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PERSPECTIVES ON INFORMATION DELIVERY*

Prepared by

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* The views expressed in this document are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. Mention of firm names and commercial products does not imply the endorsement of UNIDO.

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Abstract-- You can't really discuss the ramifications of information delivery in a world wide context without first coming to grips with the differences between the world's free market economies and the more centrally planned economies. Moreover, the ability to effectively provide information delivery is in itself tied up in the emerging computer, materials and telecommunications technologies and their domestic and international diffusion rates. Many of these emerging technologies are currently captive to National Information Polices (both stated and unstated), the ability to innovate, formal and informal standardization of both hardware and software, and the availability of risk capital. This paper will attempt to add a new perspective to some of these issues and suggest a way to accelerate the broader delivery of needed information through out the world.

FREE OR CENTRALLY PLANNED ECONOMY?

While it is often useful for governments to attempt to focus public attention on the perceived differences between a free and a centrally planned economy, it is important for us to recognize that the true differences are more in the direction of the joint government/industry planning verses the collective free economic choices of individual consumers. In short, it is not a question of whether or not the central planning is done -- all nations do it! It

is the degree to which government judgments replace the consumers' choice. For example, to varying degrees, all nations have a government plan to ensure the economic viability of their agricultural base. And many nations erect government enforced mechanisms to ensure their emerging industries have a chance to grow strong before they must face international competition in their domestic markets. Other nations known for their professed free market economies mask a good deal of government influenced economic planing under the national defense umbrella.

The evidence thus far is clear that to the extent that the more centrally planned economies are successful in their planing, that is they successfully select "winners", they are able to internationally commercialize their goods and services faster than the free market economies. (The opposite also is true!) As this act of selection is applied to the delivery of consumer information (e.g. scientific, business, technical, know how, and personal) it is not surprising to learn that many nations outside the United States have moved much more rapidly in diffusing information delivery mechanisms to their publics at large. Moreover, many are well on their way to standardizing their technologies and focusing their efforts on how to penetrate new international information markets. At the same time the same nations are erecting transborder barriers that isolate them from the impact of the rapidly changing technologies. This is the wrong strategy because the product life cycle of most computer/telecommunication technologies and their associated products being compressed to six years or less. This means that contrary to the intent, the transborder barriers probably will result in

destruction of the very infrastructure they were intended to preserve.

To get a better sense of a major "free market" oriented information industry let's look at the the American Business Information Market in 1980.[1] For convenience we have categorized it into eight major segments:

BUSINESS INFORMATION MARKET

SEGMENT	REVENUE (000)	PERCENT
o Trade Magazines	$1,933	34
o Reporting Services	844	15
o Credit Information	853	15
o Research Services	515	9
o Newsletters	507	9
o On-Line	431	8
o Loose Leaf	302	5
o Directories & Books	296	5
TOTAL	$5,618	100

TABLE 1

In a free market economy, the business information markets may be characterized by three major distinctions.

1. As can be seen from any newspaper, most information products economically support one another. Advertising, indexing and

reference material coexist with entertainment, news and personal information. This is also true for many of the successful online databases where one can get access to the stock market activities, look up something in an encyclopedia, make airline reservations or mail a letter with equal ease.[2]

2. Most information is supported through Advertising. (Approximately 75% of all consumer oriented information products in the U. S. are supported by Advertising.) [3]

3. The market is very mature and practical. It is driven by very pragmatic views about what a consumer will buy.

In a "free market" information is provided only when it is perceived that it will profitably cause a consumer to make a profitable purchase. It is driven by Advertising and promotion dollars focused on what are believed to be profitable target markets. Within these constraints information delivery systems will be developed only when enough producers can profitably match their goods and services with the perceived needs of a buying population. Without this match nothing happens!

