WIRED CITIES

SHAPING THE FUTURE OF COMMUNICATIONS

EDITED BY
WILLIAM H. DUTTON
JAY G. BLUMLER
KENNETH L. KRAEMER

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CHALLENGES FACING RESEARCH ON WIRED CITIES

Ronald E. Rice

Ronald Rice served as rapporteur for a roundtable discussion of directions for future inquiry. Chaired by Jay Blumler, the panel included Denis McQuail, Seisuke Komatsuzaki, François Gerin, Mitchell Moss and Toshihiko Murata. Rice organizes and expands upon points developed in the roundtable. He outlines basic definitional and analytical groundwork that must be laid for empirical research on wired cities to progress.

The preceding case studies and conceptual overviews of wired cities reveal considerable diversity. This diversity includes the technologies implemented and discussed, the research approaches, the political foundations, the criteria for success and the population of users in the wired cities as well as the users of the case study reports. We should, of course, celebrate this range of interests and foci. But such differences as exist are not always made explicit, nor in fact do they include all the possible approaches that might be useful. This chapter responds briefly to these two points; it will suggest that certain assumptions or emphases be made more explicit, and that certain topics be considered in future research on advanced wired cities. In particular, it will concentrate on two sets of variables—the analytical perspective taken and measures of quality of life—that would expand research activities, and three variables—success, interactivity and information—that require more explicit definitions.

ANALYTICAL PERSPECTIVES

Kling and Scacchi (1980) have suggested that analysts, users, implementers and managers can take six perspectives when analyzing the impacts of computers. Three are considered as examples of *systems rationalism*; each of these assumes the possibility of consensus, common values and agreed-upon goals. These are (1) rational analysis, which emphasizes cost efficiency and routine tasks; (2) structural analysis, which emphasizes organizational characteristics; and (3) human relations, which emphasizes individuals' satisfaction in the achievement of organizational goals. Three perspectives are considered as examples of *segmented institutionalism*. Each of these assumes a pluralism of goals and values, resulting in conflict as well as different, changing agendas. These include (4) interactionism, which emphasizes how actors develop and negotiate their own meanings for technologies; (5) organizational politics, which emphasizes how actors maneuver to protect or acquire organizational resources; and (6) class politics, which emphasizes social stratification and struggles over the control of the means of production.

This sixth perspective has been argued frequently by what has been called the critical approach. Theorists and activists loosely allied under this banner often contend that in order to understand the uses and consequences of communication, a theory of society and social structure is required. That theory is frequently represented by Marxism, but need not always be. There are now considerable precedents for taking this approach in the analysis of telecommunications technology. Variables of interest to this perspective include concentration and conglomeration in various telecommunications industries, technological dependency, cultural commercialization, the privatization of information and transnational domination.[1] These are social and international issues of the highest order, but are not often conceptualized as variables to be studied; nor are they often specifically studied in funded research projects.

While these six general perspectives have been developed as tools for understanding how computers have been used and have had impacts, particularly in organizations, they may profitably be used as categorical variables in understanding how advanced wired cities have been developed and how they are perceived and governed. For example, a local cable systems operator may view proposals for expanded community service from a system's rationalism perspective—How can the technology be matched to current infrastructure and market to provide cost-effective service?—while local political groups may view the service from a segmented institutionalism perspective—What new social identity may underprivileged groups have, particularly if they can gain access to production facilities?

These perspectives may be applied as subcategories for both the policy planning process and for the study of social impacts of the particular wired city. Further, different projects may be compared on these perspectives to see how different governments and societies place more or less value on them. Applying or at least identifying these perspectives may help make more explicit the underlying assumptions of researchers as well as designers, politicians and citizenry of each project. It may also lead analysis further into the background of a given wired city, focusing, say, on the goals of corporate funding or how concepts of progress and technology play a role as motivating symbols.

