7 INFORMATION TECHNOLOGY, DEMOGRAPHICS, AND THE RETAIL RESPONSE

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This chapter is organized into three broad sections. The first details the demographic matrix of 1995; America will be a much more mature nation, a middle-aged society predominantly "paired and nested." The era of explosive labor force growth will have passed—a period of labor force shortage will have arrived. Decentralization and deconcentration trends will continue at regional and metropolitan levels, but older regions—presently typified by New England—may secure increasing vigor. And the demographic and economic parameters of the 1990s indicate a far more receptive environment for technological innovation.

The second section highlights a much more difficult task—forecasting technological impact. The demographic matrix of the balance of the century is relatively "certain" within general boundaries, but there are relatively few technological imperatives with such vigor as to support instant judgment. An overview of the evolution of retailing in America provides an insightful example of the complexities at work.

The concepts of stasis and inertia versus the forces of change unleashed by technological innovation are the subject of the final section. Journey to work—the linkage between residence and workplace—is evaluated, along with the notion of the "electronic cottage." The impact of the information era may portend households free of spatial ties as they work at their dispersed electronic residences—with information commuting, not people. But just as shopping malls flourish in the face

of electronic retailing, so too will the office remain viable. People will not want to be isolated from other people. Thus the impact of technology must be viewed through a matrix of societal elements that will shape its eventual spatial distribution—and settlement patterns as well.

DEMOGRAPHIC PARAMETERS

The confusion between sequence and causation is a hazard of the social sciences. We are dependent upon past relationships for forecasting the future. When these relationships alter—or if they are coincidental in time rather than descriptive of immutable linkages—the predictive failure can be very costly indeed. We are much more competent as historians than as futurists.

This stipulation is essential as we project demographic realities to come. It is made even more significant when we attempt to interpret the applications of communications and information technology both present and anticipated.

In the first domain, for example, it is chastening to observe the demographic forecasts of yesteryear. In the depths of the Depression, the consensus of learned forecasters, typified by the 1933 Hoover Commission Report, envisioned a population peak of 145 million people in the United States in the 1980s (President's Research Committee on Social Trends 1933).

The post–World War II baby boom (1946 to 1964) was completely unanticipated in both its scale and its longevity. The rapid increase in reproduction was matched only by its precipitous decline. The subsequent baby bust of the post-1964 years was equally unforeseen. We have moved from national population projections for the year 2000 of more than 300 million to a consensus of 265 to 270 million (Sternlieb, Hughes, and Hughes 1983). The former was a function of the fertility rates of the 1950s; the latter, of their abrupt reduction in the 1960s and early 1970s. In retrospect, the tendency for straightline extrapolation based on "clear trends" among the nominally learned is all evident.

There are, however, three basic demographic phenomena that can be forecast with a reasonable degree of certainty. They revolve around the powerful dominance of the baby boom cohort moving through its life cycle with enormously consequential societal repercussions; the maturing baby bust generation, introducing the concept of shrinkage at each stage of its life cycle; and the rise of the elderly—as yet much more

a function of longevity than of a unique size of cohort. These three phenomena will dominate our population change through the balance of the century. Anticipations of their future ramifications feed back even now to our vision of social issues to come.

From an *areal* perspective, there are also three seemingly immutable processes of our time: decentralization, particularly evident in the dominant settlement artifacts—the major industrial cities—of a century we now realize ended with World War II; suburbanization and exurbanization, which has resulted in a continuous broadening of the concept of metropolitan areas; and regional shifts—that is, the transfer of population and economic activity typically from the Northeast and Midwest to the South and West. So consequential has this last element been, as to raise a number of statistical anomalies—that is, the rise of cities and metropolitan areas as the new growth areas thicken up, and of vast conurbations, perhaps mislabeled metropolitan areas, growing in size while their older forebears decline.

Bounding these elements—and at one and the same time both dependent on them and serving as accelerants as well—are transformations of the American labor force, and technological/economic functions as well. The demographic dynamics, summarized subsequently, set the basic stage for the future.