At the other extreme is the centrally planned economy where information is more directly managed by a central government in the "public good". The profit and free choice is subjucated to the vision of the government central planners. Government funds replace the Advertising dollar and market choices are narrowed to those that are, in the governments view, in the best interest of the consumers. Under these conditions, delivery mechanisms can be quickly selected and

targeted without regard to their profitability. Therefore, to the degree that good selections are made the more centrally planned economies have an inherent short term advantage in commercializing new innovative delivery concepts and gaining early market share. The down side is that unless they are able to gain a controlling market share, technological changes may render the early entrants' information delivery systems obsolete. This makes the selection of delivery systems a very high stake affair!

I do not want this very brief and somewhat cavalier discussion of "free markets" and centrally planned economies to be interpreted as an endorsement of one or the another. Quite to the contrary, the discussion is only an attempt to highlight differences between the two social structures. A rational appreciation of the differences is important if we are to develop effective world wide information delivery systems that will adequately accommodate the needs of both structures.

The message I wish to assert at this point is that all nations do some planning and as with all situations those who plan best will do best. But the current rate of technological change associated with the stream of new information technologies makes planning even more difficult without impeding technological progress. Moreover, as new technologies come on stream it will become increasingly difficult to deal with the technological and market uncertainties and almost impossible to usefully assess the probabilities of technological maturity and market development. Standardization, as we have known it may no longer be possible. And the late entrant into the

information market may have an unprecedented advantage over the early entrant. This is because the late entrant may fortuitously capture a technology far superior to that already in place. Indeed, we may expect much more turbulence in the market place as new information technologies destroy the old. The rules of engagement are rapidly changing; and the past advantages of the more centrally planned economies may now be on the wane--at least in the information arena!

THE INFORMATION PROCESS

As we seek out new ways to deliver information we do well to remember that the information delivery process has been able to swamp the cognitive limits of the brain ever since the computer came on to the scene. The ability to deliver more and more data has delighted those who develop it and confounded those who have had to translate it into information. As yet the information industry hasn't learned how to effectively subtract data and deliver only the relevant information. When it does it will truly be a servant of mankind and not the enslaver.

I am sure we all know what the information process is. We've been living with it for years and have probably studied it. But just as I'm sure we all knew what the moon looked like before our space voyages, we all have a different feeling now that we have seen it close up. Well on the off chance that we may learn something about the delivery of information through a brief inspection of the process, I'm going to take you on a brief voyage.

For convenience, the information process can be broken down into five major activities: Mental or visual sensation of an event (the Source), Recording the event, Converting the record into retrievable formats, Outputting the converted record into useful media, and the Delivery of the information to the user/customer having an interest in the recorded event. Each of these, as we shall soon see, has its own set of supporting technologies that do not necessarily interface nor are they moving (changing) at the same rate.

SOURCE

The mental or visual sensation of an event is normally thought of as being limited to the five senses. While this is, indeed, true, in todays technology dominated environment we also need to be sensitive to the fact that much of the new and interesting information comes from the ability to enhance these senses. And, consequently the demand for information may be viewed as a function of the technologies used to sense it. For example, the electron microscope has greatly enhanced the ability to observe the activity of DNA, Bio-tech, electron mobility; and new space vehicle mounted advanced telescopes have similarly expanded our information base about outer space. The point is that the means by which an observation is made is an important element to include in the source creation so that in the final delivery system the user/customer can effectively discriminate between enhancement mechanisms used by the various sources. (This is not unlike a reader selecting an author of choice.)

RECORDING

The recording of the original source from the observed or sensed event must be done with the user/customer retrieval ability in mind. For example, if the observer is creating the source in one language but the user speaks another then the observer must arrange for translations (preferably machine automated or assisted). Or if the originator is providing a written source and the user is expected to retrieve it through electronic means, then a conversion process must be used or the originator must be encouraged to use another means that matches the retrieval capability of the user. The recognition of the need to match the creation media with the method of retrieval is an absolute necessity if we are to effectively internationalize the delivery of information. Moreover, as we shall see this matching process may be driven by the standardization of technology (or the lack of it). At the moment we are looking at a myriad of technologies that can be used for the creation of the source, these include: spoken, written or typed with or without computer enhancements through tape, disks (video, floppy, hard or soft) and light.[4]

