1.0 INTRODUCTION

In almost all of the thirty reports it has published since “The Limits of Growth (1972)”, the authors (Club of Rome) do not only describe and analyse the complex problems facing the world (world problematic), they are essentially keen to offer protections which point to constructive paths into the future (world resolution). Hence, there can be no doubt that ‘globalization’ has become one of the trendiest words in fashion as our millennium comes to an end. It is pertinent to note that this phrase does not reflect an inevitable natural phenomenon but, rather, is indicative of a process which has to be structured on any number of differing levels. Thus, our main concerns will be to deal with on the global level, two long-term goals of equal importance: Environmental sustainability and Socio-economic equality. These goals often stand in contradiction to each other but strategically seen, they are nevertheless interdependent. A partial or total arenunciation of any one of these goals would endanger achieving any of the others.

Globalization, then, is a process which has to be structured quickly and in a positive way. If this is to be systematically achieved, the population of the world will have to assume a high degree of responsibility for a common future. Humanity’s future will only be secured if our intercourse with nature becomes more respectful, sparing, and sustainable. This will require not only all of our efforts to make use of technical advances to increase efficiency, but will also demand that we develop new sustainable life-styles which, at least, in part will require some material renunciation. It is against this background that the rest of this paper is divided into five sections. Section two looks at the concept of globalization. The inequality and unsustainability problems are respectively the focus of sections three and four. The digitalization process as a global solution is presented in section five while section six concludes the paper.

2.0 GLOBALIZATION

Indeed, globalization is not new, but the present era has distinctive features. Shrinking space, shrinking time and disappearing borders are linking people’s lives more intensely, more immediately than ever before. That is, people everywhere are becoming connected – affected by events in far corners of the world. Here, we have new markets (Foreign Exchange and Capital Markets linked globally, operating 24 hours a day, with dealings at a distance in real time); new tools (Internet links, Cellular phones, Media networks); and new actors (the world trade organization with authority over national governments, the multinational corporations with more economic power than many states, the global networks of non-governmental organizations and other groups that transcend national boundaries); and new rules (multilateral agreements on trade, services and intellectual property, backed by strong enforcement mechanisms and more binding for national governments, reducing the scope for national policy). The challenge of globalization in the new century is not to stop the expansion of global markets but to find the rules and institutions for stronger governance–local, national, regional and global–to preserve the advantages of global markets and competitions; and also to provide enough space for human, community and environmental resources to ensure that globalization works for people (UNDP, 1999).

In this sense, globalization is shaping a new era of interaction among nations, economies and people. It is increasing the contacts between people across national boundaries – in economy, in technology, in culture and in governance. But it is also fragmenting production processes, labour markets, political entities and societies. So, while globalization has positive, innovative, dynamic aspects - it also has negative, disruptive, marginalizing aspects. Today's interactions between nations and people are deeper than ever as shown by global trends and links in table 2.1 (See the appendix for variables description). During this global integration are policy shifts to promote economic efficiency through the liberalization and deregulation of national markets and the retreat of the state from many economic activities, including the restructuring of the welfare state. Driving integration even faster are the recent innovations in information and communications technology. But global integration is still

	MERCHANDISE EXPORTS MILLIONS OF DOLLARS		EXPORT OF COMMERCIAL SERVICES MILLIONS OF DOLLARS		MERCHANDISE IMPORTS MILLIONS OF DOLLARS	
	1983	1998	1983	1991	1983	1998
WORLD	1,757,216	5,414,844	356,892	1,326,312	1,755,569	5,358,567
LOW INCOME	88,785	334,896	10,869	51,538	102,719	295,254
EXCL. CHINA &INDIA	-	-	5,457	18,068	-	-
MIDDLE INCOME	410,520	953,662	57,320	230,847	381,036	1,018,458
LOWER MIDDLE INCOME	-	239,691	27,570	101,056	205,214	370,345
UPPER MIDDLE INCOME	225,563	622,99	30,088	130,233	184,578	647,211
LOW & MIDDLE INCOME	493,984	1,288,084	68,072	282,785	482,412	1,313,145
EAST ASIA &PACIFIC	97,271	537,234	12,292	105,518	101,854	411,054
EUROPE & CENTRAL ASIA		249,450	-	77,726	-	309,720
LATIN AMERICA & CARIB	99,355	270,876	14,268	44,471	74,429	337,406
MID EAST & N. AFRICA	118,705	103,782	14,926	30,412	123,259	113,156
SOUTH ASIA	14,868	50,743	4,457	12,396	25,032	67,304
SUB-SAHARAN AFRICA	49,231	84,706	6,603	13,026	51,878	86,534
HIGH INCOME	1,274,830	4,124,433	288,345	1,043,005	1,278,838	4,040,845

TABLE 2.1 GLOBAL TRADE LINKS SOURCE: WORLD BANK DEVELOPMENT REPORTS

	IMPORTS OF COMMERCIAL SERVICES MILLIONS OF DOLLARS	NET PRIVATE CAPITAL FLOWS MILLIONS OF DOLLARS	FOREIGN DIRECT INVESTMENT MILLIONS OF DOLLARS

	1983	1997	1990	1997	1990	1997
WORLD	377,843	1,307,618	-	-	129,662	400,394
LOW INCOME	21,228	85,092	14,819	88,685	5,732	59,509
EXCL. CHINA & INDIA	17,369	44,337	4,840	19,551	2,083	11,922
MIDDLE INCOME	87,836	247,297	28,091	210,049	18,697	103,780
LOWER MIDDLE INCOME	35,868	103,897	-	-	-	-
UPPER MIDDLE INCOME	51,234	143,661	-	-	-	-
LOW & MIDDLE INCOME	108,707	332,063	42,910	298,73	24,429	163,295
EAST ASIA & PACIFIC	17,773	128,602	18,720	104,257	11,135	64,284
EUROPE & CENTRAL ASIA	-	59,655	7,695	49,875	1,097	22,314
LATIN AMERICA & CARIB.	21,329	63,390	12,411	118,91	8,188	16,573
MID. EAST & N. AFRICA	38,488	36,039	622	7,899	2,711	5,240
SOUTH ASIA	5,329	17,494	2,174	11,110	464	4,662
SUB-SAHARAN AFRICA	14,347	25,133	1,288	6,674	834	5,222
HIGH INCOME	271,116	977,279	-	-	168,233	237,099

TABLE 2.1 (CONTD)

very partial since the flow of labor is restricted, with borders closed to the unskilled. However, the world today has more opportunities for people than hundred years ago. Child death rates have fallen by half and a child born today can expect to live a decade longer than a child born then. In developing countries, the combined primary and secondary enrolment ratio has more than doubled - and the proportion of children in primary school has risen and form less than half to more than three-quarters. Also, adult literacy rates have risen and more states are now independent with more than seventy percent of the world's people living under fairly pluralist democratic regimes. But these trends make great unevenness in the advances and in the new setbacks. Despite the tremendous progress in the 20th century, the world today faces huge backlogs of deprivation and inequality that leave huge disparities within counties and regions.