The Population Context

The United States is passing through the pressures exerted by the enormous increments of population growth that have characterized the post–World War II era. From 1950 through the mid-1980s, our population increased by nearly 60 percent (Sternlieb, Hughes, and Hughes 1983), but this is a process that is now slowing. The baby boom upsurge of the 1950s, marked by an 18.5 percent population increase nationally between 1950 and 1960, gave way to the baby bust era of the 1960s and 1970s, with decade population increases on the order of 13.4 and 11.4 percent respectively. The dynamics set in motion over these last three decades will dominate the demographics of tomorrow. *Much of the adaptation and receptivity to new technology and information systems will be shaped by them.*

The stress points of the 1970s are illustrated in the age structure data of Table 7–1, which highlights the reduction in the absolute number of children under the age of fourteen years in the 1970s (the baby bust

Table 7–1. Total Population Age Structure, U.S. Total Population (Including Armed Forces Abroad): 1970 to 1983 (Numbers in thousands).

			Change: 1970 – 1980			Change: 1980 – 1983	
	1970	1980	Number	Percent	1983	Number	Percent
Total	205,052	227,704	22,652	11.0%	234,496	6,792	3.0%
Under 5 years	17,166	16,457	– 709	– 4.1	17,826	1,369	8.3
5 to 13	36,672	31,080	– 5,592	–15.2	30,116	– 964	– 3.1
14 to 17	15,924	16,139	215	1.4	14,633	–1,506	– 9.3
18 to 24	24,711	30,347	5,636	22.8	30,148	– 199	– 0.7
25 to 34	25,324	37,593	12,269	48.4	40,334	2,741	7.3
35 to 44	23,150	25,882	2,732	11.8	29,492	3,610	13.9
45 to 54	23,316	22,737	– 579	– 2.5	22,342	– 395	– 1.7
55 to 64	18,682	21,756	3,074	16.5	22,219	463	2.1
65 years and over	20,107	25,714	5,607	27.9	27,384	1,670	6.5

Sources: U.S. Bureau of the Census, *Statistical Abstract of the United States: 1984* (104th Edition), Washington, D.C., 1983; U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 949, *Estimates of the Population of the United States, by Age, Sex and Race: 1980 to 1983*, U.S. Government Printing Office, Washington, D.C., 1984.

generation), with a decline of more than 6 million; and the enormous growth of young adults in the twenty-five to thirty-four years of age range (the maturing baby boom), who increased by half. Indeed, nearly all of the population increment of the 1970s was in the twenty-five to forty-four years-of-age sector (20.6 million out of 22.7 million). The growth in older Americans barely compensated for the loss of the young.

The three basic propulsive forces were thus made evident in the 1970s: the sheer size—and now the aging—of the baby boom generation; the continued growth in the elderly; and a relative dearth of new, young adults on the horizon. While the baby boom echo, as a function of the sheer size of the cohort at risk, is illustrated by the resumed growth in the under-five years of age population between 1980 and 1983, it is but a shadow of the earlier vitality that produced its parents.

Presented in Table 7–2 are the age structure shifts projected from 1983 to 1990 and then through 1995. By that terminal date, the demographic profile of America is dominated by the aging of the baby boom generation. Over 73 million Americans will be between thirty-five and fifty-four years old—a dramatic expansion without parallel in our past. Its companion—a shrinking number of young adults—is indicated by the relatively small increments in their historic absolute number. And the much-feared accession rate to the elderly will be substantial, but it will really only become dominant in the next century.

America of 1995 will be a much older nation, with its population concentrated in middle-aged to near-middle-aged groups. It will be much less dominated, at least from a numerical point of view, by the youth orientation of past decades. It should be noted in this context that, subject to changes in immigration flow, population projections to 1995—at least for people over the age of ten—are relatively secure in scale. The demographic matrix of the next decade has already been set in place.

Regional Population Shifts

Of considerably less certainty are future regional settlement patterns. In the 1970s, accelerated population growth in the South and West on a national scale brought with it a new vocabulary, of Sunbelt and Frostbelt, to the general media. But more significantly, it represented the visible product of the long-term pyramiding of successive technological innovations.

Before the turn of the century, F.J. Kingsbury (1895) isolated three factors portending significant changes in the population distribution

Table 7–2. Population Projections by Age, U.S. Total Population (Including Armed Forces Abroad): 1990 and 1995 (Numbers in thousands).