CONVERSION

The conversion of the source information into retrievable formats is the usual next activity. Traditionally this has included: cataloging and indexing of bibliographic, abstract and full text information in both visual and electronic media (e.g.. catalogue cards and on and off line data bases/. However, this method is a hierarchy arrangement that requires that the retriever move

sequentially through the catalogues and indexes etc. Today the relational data base and the emerging elements of artificial intelligence promise new conversion methods that are far more powerful, especially when used with the read/write video disk. But at the same time, to be universally effective the conversion methods require a degree of standardization at the source that heretofore has not been necessary. For example, in order to use electronic mail from Personal computer (PC) to personal computer (PC) the information must be entered in a standardized format that is compatible with the transmitting and receiving protocols.

OUTPUT

Simply stated the output of the conversion process must be in the media and format carried by the the available delivery networks and be retrievable by the technologies available to the final users. Consequently, at the moment we are limited to: Paper, fiche, magnetic or paper tape, magnetic or video disk, optics and voice. From these we must select the media and formats that are most likely to reach our customer. They, in turn, are quite diverse and to a growing degree will use specialized distribution channels and formats. For example, more and more people are using their personal computers to access the many online data bases to satisfy their business and personal information needs instead of using the traditional libraries or newsletters. At the same time aggressive public and specialized as regional network nodes for online databases services. And in some cases larger specialized libraries in major transnational companies are developing their own data bases for the highly specialized needs

of their employees and in some cases even their customers. (But, even here we are beginning to see these libraries give way to the automated offices.) The larger scientific and technical societies and trade associations also are developing their own mix of information services. Federal, state and local governments too have recognized the need for information and have developed their own data bases and means of access to others.

In a sense one could say that the entire sequence of creating, recording, converting, outputting and delivering information is in a state of turbulence which at this time makes it impractical to create universal information delivery paths from the multitude of sources to the final users. Therefore, we must look carefully at the final users and determine how we can best serve those that make up the most profitable markets; or in the case of the more centrally planned economies, how they can best satisfy their strategic and tatical state objectives.

DELIVER INFORMATION TO WHOM?

In truth one could say that the information markets are unlimited. Indeed, there is are many who subscribe to the statement. And some have even gone so far as to say that the information market is the only one legal in all countries that provides a product or service that is intellectually addictive to almost all who sample it. If we are willing to buy into that statement then the key to success is to identify those who can be most profitably addicted.

On the way to identifying the profitable markets we must develop some selection criteria against which we can compare the relative merits of each market. Obviously size is one of the more important criteria. Another, not so obvious is the kind of decisions that are made by the user and the cost of making a bad one. The latter immediately would suggest that those who are involved with both corporate, health and government strategic issues would be likely target markets. However, these very costly decisions frequently require a degree of secrecy in the information acquision and manipulation that is not normally available without some extraordinary costs. For example, it is not too difficult with today's technologies for competitors to intercept streams of electronic information from one another and reverse engineer the information to determine with reasonable accuracy what the other is up to. Setting up counters to this kind of eavesdropping is a very costly process. This in itself suggests another market, that of creating a blind information collection capability that would obscure the identity of the final user. To a degree this is now being accomplished by speciality libraries and consulting organizations.

There are additional selection criteria that will help define our target markets. For example, we would want to know the needs associated with: (1) The data reliability and quality requirements; (2), The timeliness and completeness of the information; (3), The hardware and software used to retrieve the information; and (4), The concentration of the market in a given geographical area.

We also would want to know how the markets can be segmented. For

example, we can look at markets from the standpoint of the disciplines involved (e.g.. scientific, engineering, technical, economic, medical, meteorological, legal, financial or managerial). Or we can look at what the information will be used for (e.g.. strategic and tactical business decisions, research and development, education, maintaining an awareness, policy and planning or curiosity). And, obviously, we would want to know where these segments overlapped (e.g.. scientific with strategic and tatical).

