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Satellite Communications: The Indonesian Experience

By

Astrid S Sustanto
SATELLITE COMMUNICATIONS: THE INDONESIAN EXPERIENCE
by Astrid S. Susanto - Jakarta.

1. Indonesia in the 21st century?

A very challenging book with a very challenging title "Communications in the twenty first century" was published in 1981. It was written by a number of experts from different kinds of disciplines and edited by Robert W. Haigh, George Gerbner and Richard B. Byrne. This book discusses the power of information what it does to people but also what it cannot do to people. Starting point is that knowledge is power, the best information helps a man to climb the ladder of success. But at the same time it starts by making clear right from the beginning that there are different kinds of information, such as those that can "diminish uncertainty" and "all others". Surely the "all others" cover most of the kinds of information, starting from economic and political data and stretching up to high societal gossip that creates uneasiness for the person being talked about. Yet the book also starts by saying:

"Whoever control the gathering, storing, and dissemination of this information commands a vitally important resource, one that will always be in scarce supply" 1/

Communication facilities and activities and the persons who handle them are then "the happy chosen people who command this vitally important resource that will always be scarce in supply", and this is the field we are working in and working for. Information transfer and dissemination more and more uses sophisticated technologies and therefore arises many questions for many scientists, just because the classification "all others" involves not only our intellects but also the entire range of senses and sensibilities.

The crucial question becomes: "what happens to the whole human being in a world in which electronic communications dominates our work as well as our leisure?" The second (sequence) of questions arising out of the first one will be: "whether in the long run humans will have to accomodate themselves to machines or whether the machines will be made to serve wholly human purposes" 2/.

The history of communications goes back to what experts agreed upon, namely to the Cro-Magnon homo sapiens of the upper Paleolithic period (35,000 - 10,000 BC), who were already language users. This conclusion was drawn based on the research carried out on the brain cage and flexible jaws and the evidence of a village like existence found during various excavations. 3/

But it was most of all the electronics of communications that enabled accumulated contact between people and nations which again enabled an enormous exchange of additional knowledge and opened new channels to reach the many informations resources previously unknown.

Wilbur Schramm noticed long ago how the developments within the communications world took place:

"From spoken language to writing: at least fifty million years.
From writing to printing: 5000 years.
From printing to the development of sight-sound media (photography, the telephone, sound recording, radio, television): about 500 years.
From the first of sight-sound media to the modern computer: fewer than fifty years" 4/

No wonder that Frederick Williams therefore talks about an acceleration curve for the improved and increased abilities for communications, and even stresses that as of today we do not know the limits of its growth. 5/ He stresses the fact that even with the acceleration curve it is still difficult to sense the remarkable compression of time scale in which recent communications innovations have evolved.

3/ Frederick Williams : The communication revolution, Annenberg School of Communications, Sage Publications, Beverly Hills-London-New Delhi, 1982 p. 27-28
5/ Frederick Williams : ibid. p. 28
The development of innovations after the telephone and its further acceleration curve until the invention of the satellite and its usage can be seen from the pictures on the next page. Most interesting is how Frederick Williams then tries to "fit in" the communication innovations since the Cro-Magnon into the system of the 24 hours clock and then discovers that more than 360 centuries human being had limited its communication abilities to develop the capability of speech. 5/6 th of the time separating us from the first *homo sapiens* passed without the invention of writing. So the writing capability had been used by mankind only since 1/6 th of its existence on this globe since the Cro-Magnon times. Further development such as "fit in" into the clock system are:

- 08.40 p.m. - Egyptian hieroglyphics
- 09.28 p.m. - invention of the alphabet
- 10.06 p.m. - Homer's works

The 360 Century Day . . .
The Acceleration Curve

NOTE: If growths in the amounts of human communication were plotted in the form of a curve, this curve would surely be showing a marked acceleration as we enter the twenty-first century.

6/ Ibid. p. 29 and 30
The 360 Century Day

NOTE: If the history of human communications were squeezed into the 24 hours of a single day, we would spend all of the a.m. hours with very little change, and with little change until the closing p.m. hours. In fact, most of the technologies which are inundating us today have been invented in the few moments before midnight.

