

# Networking Technologies and the Rate of Technological Change

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## ABSTRACT

Appreciating networking as a cultural phenomenon with substantial significance is the purpose of this paper. The technology networking employs is changing rapidly and possibly no issue has as significant implications to networking as the rate of change. As social phenomenon, ICT networking has a venerable history over the last 25 years. Centuries before ICT arrived at today's prominence, practices affecting the sharing of knowledge were established in European art institutes. Television's development, before the ICT of present day, was profoundly shaped by these knowledge principles. ICT networking in the present day is the basis of the Information Economy and produces positive results based on the global network's utility. Complex new societal and technological developments are, according to some experts, possible only with the networking of ideas. When technique skills, including networking abilities, are recognized as valuable, inclinations to monopolize these useful skills can occur. Imagination issues are now increasing networking's importance as a metaphor of the present.

Keywords: Networking, ICT, Internet, Information Economy, Cognitive, Technology, Globalization

## NETWORKING'S IMPORTANCE IN COMPUTER LITERACY

When computer learning begins several ideas occur for the computer learner's initial literacy development. Word processors, games, and networking possibilities are all options for initial computer learning activity. More sophisticated knowledge about how to use computers tends to develop from the early techniques the computer learner chooses. For the last 25 years, networking has attracted the first computer literacy efforts of many computer learners. Different network techniques have been prominent during these years, but the significance of networking in computer literacy development evidences the substantial importance of the networking phenomenon.

Economists attempting to explain the profundity of ICT similarly sometimes begin with explanations that emphasize networking. Networking improves transactions, and economists often emphasize transactions as the basis for economic interaction. Other economists discuss knowledge transfer and the valuableness of the knowledge commodity. Contemporarily, knowledge is the economic good that produces the information economy's unusual success. Networking is an essential phenomenon needed in explanations about how contemporary economics function.

Recent developments appear to have substantially increased the importance of networking in ICT explanations. The computer literacy skills to accomplish successful networking are more in demand now than ever. Technologies such as a fast, dependable broadband Internet have reestablished networking's importance. The amount of imagination and innovation in computer networking is currently as great as at any time in last 25 years. Networking's attractiveness results possibly from favorable analogies to the workings of a successful machine. Networking provide authentic encouragement from the purely computerized or machinery side of networking. The potential of ICT can be comprehended. Networking proves to be a powerful technique for maintaining a positive imagination about ICT.

## RESOLVING THE RATE OF TECHNOLOGICAL CHANGE IN ICT

All technologically oriented subjects are profoundly influenced by the rate of technological change. Technology only changes at an accelerating rate. Reviewing the development of ICT, the critical computer skill has often been aptitude in comprehending technological change issues. Substantial ICT aptitude has required an ability to explain how the field will change in a few years. Proficiency in ICT requires an ability to project changes. Many rational problems, also, exist in accepting technology that has substantial potential for rapid changes.

The phrase "Information Technologies Revolution" has been used to discuss the rapid change occurring in ICT. This phrase attempts to impress that ICT influence is pervasive. Indicating a revolutionary change is occurring conveys the meaning that the transformation of culture presently occurring is profoundly reaching everyone. The preponderance of authorities contend that while significant cultural forces are undeniably being produced, the phenomenon is not properly termed "revolutionary." Experts support the theory that ICT change is instead a type of economic reorganization. The extent of social transformation is thought to be significantly moderated by the economic system. How extensively ICT innovation reaches throughout society is questioned. The exact percentage of ICT enthusiasts is thought to be low and to encourage analyzing change as non-revolutionary.

Many authorities have agreed the transformation happening reflects the development of the information economy. The information economy, places more value on the knowledge commodity required to make technology work. Knowledge acquisition's importance distinguishes an information economy from proceeding forms of economic organization. The size of

firms in the information economy follow remarkably different knowledge. The valuableness of a small, medium or large firm tends to be indifferent. The size of the firm is not necessarily connected with providing essential information about how technology works. Similarly, vital know how for technology can emerge from all areas of the globe.