			Change: 1983 – 1990			Change: 1990 – 1995	
	1983	1990	Number	Percent	1995	Number	Percent
Total	234,496	249,731	15,235	6.5%	259,631	9,900	4.0%
Under 5 years	17,826	19,200	– 1,374	– 7.7	18,616	– 584	3.0
5 to 13	30,116	32,183	2,067	6.9	34,443	2,260	7.0
14 to 17	14,633	12,940	– 1,693	–11.6	14,071	1,131	8.7
18 to 24	30,148	25,777	– 4,371	–14.5	23,684	–2,093	–12.0
25 to 34	40,334	43,506	3,172	7.9	40,489	–3,017	– 6.9
35 to 44	29,492	37,845	8,353	28.3	41,994	4,149	11.0
45 to 54	22,342	25,391	3,049	13.6	31,378	5,987	23.6
55 to 64	22,219	21,090	– 1,129	– 5.1	20,951	– 139	– 0.7
65 years and over	27,384	31,799	4,415	16.1	34,006	2,207	6.9

Note: Census Bureau Middle Series Projection.

Sources: U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 922, *Projections of the Population of the United States: 1982 to 2050* (Advance Report), U. S. Government Printing Office, Washington, D.C., 1982; U.S. Bureau of The Census, Current Population Reports, Series P-25, No. 949, *Estimates of the Population of the United States, by Age, Sex and Race: 1980 to 1983*, U.S. Government Printing Office, Washington, D.C., 1984.

between the city and its surrounding countryside—the trolley, the bicycle, and the telephone. Each of these entrants into American life was seen as expanding the periphery of urban settlement. Kingsbury perceptively suggested that alterations in society's course are often underlaid by the pyramiding of seemingly unimportant and inconspicuous developments into forces of major consequence.

Current modifications of America's demographic evolution have been facilitated by the same general categories of technological innovation recognized by Kingsbury—public and private transportation and communications. Advances in air transport and dry-bulk cargo shipping, the Interstate Highway System, and the increasing sophistication of place-independent computer linkages—have served substantially to homogenize time and space, and radically alter patterns of connectivity.

Predecessors of these innovations gave impetus to the suburbanization process in earlier decades. In the 1970s they advanced to the national scale and facilitated increasing disparities in interregional population growth. And the processes at work have propelled themselves into the 1980s. In Table 7–3 we have shown the changes in the regional distribution of America's population from 1980 through 1984. The conventional wisdom of population shifts to the South and West at the cost of the Northeast and Midwest is still valid. Roughly 90 percent of all of America's population growth in the first four years of the 1980s was in the former areas; the latter, at least from an aggregate demographic perspective, remained virtually static.

The pattern of change from mid-1983 to mid-1984 indicates a potential break from the past. The slowing down of the natural resource economy—of the mineral base of Texas and the Rocky Mountain areas—introduces new uncertainty. Wyoming, for example, actually lost population, but this may be only a recession-borne blip. The new information economy, however, may be much less resource-dependent than its predecessor. The world economy that it makes possible further deepens the problems of those domestic areas whose raison d'etre rests on suddenly challenged bases. The copper states are depressed by both fiber optic cables and alternative mineral exploitation throughout the world.

The future will hold equally significant and equally unanticipated developments. In the early 1970s, New England was still considered an economic laggard, depleted by the loss of its historical industrial mainstays over the preceding half century. Spearheaded by new innovations, the information and technological era has reversed New England's economic fortune. Although its 1980 to 1984 population growth still lags the nation, a base for future growth has been established.

Table 7–3. Estimates of the Resident Population of States, July 1, 1983 and 1984 (Including Armed Forces Residing in Each State) (Numbers in thousands).

Region, Division, and State	*Estimate*		April 1, 1980 (Census)	Change, Number	1980–84 Percent
	July 1, 1984 (provisional)	July 1, 1983			
United States	236,158	234,023	226,546	9,612	4.2
Northeast	49,728	49,502	49,135	592	1.2
New England	12,577	12,486	12,348	228	1.8
Middle Atlantic	37,151	37,016	36,787	364	1.0
Midwest	59,117	58,890	58,866	251	0.4
East North Central	41,601	41,478	41,682	– 81	–0.2
West North Central	17,515	17,412	17,183	332	1.9
South	80,576	79,637	75,372	5,204	6.9
South Atlantic	39,450	38,852	36,959	2,491	6.7
East South Central	15,028	14,931	14,666	362	2.5
West South Central	26,098	25,854	23,747	2,351	9.9
West	46,738	45,994	43,172	3,565	8.3
Mountain	12,553	12,348	11,373	1,180	10.4
Pacific	34,184	33,646	31,800	2,385	7.5
New England					
Maine	1,156	1,145	1,125	32	2.8
New Hampshire	977	958	921	56	6.1