Global governance therefore is the framework of rules, institutions and practices that set limits on the behaviour of individuals, organizations and companies; and hence the intergovernmental policy - making in today's global economy is in the hands of the major industrial powers and international institutions they control (The world Bank, International Monetary fund, and the Bank for international settlements).

Their rule-making may create a secure environment for open markets, but there are no countervailing rules to protect human rights and promote human development. More so, ad-hoc and self-selected policy groups have emerged in the past decade to make de facto global economic policy, outside the United Nations or any other format system with democratic processes and participation. Some of these groupings includes G-7, G-22, G-15, and G-10. All these groups play a key part in international economic policy-making, yet only the G-22 has any consultation with developing countries, and then only with a select few. And yet, one big development in opening opportunities for people to participate in global governance has been the growing strength and influence of NGOs. They have been effective advocates for human development, maintaining pressure on national governments, international agencies and corporations to live up to commitments.

3.0 INEQUALITIES (INSECURITIES)

Indeed, globalization has its winners and its losers. With the expansion of trade and foreign investment, developing countries have seen the gaps among themselves widen. Meanwhile, in many industrial countries, unemployment has soared to levels not seen since 1930s, and income inequality to levels not recorded since the last century. This picture is clearer by looking at the parameters of global inequalities/insecurities in Table 3.1 (see appendix for variable description). In-fact, uneven globalization will bring not only integration but also fragmentation – dividing communities, nations and regions into those that are integrated and those that are excluded. Again, Social tensions and conflicts are ignited when there are extremes of inequality between the marginal and the powerful. Research on complex humanitarian emergencies have revealed that "horizontal inequalities" between groups - whether ethnic, religions or social groups are the major cause of the current wave of civil conflicts. Inequalities (insecurities) matter not only in incomes but in political participation (in parliaments, cabinet, armies and local governments), in economic assets (inland, human capital and communal resources), in social conditions (in education, housing and employment). Again in most countries, dislocations from economic and corporate restructuring and dismantled social protection have meant heavy job losses

		REAL GDP PER CAPITA (PPP$) 1997	HUMAN DEVELOP0MENT INDEX (HDI) VALUE 1997	GENDER-RELATED DEVELOPMENT INDEX (GDI) 1997	HUMAN POVERTY INDEX HPI (%) 1997	GNP PER CAPITA (US $) 1997

1.	ALL DEVELOPING COUNTRIES	3.240	0.637	0.630	27.7	1,314
2.	LEAST DEVELOPED COUNTRIES	992	0.430	0.415	44.9	260
3.	SUB-SAHARAN AFRICA	1,534	0.463	0.454	40.6	522
4.	ARAB STATE	4,094	0.626	0.609	32.4	1,754
5.	EAST ASIA	3,601	0.712	0.709	19.0	1,330
6.	EAST ASIA (EXCLUDING CHINA)	14,300	0.849	0.843	-	11,811
7.	SOUTH EAST ASIA AND THE PACIFIC	3,697	0.695	0.692	25.0	1,556
8.	SOUTH ASIA	1,803	0.544	0.525	36.6	452
9.	SOUTH ASIA (EXCLUDING INDIA)	2,147	0.542	0.524	38.6	670
10.	LATIN AMERICA AND THE CARIBBEAN	6,868	0.756	0.749	14.5	3,953
	EASTERN EUROPE AND THE CIS	4,243	0.754	0.752	-	2,249
	INDUSTRIALIZED COUNTRIES	23,741	0.919	0.915	13.5	27,174
	WORLD	6,332	0.706	0.700	-	5,257

TABLE 3.1 PARAMETERS OF GLOBAL INEQUALITY (INSECURITY) **SOURCE:** UNITED NATIONS HUMAN DEVELOPMENT REPORTS

Cont. from page 8 at the end of the last column

TOTAL ODA US $ MILLIONS		ODA AS % OF GNP		EXTERNAL DEBT (US $ MILLIONS)		EXTERNAL DEBT AS % OF GNP	
1991	1997	1991	1997	1985	1997	1985	1997
47,918	34,469	1.9	0.9	915,690.6	2,001,755.0	39.9	36.0
15,136	13,041	13.4	11.1	71,411.0	134,713.2	62.4	92.3
15,658	13,726	123	6.7	95,328.2	198,224.2	74.0	66.3
10,360	4,807	4.0	-	138,570.0	201,196.9	41.6	45.7
2,160	2,136	0.3	0.1	71,281.3	290,787.4	18.0	22.0
161	96	-	-	54,585.3	144,090.4	59.9	32.9
5,189	4,152	1.4	0.5	107,596.7	356,228.2	56.2	61.3
7,642	4,335	1.9	0.7	68,024.1	161,295.8	15.8	25.7
4,897	2,657	5.2	1.9	27,073.4	66,891.6	12.8	26.8
5,246	5,265	0.5	0.5	408,877.7	702,817.1	58.3	33.9
5,697	4,272	0.4	0.4	-	284,564.4	-	30.5
-	-	-	-	-	-	-	
-	-	-	-	-	-	-	