The rate of technological change in ICT has many profound implications, and the, rate of technological changes issues possibly exert more influence on politics than now realized. If as the information economist describes, the information to make technology work is vital, changing interconnectedness in networking vital knowledge can have substantial influence. As one increasingly believes that knowledge networking is vital to technology's success, one more readily imagines that changing interconnectedness could substantially affect politics. As ICT innovates in connecting people with know how, political situations arise around the exchange of knowledge having commodity significance.

Every few years, ICT innovates almost beyond recognition. Within three to five years, assumptions and understandings about ICT tend to be supplanted by new ideas. Ideas and perspectives that were virtually esoteric three years ago become common knowledge. The percent of people interconnected with ICT is steadily on the rise. Globalization of ICT is proceeding at a dizzying rate. Reality assumptions about ICT are quickly being revised.

Politics analyzes the increasing confrontation between global culture and local cultures. Throughout the world, political organizations are coming on-line. In many situations, the expectations of the politicians is to succeed with the electorate by explaining the implications of increasing globalization for their constituents. The ICT global interconnectedness phenomenon is larger, however, than politics. With technology changing all the countries throughout the world, the various centers producing explanations and concepts are multiplying each year. While politicians might like to stem the tide of on rushing ideas and cooperations, such a task would be truly sisyphian.

Politicians are required to establish themselves as brokers presenting the new global culture to constituents in ways that gain political approval. ICT innovations can present politicians with difficult situations. Attempting to present reality to the people about an unstoppable phenomenon occurring simultaneously throughout the world's cultures, can lead to substantial embarrassment. Political leaders may demonstrate a tendency to become provoked and to attack the basic global environmental change occurring in ICT. The possibilities for political dementia with regard to environmental change issues are authentic.

Reluctance to accept the globalization of culture and political values can be a source of great confusion in political reasoning about ICT innovations. Politicians can gain by conveying knowledge and understanding about changes occurring in the global environment to their constituents, but temptations to attempt to manage or control forces of globalization are

rules of reason due to the commodity significance of dangerous. When the American political machines began, traditional political leaders were reputed to provide a bucket of coal to their faithful to gain political support. In present day America, the successful politician regards ICT innovation similarly to the political leaders of earlier years. Today's politicians can gain in political support by bringing a bucket of knowledge and understanding about global changes occurring in ICT.

Ridiculing the substantial changes occurring in global interconnectedness is a possible blunder that could occur in the contemporary political system. Denying that new global realities are emerging from the transformation occurring in ICT lacks connectedness with reality. Ignoring new factors and variables introduced as a result of globalization of information, inevitably could fail to understand present social reality. A loss of popularity could result from not accommodating contemporary reasons from the global Internet community. Worse yet, politicians who ridicule the newly interconnected community might find themselves in doubtful conflict with the ICT phenomenon itself.

Attempts to ignore new political factors and participants could produce sad consequences for contemporary politics. The difficulties contemporary politicians may have with ICT is more substantial, however, because of the rate of technological change. The ICT astute politician need reasonably project how technological change will alter the political environment in a few years. The politician must be concerned with the relevance of today's policy positions as they pertain to various situations in the not too distant future. Politics might become trapped into policy dilemma's because of change issues to the detriment of the public interest. Some inherent conflicts may occur as the process of adjusting to rapid technological change proves excessively abrasive to local culture.

Resolving rate of technological change in ICT by imagining political situations is theoretically possible. Inevitably, politicians are going to interact somehow with the new innovations in ICT. Were one to attempt to explain possible scenarios involving ICT and politics a few years hence, some sense of the rate of technological change in ICT might be gained. The truth that would emerge if this techniques were utilized is that there are some substantial changes ahead for ICT. From the theoretical perspective, projecting political situations at five years intervals would require considerable technological acumen. Also, little doubt exists that these scenarios would authentically convey a sense of futurism in ICT.