Vermont	530	525	511	18	3.6
Massachusetts	5,798	5,763	5,737	61	1.1
Rhode Island	962	956	947	15	1.6
Connecticut	3,154	3,139	3,108	47	1.5
Middle Atlantic					
New York	17,735	17,663	17,558	177	1.0
New Jersey	7,515	7,464	7,365	150	2.0
Pennsylvania	11,901	11,889	11,864	37	0.3
East North Central					
Ohio	10,752	10,736	10,798	− 46	−0.4
Indiana	5,498	5,472	5,490	8	0.1
Illinois	11,511	11,474	11,427	84	0.7
Michigan	9,075	9,050	9,262	−187	−2.0
Wisconsin	4,766	4,746	4,706	60	1.3
West North Central					
Minnesota	4,162	4,144	4,076	86	2.1
Iowa	2,910	2.904	2,914	− 4	−0.1
Missouri	5,008	4,963	4,917	91	1.9
North Dakota	686	681	653	34	5.2
South Dakota	706	699	691	15	2.2
Nebraska	1,606	1,596	1,570	36	2.3
Kansas	2,438	2,426	2,364	74	3.1

Table 7–3. continued

Region, Division, and State	*Estimate*		April 1, 1980 (Census)	Change, Number	1980–84 Percent
	July 1, 1984 (provisional)	July 1, 1983			
South Atlantic					
Delaware	613	606	594	18	3.1
Maryland	4,349	4,299	4,217	132	3.1
Dist. of Columbia	623	623	638	– 16	–2.4
Virginia	5,636	5,556	5,347	289	5.4
West Virginia	1,952	1,962	1,950	3	0.1
North Carolina	6,165	6,076	5,882	283	4.8
South Carolina	3,300	3,256	3,122	178	5.7
Georgia	5,837	5,732	5,463	373	6.8
Florida	10,976	10,742	9,746	1,229	12.6
East South Central					
Kentucky	3,723	3,713	3,661	62	1.7
Tennessee	4,717	4,676	4,591	126	2.7
Alabama	3,990	3,961	3,894	96	2.5
Mississippi	2,598	2,581	2,521	77	3.1
West South Central					
Arkansas	2,349	2,325	2,286	63	2.7
Louisiana	4,462	4,440	4,206	257	6.1
Oklahoma	3,298	3,310	3,025	273	9.0
Texas	15,989	15,779	14,229	1,759	12.4

Mountain					
Montana	824	815	787	37	4.7
Idaho	1,001	987	944	57	6.0
Wyoming	511	516	470	42	8.9
Colorado	3,178	3,416	2,890	288	10.0
New Mexico	1,424	1,399	1,303	121	9.3
Arizona	3,053	2,970	2,718	335	12.3
Utah	1,652	1,618	1,461	191	11.0
Nevada	911	897	800	110	13.8
Pacific					
Washington	4,349	4,302	4,132	217	5.2
Oregon	2,674	2,658	2,633	41	1.6
California	25,622	25,186	23,668	1,955	8.3
Alaska	500	481	402	98	24.4
Hawaii	1,039	1,018	965	74	7.7

Source: U.S. Bureau of the Census, *Commerce News*, CB 84-233, Public Information Office, Washington, D.C., December 28, 1984.

Will a similar path be open to other aging industrial regions? The Sunbelt-Frostbelt disparities of the 1970s were linked to shifting energy costs and the obsolescence of the industrial infrastructure of the past. But the age of energy "shortfalls"—and with it the rush to Texas and the mountain states—may be over, raising questions as to the long-term pulling power of these areas. The new information era has not only resurrected New York City as the national—and now worldwide—financial capitol, but it has also given it much greater potency, challenging the role of the "regional cities." The inertia of past spatial demographics will be continually challenged as the future economy unfolds.

Long-term shifts of population—and with them, jobs, residence place, entertainment facilities, and all the infrastructure of modern-day life—render obsolete old facilities in left-behind areas and demand an accelerated level of new capital provisions in the high-growth areas. With them comes the capacity—at least the potential—for crest-of-the-wave innovation, for the employment of new means of communication and transportation that do not face the competition of the already-in-place infrastructure of the older sections of the nation. One out of four houses built in the South dates from 1970 or later—the equivalent for the Northeast is one in ten (Sternlieb, Hughes, and Hughes 1983).