Cont. from the last column of page 9

DEBT SERVICE RATIO % OF EXPORTS		DEPENDENCY RATIO (%)		FEMALE ECONOMIC ACTIVITY RATE			REFUGEES		SUICIDES 100,000		PRISON 100,000 PER	GENDER EMPOWERMENT MEASURE
				% RATE	1985 =100	%OF MALE RATE	BY COUNTRY OF ASYLUM (000)	BY COUNTRY OF ORIGIN (000)	MALE	FEMALE	1994	
1985	1997	1997	2015	1997	1997	1997	1997	1997	1990-95	1990-95		
28.7	18.4	62.5	50.7	39.3	111.3	68.0	7,669.6	-	-	-	238.8	0.3798
20.5	12.4	84.8	70.8	41.1	99.7	76.5	2,749.1	2,704.5	-	-	204.4	0.2814
25.2	13.7	91.4	77.6	37.8	97.7	73.9	2,770.0	2,005.4	-	-	-	-
-	-	74.3	57.4	19.2	123.7	38.6	763.3		-	-	-	-
18.5	8.6	47.5	40.6	55.1	114.2	86.6	292.7	119.8	-	-	-	-
27.8	8.6	41.2	41.1	41.2	126.1	69.7		-	-	-	-	-
30.5	14.7	60.0	45.8	41.7	118.6	74.1	-	-	-	-	-	-
15.8	19.9	68.1	49.8	29.1	99.4	51.7	3,559.2		-	-	-	-
10.9	20.5	76.5	55.8	29.5	114.2	55.9	3,336.1	300.6	-	-	-	-
38.1	35.6	61.5	50.2	28.8	140.0	51.3	83.2	-	-	-	-	-
-	9.8	51.2	44.7	45.6	97.3	82.4	835.0	1,069.4	51.9	10.5	225.7	0.5767
-	-	49.7	52.7	41.9	119.4	72.6	2,753.3		19.5	5.7	233.4	0.4513
-	-	59.6	50.6	40.2	111.3	69.8	11,975.5					

(THE END OF) **TABLE 3.1** PARAMETERS OF GLOBAL INEQUALITY (INSECURITY) SOURCE**:** UNITED NATIONS HUMAN DEVELOPMENT REPORTS

and worsening employment conditions. Jobs and incomes have become more precarious. Again, the pressures of global competition have led countries and employers to adopt more flexible labour policies, and work arrangements with no long-term commitment between employer and employee are on the rise.

Indeed, globalization opens many opportunities for crime, and is rapidly becoming global out-pacing international cooperation to fight it. Today, there are many drug users, threatening neighbourhoods around the world. Illegal trafficking in weapons is a growing business - destabilizing societies and governments, arming conflicts in some continents. Another thriving industry is the illegal trafficking in women and girls for sexual exploitation, a form of slavery and an inconceivable violation of human rights. Here women lose not only their freedom, but their dignity and often their health if they return to their homes, they are often rejected by their families and communities. At the heart of all, this is the growing power and influence of organized crime syndicates. The sheer concentration of their power and money criminalizes business, politics and government. All have operations extending beyond national borders, and they are now developing strategic alliances linked in a global network, reaping the benefits of globalization. Again, Civil Conflicts have been flaring for decades. But what's new today is the complex interaction of interests, the blurred line between conflicts and business. Defence is becoming privatized, and international private military firms are proliferating. Accountable only to those who pay, such businesses are hard to regulate and so far domestic and international laws seeking to limit mercenary operations have been ineffective.

4.0 UNSUSTAINABILITY

At the end of the 20th Century, environmental problems are a matter of both national and global concerns. Many of them create spillovers that impose heavy costs not only on those close to the source of the problem but on society as a whole and on future generations. Individual countries have strong economic and social reasons for aggressively protecting their environments by creating incentives to reduce and manage such spillovers. Yet, an important subset of environmental problems is global in scope. Many counties have contributed to these problems, and no individual country can effectively address them by acting alone. These are the problems of the "global commons", which will place all countries at risk if no collective action is taken. There are many such issues, including desertification, persistent organic pollutants, the fate of Antarctica, and the environmental health of the high seas and the seabed.

However, **biodiversity destruction and climate change** are two pressing problems in the global environmental agenda. Table 4.1 (Global environmental problem) reports the current state of these problems (with variable description in the appendix).

TABLE 4.1 GLOBAL ENVIRONMENTAL PROBLEMS
SOURCE: WORLD BANK DEVELOPMENT REPORTS

	ANNUAL DEFORESTATION 1990-1995		NATIONAL PROTECTED AREAS (1996		CARBONDIOXIDE EMISSIONS				CO_2 EMISSIONS		SO_2 EMISSIONS PER CAPITA (Kilograms)	GDP PER UNIT OF ENERGY USED	
					MILLION METRIC TONS		PER CAPITA METRIC TON		% FROM FOSSIL FUEL	SHARE OF THE WORLD TOTAL (%)			
	SQUARE KILOMETERS	AVE. ANN. % CHANGE	THOUSAND SQUARES KM	% OF TOTAL LAND AREA	1980	1996	1980	1996	1996	1996	1995	1980	1996
WORLD	101,724	0.3	8,542.7	6.6	13,640.7	22.653.9	3.4	4.0	62	93.8	41.78	3.1	3.2
LOW INCOME	49,332	0.7	2,439.4	5.9	2,126.1	5,051.8	0.9	1.5	72	0.4	-	-	-
EXCL. CHINA & INDIA	-	-	-	-	302.0	690.9	0.4	0.6	-	-	-	-	0.8
MIDDLE INCOME	64,086	0.3	2,809.9	4.8	2,804.5	6,871.5	3.3	4.8	69	36.0	41.25	2.4	1.7
LOWER MIDDLE INCOME	21,162	0.2	1,563.6	4.3	1,150.1	4,194.9	2.6	4.8	72	-	-	1.7	1.0
UPPER MIDDLE INCOME	42,924	0.5	1,246.3	5.7	1,654.4	2,676.6	4.0	4.7	61	-	-	2.8	2.6
LOW & MIDDLE INCOME	113,418	0.4	5,249.3	5.3	4,930.6	11,923.3	1.5	2.5	69	36.4	41.25	1.4	1.3
EAST ASIA & PACIFIC	29,956	0.8	1,102.2	6.9	1,958.5	4,717.5	1.4	2.7	81	-	-	-	-
EUROPE & CENTRAL ASIA	-5,798	-0.1	768.0	3.2	886.9	3,412.7	-	7.4	68	-	-	-	0.8
LATIN AMERICAN % CARABEANS	57,766	0.6	1,456.3	7.3	848.5	1,209.1	2.4	2.5	32	-	-	3.5	3.2
MID. EAST & N. AFRICA	800	0.9	242.0	2.2	493.6	986.9	3.0	3.9	93	-	-	2.2	1.6
SOUTH ASIA	1,316	0.2	213.0	4.5	392.4	1,125.1	0.4	0.9	79	-	-	0.7	0.9
SUB-SAHARA AFRICA	29,378	0.7	1,467.8	6.2	350.7	472.1	0.9	0.8	79	-	-	-	-
HIGH INCOME	-11,694	-0.2	3,2934	10.8	8,710.2	10.730.6	12.3	12.3	58	43.8	42.31	4.1	5.0

