# IOIU
# Information Overload
# Information Underuse:
# A New Challenge to Society

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Perhaps the most important trend of our times is the transition from an *energy*-intensive to an *information*-intensive economy and society. The significance of this event can hardly be overestimated and it indeed must be counted as one of the major watersheds in human history. Its consequences are enormous and its potential impacts yet to be fully fathomed.

In this paper we will focus on one intriguing challenge associated with the information revolution, the epistemological problem perhaps best described in the capsule expression IOIU, "information overload, information underuse". Currently the subject of a major international study conducted by the Gamma Institute for the United Nations, IOIU refers to the simultaneous surplus and scarcity of information - a paradoxical state of affairs made possible by the information revolution itself. At stake is the nature of the emerging"information society" and its international dissemination. This latter aspect introduces the relevance of IOIU to global development and raises another important issue: that of *collective* or *societal* learning (as opposed to individual learning). How do societies learn? What does it mean when they have in fact "learned"? How does one measure this societal learning activity?

In order to tackle these questions systematically we will first very briefly review the fundamental characteristics of the Information Revolution and subsequently discuss the IOIU challenge itself.

## 1. A Historical Interpretation of the Information Revolution

The "information revolution" describes the important innovations which have occured in the past 15 years in the microcomputer and telecommunication field. This technological revolution has led to two major results: The "Information" Society and what we call at the GAMMA Institute, the "Informediated" Society. The Information Society refers to the growth of the Information Sector in total economic activities. Today over 50% of total economic activity is generated in the information sector and close to 60% of the labor force is employed within it. "Informediation, on the other hand refers to the change in the **productive process** where high technology information machines are now mediating an increasing number of activities, some having nothing to

do with information production itself. The high degree of informediation of the economy is the culmination of a historical process which started with mechanization.

In a nutshell we argue that the information revolution is situated along a path of historical **continuity** yet, at the same time, exhibits elements of partial **discontinuity** vis-a-vis the past which create totally new effects. In many senses the information revolution lies **within the logic of industrialization** and is not, as is fashionable to say today, a "post-industrial" phenomenon. Our reading of the historical process of industrialization is that its central feature was and is an increasing **capital-intensity** in the production process. This increasing use of capital, in the technical sense of the word , has nevetheless taken different forms. If we chart the progress of industrialization in the last two centuries we can say that it went through two distinct phases.

In the first and second industrial stages (1750-1820 and 1870-1914) **energy capital** replaced human and animal labor. The process was called ***mechanization.*** Machines, tools, instruments and other strength replacing devices were introduced into the production equation.

In the contemporary industrial stage a new capital intensity is now present in the production process. There is continuity because now as before, capital in the form of machines is inserting itself in the manufacturing process. However the new capital is **information capital** composed of computer and telecommunication machines. These machines are not *strength*-replacing but *intelligence*-replacing. They therefore penetrate many new fields of human activities, hitherto protected and untouchable. Mental activities, both perceptual and conceptual and, at the limit, intelligence itself may be emulated at the machine level. What this implies is a gradual but sure penetration of information technology in all human activities.

That process of increasing pervasiveness of information machines in our lives we call " informediation". As production and consumption is becoming informediated the process which started with the first industrial revolution is being completed. Mechanization is being succeeded by informediation. Therefore all social and economic effects of the new technologies must be measured by this new process of

informediation. Informediation increases and accelerates the move towards the "Information Society" but must nevertheless be viewed as distinct from it. Informediation focusses on *process*-oriented changes in our society while the growth of the information sector decribes *product*-oriented changes. Ultimately the two feed upon each other, but because of the extent of process-oriented change, its consequences are likely to be more widespread and fundamental. When the mode of production changes, eveything changes with it.

## 2. The Epistemological and Social Challenges.

A complete catalogue of possible impacts of informediation would require a treatise the length of a book or even an encyclopedia. Economic, political and social changes mutually interact to create cumulative effects. For the purposes of this communication we will focus on what we call the IOIU challenge, the epistemological- cum-social challenge of too much and too little information. To fully undertstand the scope and nature of the debate let us consider the following points:

### *(1) Knowledge is the New Form of Power.*

In the mechanization phase of industrialisation, the possession of physical and monetary capital was the road to power. Industrial capitalism allowed the means of production to be concentrated in a small number of people, who by holding the capital, also held the economic and political power. In the informediation change the passport to power is no longer physical but information capital. From a world comprised of haves and have-nots we are moving to one where there are "knows" and "know-nots"., with the rider that the "knows" are becoming the "haves" and the "know-nots" are becoming the have-nots. Knowledge is power and lack of knowledge paves the road to dependence and vulnerability. The peasants and serfs of the feudal system and the proletariat of the early capitalist system are now being replaced by the "techno-peasants" of the new society - those unable or unwilling to use the new knowledge machines.