Central City Population

The subject of population change and the concomitant alteration of economic functions in central cities is an enormously complex one. In our own estimation, we do not see the pattern of population decline, shown in Table 7–4 for selected cities from 1950 to 1980, altering markedly in the future. The long-term nature of the forces underlying this decline makes this evident.

The development of the horse-drawn streetcar in the late nineteenth century was the initial instrument that stretched the city beyond its circumscribed pedestrian limits. The ability to transmit electricity from a central power station to a moving vehicle, and the development of an efficient electrical streetcar motor, further accelerated movement to the countryside. The diffusion of the telephone and advances in the transmission of electricity economically, including the switch from direct to alternating current, also facilitated population decentralization. At the same time, they also permitted *employment* centralization, increasing the number of people who could be gathered at a central locus within a fixed period of time.

Table 7–4. Population Change, Selected Cities—1950 to 1980.

City	1950[a]	1970[b]	1980[c]	Change: 1950–1980		Change: 1970–1980	
				Number	Percent	Number	Percent
Boston	801,444	641,071	562,994	−238,450	−29.8	− 78,077	−12.2
Buffalo	580,132	462,768	357,870	−222,262	−38.3	−104,898	−22.7
Chicago	3,620,962	3,369,357	3,005,072	−615,890	−17.0	−364,285	−10.8
Cincinnati	503,998	453,514	385,457	−118,541	−23.5	− 68,057	−15.0
Cleveland	914,808	750,879	573,822	−340,986	−37.3	−177,057	−23.6
Detroit	1,849,568	1,514,063	1,203,339	−646,229	−34.9	−310,724	−20.5
Minneapolis	521,718	434,400	370,951	−150,767	−28.9	− 63,449	−14.6
New York City	7,891,957	7,895,563	7,071,030	−820,927	−10.4	−824,553	−10.4
Newark	438,776	381,930	329,248	−109,528	−25.0	− 52,682	−13.8
Philadelphia	2,071,605	1,949,996	1,688,210	−383,395	−18.5	−261,786	−13.4
Pittsburgh	676,806	520,089	423,938	−252,868	−37.4	− 96,151	−18.5
St. Louis	856,796	622,236	453,085	−403,711	−47.1	−169,151	−27.2

Sources: U.S. Bureau of the Census. *County and City Data Book, 1956* (A Statistical Abstract Supplement), U.S. Government Printing Office, Washington, D.C., 1957; and U.S. Bureau of the Census, *Commerce News,* "Three Cities of 100,000 or More At Least Doubled Population Between 1970 and 1980, Census Bureau Reports," CB81-92, Public Information Office, Washington, D.C., June 3, 1981.

[a]April 1, 1950 Census.
[b]April 1, 1970 Census.
[c]April 1, 1980 Census.

The advent of widescale automobile ownership after World War II merely accentuated the suburbanization process. It permitted the working-out of long-standing social desires that had been evidenced in the late 1920s. The data of Table 7–4 were virtually preordained by the technological introductions of a half century before.

At present, despite much publicity, the often-heralded return of older suburbanites and Yuppies to the central city simply has not occurred; future demographics, particularly the slowing growth of household formation, are a distinct negative. *The homogenization of space—and increasingly of time—available through information technology has made much of the historical functions of the older core areas obsolete or, at best, opened them to very substantial and increasingly successful competition.* The major dynamics of dispersion and decentralization made possible by the technology of yesterday can only be accentuated by future innovation; within this latter context, there is little, at least on the horizon, that is unique and specific to central cities and might provide them with a new surge of competence and pulling power.

Household Change

The impact of technology is a function of the societal matrix that serves as a shaping device. Within this context, the shifts in America's household configurations are particularly important. The 1970s were the years of nominally unorthodox households—singles and "mingles"—and a relatively slow growth in traditional married couples. Overall, however, there was an enormous expansion in the number of American households. Housing buying power, at least in the beginning of the 1970s, was relatively high—a variety of household types, therefore, had the capacity to seek out independence. The future, however, in our own estimation, will be quite different.

In Table 7–5 we have projected household growth increments by age, type, and tenure, from 1983 through 1995. (The 1983 and 1995 totals are presented in Tables 7–6 and 7–7.) The pattern is one that reflects the maturing of America. First and foremost is a decline in the scale of household formation—absolute household growth will average only 1.2 million per year in the early 1990s as compared to 1.7 million in the 1970s.