Indeed, **economic activity** is the driving force of climate change and biodiversity destruction. Both originate in current pattern of consumption and resource use. As shown in the Table 4.1, the economic activity of industrial nations which house less than 20 per cent of the world population originates greater percent of global emissions of carbon-dioxide that could potentially change the global climate. The destruction of forest ecosystems that accompanies industrialization is believed to be the main source of global biodiversity loss. Thus, fossil fuels and forest destruction are at the root of the global environmental problems. Industrial society depends on fossil fuels, and industrialization has led to most of the destruction of the world's forests in contemporary society. From this perspective, without changing industrial countries' patterns of consumption, and resource use, there would be no solution to the world's **global environmental problems.**

Yet, the contribution of developing countries is more ambiguous and complex. Many developing countries are embarked on, and aspire to their own process of industrialization. If, however, they were to replicate the pattern of resource use of industrial countries, fifty years from now they could become the major source of global environmental damage: this could spell disaster. Again, the developing countries are the source of most exports of natural resources used in the world. Here, industrial countries extensive use of resources are associated with **resource – intensive patterns of economic growth in** may developing countries, patterns that have prevailed since the end of colonial rule fifty years ago. The situation has been summarized as the developing countries over-exploitation of resources which are exported and over-consumed in the industrial countries.

As evidence about the potential seriousness of the effects of climate change has mounted, attention has focused on the likely costs of different policies to slow or halt the change. Numerous studies have investigated the possibilities of reducing the emissions of green house gasses, the cause of global warming, with most attention being focused on CO_2, the most important greenhouse gas and various economic models have been developed to examine the likely cost of reducing such emissions (See Nwaobi, 1997). These models have mostly concentrated on man-made emissions of CO_2, which arise almost entirely from the burning of fossil fuels, so that energy–sector detail has been of importance. There have already been several surveys of these model results (Howeller et al., 1991; Boero et al., 1991 and Cline, 1992). But each of these surveys has been confronted with the problem of trying to compare like with like, the model results generally being for a variety of different time periods, key baseline assumptions, reduction scenarios and so on. Even with a standardization of assumptions on growth, population and resources, the ball emission paths vary greatly across the models. This is already a point of concern since the costs of achieving any target level for emissions such as the stabilization at 1990 levels, depend critically on the nature of the baseline (what "distance" does one need to cut). In such "target" cases, it is not only the absolute tons of carbons that will vary across models but also the proportionate cut. The CO_2, emission paths in the ball scenario are shown in Table 4.2

BILLION TONS OF CARBON

	CRTM	ERM (1)	ERM (2)	GREEN (1)	GREEN (2)	IEA**	MR (1)	MR (2)	WW
1990	6.003	5.767	5.767	5.815	5.815	5.919	6.003	6.003	(Average of 1990 to 2100 is 25.2
2000	6.931	-	-	7.071	7.418	7.316	6.970	6.748	
2005	-	6.709	7.856	7.704	8.250	7.932	-	-	
2010	8.031	-	-	8.705	9.452	-	8,153	7.581	
2020	9.327	8.180	10.505	10.806	11.938	-	9.520	8.681	
2050	11.337	11.838	17.606	18.998	21.769	-	14.992	11.356	
2080	23.519	18.099	32.185	-	-	-	26.945	18.701	
2100	35.863	22.578*	41.594*	-	-	-	39.636	26.039	65.5

TABLE 4.2: WORLDWIDE BUSINESS AS USUAL (BAU) CO2 EMISSION

* 2095

** The IEA model projections in this table have been adjusted to exclude non-fossil solid fuels, bunkers, non-energy use of fossil fuels and petrochemical feed stocks. These categories included in the standard IEA model output have not been excluded from the tables in the appendix or from the result reported in the IEA paper and add around 900 million tons to the 1990 global figures of carbon emissions.

*** In the three cases (ERM, MR, GREEN) where two emission paths are indicated, the first column denotes the standard model and the second column shows the sensitivity to a different assumption on the autonomous energy efficiency improvement (AEEI). ERM (I), GREEN (1) and MR (2) have an AEEI of 1 per cent per annum while ERM (2), GREEN (2) and MR (1) have an AEEI of ½ percent per annum.

**** CRTM is the carbon Rights Trade Model (See Rutherford, 1992); ERM is the Edmonds–Reilly Model (See Barns et al, 1992); GREEN is the OECD Model (See Oliveira Matins et al, 1992); IEA is the International Energy Agency Model (See Vouyoukas, 1992); MR is the Mane-Richels Global 2100 Model (See Mane, 1992) and WW is the Whalley-Wigle Model (See Whalley and Wigle, 1992)

Here, there are some differences in the starting point for energy–related CO_2 emissions in 1990, ranging from 5.8 billion tons of carbon (GREEN WW ERM) to 6.0 billion tons (CRTM and MR). This initial difference of 3 percent is not trivial, but it is also not surprising given that 1990 data are estimates based on data on energy consumption in earlier years and the application of "carbon emission coefficients" for different categories of fuel. In fact, the difference in 1990 level of emissions look relatively small when compared with the divergences in CO_2 emissions that open up, even in the short-term (for the world).