Source: Frederick Williams: ibid. p. 30
10.38 - 11.01 p.m. - the Roman Empire and Cicero's writings
11.38 - Gutenberg Bible (almost 10 centuries after the Roman Empire)
11.53 - the steam press
11.53.24" - the telegraph
11.54.38" - the first transatlantic cable
11.55.02" - the telephone
11.55.04" - the phonograph

The communication revolution as Frederick Williams sees it takes place after mankind has spent nearly 99.6% of its life on this earth, e.g. during the last "minutes and seconds" towards the year 2000. So further development follows:

11.55.47" p.m. - radio telegraphy, motion picture camera
11.56.48" - commercial radio and reality
11.57.04" - sound motion pictures
11.57.40" - prototype electronic computer
11.57.50" - xerography developed
11.57.52" - transistor invented
11.58.02" - colour TV introduced

The last "minutes and seconds" towards the year 2000 show enormous quick developments:

- 104 seconds - Sputnik launched
- 101 " - stereophonic FM broadcasting
- 92 " - first commercial satellite
- 87 " - computer timesharing feasible
- 85 " - merger of telecommunications and computing
- 78 " - portable TV camera
- 74 " - microelectronic circuitry
- 62 " - major advances in computer memories
- 61 " - home TV recording equipment
- 49 " - acceleration of the communications innovations revolution from 1980 onwards towards the year 2000.

Looking at this "time-table" we can then conclude that it is no wonder that the software world has stayed behind the development of the hardware and therefore are at the utmost capable to do impact studies!

This seminar is therefore most timely held for Indonesia, in order to wrap up and make an inventory of the capabilities of the communication technologies, which because of the merger of the telecommunications system with the computer system imperatively demands a new approach towards the study and science of communications.

All this is necessary in order to prevent us from being just the acceptors of technologies and getting more passive and even submissive towards the communication technologies which keep on developing. As is generally agreed, any kind of technology, including the communications technologies should only be a tool in man's hands and not be its master or tyrant.

7/ ibid. p. 32
All these rapid changes helped to shape what is now generally known as the information age/society. As has become clear out of discussions previously, the information age/society has been the result of especially the influence of the "marriage" of the already existing telecommunication system with the newly developed computers. Richard Munro in his article "Up with the new and old" says that the opportunities given by this merger between telecommunications and computers are among others:

- an increased multiplicity of choices and channels
- increased interaction not only between man and man but also between man and machine, such as offered by the viewdata technology, from which the viewer can not only tap data banks or other information resources but also "talk back" to the computer connected screen, instruct it or ask for additional and earlier obtained depth data, which in the end results in more comfortable relationship between man and his electronic equipment
- increased digitization, comfortable man-machine relationship, interactive computers and increased video media

Yet, it is well perceived that all this digitization and man-machine communication relationship will have different implications and impacts on different socio-economic and cultural societies. As it was wrongly projected, television - only in very specially designed cases - became the medium of instruction. The same unforeseen impacts of the combination of telecommunications and computers would only become a kind of mechanical brain, that is doing the kind of work for man. Then through further development the computer was given assignments which surpassed the speed and load of data to be processed by human being. This took place when the process of technical development in the electronic field among others replaced vacuum tubes with mechanical relays, transistors eliminating the vacuum tubes, integrated circuits supersede transistors, and the computer-on-a-chip replaced the integrated circuit. Although the telephone, television and the computer were actually single inventions, together they moved societies without being conscious about it, into the informational stage of development. Direct consequences are therefore unavoidable as information enters the realm of mind and thought.

Richard Munro even wonders, why in this age of electronics revolution, this information age has not produced its own philosopher, just like Arnold Toynbee and Oswald Spengler were the philosopher's of the industrial age.

Some additional products of the combination of communication equipment with computers will then be:

- an increased differentiation of classification of communication needs
- communication needs that serve intimacy and individuality
- the development and increased need to use communications to integrate large groups of people 11/

At the same time a number of messages and media are further designed to enhance the highly specialized interests of individuals or identifiable sub-groups.