Secondly, and equally evident, is the continued dominance of ownership. Again, this has significant ramifications for the adoption of new

Table 7–5. Projected-Household Growth Increments: By Age, Type and Tenure: 1983 to 1995 (Numbers in thousands).

	OWNER HOUSEHOLDS					
		Family Households			Nonfamily Households	
			Other Family			
	Total	Married Couple	Male Householder	Female Householder	Male Householder	Female Householder
All Households	11,038	8,005	251	1,031	624	1,124
Under 25 years	– 184	– 117	– 13	– 12	–30	–15
25 to 34	44	34	– 1	11	15	–16
35 to 44	4,742	3,809	114	448	250	120
45 to 54	3,839	3,011	105	389	164	171
55 to 64	–609	– 439	– 21	– 44	–21	–84
65 years and over	3,206	1,709	67	238	244	948

	RENTER HOUSEHOLDS					
		Family Households			Nonfamily Households	
			Other Family			
	Total	Married Couple	Male Householder	Female Householder	Male Householder	Female Householder
All Households	3,417	1,247	96	734	563	778
Under 25 years	– 811	– 318	–17	– 118	– 192	– 166
25 to 34	39	57	–12	2	2	– 10
35 to 44	2,089	854	74	539	414	209
45 to 54	1,155	460	46	228	231	191
55 to 64	– 146	– 55	–11	– 11	– 38	– 31
65 years and over	1,092	249	17	94	146	585

Source: CUPR Household Projection Model.

technology. On the one hand, owners may be more desirous—or perhaps even more capable—of long-term capital investment in their domicile. A second, and perhaps less salubrious (from the viewpoint of technological innovation, at least), element is the decline in renter households. While not precisely coterminous with multifamily housing—it is

Table 7–6. Owner and Renter Households by Age and Type, U.S. Total: 1983 (Numbers in thousands).

	OWNER HOUSEHOLDS					
		Family Households			Nonfamily Households	
			Other Family			
	Total	Married Couple	Male Householder	Female Householder	Male Householder	Female Householder
All Households	54,494	38,853	1,195	4,427	3,513	6,507
Under 25 years	1,097	759	47	80	163	49
25 to 34	8,985	7,060	162	553	872	338
35 to 44	11,149	8,895	263	1,103	589	299
45 to 54	9,525	7,499	240	929	401	456
55 to 64	10,519	7,709	210	777	440	1,383
65 years and over	13,219	6,929	273	986	1,048	3,982

	RENTER HOUSEHOLDS					
		Family Households			Nonfamily Households	
			Other Family			
	Total	Married Couple	Male Householder	Female Householder	Male Householder	Female Householder
All Households	29,423	11,055	821	5,043	6,001	6,504
Under 25 years	4,597	1,670	152	727	1,071	977
25 to 34	10,119	4,377	254	1,812	2,175	1,501
35 to 44	4,871	1,997	178	1,222	970	504
45 to 54	2,829	1,109	111	588	553	468
55 to 64	2,555	893	74	346	562	680
65 years and over	4,451	1,009	51	348	670	2,374

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, No. 388, *Household and Family Characteristics: March 1983,* U.S. Government Printing Office, Washington, D.C., 1984.

indicative of relatively modest increments in large-scale, physically integrated housing configurations—this may have some limiting impact in adoption of large-scale, centrally located innovation.

Unlike the 1970s, household growth will be dominated by married couples—typically two-worker households—concentrated in the thirty-five to fifty-four year old householder age segment. At least in historic

Table 7–7. Household Projections by Age, Type, and Tenure of Households, U.S. Total: 1995 (Numbers in thousands).