In table 4.2, world emissions grow rather more rapidly over the short to medium – term in GREEN and IEA than in the other models. ERM shows the slowest emission growth. Up to 2020, emissions in GREEN are growing by up to ½ per cent per annum faster than in ERM, despite the assumption of the same autonomous energy efficiency improvement of 1 per cent per annum. Hence a gap of over 1½ billion tons of carbon opens up by 2020 between the top and bottom of the range of models, the 10.8 billion tons or GREEN and the 8.2 billion tons of ERM. But looking beyond 2020, where it is possible to make direct comparisons of time paths for only CRTM, ERM, MR and GREEN (up to 2050), the divergent emissions parts for only CRTM, ERM, MR and GREEN (up to 2050), the divergent emission part for the earlier period open up much further. Of course, what may look to be relatively small differences in annual growth rates of CO_2 emissions compound over a century into significant differences in terms of levels. The average growth rate of emissions over the whole of the period 1990-2100 is 1.3 per cent in ERM, 1.6 per cent in CRTM and 1.7 per cent in MR. But the spread between the lowest and highest emissions in 2100-22 ½ billion tons of carbon in ERM and 39 ½ billion tons in MR is quite startling. WW have a point estimate for 2100 of 65 ½ billion tons but this seems to reflect both an extremely pessimistic assessment of energy efficiency improvements and the lack of substitution possibilities imposed by the two fuel structure of the model. Thus, the importance of the autonomous energy efficiency parameter (AEEI) in contributing to the large differences in emissions has been revealed by some sensitivity testing. In an alternative BAU scenario, using ERM but reducing AEEI from 1 percent per annum to ½ percent in all regions, world emissions rise from the previous 22 ½ billion tons to around 42 billion tons by the end of the next century, much in line with the MR results. A similar exercise with MR, this time increasing its AEEI to 1 per cent per annum in all regions, leads to emissions in 2100 of 26 billion tons, much closer to the standard ERM result of 22 ½ billion tons. On the other hand, imposing a lower AEEI of ½ per cent in GREEN takes the 2050 emission to a higher level (21.8 billion tons compared with 19 billion tons using the standard model with a 1 percent AEEI)

It is therefore very evident that the world faces a major challenge: to find practical paths for sustainable development. This means finding ways to reorient consumption patterns and use of natural resources in ways that improve the equality of human life, while living within the carrying capacity of supporting ecosystems. It requires building economic systems where basic needs are satisfied across the world, while protecting resources and ecosystems so as not to deprive the people of the future from satisfying their needs. It also requires **building a future in which humans live in harmony with nature and** we are far from this goal. Indeed, in many ways, the world economy is moving in the opposite direction and the task is daunting.

5.0 DIGITALIZATION

Digital technology describes not only the digitalization of communication but an entire plethora of new processes and instruments. A decisive role in all this was played by the **microelectronic** revolution at the beginning of the 1980s, as well as modern satellite technology and **fibre optic cables.** All of these things have produced a wide range of new products: mobile telephones, e-books, pagers, players, notebooks, recorders, and so on. These discoveries are consequently leading to what might be called the **knowledge revolution.** Here, an important input is knowledge rather than information. This is basically the difference between the computer industry, which is based on Information Technology, and other sectors such as telecommunication, biotechnology and nano technology, which involve knowledge. In other words, knowledge is the content while information is the medium. Thus, the content is driving change, facilitated by the medium.

A distinct possibility therefore, is that in the mid 21st Century, a new society will develop, a society that is centered in human creativity and diversity, and which uses **information technology rather than fossil fuels to power economic growth.** This vision is a human-centred society which is deeply **innovative in terms of** knowledge and at the same time very conservative in the use of natural resources. The patterns of consumption and resources use may not be as voracious as those in the industrial society and may be better distributed across each society and across the globe. This knowledge society may achieve economic progress that is harmonious with the nature. This vision is distant and only a possibility at present. Without developing the right institutions and incentives, this possibility may never come to pass, and a historical opportunity may be lost. Table 5.1 shows the current structure of information and communication technologies in the world (with the variable descriptions in the appendix).

	DAILY NEWS-PAPERS (,000) 1996	RADIOS (,000) 1996	T.V. SETS (,000) 1997	TEL. MAIN LINES (,000) 1997	MOBILE TEL. (, 000) 1997	PERSONAL COMPUTERS (‘000) 1997	INTERNET HOSTS (‘000) JAN. 1999	ELECTRIC POWER CONSUMPTION PER CAPITA (K/W) 1908	1996	ELECTRIC POWER TRANSMISSION AND DISTRIBUTION LOSSES 1980	% OF OUTPUT 1996
WORLD	-	380	280	144	40	58.4	75.22	1,576	2,027	8	8
LOW INCOME	-	147	162	32	5	4.4	0.17	188	433	12	12
EXCL CHINA & INDIA	13	133	59	16	1	-	0.23	155	218	14	19
MIDDLE INCOME	75	383	272	136	24	32.4	10.15	1,585	1,092	9	12
LOWER MIDDLE INCOME	63	327	247	108	11	12.2	4.91	1,835	1,771	8	11
UPPER MIDDLE INCOME	95	469	302	179	43	45.5	19.01	1,188	2,106	10	13
LOW & MIDDLE INCOME	-	218	194	65	11	12.3	3.08	633	886	9	12
EAST ASIA & PACIFIC	-	206	237	60	15	11.3	1.66	260	724	8	9
EUROPE & CENTRAL ASIA	99	412	380	189	13	17.7	13.00	2,925	2,795	8	11
LATIN AMERICA & CARIB.	71	414	263	110	26	31.6	9.64	854	1,347	12	16
MID. EAST & N. AFRICA	33	265	140	71	6	9.8	0.25	483	1,162	10	9
SOUTH ASIA	-	99	69	18	1	2.1	0.14	116	313	19	19
SUB-SAHARAN AFRICA	12	172	44	16	4	7.2	2.39	444	439	9	10
HIGH INCOME	286	1300	664	552	188	269.4	470.12	5,783	8,121	8	6

TABLE 5.1 WORLD STRUCTURE OF INFORMATION AND COMMUNICATION TECHNOLOGIES
SOURCE: WORLD DEVELOPMENT REPORTS

To produce new knowledge, economic incentives are necessary. This could involve restricting the use of the knowledge by others, so the creator can benefit. Patents on new discoveries work in this fashion: by restricting the use of knowledge and this creates a problem. Any restriction in the sharing of knowledge is inefficient, because knowledge could be shared at no cost and by doing so, it can better others. So, restrictions on the use of knowledge are inefficient after knowledge is created. However, without some restrictions there may be no incentive to create new knowledge and this could be called the paradox of knowledge. Here, the solution to the paradox could be a new system of property rights that can deal simultaneously with the need to share the use of knowledge for efficiency, while at the same time preserving private incentives for production. These systems ensure and encourage widespread use of knowledge, while at the same time offering incentives to private individuals, the knowledge creators to produce new knowledge. Specially, we propose substituting patents by a system of compulsory negotiable licences which are traded in the market competitive along with all other goods in the economy. In this new scheme, the right to knowledge is unrestricted; however, users must pay the creator each time they use their knowledge. Since the license are traded in competitive markets, they ensure that the creators of knowledge are compensated for their labour in a way that reflects the demand for their products and therefore their usefulness for society.