Of equal importance to what has just been said about the markets themselves, is a determination of HOW the needed information will be delivered. The HOW is pretty much restricted by the available distribution and acquisition capabilities. These will range from the postal distribution of hard copies of the information to a local library or final customer to the telecommunication of the information in either abstract or full text form to a centralized distribution point or direct to the user. The latter approach obviously is dependent on the customers telecommunications and computer hardware and software, and the degree of standardization/compatibility between them.

History has demonstrated that the major markets develop along major transportation networks. These markets fall into the following general segments: Home, Business, Government, and Education. The overall needs of these four market segments are not significantly different. Albeit the means of retrieval and the emphasis on specific subject matter may be. For example, we can get a sense of the business information needs from a recent Fortune survey of the

distribution and application of personal computers in American firms. According to that survey PCs were found in: [6]

- o 57% of small to medium firms (less than 100 employees),
- o 73% of medium firms (100 to 999 employees);and,
- o 92% of large firms (1000+ employees)

The survey goes on to show the major PC applications, listed in descending order.

- o Financial analysis
- o Accounting
- o Administrative record keeping
- o Sales
- o Communication
- o Personnel
- o Engineering/scientific applications
- o Instruction/education

While this is a business oriented list, there are many similarities with the needs of most markets - even the home market. For example, the home market in the U.S. abounds with financial, accounting and stock applications. But it is doubtful that any beyond the home market has a strong interest in childrens' games. Moreover, there is a blurring and a general misunderstanding about the information needs of these markets. A short three years ago many thought that home banking would come on stream quickly, yet at least in the U. S. a paltry 100,000 currently bank from home [7]. Undaunted by this

discouraging figure, the industry looks for an increase to 10% to 20% by 1995. Yet in the United States less than 6% of homes have a personal computer and of those only 12% have modems.[8] That means only .72% of American homes can even participate in that market. One must anticipate that until the use of a home PC becomes more wide spread, the market will remain primarily a business dominated market with only a residue spillover to the home (e.g.. managing assets, and income tax preparation).

In contrast, the electronic information databases can and do provide a very broad range of specific and general information so that the business or home user can browse, select and then retrieve only what is wanted. There are specific data bases that target individual market segments (e.g.. MEDLINE for medicine, AGRICOLA for agriculture, ENERGY, CENSUS for demographic and general statistical information); and there are a number of very general databases that are collections of both specific and general information (e.g.. CompuServe, The Source, Dow Jones News/Retrieval Service). But these too are gaining a broader market popularity with those non professionals and occasional users who are finding that their jobs, livelihood and quality of life are more and more dependent on being informed on a broad range of subjects. This broadening of interest in all information sources can be expected to increase as the general awareness of the citizenry increases and their literacy level broadens. And perhaps of equal importance is the fact that as the associated technologies improve they drive down the costs of becoming well informed.

There is, however, at least one common denominator in all the electronic information markets. That is the need for integrated software that will both retrieve the information and support its manipulation and analysis without re-keying. And do so with ease! With over 2800 known public and private databases* many having their own protocols and telecommunications systems, hardware and software compatibilities, there obviously is a monumental job of standardization needed or an opportunity for a most innovative means for providing direct communication!

The answer to the question posed at the beginning of this section remains elusive. Many potential markets and segments have been suggested. At the same time it should be clear that the means for reaching any one of these markets/segments is primarily a function of the value of the information and that, no doubt, will vary unevenly from customer to customer and from boarder to boarder. In essence the WHOM in the title to this section is really anyone who can profitably be reached. And the reaching is a function of the ability of the provider of the information to create an acceptable means of information acquisition and delivery.

The provider just mentioned is the key to the creation of information delivery systems. It is a middleman who understands the needs of the users and the creators of information, and of equal importance the technologies needed or available to connect the two. In essence the provider today is the delivery system.

