that function in concert to allow benefits to accrue" follow (p.25, italics mine). This is easier said that done. The report sees the task being simplified by three things – the research in social science which shows 'some' policies and practices as boding well for the challenge (presumably the ones the augur well with the 'rise of market forces' as a later chapter elaborates over 30 pages), collaboration being a characteristic of the international science community that is already in place, and ICTs which have made this process easier. That being said, the recurrent frame of 'human capital formation' for 'nation building' remains very much in focus (pp.26-30).

At the level of policy discourse at the EU level (COM 2003, COM 2006) I see the influence of global actors with their focus on the 'national' as having been assimilated and transposed onto a 'regional' emphasis. The idea of a greater Europe effectively is a nationalist project on a regional scale. Internationalisation of education and research, is presented in with the added dimension of the language of 'competition' with the United States for the best brains from the rest of the world. The importance of the reorganisation of knowledge across disciplinary boundaries, blurring of the separation between applied and fundamental research, of deriving technologies, products and processes from knowledge; and the challenges all this faces it terms of traditional structures and systems finds careful consideration. A major gap is identified in relation to the ability of European researchers to form networks and teams across countries that would bring more talent to the task at hand.

Frame 3: Isolated pursuit of techno economic science

The World Bank report also tends, based on the narrow economic notion of valuing knowledge to treat 'knowledge work' as synonymous with Information and Communication Technology (ICT) related work. Bangalore in India is referred to as a case in point (p.8). The manner is which the relation between ICT and the Knowledge Society (not Economy) is theorised is a particularly challenging one. Yes, ICTs do make the dissemination of knowledge easier, and knowledge and innovation within the Software Industry can create jobs and generate wealth. However, such knowledge is only one very small part of the knowledge (and the way in which its implications or benefits can be organised and managed) that will meet the challenge of a better quality of life for people and the planet. *Constructing Knowledge Societies: New Challenges for Tertiary Education*(2002) thus subverts the notion of 'sustainability'

by tying it exclusively to the workings of an economy built around linear and largely compartmentalised ways of understanding the world, with both wasteful and harmful consequences for the earth. More of this reductionist discourse on what is valuable Knowledge is manifest in examples which relate agricultural productivity to investment in R&D of industrialised countries in contrast to the poor performance of others (p.9). The sustainability or other systemic consequences of this 'productivity' are excluded. Again the linearity of the thinking about development in terms of surplus from the primary sector feeding into industrial and economic growth, no matter what the long term social and ecological repercussions, even as the world faces unprecedented environmental and food security challenges is striking.

The report *Understanding Knowledge Societies: In twenty questions and answers with the Index of Knowledge Societies*(2005) prepared by the Division of Public Administration and Development Management of the Department of Economic and Social Affairs of the UN, offers a more critical perspective with regard to isolated pursuit of techno economic science . It makes a valuable case for how "Mass production of the knowledge 'to do', piling up technological innovations, and converting them into products and services in the framework of the Knowledge Economy managed by the currently existing market does not by itself ensure high levels of quality and safety of life for all people everywhere" (p. xii). It envisions instead a 'new direction in development' based on the creation and dispersion of knowledge "to maintain developmental equilibrium" (p.xii). Yet, at no point does it actually talk of what kind of knowledge will help create this developmental equilibrium.

Other themes: Promise amidst continuing confusion

In a section on 'New Modes of Organisation and Operation' (p.35) of the World Bank report, a subsection on 'Organisation and Management' makes a paragraph-long case for interdisciplinary and multidisciplinary programmes citing as 'significant new areas', advanced material science and environmental science, among other things (p.37). Referring to the work of Gibbons and 'new patterns of knowledge creation', it however, at the same time suggests confusion and a lack of clarity when it states "…students become less involved in the production of new knowledge and more involved in contribution to the circulation knowledge across traditional disciplinary boundaries" (ibid). Production of knowledge is very much at the heart of what Gibbons is arguing for and what SD requires.