There are, of course, other sets of perspectives that may be useful to identify and apply. Certainly economic/political philosophies—free market, government monopoly, trade oligopoly, nonprofit—must be made explicit. Other sets of perspectives, such as primary motivation for implementation—marketing of surplus telephone capacity (in the case of early Canadian videotex systems) or providing social services (in the case of the National Science Foundation-sponsored cable studies)—should be made explicit. In general, identifying different perspectives of different advanced wired cities would facilitate a clearer understanding of *comparative* advantages, impacts and insights between different sites. This differentiation would help avoid the uninformed tendency of some American literature to group all northern European systems together.

QUALITY OF LIFE

Certainly any change as grand as wiring a city is likely to influence the nature and quality of life for those who live and work in the area. As in social science in general, and in the literature on development in particular (and we might gain some insights by looking at the growth of a wired city as an example of economic and social development), qualitative variables measuring changes in quality of life or work are often underemphasized (Rogers 1976). This is partially a measurement problem—How do you measure happiness or community well-being?—but partially it is due to an emphasis on technological and economic, rather than human, aspects of change. Research on advanced wired cities has an opportunity to incorporate advances in assessing how pervasive communications technology affects our living situations.

The Japanese, especially under the influence of Professor Ito, have made strides in treating quality of life as a major variable (Ito 1981). Some have criticized their approach as too quantitative, e.g., by calculating measures such as words-per-distance-per-time for each medium, and

comparing diverse media on this common indicator. But these analyses do establish trends and have been used to compare different societies as to their preferences for different communication channels. At the time of his death, Ithiel de Sola Pool had just finished an analysis of U.S. information flows that used the measures developed by Ito and others. A related set of measures would include categorizing information workers.[2]

As part of each advanced wired cities project perhaps a standard set of indicators could be collected to build up a comparative database. One specific outcome would be to see whether differences across societies are largely products of differential access to technologies and different stages in technological development, or whether they are due to cultural differences. For example, Ito's research shows that Japanese use a variety of media to a much greater extent than do Americans. Even if the specific indicators are not used, the process of eliciting measures of quality of life in different communication contexts would be useful to sociologists as well as to politicians.

On a less grand scale, indicators of quality of working life have been developed and should also be considered in advanced wired cities research. There tends to be an emphasis on the whole society or the whole city in current wired city studies, whereas organizations and individuals working in them will also certainly be influenced by the communication infrastructure available. Definitions of, and effects upon, quality of work life are the direct analogies of quality of life at the higher, social level of analysis. We are more fortunate here in that the literature on organizational and work traits leading to improved satisfaction, productivity and social interaction is rather rich. We know, for example, that variety in skills and tasks, and increased control over the task, lead to greater work satisfaction, though not always to increased organizational productivity (Rousseau 1977; Nicholas 1982). It would be useful to identify any changes in the organizational communication environment due to changes in the nature and design of work. In this way, organizations could have a better idea how to apply or constrain external infrastructures to improve their internal conditions.

Further, by taking into account quality of life as a variable, advanced wired cities research also has the opportunity to expand the nascent studies of teleworking. That is, one potential impact of information technology is to enable people to accomplish their tasks independent of the location of their employer. Teleworking, or telecommuting, has a wide range of benefits and disadvantages (Nilles, Carlson, Gray and Hanneman 1976; Olson 1982), but research on the topic has rarely gone beyond the anecdotal. Developing measures of quality of life that apply to social as well as to organizational life would facilitate an understanding of the

changes involved in shifting one's work from the office to the home (or to local information centers).

Certainly one of the most important work life measures has to be employment level, both overall percentages and occupation-specific percentages. The question of the impact of computers and communication technologies on employment has been hotly debated since the advent of mainframes, with considerable research by unions and critics of office automation. But exact causation has been hard to determine, and the issue has reached the policy agenda primarily only in European countries. Again, archival and longitudinal monitoring of labor statistics should be a common component of studies on advanced wired cities. Cross-tabulating these numbers with quality-of-life indicators and categories of information work, as mentioned above, would go a long way toward specifying the exact nature of employment effects due to telecommunications changes.

VARIABLES REQUIRING GREATER DEFINITION

A careful reading of the preceding chapters will reveal another research issue of concern: the dynamic, contextual and sometimes vague definitions attached to central concepts in this research. Three, in particular, deserve attention. They are the nature of project success, interactivity and information itself.