Networking is another possible technique for resolving the rate of technological change in ICT. Cooperation among computer enthusiasts has for decades been a popular technique for gaining an appreciation of what is ahead in ICT. Networking is an excellent example of heuristic intelligence. When people network, they gather many different bits of information about the emerging reality in ICT. Using their heuristic aptitudes and

imaginations, networking enthusiasts learn to project how ICT innovations are likely to affect society a few years hence.

## **DEVELOPMENTS IN NETWORKING TECHNOLOGY**

Present developments in networking technology basically are in the direction of heuristic intelligence. A technique that valuably assist in projecting rational explanation forward from what is presently known is a heuristic technique. Often less is known about a subject than is desirable. Consider the subject of networking, itself, as an example. Experts would like to authoritatively elaborate the utility of ICT networks and reasonably discuss their future. Possibly, the process by which economic gain results from networking could be better described. Lacking exact data upon which to substantiate findings, heuristic techniques could be used to better explain future networking. With heuristic methods the theorist can reasonably fill in gaps and resolve unknowns in a theoretically acceptable manner. Results from heuristic methods could be a discussion of networking that is both pleasing and reasonable in explaining the usefulness of networking.

To appreciate present innovation in networking, we need consider how networking has developed. In the early phases of development, hosted exchange of messages provided many enthusiasts with their initial experience with computer networking. By 1980, the large information services had established special interest groups on their information services that encouraged interested persons to join and post messages on various subjects. To this day, technical support for various softwares and hardwares still utilize the interest group, message, and thread technique to provide technical support.

The large information service's special interest groups established the norms for computer networking. A message written by one interest group member in the early 1980's would likely evoke a response from numerous other participants in the interest group. Messages were, often, involved and emotional. People would write very personal reactions to almost nonsensical comments by others. People became personally involved with posting messages and reading threads because they were perceptive of strengths in networking. Messages provided additional fragments to the puzzle each person was attempting to solve about ICT.

During the years from 1983 to 1996, dial up BBS was the standard in computer networking. A BBS enthusiast would have a list of a dozen or more different BBS's that he would regularly connect with from his personal computer. A caller's modem software program could list dozens of BBS numbers dialable from his personal computer. The dial-up programs might list possible BBS connections locally, from geographically remote locations, and even from international BBS numbers.

With the BBS connection established, the accessor had numerous options. Messaging groups were present, and the caller could add messages to existing threads or possibly begin a new message thread about whatever subject interested. On-

line games were available allowing callers to test their computer game proficiency. The BBS feature most in demand, however, were subject matter area groups with graphics to be uploaded or downloaded. The accessor could choose a subject area from the BBS main menu, review text descriptions of available graphics and download those of interest. The BBS caller had the option of uploading his own graphics to the BBS. When the caller uploaded graphics, the uploaded files appeared in a list with a text description provided by the uploader.

For whatever reason, never before had images had the significance they attained with BBS. One cognitive explanation could be that callers were enthralled with the possibility of combining ideas obtained from graphics exchanges. Adding bits of information to a reality schemata from downloaded files proved very rewarding. The thrill of heuristic discover was undeniably present in BBSing and this may be what callers responded to positively.

Internet in present form with the browser was begun by 1994, and computer networking moved to the Internet. All techniques for networking including messaging and graphics exchanges moved from BBS to Internet. Internet was not, however, the same as BBS since the sense of group membership that pervaded early interconnected computing and BBS was substantially lost. New possibilities for networking were technologically feasible with Internet, and networking took many new forms after Internet's introduction.

Web conferencing was introduced as a result of the new technological capabilities of Internet. Internet conferencing could take several forms including synchronistic meeting programs, exchange of web cam pictures, and various chat formats. Although these networking ideas were more complex than their predecessors, they were similarly heuristic cognitive experiences.

The synchronistic meeting programs were hosted by a web server specialized in providing conferencing facilities. These programs created a meeting room environment on the host web server. Conference participants were provided a URL and ask to access the URL at a specified time. All attending were allowed to interconnect on the conference server's URL. Attendees' computer screens presented a representation of the conference room provided by the conference hosting company.