If knowledge is power, and the lack of knowledge weakness ,a certain number of associated issues, both at the personal and collective levels, may now be identified. At the individual level two issues emerge as

crucial to the politics of the information society. The first is *privacy* and the second is the evolution of *property rights* .

The *Privacy* issue refers to the question of access to information and the difficulty in controlling it. There is both too little and too much access to information, with the latter becoming the principal problem. The right to privacy is indeed threatened by national and international computer networks which can monitor the whereabouts, activities and behaviour patterns of individual citizens. The spectre of the rise of the computer state with all its Orwellian implications is indeed perplexing.

The effect of the information revolution on *property rights* is, paradoxically, quite different.It is notso much the public at large but the innovators themselves who are threatened. Information is extremely difficult to protect or to privatise, and the increasing transparency and ease of use of information technology leads to an intriguing situation. Copying, either legally or illegally the hardware and software associated with the information machines is becoming so easy that it may actually act as a deterrent to the innovation process because the pioneer finds himself bearing the full development costs of his invention which then becomes a public good. Here, too, there is too much information and no satisfactory way to protect it. There is nothing more protent than an idea but also, nothing as difficult to protect, patent and copyright laws notwithstanding.

At the international and collective level, an important issue is that of *trans-border data flows,* the information transfer patterns across international frontiers which reduce the capability of hitherto sovereign national states to regulate or manage their knowledge bases. In some senses the trans-border data flow issue is the societal counterpart of the privacy issue at the individual level. The "privacy" of a country is threatened by international access to its data banks. Its sovereignty is thus imperilled.

Another related issue is the whole question of the New International Information Order, (NIIO) a Unesco-generated debate on how to create a more egalitarian international information order to complement the still elusive New International Economic Order (NIEO). In both cases there is an attempt to make the world system work for rather than against the

development of the Third World and the principal obstacle in both cases seems to be that the world system appears to favour the "haves" and the "knows". In the case of the NIIO there is concern that information flows are basically asymmetrical. Certain types of information flows from the highly developed North to the less developed South and bring with it cultural imperialism. Other vital forms of information, which the South may not want the North to have flows North. The result, say the proponents of a new international information order , is increasing domination effects flowing from the North to the South. Connected with this issue is of course the question of technology transfer, and the appropriateness of the technology exported to the Third World - another burning question arising from the Information Society.

### *2) The Heart of the IOIU Problem: The Production, Distribution and Relevance of Information .*

The heart of the IOIU problem is the relationship between the production consumption and distribution of information. A fundamental question is whether the information revolution is principally *supply-pushed* or *demand-pulled.* Is the evolution of the technology and the information it brings with it, a response to clearly articulated needs and demands or does supply creates its own demand. The evidence points to the latter. It is not the burning desire for computers, videotext machines or VCRs which drive those industries but rather the decreasing costs associated with production of high-tech equipment coupled with increasing performance which is creating a demand for these products. Once available and used they are in high demand. The commodity precedes the need. Electronic engineers claim that a *two-fold* increase in investment in micro-electronic equipment usually results in a *ten-fold* increase in computing power. This technology push allows for cheaper and more powerful products to constantly flood the market. As a result, the production capabilities initially outstrip consumption potential but with decreasing costs, supply creates its own demand, and the growth dynamic picks up steam.

If this is true at the hardware level, it is doubly true at the software level. The capacity to generate information is now so immense that only a fraction of the produced information is effectively consumed. Japaneses studies have shown that even before the microelectronics

revolution, the more conventional media (printing, tapes, television cinema, radio) were producing such a large information output that less than 10% of information produced (measured in kilobytes) was actually used. With the advent of microelectonics, the enormous data banks now possible will mean that ultimately less than 2% of the information produced will be consumed.

This Information Overload is intuitively obvious. If one looks at the growth of scientific journals, periodicals, magazines, TV.channels, radio stations etc., one concludes that there is no way, in purely physical terms, for a person to keep up with the publications in his own field, let alone others. Information overload leads to information underuse since the overloaded prospective information consumer simply drops out of the game. One indicator of this IOIU syndrome is the increasing need by high-level decision makers for consultants who will not offer them more but *less* information. Overwhelming quantity is replaced by selective quality. What the busy executive needs, most of all is analysis, interpretation and the outlining of options not data. In other words there is a growing market for **information filters,** which are methods of distilling and synthesising large quantities of data into meaningful and digestible portions.