This fast "transportation of information" across and between different users and information centers, naturally will lead to tremendous changes in society. For the start several countries and policies might object to what is coming (and they have it in their hands either to accept the newly introduced technology or to refuse it), but once accepting the new technology, society will experience changes, because the new norms are part and parcel of the new technology.

Anne W. Branscomb in her efforts to give an answer to the problem of communication explosion management stresses the fact that the new communication technologies are very democratic in nature.

If the tribe or village was small and closed as well as simple, the computerized information society will be open and complex 12/

In her analysis Anne Branscomb cannot avoid admitting that indeed there seems to be a "theory of information poverty in an economy of information wealth" 13/

Yet she keeps on saying that:

"In trying to find ourselves in the twenty-first century we will have at our disposal technological systems capable of reaching millions in our global electronic society, or we can retreat to the data confined to our own sets of floppy discs"

meaning, that whatever technology will be used by the country or individual is up to the individual to determine whether he would like to be linked up to the "open world" or isolate himself from the wealth of information available outside his confinement.

The choice to use or not to use the technologies and the offered information keeps being in the hands of the individual's choice and decision.

11/ ibid. p. 45
12/ Anne W. Branscomb: Finding one's place in a multimedia society, Robert Haigh et.al.ibid, p.77
13/ ibid. p. 79
Indonesia's experience with the satellite dates back to 1976 when the first Palapa satellite was launched. The first beneficiaries of satellite communications were naturally the governmental institutions and the business world and those who were already connected to the telephone system. Since then the rapid growth of further connection of radio and television to the satellite and further inter-island telecommunications hardly reminds a person any longer that their communications with someone hundreds of kilometers apart was only possible because of the presence of the Palapa and being connected to it. Since then other satellites developed and were used: the Symphony was used for space and scientific research and soon it was followed by the Landresource satellite. As very much discussion will be thrown upon telecommunications, in this part of the paper more attention will be paid to the use of satellite for planning purposes, this also being a process of communications especially in the field of planning. Thus Landsat imagery used for planning purposes can be looked upon as a special kind of development communications. This kind of development communications takes place between experts and government officials using satellite communications right from the beginning: from satellite remote sensed data/information acquisition via satellite data transmission, the process of coding and encoding (= data interpretation) until such activities as data massaging for the sake of fitting the data into the existing codification and hardware systems used and in the end the planner being the user of all those activities. Thus the planner will only be able to benefit from this linkage with the Landsat and its other activities, if he himself has been trained into the symbol system/language of the software being transmitted through the various computerized channels.

Quite unobtrusively since last year LAPAN (the Indonesian Center for Space and Aeronautical Research) at Pekayon/Jakarta reached the ability to receive Landsat imageries and transfer them to BAKOSURTANAL (Center for Coordination of Surveys and Mapping) for further use. BAKOSURTANAL has enjoyed a World Bank Loan during the Repelita III to improve its equipment and infrastructure in order to meet the challenges of the new technologies. Thus activities which started at two various research institutes with a simple wish to increase its research abilities and capabilities, proved to open up a new horizon in the field of communications using space facilities.
Independent from each other's institutional development, the FAO supported the Center for soil Research of the Ministry for Agriculture in its capabilities to use remote-sensed maps/data for soil-basemaps development, using groundtruths. Also during Repelita III the Government of Japan through JICA gave a grant aid to the Ministry for Public Works to develop the capability and infrastructure of the Remote-Sensing-Computor Center in Jakarta, to use land-resource maps obtained via the satellite for the execution of their projects. The JICA project stipulated as its pilot area the landstrip stretching from Sibolga to Tebing Tinggi at Sumatra, covering the Asahan-River Project area where the huge dam was to be built. It shows a serious effort towards a project execution, based on groundtruths and satellite imageries. A latecomer is the Institute for Meteorology and Geophysics of the Ministry of Communications and Transportation which might receive some foreign aid from a European country within the shortest possible time.