Success

Several major videotex studies have just been completed, ranging from Florida to New Jersey to Columbus to San Diego to outer space (Time Inc.'s failed satellite-delivered teletext service). Even with shared access to the same results (such as amount of use, subjects' satisfaction with the service, expected willingness to pay and preferred content categories), different researchers, vendors and policymakers still disagree on whether the trials were successes or failures (Rice and Associates 1984, Chapter 5). That is, there are few accepted criteria for success in ventures such as public telecommunications systems or wired cities.

One aspect of success has to do with whether the trial continued after the point at which initial research funding ended. Did the technological system become a part of the social and economic system, or did it last only as long as someone else supported it? From this viewpoint, many major systems must be seen as failures. But from the criterion of increased public awareness and insights gained into system design, content preparation and marketing, most must be seen as successes.

For another example, it is really misleading to trumpet the early death of microcomputers just because not everyone owns one and because they are not used a lot in the home even if bought. Different technologies have very different diffusion rates, for at least somewhat understandable reasons. As discussed earlier in this book, the telephone took 75 years to reach 50% penetration, and cable has yet to exceed 40% penetration. On the other hand, radio and television diffused rapidly. But in the first case, benefits of the technology are more or less linked to how many others are using the system, and both cable and the telephone require physical infrastructure linking users to service providers. Radio and television, on the other hand, can be enjoyed individually, and once a broadcasting facility is available, there is little need for extra infrastructure other than the individual's set. Microcomputers are perhaps a mix of these attributes. Further, it is inconsistent to establish some level-of-use criterion not applied to other major technologies, such as the automobile or the typewriter. How many hours a day must these be used at home before they are considered successful?

One way to gauge success would be to measure people's expectations of telecommunications systems, before and after they are made available. In this way, we can understand whether a project failed simply because users' expectations were too unrealistic; we can also note how expectations change with increased exposure, and we can determine at what point expectations are being met and whether they are being changed. Both of these are alternate indicators of success. There are precedents for this approach, largely in the study of office automation.

Interactivity

The positive social benefits of new media and advanced wired cities are often based upon a characteristic of these systems known as interactivity, i.e., the fact that they can facilitate two-way communication, which differentiates these technologies from more traditional mass media. Yet the term *interactive* is loosely used and rarely operationalized. It may serve well enough as a symbolic term, indicating the fact that there is at least some level of user control over and above choosing which television channel to watch or which newspaper to buy. For the average user, this may be sufficient.

But insofar as there is a continuum linking static, one-way media such as a printed book to dynamic, simultaneous multiuser media such as community computer bulletin boards, research would do well to define the level of interactivity available in the system.

There are several schema for setting the levels in the continuum of interactivity. The criterion of artificial intelligence would require that a system's interaction with a user is indistinguishable from that of another person's. Bretz (1983) argues that only systems in which interactant B can respond on its own to interactant A should be considered truly interactive. Naturally, this would exclude all videotex systems. A less stringent criterion would require only that interactant A have the ability to send messages that are operated on by the system and have effects on the system's output. This criterion would allow interactive videotex systems, but would exclude teletext systems. A lower level, requiring only that interactant A be able to select a set of content possibly unique from that of other users, would include teletext systems but of course would exclude one-way cable systems. The lowest level might only require the possibility of feedback—either from interactant A to system B, or some message from B tailored to user A.

A further specification of these levels might involve the amount of unique information (larger storage systems on teletext services would increase the possibilities for unique user content) or the amount of simultaneously responding interactants (larger computer conference systems would be considered potentially more interactive). Insofar as interactivity has until recently been the province of interpersonal communication, the new media have created a fuller continuum between interpersonal and mass communication; this stands in contrast to the former discrete distinction between these forms of information exchange.