Web cams and chat rooms produced other Internet innovation in networking. Web cam conference programs are designed to allow several people to look at each other's video image and exchange conversation with audio connections. This conferencing technique, similarly, employs a conference hosting web server and a meeting room environment. Web cam enthusiasts pointed their browsers toward the conference hosting URL and chose a meeting room that matches their interest. Creating one's own meeting room for a select group of friends is possible.

Internet has supported all different types of chat room environments. In most cases, chat involves typing comments and waiting for typed responses from the other chat participants. Occasionally, chat rooms may be conducted with audio exchange between the participants.

These networking situations exemplify networking after Internet and the browser took over networking. All of these examples strengthened imagination about what is possible with interconnected computer networking. A cognitive phenomenon similar to that previously discussed occurs in these networking situations. Conferees are being encouraged to gather bits of information, gain in perceptions of reality, and allow their own imagination to fill in lacking or incomplete details. The pleasing nature of reasoning heuristically in these situations proves a rewarding cognitive experience.

Another recent Internet networking techniques with heuristic features is the subject area top list website. Top lists exist on hundreds of Internet subjects of all description. An example of a top list would be a top list of various providers of free softwares for pocket PCs. A free pocket PC software top list might include as many as a hundred or more different web sites making available free pocket PC software.

A free pocket PC software top list could rank order member websites in the order of the websites providing the most incoming hits to the main top list ranking page. Alternatively, a top list could be rank ordered according to the websites getting the most votes or hyperlink connections from the top list web page. If there were a hundred websites on the top list, their rank ordering would be determined by popular support with most popular websites ranked first. The top list reflects a group collaborative effort with all those joining in the venture of aggregating information about the subject matter in question. Cognitive skills at refining bits of data in the direction of an exacting discussion of reality are being developed by the top list networking technique.

## COMBINATIONS OF ICT AND NETWORKING

Sustaining the imagination necessary to complete an ICT project is probably the significant objective of juxtaposing concepts about ICT and networking. The eventual possibilities of ICT are unknown to the present day. There are, however, an abundance of science fiction scenarios for ICT's development. Whatever developments are ahead, the imagination for substantial ICT innovations need be sustained. Combining ICT and networking effectively improves understanding of an enterprise project and takes advantage of all possible opportunities to sustain the imagination about completing tasks and projects successfully.

The ICT and networking designer could possibly gain in appreciation of problem solving by the interaction of assumptions, misassumptions, and reality in the building of the cathedral at Chartres. O'Rourke, Fishman, and Selkow encourage ICT designers to ponder the problems encountered in the completion of a great cathedral such as Chartres and analogize problem solving from this situation to the design of ICT architecture. (O'Rourke, pp. 61-72)

Chartre, as an example, convinces of the importance of assumptions in completing a project even though some prove untrue. O'Rourke et al. emphasize that even faulty assumptions have a substantial influence on the completion of a great

project. These authors purport a technique that carefully analyzes erroneous assumptions about how something is to be accomplished. A discussion about the final project schemata, utilizing this technique, adequately includes both assumptions and misassumptions. Writing in the management information field, these authors are primarily concerned with making technology work effectively. O'Rourke et al. place emphasis on attaining successfully functioning computer technology. These authors' idea is computerist and duly impressed with successful computing.

The town of Chartres, situated at a crossroads ninety kilometers from Paris, lost the town's old church to fire in 1134. A leading cleric, Abbott Suger, surveyed the ruins and saw opportunity to build a great Gothic church upon the ruins of the old church. Abbott Suger had three major reasons for wanting to build a new church at Chartres:

- Chartres was a major crossroads
- The site was prepared
- Craftsmen could get there

Abbott Suger was an articulate person with the ability to persuade both the Holy See and the King to support and fund the building of the new church.