These examples show that satellite use in Indonesia is not limited to telecommunications for the sake of oral or visual communications, but also trying to make benefit of the other capabilities of the satellite. The Land resource evaluation and planning project to be funded by the ADB is one example of this. If satellite communications for the sake of television and radio transmission is facing its second phase already (expansion of transmission and eventual replacement of equipment), the information exchange in the field of landresource evaluation for planning purposes is also entering its second phase, e.g. from developing its infrastructure towards the interphasing/interlinking stage. To be interlinked (for two way communication) within this project are for the time being BAKOSURTANAL, the Remote Sensing Computor Center of the Ministry of Public Works, the Center for Soil Research of the Ministry of Agriculture, and the provinces of Sumatra through their BAPPEDAs (provincial planning agencies). It is hoped that for a second phase in the future, other remote-sensed-data centers will be linked up in to this system, e.g. the PUSADATAt (Data center) of the Ministry for Agriculture, LAPAN (the Institute for Space and aeronautical research), the Directorate General for Agraria of the Department of Interior Affairs, and other additional BAPPEDAs such as the provinces of Java and Sulawesi. For perhaps the first time it happens that an important project "leaves out Java", except for its Centrally owned and operated computor center is such as mentioned above.
The reason is for communication scientists perhaps also a new one, namely that in order to be able to benefit from the interlinkage of this data (map) - exchange, a number of various kinds of maps should be available already, and foremost the topographic map of the region should be at hand, being the starting point of developing the other kinds of data maps. Apart from this system but not entirely or directly linked up to the satellite, is the computerized communication system to be developed for the Jakarta region. This link which will be using the fibre optics technology and the phone, will link up the Ministry of Finance with the National Planning Agency, the State Secretariate, the Ministry for Industries. Another beneficiary of this project will be the Municipality of Greater Jakarta. Looking at the two systems, it can be said that hard efforts are being done in order to obtain and to exchange data as recent and quick as possible for better policy decisions and planning. In other words: another kind of software and another kind of data with different symbol/language system is developing side by side with the transmission of information through the kinds of channels we already know. The academic question naturally arises: will the "traditional" communication scientist leave this opportunity of the future open to others such as "specialist" who have come from any kind of discipline but from communications or does our discipline has the courage "to jump" into the matter and provide new job opportunities for their graduates. We already noticed nowadays informatics is developing a new kind of skilled manpower (which is highly paid), which actually only need the trainee to have a minimum of knowledge in mathematics, in order to handle information received or to be programmed for further transmission or use via the computers. For the second time since the sixties the communication scientist has come to a cross road. The question is a fundamental question as the communication scientists have to decide their scope of scientific investigations and substance of teaching. Will they limit themselves to the "traditional" mass media or are they willing to widen their horizon and take the definition of communications in a larger sense? It should never be forgotten that if the communication scientists decide to join the recent developments of communications and informatics, the possibility is still there
since the software to be learned is not too far advanced yet compared with shall we say further ten years from now. Therefore the right moment for decisions is now otherwise the golden opportunity for this might hardly return for a second time. Engineers are already thinking or linking up the satellite communication system on landresource information such as mentione before, with the fibre optics linkage to be developed for Jakarta. For us social scientists this seems to be a dream of the future, but for engineers the possibility is there, the only obstacle being the high price to install the hardware to interface the two. At least it is tried already that the language used by the computers to be such, that "the two systems can talk to each other". All these technical problems faced by an engineer are actually not far away from the problems faced by the social scientists specialising in communications. Each hardware system can be looked upon as the frame of reference of the communicator and recipient who are interconnected to one another through the computorized channel system. It is therefore that the transmission of landresource/remote sensed data are actually very close to the theory of communications in general. The communication aspects are very clear in remote-sensed data use (through computorization): it starts with codification and classification of data/maps in order to enable estimation and interpretation. There might be soil colour maps, geological maps, ecological maps, geomorphological maps, drainage pattern maps, vegetation and cropmaps as well as forest maps etc. but in the end all these maps have to be interpreted together e.g. relevant and adjusted to the needs of the use of a certain piece of land. For this reason computorized compatible tapes (CCT) have to be used. The engineers have taken care of the hardware, what about the software? We communication scientists have always boasted about the need for sufficient information as a prerequisite of wise and good decision making. Now that this new hardware is there to be used and asking for software ability and capability, are we staying aside in this special field of development communications and will we not help in more wise and exact forecasting and decision making, only because we have not been introduced the new symbol and language system of those various kinds of maps? Experts in map interpretation mention that communication graduates only need some training of 3-6 months, in order to get acquainted with the material to be
interpreted. The rest of the theory is communication theories. Without being aware of it, the word "communications" has been changed into "communication", meaning computerized communication. Joining a training of 3 - 6 months will help many a communication graduate to enter into administration and other office work, working with and in front of a computer. Instead of putting and making an overlay of 8 or more maps and helping the expert to decide whether the land in mind will be suitable for a proper project in mind, he'll use his head to push the right key buttons asking for the relevant maps, be it a population map combined with a vegetation or geomorphological map and then give his advice to the decision maker. Reliability of information is more guaranteed compared to the use of traditional overlays and using the naked eye for interpretation. So much about the LandSat as an example of satellite communications and its technologies of use and application in Indonesia.