THE DELIVERY SYSTEM

With the whole world as the potential information market the development of a proprietary delivery system is probably beyond the practical undertaking of any individual firm or perhaps even any country. For example: As stated in the earlier discussion about the more centrally planned economies, if they pick the right information technologies and focus joint government/industry efforts they can accelerate their technology development and gain an early control of the market. Together the joint government/industry efforts perform the function of a provider (as mentioned earlier). As such, they can mandate a degree of standardization that free market economies normally would not tolerate. But, at the same time they run the risk of making their commitment too early in the innovation cycle and being saddled with a quickly obsoleting and isolated information infrastructure. Consequently, even under these joint government/industry arrangements there is a significant risk.

In contrast, the "free market" providers are private sector firms attempting to connect with the information needs of the customer. These providers exist in a highly competitive and currently low margin arena and probably find it entirely too risky to enter a market as aggressively as do the providers of the more centrally planned economies.[10]

In this environment, there is a good chance that world wide competition for the development and control of information delivery systems may become very destructive. The combination of entry

strategies (i.e.. acquisition, joint venture and in house development) may result in a generally unresponsive hodge podge of inefficient or even unuseable information delivery systems. Or it may generate such a high degree of specialization in the drive for niche market control that the use of the systems generated may be beyond the financial reach of most potential users.

But there is a way to avoid the risk of destructive competition through the creation of innovative arrangement making that will allow for the development of a delivery system that is universally acceptable and which allows for continuing innovation at both ends of the system. The delivery system would be analogous to the universality of electric wiring in a home or office which supports a myriad of appliances, communication devices, and pieces of office equipment at one end and several electric generation modes on the other (e.g.. oil, coal, nuclear, or solar).

For discussion purposes, lets look at how to improve the delivery of information from on-line electronic databases through the development and application of artificial intelligence and TCNQ (See footnote 4) technologies. These having been identified as offering the promise of being able to deal with nonstandardized information formats in a way that the user would never notice (e.g.. The method of communication will become totally transparent to the user.) and at the same time increase the communication speeds by a factor of 10,000.

Broadly, the objective is to so improve the attractiveness of

the on-line databases that most of the consumer information market can be reached more effectively and less costly than today. (In the United States alone this market approximates $80.0 billion.)

To do this we create what is called in the United States a General Partner (GP) who will be responsible for the creation and commercialization of the necessary technologies. (I am using a United States example because I am not familiar with the tax and organization laws of other countries.) The GP then goes to firms in other countries to execute what we call an option contract, say in the amount of $750,000 or some other acceptable amount or even value in kind, which would be put into escrow pending the outcome of the research. In essence this is a contract that says that the Option Buyers (O.Bs.) will put up an amount of money to guarantee the purchase/lease or otherwise acquire the developed (ready to be commercialized) technologies on a mutually satisfactory basis. The money would be payable only if the GP is successful in executing the requirements of the individual option contracts. (And then the funds could be used to offset the cost of acquiring the finished product.) This, then takes the risk out of the market -- the initial market is guaranteed. And if the G.P. is successful, then the O.Bs. will all have access to the universal delivery system and be able to provide proprietary innovations at either end.

The next step on the part of the GP is to enter into a contingency contract (based on the successful syndication of the Partnership) with the most promising Research Organizations (R.Os.) in the world. It would be their job to overcome the existing

technological barriers. This then guarantees as, much as possible, that the best people in the world will focus their capabilities on the resolution of the barriers. Additionally, the fact that these prestige organizations are willing to accept the contracts provides a degree of comfort to the solution of overcoming the barriers.

Now that the market and technological success have been assured as much as is humanly possible, the next step for the G.P. is to get the necessary funds to make it all happen. For our example let's assume that approximately $500 million is needed to carry out the research. To acquire this amount of funds for this kind of effort in the United States would not, at this writing, be difficult using the Research and Development Limited Partnership (RDLP) concept. [11] (See Figure 1) Under this concept the GP would syndicate the partnership to Limited Partners (L.Ps.) who in the U. S. economy would have compelling incentives to invest. Their role is solely that of an investor. They have nothing to do with any part of the management or operations of the RDLP---that is the exclusive responsibility of the GP.