Specifying the level and extent of interactivity inherent in identifiable segments of a wired city would make categories such as benefits and consequences more useful for later planning and policy purposes. Only by knowing that one system uses downstream cable and upstream telephone while another uses two-way cable can we arrive at the generally substantiated conclusion that, for most learning purposes, the former system is as effective as the second (and much simpler, cheaper and more accessible). Thus, the notion and operationalization of interactivity should be better defined in future research.

Information

The most central concept of advanced wired cities research, the nature of information and its distribution, should be considered a candidate for closer scrutiny and better operationalization. But indeed the attributes and applications of information are sufficiently different from those of material goods or energy that different economic and social policies must be designed to take advantage of this resource. We are by now familiar with most of these attributes of information, such as its variation in value being a function of its usage by more people, its timeliness, ownership, and nontangibility.

Consider just one implication of these attributes. One of the major assumptions underlying the development and support of AT&T as a regulated monopoly was the notion of a nationwide communications network as a social good; that is, universal service had wider benefits than just the profits accruing to the owners of the service. This concept of information access as a social good, generating benefits to communities or societies as a whole, and not only to specific owners of technology or information, is still controversial.

Taking into account possible social benefits when designing systems or making policy about systems access does have significant consequences. For example, international funding and telecommunications agencies slight most rural telecommunications systems because they do not generate the revenue that urban systems do. These urban systems have dense communication traffic, creating high cost-effectiveness ratios. Now, in the design models behind such systems, invested cost is minimized. But this cost is purely private (or institutional), and the return on investment is also stated in terms of capital returned to the funding agency. The social good stemming from rural access to good telecommunications infrastructure—such as increased participation in political decision making, improved quality of life, better contact with relatives or with markets, which generates increased travel or business sales—is not figured into the design models. When they are, the actual system design may come out differently. In wired cities, for example, information services such as cellular radio and low-powered television clearly have social benefits over and above private benefits, but the current regulatory environment ignores mechanisms that might support these social goods.

Another aspect of information is that it is theoretically independent of material form and therefore may be obtained in several different forms and through several different channels. Thus, the development of a variety of media systems in advanced wired cities will create new forms of competition among media—for advertising dollars, consumer spending, programming and consumer leisure time. Thus, the nature of information requires that we look not only at the impacts *of* new media, but also at the impacts *on* new and old media.

SUMMARY

Future research on advanced wired cities should consider expanding and specifying some of the variables measured and analyzed in such projects. This suggestion is motivated by the fact that many of the most important variables are still ambiguous, vague or nonstandard in many projects, and by the fact that some important variables may not be receiving sufficient attention.

Three classes of variables were considered. The first included analytical perspectives. There are multiple ways to observe and interpret a given set of results, and research should at least be explicit about its particular perspective. The second class included quality-of-life indicators. A healthy attention to matters of satisfaction, happiness and welfare, in addition to the typical survey variables, would go a long way toward humanizing both the implementation and the evaluation of advanced wired cities systems. The third class included variables that seem to lack sufficient specificity or operationalization, especially when they are crucial to the meaning of wired cities. Success, interactivity and information are the buzzwords of wired cities, but they often serve as signposts rather than maps.

There are, of course, other issues that research on wired cities could consider, particularly in methods and design. Some of these include (1) standardization of questionnaires across sites and cultures; (2) analyses that specifically measure and describe *processes* rather than just *differences* across time periods (when, in fact, time is considered at all); (3) network-analytic methods that identify patterns of information exchange and interaction structures; and (4) more explicit identification of levels of analysis in research projects.[3] By the very nature of the associated technology, social systems and subtle consequences, advanced wired cities researchers may feel that broad case studies and aggregate surveys, with traditional but loosely defined variables, are the accessible tools for the job. Yet the growing number of research sites, and the growing body of research on these advanced wired cities, are generating a need and an opportunity for rich, wide-ranging and rigorous studies. The future of research on such social systems is bright and exciting but presents current approaches with a challenge.

NOTES

1. Fombrun and Astley (1982); Mosco (1982); and Schiller (1982).
2. Categorizations have been developed by Machlup (1962), Bell (1976), Porat (1978) and Schement and Lievrouw (1985).
3. These are discussed in Rice and Associates (1984, Chapter 4).

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