When deciding to build this great cathedral, Abbott Suger made the following assumptions:

- The church and royalty will provide adequate funding for the entire project, provided as needed.
- The building processes were understood and had been mastered.
- The building site was perfect and prepared.
- The French craftsmen could provide an adequate supply of workers with the correct skills required to do the tasks at hand.
- A complete understanding of the order and duration of each step of the building process existed.
- Everyone wanted this great cathedral, so support would be ongoing until completion. (O'Rourke et al., p. 60)

Abbott Suger's assumptions represented "the complete spectrum of information that should be made explicit in any project." Each of these assumptions had significance in the completion of the cathedral. Not all Abbott Suger's assumptions were, however, correct. (O'Rourke et al., p. 64)

Misunderstandings included the satisfactory nature of the building site. Building the new cathedral on a hill eventually significantly complicated completing the construction. Moving heavy materials uphill prove difficult, and the seasons

complicated the task even more as snow in the winter was impassable and as spring rains turn the roads to quagmires. Hauling materials uphill became virtually impossible during winter and spring producing serious delays in construction.

The site of the former church proved unsatisfactory as new construction began to settle into the earth. The expected soundness of the foundation proved a dismal myth. The west portal of the cathedral had to be disassembled, a foundation of cement laid, mortar scraped arduously from each block, and the portal rebuilt. This mistake in construction added fully two years to the completion of the cathedral. (O'Rourke et al., p. 65-66)

At the present time, attempts to create global complex ICT networks go forward. Some of the assumptions experts currently have about networks may eventually prove untrue. Nevertheless, these assumptions about networks could prove to be the shaping factors that lead to the creation of future innovations in network infrastructures. In many ways designers of network infrastructures confront tasks much as Abbott Suger confronted in the building of the cathedral at Chartres. While all the difficulties network infrastructure designers must eventually resolve are unknown, something can be gleaned about the eventual shape of their efforts.

#### **ARE NETWORKING PRACTICES LIKELY TO BECOME MONOPOLISTIC?**

This paper's analysis basically supported that the trend to increase the number of people involved with networking is inevitable. Another mechanism affecting networking need be discussed, however, to appreciate why network size may finally fail to increase. Whenever a technique appears to have significant economic value, the increasing network size principle appears overridden by monopolization of technique. Valuable techniques have tended to be monopolized to keep economically promising ability in the hands of a limited number of people.

Knowledge monopolies need be considered. Harold Innis, the father of modern communication studies, repeatedly spoke of the "knowledge monopolies" that were created by important technological change (Postman, 1993, p. 9). The monopolies issues associated with Internet development tend to make networking techniques somewhat esoteric. The networking developments with most profound implications for eventual ICT networking may be cloaked so as to limit involvement in the development processes. Internet knowledge manipulation practices are not completely dissimilar from past experiences. In assessing Internet's development, one cannot ignore the contentiousness of the monopoly explanation.

Knowledge transfer has historically been concerned with the establishment of specialized knowledge. Art institutes and academies have over many centuries been the guardians of the knowledge surrounding new techniques. Attempts to establish monopolies over new techniques in knowledge transfer can be found in several areas of human activity including painting and television. Development of networking techniques in knowledge transfer are likely to similarly follow

monopolist practices. In ICT, monopolistic practices in networking can involve making techniques esoteric to the point of discouraging additional entrants into the field.

Knowledge monopolies have been discussed as profoundly influencing Internet's development. Reasoning from the literature about knowledge transfer phenomenon in art to Internet indicates the possible importance of knowledge monopolies. Bignamini and Castelnovo write about the establishment of the academies of art in Florence and Rome during the second half of the 16th century. These academies made significant changes "regarding the creation, selection and transfer of theoretical and visual knowledge". The Florentine Accademia del Disegno was created in 1563, and the Roman Accademia di S. Luca established in 1593. Both of these institutions eventually offered educational instruction (Bignamini and Castelnovo, 1998, p. 225).