Closely associated with the information-filtering function is the **relevance** of the information dispensed. Information Science has, unfortunately not yet developed a fully quantifiable indicator of relevance of information. The accepted measure of kilobytes in effect skirts the epistemological problem since it treats all levels of information in the same way. Yet, in our minds, information is orgnanized hierarchically. Possessing a telephone book with an enormous amount of information in it is only meaningful if one knows how to use it. If one does not, the addition of say yet another volume of The Yellow Pages with its supplementary megabytes of information will be less meaningful than an altogether different type of information: information about the operating principle of the ordinary telephone books i.e. alphabetical listing in the white pages and professional listing in the yellow . A further essential information to actually use the telephone book is knowledge of the sequence of the alphabet itself. In a foreign country which uses the same alphabet but not the same sequence of letters, consultation of the phone book becomes extremely problematic.

All this means is that the function of information filtering in order to achieve relevance requires a hierarchical construction of information itself. Information *about* information must be treated separately from information itself. For example one method of hierarchical grouping could be as follows: At the lowest level we find *data,* i.e. the stuff one finds in a telephone book. At a higher level is *an operating principle or data-base system,* which allows the use of the data. At an even higher level we have what philosophers would call "*knowledge*" a complex set of epistemological beliefs which give significance to the data-base system. Even higher in the hierarchical scale may be "*understanding*" or "*meaning*" which, in a sense, shifts the focus to what actually underlies knowledge: what are the questions which we want answered in the first place? Finally, at the highest level is what philosophers will call "*wisdom*" or "*sophia*" obviously very distinct from data or even knowledge. This is what Teilhard de Chardin called the Noosphere and is the ultimate culmination of Gnostic Philosophy: that knowledge is road to divinity etc.

At a less esoteric level we can nevertheless offer the following proposition on the question of the relevance of information. One of the principal causes of IOIU, (the simultaneous overload and underuse of information) is the lack of a hierachical perception of information-levels and therefore the complete loss of relevance of certain types of available information which are literally relegated to the waste-paper basket. It would follow then that to neutralize the IOIU effect one would have to labor to construct relevance trees and in doing so shift the focus from answers to **questions.** *There can be no such thing as a good answer to a bad question.* An important part of the epistemological problem of the Information Society is that many questions asked are indeed not very "good". The net result is trivialization of information - superbly exemplified by the Game of Trivial Pursuit: the pretense that raw data has high epistemological significance. Trivial pursuits are very entertaining activities to be sure, as all true aficionados of the game will attest - but they are hardly contributions to the Noosphere! Yet one very real danger of the Information Society is the progressive trivialization of knowledge as reels and reels of computer printouts, TV re-runs and redundant publications overload our mental absorbtive capacities.

## 3. Conclusion: IOIU and Collective Learning.

If in the emerging Information Society knowledge is power, then the acquisition of that knowledge becomes a crucial variable for survival This raises the issue of learning which quintessentially is knowledge acquisition. What makes individuals learn is well documented in a series of treatises and psychological textbooks. What determines societies' ability to learn is not well-known and should be the object of intense research. On the Society's side the relevant questions here have to do with its openness , the flexibility of its institutions, its ideological and cosmological underpinnings and, in general, its capacity to undergo paradigmatic shifts . Japan, for instance is the classical example of a very successful societal learning. China, on the other hand may well be a counterexample where, historically, China has refused to learn much from abroad, sometimes to its detriment. Some countries exhibit structural characteristics which reduce their capacity to absorb foreign or new informational inputs. Others are like sponges. They absorb everything and convert foreign informational inputs into their cultural "genetic" code.

On the supply side of knowledge, the Information Revolution aggravates the IOIU problem by allowing for the indiscriminate production and distribution of various types of information. The plethora of information may lead to less knowledge. However, there is reason to believe that information technology itself, properly understood and managed, may deal decisively with the problems it itself has created. Unlike nuclear technology, its potential benefits and opportunities far ouweigh its threats and, if properly managed may lead to a new era of plenty, where general affluence in both material and information goods will be available to all. But waht is most needed is information about the Information Society. We have to see the forest not just the trees, and that itself is the most difficult challenge of them all.