This arrangement would ensure that the O.Bs. would get approximately $500 million of research without investing any money at all. (Remember, their funds are for the purchase of the successful research not for the conduct of the research.) Only if the research is successful will the option be exercised. Depending on the arrangement, the option funds could be applied to the purchase of the completed technology itself. If the research is not successful, then

the option funds will be returned to the G.Bs. from the escrow account.

This RDLP arrangement, or some other that takes the risk out of the research, can be applied to a whole family of technologies associated with the international development and commercialization of information delivery systems. Here the extent of our imagination is our only limitation.

RESEARCH AND DEVELOPMENT LIMITED PARTNERSHIP

(RDLP)

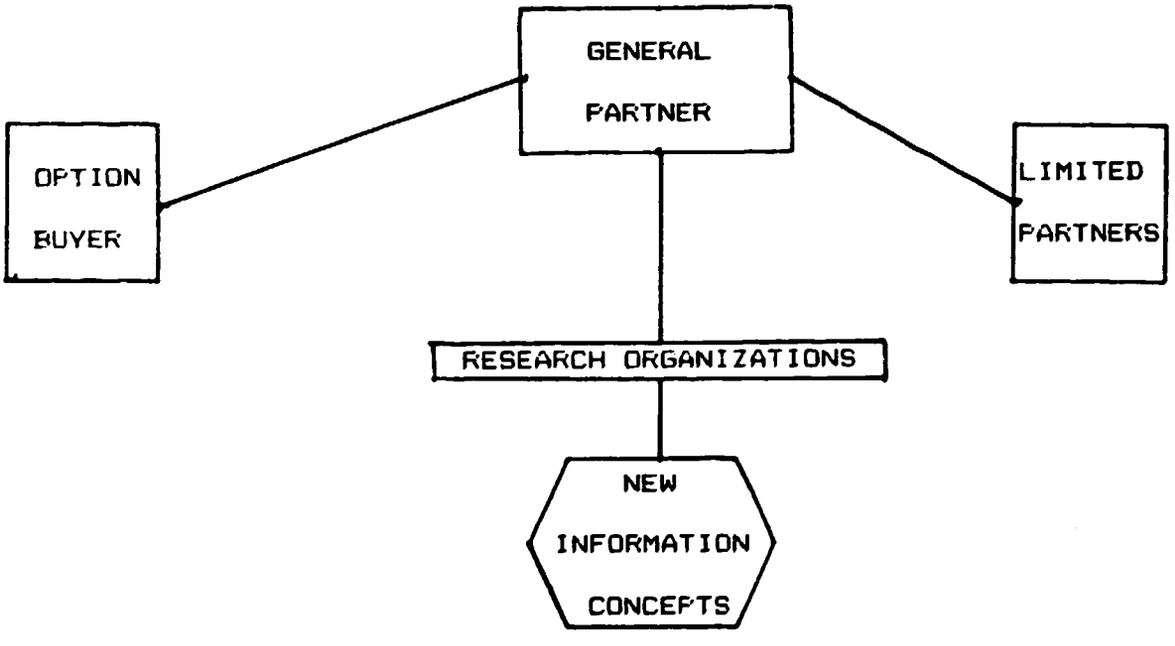

FIGURE 1

This is probably a good place to stop and summarize what has been said thus far. Simply put, the entire information arena is in such a state of turmoil that any projections about how information

may be best delivered in the near or long term is pure speculation with one exception. That is, if information is to be delivered to a very broad user base then there must be a far greater degree of standardization at the source, recording, conversion, and delivery than we have seen to date.[12] Moreover, any such standardization may, unless there is an extraordinary degree of enlightenment, prematurly freeze information and its supporting technologies and quickly render the users uncompetitive. For example, each industrial country has a different standard for their electric outlets. Consequently, consumer appliances and industrial goods must be specially adapted for export and import; thus making international trade more difficult than it need be. This further creates minor inconveniences that require an international traveler to have a set of adapters that will convert the "foreign" standards for electric outlets to the same standards that exist in the travelers home country. Note, the same thing can be said for driving on the left vs. on the right side of the road; 50 cycle current vs. 60; the fact that approximatly 70% of the Europesn telecommunications specifications are incompatable [13] and the variation of environmental pollution standards each industrial nation enforces. On balance one must say that there just isn't a good precedence for the degree of international standardization that is necessary for the world wide delivery of broad ranges of information. Therefore, I believe that the delivery of information will continue to be driven by the ever evolving technologies associated with materials, telecommunications, computers and software, especially artificial intelligence, and by the nationally supported levels of standardization that will artificially induce short term market demand. In spite of the fact that there are arrangement makings