	OWNER HOUSEHOLDS					
		Family Households			Nonfamily Households	
			Other Family			
	Total	Married Couple	Male Householder	Female Householder	Male Householder	Female Householder
Under 25 years	913	642	34	68	135	34
25 to 34	9,029	7,094	161	564	887	322
35 to 44	15,891	12,704	377	1,551	839	419
45 to 54	13,364	10,510	345	1,318	565	627
55 to 64	9,910	7,270	189	733	419	1,299
65 years and over	16,425	8,638	340	1,224	1,292	4,930
TOTAL	65,532	46,858	1,446	5,458	4,137	7,631

	RENTER HOUSEHOLDS					
		Family Households			Nonfamily Households	
			Other Family			
	Total	Married Couple	Male Householder	Female Householder	Male Householder	Female Householder
Under 25 years	3,786	1,352	135	609	879	811
25 to 34	10,158	4,434	242	1,814	2,177	1,491
35 to 44	6,960	2,851	252	1,761	1,384	713
45 to 54	3,984	1,569	157	816	784	659
55 to 64	2,409	838	63	335	524	649
65 years and over	5,543	1,258	68	442	816	2,959
TOTAL	32,840	12,302	917	5,777	6,564	7,282

Source: CUPR Household Projection Model.

terms, these are people moving into the peak income-earning years, with a greater capacity for capital investment. Time will tell whether they have as much desire for crest-of-the-wave "electronics" as they exhibited in the 1970s. At least the more youthful among them are children of the electronics age, already shaped by casual ease of access to the computer; this, combined with personal means, may yield a

much greater level of adaptation to the era of high technology than we have yet seen.

Labor Force Constraints

Changes in the labor force may well be the most important manifestation of the demographic matrix, both in terms of the economy of tomorrow and of technological adoption as well. The United States from 1970 through 1982 was unique among its principal overseas trading partners in terms of total civilian employment growth (Table 7–8). While it expanded in the brief twelve years by more than 25 percent (almost 21 million jobs), it was actually declining in Germany and Great Britain. Even Japan's performance—an 11.6 percent growth rate (6 million jobs)—was dwarfed in comparison.

The level of capital investment in production facilities in the United States was severely impacted by this phenomenon. The costs of money in the 1970s increased very substantially; at the same time, labor was relatively freely available—and, particularly at unskilled levels, relatively cheap. The temptation to maximize the use of the latter—and minimize the former—was pervasive.

Table 7–8. Total Civilian Employment in the U.S., Four Largest European Nations, and Japan: 1970 to 1982[a] (Numbers in thousands).

			Change: 1970 to 1982	
	1970	*1982*	*Number*	*Percent*
United States	76,678	99,526	20,848	26.5
Four largest European countries, total	89,290	88,920[b]	– 370	– 0.4
France	20,320	20,980[b]	660	3.2
Germany	26,100	25,090[b]	–1,010	– 3.9
Great Britain	23,780	22,460[b]	–1,320	– 5.6
Italy	19,090	20,390	1,300	6.8
Japan	50,940	56,857[c]	5,917	11.6

Sources: Norwood, Janet L. 1983. "Labor Market Contrasts: United States and Europe." *Monthly Labor Review* 106, no. 8 (August): 3–7 (for U.S. and Europe); OECD, *Labor Force Statistics: 1969 to 1980,* Paris, 1982, and Quarterly Supplements (for Japan).

[a]Includes self-employed, other non-payroll, and agricultural employment.
[b]Preliminary.
[c]Third Quarter.

to 1995.

	Labor Force (in thousands)					Participation Rate				
	1970	1980	1982	1990	1995	1970	1980	1982	1990	1995
Total, age 16 and over	82,771	106,940	110,204	124,951	131,387	60.4	63.8	64.0	66.9	67.8
Men	51,228	61,453	62,450	67,701	69,970	79.7	77.4	76.6	76.5	76.1
16 to 24	9,725	13,606	13,074	11,274	10,573	69.4	74.4	72.6	74.7	74.5
16 to 19	4,008	4,999	4,470	4,123	4,043	56.1	60.5	56.7	62.3	62.9
20 to 24	5,717	8,607	8,604	7,151	6,530	83.3	85.9	84.9	84.4	84.1
25 to 54	32,213	38,712	40,357	48,180	51,358	95.8	94.2	94.0	93.8	93.4
25 to 34	11,327	16,971	17,793	19,569	18,105	96.4	95.2	94.7	93.7	93.1
35 to 44	10,469	11,836	12,781	17,469	19,446	96.9	95.5	95.3	95.6	95.3
45 to 54	10,417	9,905	9,784	11,142	13,807	94.3	91.2	91.2	91.3	91.1
55 and over	9,291	9,135	9,019	8,247	8,039	55.7	45.6	43.8	37.4	35.3
55 to 64	7,126	7,242	7,174	6,419	6,311	83.0	72.1	70.2	65.5	64.5
65 and over	2,165	1,893	1,845	1,828	1,728	26.8	19.0	17.8	14.9	13.3
Women	31,543	45,487	47,755	57,250	61,417	43.3	51.5	52.6	58.3	60.3
16 to 24	8,121	11,696	11,533	10,813	10,577	51.3	61.9	62.0	69.1	71.6
16 to 19	3,241	4,381	4,056	3,788	3,761	44.0	52.9	51.4	56.8	58.2
20 to 24	4,880	7,315	7,477	7,035	6,796	57.7	68.9	69.8	78.1	82.0
25 to 54	18,208	27,888	30,149	40,496	44,852	50.1	64.0	66.3	75.6	78.7
25 to 34	5,708	12,257	13,393	16,804	16,300	45.0	65.5	68.0	78.1	81.7
35 to 44	5,968	8,627	9,651	14,974	17,427	51.1	65.5	68.0	78.6	82.8
45 to 54	6,532	7,004	7,105	8,718	11,125	54.4	59.9	61.6	67.1	69.5
55 and over	5,213	5,904	6,073	5,941	6,008	25.3	22.8	22.7	20.5	19.9
55 to 64	4,157	4,742	4,888	4,612	4,671	43.0	41.3	41.8	41.5	42.5
65 and over	1,056	1,161	1,185	1,329	1,337	9.7	8.1	7.9	7.4	7.0