Subsequently, academies were established in France and England. The French Academie de Peinture et de Sculpture established in Paris in 1648 was renowned for effectiveness in selecting models for artists and in other ways imposing itself on artists. The Royal Academy of Arts was established in London in 1768; however, unlike European institutes London's Royal Academy supported itself with paid subscribers and tickets and catalogs sold at annual expositions. All artists could submit their works to Royal Academy exhibits unlike the continental practice which allowed only academy members to exhibit. The English art institutes did, however, control the artist's career similar to the custom of European art institutes (Bignamini and Castelnovo, 1998, pp. 229-233).

The examples of art institutes indicate Internet's development may have a propensity to become dominated by those who have control of technical and artistic skills. From the Renaissance onward, advances in knowledge transfer have become jealously maintained. Considering Internet in 2004, one need reasonably consider whether anticipated developments in networking are likely to occur in the direction of ever larger networks. The success of Internet since the advent of the browser in 1994 has been substantial enough that practices similar to the early art institutes may be dominating knowledge transfer phenomenon and somewhat restricting network size.

When Innis wrote about "knowledge monopolies" created by important technologies, his television reasoning had implications for today's Internet. Television is a famous example with high-paying, gratifying careers "for executives, technicians, newscasters, and entertainers"; These people promoted their own interests while improving television's importance (Postman, 1993, pp. 9-10). Possibly, television obtained an unqualified acceptance only by protecting the few who had the knowledge to make the media work. The jealousy with which Internet developers maintain their skills could astound ICT prognosticators. Some of the innovations in networking and ICT may remain esoteric for decades because economic incentives encourage the monopolization of economically powerful techniques.

## IS NETWORKING OR ICT TECHNOLOGY THE SOURCE OF ECONOMICALLY USEFUL IDEAS?

The amount of money invested in ICT supports that something economically useful is happening in the computer phenomenon. Several explanations are readily provided for the economic utility of computers. Productivity gains are thought to occur because computers allow more work to be accomplished quickly. Another possible source of economic gain from computers is their ability to improve overall confidence in an enterprise. With enough information technology, people work more confidently and accomplish more productive effort. Computer equipment can cause clients of a business or agency to be more trusting and respectful of the concern with whom they are doing business. ICT can produce better cooperation and more profitable results.

Compare these several reasons for economic gains from ICT with the positive economic consequences thought to occur from networking. In any transaction, the objective is for buyer and seller to quickly agree on terms that both believe to be mutually advantageous. Each new member in a network increases the probability that such a favorable agreement between buyer and seller can be achieved.

The amount of economic gain occurring from networking is difficult to estimate. There are, of course, ordinary transactions in business occurring over the Internet. As a percentage of the economic gains from networking, however, reduced transaction costs must be only a tiny fraction of overall economic gains occurring from networking.

Attempting to explain where the major economic gains are from networking causes analysis of the valuableness of global culture. Knowledge transfer from the global Internet community to various locales has economic utility as global culture is economically sounder in resolving problems. Internet networking is a demand-pull phenomenon and local culture demands more interconnectedness. Networking occurs globally over Internet because there is an authentic economic demand for useful knowledge found on Internet.

The substantial economic gain produced by Internet networking occurs because of the valuable knowledge that is transferred from global Internet to various localities throughout the globe. Knowledge is the economic good Internet provides through networking that enhances economic conditions globally. The economic utility of knowledge transfer allows positive occurrences in economies everywhere.

The economic significance of Internet networking can be analyzed from Table One. The data presented in Table One is Internet access data collected by this paper's author. The access data in Table One presents the number of Internet accesses for various geographic regions January to March 2004. As the data indicates, substantiating that Internet networking is occurring globally can be accomplished. The data presented in Table One evidences networking reaches throughout the globe.

In evaluating the economic significance of networking, Table One presents a perspective on Internet emphasizing the amount

of knowledge transfer taking place. Estimating the economic significance of Internet networking with Table One causes some revision of ideas in the direction of substantial knowledge transfer producing salutatory affects. While Table One only records Internet access data collected by this author, the data presented causes one to believe that were all the data about Internet accesses analyzable, a very substantial transfer of knowledge globally would be found to occur.