The 'Index of Knowledge Societies' proposed by the report *Understanding Knowledge Societies: In twenty questions and answers with the Index of Knowledge Societies*(2005) perhaps in keeping with the trend of composite indices established by the Human Development Index, also undertakes to be one. The three dimensions of 'assets', 'advancement' and 'foresightedness' are further composed of four or five indicators themselves. A glance at the composition:

Table 3.1: Dimensions of the Index of Knowledge Societies

Assets	Advancement	Foresightedness
The repositories of knowledge and how the flow of knowledge will be facilitated	Degree to which nurturing and advance of human resources takes place	Degree to which growth and development of KS is facilitated by minimising negative externalities
Years of schooling	R&D Expenditure	Child mortality
Young population (<15)	Govt Health Expenditure	GINI Index
Newspapers	(low) military expenditure	Protected Areas
Internet users	Pupil/teacher ratio (pri.ed)	CO2 emissions
Phones and cell phones	Freedom from corruption	

Source: *Understanding Knowledge Societies: In twenty questions and answers with the Index of Knowledge Societies* (2005) p. 152

Among the 'assets' the last three point to the stance that the report takes regarding "the limitless development of people and limitless development of information" (executive summary, p. xiv) – as against social transformation emanating from the thought of a few path breaking individuals, and the lay person only concerned with how it affects his/her life than its intricacies. The emphasis on the years of schooling is unmindful of the black box of what goes in schools and whether without this consideration, it can be automatically recommended for inclusion in such an index. As regards the dimensions of advancement and foresightedness, while there is much in them that promotes human well being and reduces suffering, the implication that they make arriving at the 'knowledge society' easier, remains at best very indirect.

I think it is pertinent to ask why 'advancement' could not take into account concrete instances of the application of knowledge that facilitated leapfrogging into a better quality of life within that society instead. An exercise of then trying to identify the key factors that make such advancement possible (including perhaps interdisciplinarity/ multidisciplinarity as fostered by the educational establishment?) would then offer constructive pointers to policy actors at various levels. Surely the valuable learning for aspiring KS's is how the all important driving knowledge can be facilitated and supported. But what we are presented is instead an index of the Knowledge Society that neither defines the characteristics of this Knowledge nor measures actual Knowledge of any description in any substantive manner.

To sum up, this chapter attempted to demonstrate that the dominant KS discourse is not even connected to a concept of knowledge in any substantive way. The jargon of sustainable development is misappropriated, but the breaking of the barriers between the separate domains of science, engineering and economics in the interest of a circular economy finds mention nowhere Conspicuous in its absence is the understanding the conventional 'development' is as detrimental to SD as underdevelopment. Chapters 2 and 3 taken together show that the HE-KS-SD discourse needs to centre around robust economic growth within a circular economy, with regionalism making way for World System thinking and isolated pursuit of techno economic science not being conflated with what 'knowledge' means in the KS.

Conclusions and Policy Recommendations

This thesis, based on an examination of the concepts of Sustainable Development and the Knowledge Society argued that Sustainable Development is a counter hegemonic Knowledge Society discourse. Hegemonic Knowledge Society discourse, by being centred on national sovereignty, economic gain and isolated practice of techno-economic science ignores issues related to the characteristics and structures of knowledge that will further Sustainable Development. This has a spill over effect on Higher Education Policy and Practice where the greater multidisciplinarity and interdisciplinarity informed by a paradigm shift in favour of systems thinking continues to receive inadequate attention and policy support.

In the light of the forgone discussion, the policy recommendations for a stronger HE-KS-SD likage are four fold, Two of these relate to Higher education as it is structured and institutionalised. The other two are about consciously moving away from the limiting frames within which the current KS discourse is framed to strengthen the global, social and economic pillars of SD.

1. Redesign curricula and syllabi at the university level so that students have the intellectual overview rooted in multidisciplinarity and interdisciplinarity of their discipline (Kline, 1995). A concrete suggestion of 10% of the course work being such was made at the UN international conference on HESD in 1998.
2. Develop strong international benchmarks in and standards through dedicated "SD and manufacturing'' research institutions to ensure that such multidisciplinarity and interdisciplinarity does indeed feed into meaningful redesign of conventional production processes.

3. More meaningfully involve young people from all over the world in higher education and research opportunities meant to further the goal of SD. Their involvement should be seen not merely as 'internationalising' HE for the host country to levy fees at foreign student rates, but as a step toward more equitable and participatory development that brings together the best minds irrespective of ethnicity or nationality.
4. Engage businesses including transnational corporations and governments with the seriousness that they engage in a sector like Defence to invest in such research for SD.

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http://www.dfes.gov.uk/londonbologna/uploads/documents/LondonCommuniquefinalwithLondonlogo.pdf

http://www.desd.org/

http://www.worldwatch.org/

http://portal.unesco.org/education/en/ev.php-URL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html

http://www.gdrc.org/sustdev/un-desd/intro_un-desd.html

http://www.ace.mmu.ac.uk/eae/Sustainability/Older/Brundtland_Report.html

http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview/

http://www.decennie-france.fr/pdf/bilan-en.pdf

http://www.product-life.org/en/cradle-to-cradle