In this sense, It is pertinent to note that the newest technologies (computers, genetic engineering and nanotech) differ from the technology that preceded them in a fundamental way. They are self-accelerating; that is the products of their own processes enable them to develop evermore rapidly. New computer chips are immediately put to use developing the nest generation of more powerful ones; which is the inexorable acceleration expressed as Moor's law. The same dynamic drives biotech and nanotech – even more so because all these technologies tend to accelerate one another. Most recently, computers are rapidly mapping the DNA in human genome and now DNA is being explored as a medium for computation. When nanobots are finally perfected, you can be sure that one of the first things they will do is make new and better nanobots. Technologies with this property of perpetual self-accelerated development (autocatalysis) create conditions that are unstable, unpredictable and unreliable. And since these particular autocatalytic technologies drive whole sectors of society, there is a risk that civilization itself may become unstable, unpredictable and unreliable. In fact, the economic destiny and prosperity of entire nations may rest on one question: Can silicon based computer technology sustain Moore's law beyond 2020? The secret behind Moor's law is that chip-makers double every eighteen months or so, the number of transistors can be crammed into a silicon water, the size of a finger nail. They do this by etching microscopic grooves into crystalline silicon with beams of ultraviolet radiation. A typical wire in a Pentium chip is now 1/500 the width of a human hair, The insulating layer is only 25 atoms thick. But the laws of physics suggest that this doubling cannot be sustained forever. Eventually, transistors will become so-tiny that their silicon components will approach the size of molecules. A this credibly tiny distances, the bizarre rules of quantum mechanics take over permitting electrons to jump from one place to another without passing through the space between. Hence electrons will spurt across atom-size wires and insulators, causing fatal short circuits. More so, transistors components are fast approaching the dreaded point - one limit – when the width of transistor components reaches 0.1 microns and their insulating layers are only a few atoms thick. Recently, some scientists have therefore sounded an alarm warning that Moor's law could collapse and that there are currently no known solutions to these problems.

However, the search for a successor to silicon has become a kind of crusade; it is the Holy Grail of computation. Among physicists, the race to create the Silicon Valley for the next century has already begun and some of the theoretical options are explored. The optical computer replaces electricity with laser light beams. Unlike wires, light beams can pass through one another, making possible three-dimensional microprocessors. Thus, the optical counterpart of a desktop computer would be the size of a car. Again, one of the most indigenous ideas being pursued is to compute using DNA, treating the double-standard molecules as a kind of biological computer take (except that instead of encoding 0s and 1s in binary, it uses the four nucleic acids, represented by A,T.C,G). This approach holds much promise for crunching big numbers. Hence large banks and institutions may one day use it. However, DNA computer is an unwiedly contraption, consisting of a jungle of tubes of organic liquid, and is unlikely to replace a laptop in the near future. Other exotic designs include the molecular computer and the quantum dot computer (which replace the silicon transistor with a single molecule and a single electron respectively). But these approaches face formidable technical problems, such as mass-producing atomic wires and insulators; and a viable prototypes yet exist. The darkest horse to emerge in this race is the quantum computer, sometimes dubbed the ultimate computer. The idea is to direct a laser or radio beam on a carefully arranged collection of atomic nuclei, each of which is spinning like a top. As the beam bounces off the atoms it flips the spines of some of them and complex computations can be performed by analyzing how the spins have been flipped.

Clearly, none of these designs are ready for prime time. Most are still on the drawing board and even those with working prototypes are too crude to rival the convenience and efficiency of silicon. There may be a silver lining to all this. If Moor's law somehow continues unbated, then by some estimates, our computers by 2050 will be calculating well beyond 500 trillion bytes per seconds (per/secs.), at which point, they will be considerably smarter than we are. In other words, there are still room for creativity and designers are still going to have to think. Computers will become a lot more transparent and you won't recognize you are using one. People with little education are going to be able to participate and the digital division is going to disappear.

For the future of the internet, most access will probably be via high-speed, low-power radio links. Most hand held, fixed and mobile appliances will be internet enabled. This trend is already discernable in the form of internet-enabled mobile telephones and personal digital assistants (PDA) equipped with radio links, APDA can serve as an appliance-control remote, a digital wallet, a cell phone, an identity badge, an e-mail station, a digital book, a paper and perhaps even a digital camera perhaps. This could be called Wireless Internet Digital Gadget for Electronic Transactions, (WIDGET). Again, so many appliances, vehicles and buildings will be on-line by 2020 that it seems likely there will be more things on the Internet than people. Internet-enabled cars and airplanes are coming on-line, and smart houses are being built everyday. Eventually, programmable devices will become so cheap that we will embed them in the cardboard boxes and these passive "computers" will be activated as the pass sensors and will be able to both emit and absorb information. Such innovations will facilitate increasingly automatic manufacturing, inventory control, shipping and distribution. The advent of programmable, nanoscale machines will extend the Internet to things such as the size of molecules that can be injected under the skin, leading to Internet–enabled people. Such devices, together with Internet-enabled sensors embedded in clothing, will avoid a hospital stay for medical patients who would otherwise be there only for observation. The Internet will also undergo substantial alteration as optical technologies allow the transmission of trillions of bits per seconds on each strand of the Internet's fibre–optic backbone network. The core of the network will remain optical, and the edges will use a mix of access technologies, ranging from radio and infrared to optical fibre and the old twisted-pair copper telephone lines. Here, more and more of the world's information will be accessible instantly and from virtually anywhere. In an emergency, our health records will be available for remote medical consultation with specialists and perhaps even remote surgery. More and more devices will have access to the global positioning system (GPS) increasing the value of geographically indexed databases. Using GPS with speech understanding software, we will be able to get directions from our WIDGETS. However, in the face of the internet – wide virus attacks, is the realization that we will depend in larger and larger measure on the network's functioning reliably - making this system of millions of networks sufficiently robust and resilient is a challenge for the present generation of Internet engineers (with an optimistic view of the future).