conceps available that can create a win - win environment and bring the information age closer to the information consumers on an international basis, the past suggests that each nation will try do it themselves. Thus duplicating expensive research and development and severely suboptimizing a world wide information delivery network!

In light of these beliefs I will, nevertheless, attempt to do some informed forecasting regarding the future information delivery mechanisms.

A LOOK INTO THE FUTURE

One of America's early Presidents said, while in the middle of a very perplexing problem, something to the effect that it would be good to know where we are before we start to decide where we are going. Well, I think that's pretty good advice. So before going out on a limb about where we might be headed in information delivery, let's briefly review where we seem to be.

The industrialized countries have moved information processing out of the dark ages and into a world of unprecedented availability and turbulence. The speed with which the underlying computer, material and telecommunication technologies have moved have, in turn, collapsed electronic product life cycles to something less than three years. There is nothing that hasn't been changed! And each new technoloical discovery poses new and profound opportunities! For example, the 10,000-BPS modem (called Fastlink) is opening up a new array of possibilities for accurately speeding information over

existing telephone lines. Maybe graphics too![14] In-Search and Pro-Search are examples of software packages that make the task of developing online database search strategies and retrieving the desired information simple enough for the occasional user to economically use. (The communications and strategy execution are virtually transparent to the user.) Other software can be used to enhance the ability to download information from a mainframe computer to a mini or PC (e.g. CrossTalk, Transporter, or Smartcom II) by emulating terminals other than the one being used. And more recently, the Vapor Levistion Epitaxy can produce optoelectronic wafers at 10% of the current cost. Applications of that technology might even eliminate the need for modems as we have known them.

By 1984 the information industry sales were $13.8 billion excluding the revenues of: magazine and newspaper publishers, broadcasters, and producers of hardware and software.[15] 1994 estimates range from $330 billion to $1.0 trillion.[16] However, these revenues will accrue to those who successfully focus on the needs (not desires or wants) of current and future customers, solving their problems, and helping them manage for success.[17] As an example, let's look at what one of America's private mail services has done to better serve those who have time sensitive delivery needs.

SERVICE COMPARISONS[18]

TYPE OF LETTER	DELIVERY TIME	PRICE (other svcs)
Instant	Seconds	$1.00 (no competing
Four Hour	Hand delivered in	$30.00 ($70.00)

	four hours	
Over Night	Hand delivered by noon of following business day	$8.00
Next Da	Next business day	$2.00 ($9.35)

TABLE 1

In this example, the customers are those who have critical time constraints to get information from one location to another. The information composition is created, recorded, converted and output in machine readable format.

In general, the delivery of information has thus far been in step with the delivery of telecommunications receivers such as personal computers. And for the foreseeable future it will continue to be so. But, as the LDCs & NICs become recognized as potential world industrial powers they will also be recognized as one of if not the largest untapped market for information, and therefore computers. However these countries do not now have the electronic, and telecommunications infrastructure we find in the industrialized countries. Therefore, we may expect that with the proper incentives they may provide the market pull for new information delivery systems that otherwise would be impractical in a mature industrial economy. Moreover, many of the LDCs & NICs have a predisposition towards a centrally planned economy. Therefore, if they pick the winners, they could catapult themselves into world dominance in the information delivery arena.

In the industrialized countries we will probably soon see the Automated Office playing a more central role than in the past. As the supporting technologies come on stream the demand for timely information to operate world wide businesses will drive their growth.