Another example of further development of technologies not yet much known and used in Indonesia is the VMS or Voice Messaging System. Many offices abroad and especially in Singapore (to mention one example in the ASEAN region) are already in the happy position to benefit from this technology. Experts say that the use of the VMS has bridged the time lag of unconnected telephone calls with two-thirds of the time, which is a tremendous gain for especially the business world. 14/

Many important messages have been stored for many a busy manager or executive, which if the VMS was not present could have meant the loss of a very vital information or request. Electronic storage and electronic transmission of messages, is now possible by the act of pushbutton telephones which is connected with a central computer system. The message is spoken into the tapes and will be heard (audial) and not read (written) when received by the recipient. When the electronic mail system uses the facsimile machine or a terminal, the VMS uses the telephones. Yet, unlike traditional communications, voice messaging cannot take place simultaneously, it neither is an interactional medium of exchange. The VMS remains a one-way-system of communications and seems to have been created for purposes of audial message recording. Sending a voice message follows more or less the usual telephone procedures, with pre-

viously connecting oneself with a small tone simulator. The pushing or dialing of a certain number will then connect the caller with the VM computer center, which will do the rest for him. 15/

Via the VMS more accurate and reliable information will be "directly" transferred with much less noise. Inspite of the huge number of satellite impact studies, all the further development of communication technologies take place at a fast pace. Question then arise: whether the communication scientists should also not speed up their pace in order to catch up with the speed of "gadgetory development" in their field. Sofar most communication scientists had little interest in what was happening in the hardware world and always felt somewhat overwhelmed because of it, when doing impact studies. The communications software world has preferred to keep an attitude of aloofness, instead of getting more involved into the development of the communication technologies.

The awareness that new hardwares/systems create new software systems, is very rare. It is because of this attitude that in the end the engineers push the hardwares on the "software's laps" and impact studies "have to cope with them".

New technologies are - as everybody known them - not always proper for every society, being determined by the philosophy of the country as well as the social, economic and cultural standards of the people. If for many industrial societies being fully in the information society, equipment like the TV and Videotexts might be an outcome and solution for quick-shopping, this is not automatically good for other countries, especially not for developing countries.

15/ ibid. h. 41
Many developing countries like Indonesia are presently experiencing at the same
time three stages of socio-economic development, being agricultural societies,
industrial societies and beginning to enter the information societal stage of
development. Indonesia for sure has entered the phase of information society as
well, since it has its Palapa ((1,2) in 1976. With the fast development of tech­
nology and its application and use by society, the time of a longitudinal —linear—
development from agricultural to the informational stage, is over. The fact remains:
how to cope with the (perhaps hard) fact that we have the three (if not more) kinds
of societies. Analysing societies in this stage at which three different stages of
societies are interacting with one another, is most fascinating. Communication Theory
should be able to benefit most out of it and the students and graduates should be
more encouraged to think in these terms. We should not scare away from communication
technologies (being part and parcel of the satellite communication system), but
should at the same time not go too lightly over it. Joseph Deken in his
book "The electronic cottage" (1983) gives reason for a more open mind towards
technologies without being too fickle about it as well. Taking computers as his
substance he says :