Without the means to electronically evaluate data, future scientific research remains unthinkable, therefore scientists has recently announced the "source codes of homo sapiens" – an approximate reading of the chemical sequence of the human genome. This genome is all the deoxyribonucleic acid (DNA), that makes up an organism. Genes (over three billion) are apart of the complex biological process of making those proteins, which determines how an organism looks, feels or behaves. This may spell the beginning of the biotech age, plus megabucks for biotech industries. But beyond the economics are the immense benefits this new discovery holds. For instance, in the area of molecular medicine, detailed genome maps have aided researchers to discover genes associated with various diseases. In such instances, doctors can now treat the actual causes of diseases rather than mere symptoms. In addition, diagnostic tests can be more specific medical researchers may also be able to produce genome specific drugs and there is the increased likelihood of improve gene therapy. Here, microbial genomic (understanding the genomes of microorganisms) could help in providing new energy sources (bio fuels), environmental monitoring to detect pollutants, protection from chemical and biological warfare and more efficient toxic waste clean-up. In addition, understanding the human genome will enable scientists to understand the effects of exposure to things like radiation and other energy–related agents. And yet, other benefits are in DNA forenics, agriculture, livestock breeding, bio-processing and the production of "made to order" babies. It is however the later, more than anything else, that has been a subject of raging controversy and thus has been seen as tinkering with the Almighty God (Our Divine). Indeed, future developments along this line should be discouraged.

6.0 CONCLUSION

Indeed national action is essential to capture global opportunities in trade, capital flow and migration and to protect people against the uncertainties and vulnerabilities of globalization. But the success of national action hinges on how effectively countries can negotiate at the global level. Thus reinventing global governance is not an option but an imperative for the 21^{ST} Century. Global Competition and market efficiency are the big objectives of current efforts to restructure global economic governance. The latter need to incorporate human development priorities for people in all parts of the world (for poverty reduction, equity, sustainability and human development). Here, the institutions of global governance have leaned hard on national governments to adopt their preferred systems of social protection – marginal for the International Monetary fund, social safety nets for the World Bank and a broader and more pragmatic range of social policy options and mechanisms for other United Nation Agencies.

But a broader, more coherent set of international principles is required - as some governments are beginning to recognize. Such agreements, carefully defined can raise living standards and protect the environment, without setting back employment or discouraging foreign investment. Collective regional action can ensure that the decisions are based on the needs of people in the countries concerned. In other words, with the new challenges of globalization, and the need to ensure stronger action on old problems and new, the time has to come to rethink the global architecture. Some of the key element of the proposed international architecture are a stronger and more coherent UN system,with greater commitment from all countries; a global central bank; a world investment trust with re-distributive functions and transfer mechanism; a world environment agency; a revised world trade organization; an international criminal court and a broader United Nations. These new and stronger international institutions of global governance can be global public goods. At the national level, public goods have been recognized as vital when the market is neither the incentive not the mechanism to meet a public need. With growing globalization, international public goods are now needed for similar reasons. This new perspective is much more than a change of terminology. To recognize the need for global goods is to accept the importance of actions of global governance beyond the capacity of individual countries to provide, to establish a rationale for new forms of financial support that countries need to ensure but to recognize also that without special efforts such support may not be forthcoming. These issues become matters for political advocacy and education on globalization in which all countries have a role and a stake.

Thus, just as countries need central banks, so the world needs a central bank in the 21^{st} century. The recent establishment of the European Central Bank demonstrates the perceived need among some of the richest industrial countries. A world central bank would therefore help stabilize global economic activity by performing several vital functions: acting as lender of resort; regulating financial institutions and flows; calming financial markets when they become jittery or disorderly; and creating and regulating new international liquidity. Enlarging the mandate of the IMF would be one approach while another would be to establish a world financial authority. Keynes' original proposal was that the global monetary authority should have access to resources equivalent to 50% of world imports. The US counter-proposal was for 15%. Several mechanisms are available to expand the global financial resources, including a renewed issue of special drawing rights and agreements with the main central banks to permit enlarged swap arrangements. Quick access to funding may be as important as the size of the resources available and procedures to achieve this need to be explored such as advance agreement on provisional lines of credit. In addition, there is an urgent need for new mechanisms to generate additional flows of resources to poor developing countries as well as new funding for global public goods.

Indeed, relative to today's global economy and the global challenge of sustainability, present structures and levels of global supports are minuscule. Needed is a world environment agency, possibly developed from UNEP, with much larger resources and broader functions. These include to oversee the global environment presenting reports and posing issues for review and policy making; to broker deals and to serve as a clearing bank. One important focus of that agency would be to encourage the removal of perverse subsidies and shift the resources released to direct support of environmental protection and other measures (including employment creation) for its cleaning house functions, the agency would oversee trade in permits for green house gas emissions, along the lines explored in the clean development mechanism proposed in the climate conferences. Emission rights could be borrowed or lent, but not sold and thus keeping the market competitive and avoiding any risk that developing countries might lose long-term control over their rights. Also, the clearing house would be a new mechanism for mobilizing additional financial resources for developing countries, especially the poorest.

Finally, the world is rushing headlong into greater integration that is driven mostly by economic forces and guided mostly by a philosophy of market profitability and economic efficiency. People in all parts of the world need to join in the debate and to make clear their interests and concerns. The process of reinventing global governance must be broader and human development can provide framework for this exploration. This piece therefore is our own contribution.

APPENDIX

1. **MECHANDISE EXPORTS**
   Shows the F.O.B (Free On Board) value in U.S dollars, of goods provided to the rest of the world.

2. **MECHANDISE IMPORTS**
   Shows the C.I.F. (Cost plus Insurance and Freight) value, in US dollars, of goods purchased from the rest of the world

3. **COMMERCIAL SERVICES**
   Comprises all trade in services, including transportation, communication, and business, excluding government services, which comprise services associated with government sectors (such as expenditures on embassies and consulates) and with regional and international organizations.

4. **NET PRIVATE CAPITAL FLOWS**
   Consists of private debt and non-debt flows. Private debt-flows include commercial bond, lending bonds, and other private credits, non-debt private flows are foreign direct investment and portfolio equity investment.

5. **FOREIGN DIRECT INVESTMENT**
   Is net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital flows, and short-term capital flows.

6. **REAL GDP PER CAPITA (PPP$)**
   Is the GDP per capita of a country converted into US dollars on the basis of the purchasing power parity exchange rate?

7. **HUMAN DEVELOPMENT INDEX (HDI)**
   This is based on three indicators: Longevity, as measured by life expectancy at birth; educational attainment as measured by a combination of adult literacy (two-third weight) and the combined gross primary, secondary and tertiary enrolment ratio (one-third weight); and standard of living as measured by real GDP per capita (PPP$). In other words, the HDI is a single average of the life expectancy index, educational attainment index and adjusted real GDP per capita (PPP$) index, and so is derived by dividing the sum of these three indices by three.