**Table One**  
**Globalization of Internet January-March 2004**  
**Data from author maintained websites**

<b>Top Geographic Regions</b>		
	<b>Geographic Regions</b>	<b>Visits</b>
1	North America	140,246
2	Western Europe	94,752
3	Region Unspecified	26,508
4	Asia	11,085
5	Eastern Europe	4,971
6	South America	4,357
7	Australia	4,177
8	Region Not Found	3,415
9	Northern Europe	2,434
10	Middle East	811
11	Pacific Islands	680
12	Southern Africa	463
13	Northern Africa	352
14	Caribbean Islands	339
15	Central America	203
16	Western Africa	24
17	Eastern Africa	19
18	Central Africa	1
<b>Total for the Geographic Regions above</b>		<b>294,837</b>

## AS A METAPHOR, IS NETWORKING'S SIGNIFICANCE ON THE DECLINE?

If one follows the Zachman Framework for enterprise architecture in analyzing networking's significance, this phenomenon can be seen to be substantially important. Despite all the various networking techniques that have been introduced since the information services began computer messaging in the early 1980's, networking's significance as a field of computer literacy is probably on the increase. Zachman perspective on enterprise architecture could be discussed as an awareness that enterprises succeed because of the combining strengths of numerous contributors to the venture. Problems or difficulties in concepts or ideas from any one source are almost certainly surmounted as the imagination to succeed with the enterprise project emerges from several points in the overall scheme of project production.

Zachman's emphasis upon collaboration and sustaining enterprise project objectives provides substantial encouragement to those who believe networking is an inevitable

activity in ICT development. The futurist is left with little doubt that ICT networking may be improving and perfecting repertoires of behavior that could be critical in sustaining future ICT development. The more complex the ICT edifice, the more accustomed designers need become to allowing crucial concepts to be supported from wherever possible in the production process. (O'Rourke, 2003, pp. 10-11)

Networking's metaphorical strength is based upon outsourcing critical imagination. ICT gains significantly in experience with how to support concepts from networking experience. In the information economy, the crucial commodity is the knowledge to make technology work. Whether this knowledge emerges from nearby geographically or from remote locations on the globe does not matter. What has importance is that somehow the knowledge is obtained to make the technologies succeed as intended.

Networking strengths goes beyond the present day, however. ICT networking is teaching a recombinant intellectual process that may well be required to support conceptual development in more advanced ICT situations. The cognitive skills being acquired from present day networking with ICT are probably the basic building blocks required to sustain concepts and imagination in future ICT development.

#### NETWORK ENTHUSIASTS AND FUTURE NETWORKING DILEMMAS

Whenever a new techniques has powerful potential, all sorts of adherents are likely to be attracted. Any revolutionary idea may even attract a substantial number of people who would use the technology questionably. Concern, about questionable uses of ICT appears present today. Because of the global reach of ICT

technologies, a proportionally greater amount of attention may be directed at removing questionable ideologies from ICT. As a factual observation, networking is substantially concerned with how techniques are shared. Technology transfer is intended only for those with adequate political values. Those who would propagate disorder are actively discouraged by realities of computer networking, at present.

Network enthusiasts may well control the future of ICT and networking. Whether ICT and networking remains a demand-pull phenomenon, probably depends on the amount of active involvement shown by enthusiasts. Significant interest in ICT and networking globally is likely to continue to shape future networking realities.

The extent to which networking enthusiasts like and are involved with their activity is probably the critical determinant of change in networking over the future decades. Networking enthusiasts are a powerful positive influence in excluding questionable uses from future ICT developments. Network enthusiasts look to be powerful influences successfully opposing questionable ideologies and attempts to promote disorder with unusual uses of ICT. ICT appears to have a reasonable future because of network enthusiasts. Substantial changes in networking could occur rapidly without undue concern because developments in computer networking since 1980 have placed much emphasis on political values.

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