"The most significant danger in the evolution of computers, which should not
be either sensational over-stated or in any way minimized, is that the more
powerful computers become, the more disastrous will be the human consequences
of letting them get out of control. It is entirely beyond the scope of com­
puters or computer programs of our era to be in any conscious sense hostile
to human kind at large; that particular worry should remain in the province
of science fiction for a long time to come. For the foreseeable future, the
danger from computers will be when they are consciously directed by one human
against another, or when computer systems are recklessly given a great deal
of power, perhaps imperfectly increasing over a period of time, without ade­
quate development of "fail safe" controls for human monitoring and take over
when necessary. 16/

Another writer Nido R. Qubein on "Communicate like a pro"(1984) gives a receipt
on how to use technology and face it with a positive but not too submissive atti­
tude. He says about the telephone as its example:

"whether your telephone is a tool or a tyrant depends on how effectively you
use it to accomplish your goals." - 17/

Some practical hints in order to achieve this effectiveness are a.o.

1. Don't jump every time it rings- unless your business demands it......
2. Organize your telephone time. Make a list of the important points you
want to cover, cover them quickly, and terminate your calls as quickly
as you can without being discourteous.
3. Use your phone to replace letters, whenever possible....
4. Use your telephone to replace personal visits whenever possible......
5. Use conference calls to eliminate meeting, where feasible" 18/

16/ Joseph Deken : The electronic cottage, Spectra Book, Toronto-New York and others,
1983, p. 16

17/ Nido R. Qubein : Communicate like a pro, a Sepctra Book, Englewood Cliffs,
New Jersey, 1983, p 146 - 147

18/ ibid. p. 147
These tips show the need for the knowledge about the capabilities of the technologies used and their acceptance within society, seen from the point of social and cultural standards. It shows a firm stand towards technology without being emotionally scared about its impacts. It seems then, that of influence of the communication scientists will be bigger if a communication scientist is aware of the technical capabilities and the limitations of an instrument. By knowing in very rough lines the capabilities of a communication technology, communications between the engineer and the software-man will be much easier and the communication scientist sometimes enjoying more influence compared to when he limits himself to his own world. At this stage of communication technology development, straight talks between communication scientists (in the traditional meaning) and the engineers becomes imperative. More knowledge about the capabilities of a communication technology will enable the software-man to develop his communication theory still further. Just like in the past the communication scientist tapped his knowledge from the fields of sociology, psychology and anthropology as well as economics, now the communication scientist should open his eyes and ears towards the advanced technology used by the communication world itself. In this frame a limitation to television and radio alone would be harmful and in the end be a setback for the Science of Communications itself.

3. Conclusions

Whether we like it or not, a fact is that Indonesia through the use of Palapa as its communication satellite, has entered the informational stage of society. As a developing country Indonesia is experiencing all stages together from the primitive interpersonal communication stage, up to the satellite computorized stage. An informational stage society needs above all brain-intensive approaches to solve its problems (Alvin Toffler) which will enable the development of flexible attitudes in this fast changing society. So, for
Indonesia apart from developing technologies that will increase job opportunities for the sake of labour intensive industries, a need for the brain intensive industries has arrived since some time. As the information technology brings enormous changes and development in the communication sector, communication scientists cannot but have to find ways and means in order to accommodate themselves with these changes taking place in their sector. Without asking for it, communication scientists have therefore been in the foreground together with the engineers who developed the communication technologies. Side by side the two will help the nation to adjust themselves quicker and easier to the vast changes around them, caused by technological and scientific improvements. As all the changes go via communications, it stands to reason that both the hardware and the software communication scientist together have to try to find solutions and answers for the problems faced by the other sectors and the nation at large. All this can be done by giving the best of services by using the hardware and feeding and connecting it with the right sources of information to be further disseminated. Never before have the communication scientists coming from the hardware and the software-world, come so close to one another, which will only be to the benefit of the nation, if there is a close cooperation between the two. Neither can go its own way: the hardware man could bring disastrous impacts to his nation if not working with the software world. Many changes have taken place even in the communication world itself part of what in the past was looked upon as hardware is now already classified as software whereas new hardwares are being developed. All these developments are additional reasons for the software-man not to stay aside and leave further developments in the field of communications to the hardware-man. If ever communication science is to prove a development of her own discipline, it is now.

Jakarta, 22nd of November 1984.