8. **GENDER-RELATED DEVELOPMENT INDEX**
   Uses the same variable as the HDI but the difference being that the FDI adjust the average achievement of each country in life expectancy, educational attainment and income in accordance with the disparity in achievement between women and men. For the gender-sensitive adjustment, they used weighting formula that expresses a moderate evasion to inequality, setting the weighting parameter, equal to 2, being the harmonic mean of the male and

female values. The index also adjusts the maximum and minimum values for life expectancy to account for the fact that women tend to live longer than men. For women, the maximum value is 87.5 years and the minimum value is 27.5 years, for men the corresponding values are 82.5 and 22.5 years.

9. THE GENDER EMPOWERMENT MEASURE (GEM)

Uses variables constructed explicitly to measure the relative empowerment of women and men in political and economic spheres of activity. Here, the first two variables are chosen to reflect economic participation and decision-making power: women's and men's percentage shares of professional and technical jobs. These are broad, lovely defined occupational categories. Because the relevant population for each is different, calculates separate index for each and then add the two together. The third variable, women's and men's percentage shares of parliamentary seats, is chosen to reflect political and decision-making power. For all three of these variables, it uses the methodology of population – weighted (I-E) averaging to derive an "equally distributed equivalent percentage" (EDEP) for both sexes taken together and each variable is indexed by dividing the EDEP by 50%. Again, an income variable is used to reflect power over economic resources and it is calculated in the same way as for the GDI except that unadjusted rather than adjusted real GDP per capita is used. These three indices for economic participation and decision-making political participation and decision-making, and power over economic resources - are added together to derive the final GEM value.

10. THE HUMAN POVERTY INDEX

Concentrates on deprivations in three essential dimensions of human life: Longevity, knowledge and a decent standard of living. The first deprivation relates to survival (vulnerability to death at a relatively early age). The second relates to knowledge (being excluded from the world of reading and communication). The third relates to a decent living standard in terms of overall economic provisioning. Here, the deprivation in longevity is represented by the percentage of people not expected to survive to age 40 and the deprivation in knowledge by the percentage of adults who are illiterate. The deprivation in standard of living is represented by a composite of three variables (the percentage of people without access to safe water, the percentage of people without access to health services and the percentage of moderately and severely underweight children under five years. However, the human poverty index for industrialized countries concentrates on deprivations in four dimensions of human life – Longevity, knowledge, a decent standard of living and social exclusion. The first deprivation relates to survival vulnerability to death at a relatively early age). The second relates to knowledge (being deprived of the world of reading and communication). The third relates to a decent standard of living in terms of overall economic provisioning while the fourth relates to non-participation or exclusion. Here, the deprivation in longevity is represented by the percentage of people not expected to survive to age 60 and the deprivation in knowledge by the percentage of people who are functionally illiterate as defined by the OECD. Again, the deprivation in standard of living is represented by the percentage of people living below the income poverty line while the fourth deprivation, in non-participation or exclusion, is measured by the rate of long-term (12 months or more) unemployment of the labour force.

11. **<u>OFFICIAL DEVELOPMENT ASSISTANCE (ODA)</u>**
Grants or loans to countries or territories that are undertaken by the official sector, with promotion of economic development and welfare as the main objective, at concessional financial terms.

12. **<u>EXTERNAL DEBT</u>**
Debt owed by a country to non-residents repayable in foreign currency, goods or services

13. **<u>DEPENDENCY RATIO</u>**
The ratio of the population defined as dependent (those under 15 and above 65) to the working age population (age 15-64).

14. **<u>REFUGEES</u>**
People who have fled their countries because of a well-founded fear of persecution for reasons of their race, religion, nationality, political opinion or membership in a particular social group, and who cannot or do not want to return.

15. **<u>CARBONDIOXIDE EMISSION</u>**
Measures those emissions stemming from the burning of fossil fuels and the manufacture of cement. These include carbon-dioxide produced during consumption of solid, liquid, and gas fuels and from gas flaming.

16. **<u>GDP PER UNIT OF ENERGY USE</u>**
Is the US dollar estimate of real gross domestic product (at 1995 prices) per kilogram of oil equivalent of commercial energy use.

17. **<u>ANNUAL DEFORESTATION</u>**
This refers to the permanent conversion of forest area (land under natural or planted sands of trees) to other uses, including shifting cultivation, permanent agriculture, ranching, settlements, and infrastructure development. Deforested areas do not include areas logged but intended for regeneration or areas degraded by fuel wood gathering, acid precipitation, or forest fires.

18. **<u>NATIONALLY PROTECTED AREAS</u>**
This refers to the totally or partially protected areas of at least 1,000 hectares that are designated as national parks, natural monuments, nature reserves, wildlife sanctuaries, protected landscape and seascapes, or scientific reserves with limited public access.

19. **<u>SULPHUR DIOXIDE (SO_2) EMISSIONS</u>**
Emissions of sulphur in the form of sulphur oxides and of nitrogen in the form of its various oxides, which together contribute to acid rain and adversely affect agriculture, forests aquatic habitats and the weathering of building materials.

20. **<u>ELECTRIC POWER CONSUMPTION PER CAPITA</u>**
Measures the production of power plants and combined heat and power plants less distribution losses and their own use.

21. **<u>ELECTRIC POWER TRANSMISSION AND DISTRIBUTION LOSSES</u>**
Measure losses occurring between sources of supply and points of distribution, and in distribution to consumers, including pilferage.

22. **<u>DAILY NEWSPAPERS</u>**
The number of copies distributed of newspapers published at least four times a week per thousand people.

23. **<u>RADIOS</u>**
The estimated number of radio receivers in use for broadcasts to the general public, per thousand people.

24. **<u>TELEVISION SETS</u>**
The estimated number of television set in use, per thousand people.

25. **<u>TELEPHONE LINES</u>**
Telephone main lines count all telephone lines that connect a customer's equipment to the public switched telephone network, per thousand people.

26. **<u>MOBILE TELEPHONE</u>**
This refers to users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology that provides access to the public switched telephone network, per thousand people.

27. **<u>PERSONAL COMPUTERS</u>**
This is the estimated number of self contained computers designed to be used by a single person, per thousand people.

28. **<u>INTERNET HOSTS</u>**
These are computers connected directly to the worldwide network, many computer users can access the internet through a single host.

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