As Office Automation applications expand we will find the Library community under considerable pressure, unless they are able to keep up with the knowledge management needs. The application of artificial intelligence that will permit natural language searching and retrieval will negate the need for the kind of cataloging, indexing and retrieval that libraries do so well today.

The major problems associated with the current need to re key information in order to analyze it will soon be a thing of the past. Driving it will be the Expanded Memory Specifications for personal computers.[17] These spec's require an unusual degree of cooperation among database and software developers. This will soon make it practical for simple data exchange without re keying.

The success of this meeting and the willingness of its participants to embark on new paths can, to a great degree, determine the course of our future. I personally believe we can do things together faster and better than apart. The opp nities for innovative arrangement making provided by the F . concept (or some other) are compelling reasons to carefully examine how the development of new information delivery systems could be influenced by the RDLF. (Over 250 RDLFs have already been syndicated for more then $2.8 billion.) The opportunity is here for the taking!

Bibliography

1. BUSINESS INFORMATION MARKET, Knowledge Industry Publications, April 1980.

2. CompuServ, 5000 Arlington Center Blvd. Columbus, Ohio 43220 (USA) is a good example of a broad based online database with a heterogenous collection of over 100 separate databases ranging from travel information to stock quotations and advisories, to cooking information and tutorials on how to start a new business.

3. IBID p. 6.

4. At the time of this writing a new optical mass-storage device was announced. It is called a: molecular electronic erasable disk and uses a tetracyanoquinodimethane (TCNQ) technology. Its developers expect full commercialization in two years.

5. Blanchard Hiatt perhaps said it better: "Universal information services means that network providers everywhere can give any customer any kind of voice, data or image service - even video - in any combination, any place, at any time, with maximum convenience and economy."

6. MANAGING THE PURCHASE AND USE OF PERSONAL COMPUTERS IN BUSINESS, in the July issue of SALES AND MARKETING MANAGEMENT, p122.

7. This is according to the consulting firm of INTERNATIONAL RESOURCES DEVELOPMENT.

8. TELEPHONE ENGINEER & MANAGEMENT, September 15, 1984, pp 116-117.

9. Williams, Martha E. "ELECTRONIC DATABASES". Science, v228, Apr. 26 1985. p 445-447.

10. The New York Times attempted to distribute its own databases. It is now distributed by Mead Data General. In contrast, Dow Jones started delivering a news database in 1974 under a joint venture with Bunker Ramo. This was so successful that Dow Jones bought out Bunker

Ramo in 1979. Both IBM & ATT seem poised for entries into the delivery arena, but their intentions are as yet unknown.

11. For further information about RDLPs write: D. Bruce Merrifield, Assistant Secretary for Productivity, Technology and Innovation, Room 4824, U.S. Department of Commerce, 14th and Constitution Avenue, N.W. Washington, D.C. 22030 and ask for: **Information and Steps Necessary to Form Research and Development Limited Partnerships, order # PB84-156058.**

12. In contrast, a good example of successful transborder standardization is the way music is created and delivered. The nomenclature standard for bars, notes, scales, etc. is accepted throughout the world.

13. Calonius, L. Eric, HANGING ON: European businesses eagerly await new state-of -the -art phone systems, The Wall Street Journal, Monday,September 16 1985 p. 78c.

14. 10,000-BPS Modem 'Breakthrough', InfoWorld. July 22, 1985, pp15-17.

15. Information Hotline, April 1984. pp 1 & 11.

16. Economist, November 30 1984, pp 93-98.

17. At this writing at least nine major firms have established a new corporate strategy for electronic distribution of information. They are: American Express, Dow Jones & Company, Dun & Bradstreet, Gannett Company, The General Electric Company, Knight-Ridder Newspapers, McGraw-Hill, New York Times Company, Readers Digest Association

18. Lambert, Steve. ONLINE: A GUIDE TO AMERICA'S LEADING INFORMATION SERVICES, 1985, Microsoft Press, Bellevue Washington. p 85.

19. LOTUS: Computing For Managers and Professionals, Lotus Development Corporation, Cambridge Massachusetts (USA) vol 1, no.5.