Source: Fullerton, Jr., Howard N., and John Tscheller. 1983. "The 1995 Labor Force: A Second Look." *Monthly Labor Review* 106, no. 11 (November):5.

The situation is very different, however, as we turn to the future. The Bureau of Labor Statistics projects a total labor force growth from 1982 to 1995 of only 21 million (Table 7–9). Thus, we will move from a pattern of labor force expansion that in the 1970s averaged 2.4 million participants a year, to 1.8 million in the 1980s, and to 1.3 million in the first five years of the 1990s—barely one half that of the 1970s. The technological imperative—assuming that we have passed through the era of economic shocks—is evident. *The 1970s, from a demographic point of view, were far from a salubrious era for technological implementation—the 1980s are much more positive—and the 1990s, drastically more so.*

Table 7–10. Total Civilian Employment in the U.S., Selected European Nations, and Japan, by Economic Sector: 1970 to 1982.[a] (Numbers in thousands).

	United States	*France*	*Germany*	*Great Britain*[b]	*Italy*	*Japan*
Agriculture[c]						
1970	3,567	2,821	2,262	782	3,839	8,860
1981	3,519	1,800	1,402	647	2,731	5,570
1982	3,571	(d)	1,371	(d)	2,525	(d)
Goods Producing[e]						
1970	26,080	7,917	12,465	10,531	7,586	18,190
1981	28,995	7,208	10,885	8,038[f]	7,722	19,700[g]
1982	27,070	(d)	10,480[f]	(d)	7,594	(d)
Service Producing						
1970	49,031	9,605	11,442	13,071	7,656	23,890
1981	67,883	11,968	13,261	14,373[f]	10,003	30,540
1982	68,888	(d)	13,251[f]	(d)	10,277	(d)

Sources: Norwood, Janet L. 1983. "Labor Market Contrasts: United States and Europe." *Monthly Labor Review* 106, no. 8 (August): 3–7 (for U.S. and Europe); OECD, *Labor Force Statistics: 1969 to 1980,* Paris, 1982, and *Quarterly Supplements* (for Japan).

[a]Small adjustments made to the overall employment data in Exhibit 8 could not be made to certain sectoral data. Includes self-employed, other non-payroll, and agricultural employment.

[b]Includes Northern Ireland.

[c]Not available.

[d]Not available.

[e]Manufacturing, mining, and construction.

[f]Preliminary.

[g]Includes utilities.

America—subject to changes in immigration—is going to be short of labor. This will be manifested in a broad variety of areas. One has only to glance at the increment in individuals over the age of sixty-five, from 20 million in 1970 to 34 million in 1995, to see one reflection of the increased demand for personal services—and this in the face of a drastic shrinkage in the labor force. Technological innovation will be the key to closing the gap.

It will be services, judging from past trends both here and abroad, that will dominate employment growth. As shown in Table 7–10, even the success stories of the 1970s—Germany and Japan—showed little increment in goods-producing employment; indeed, Germany actually had a small decline. It is the service sector throughout the advanced industrial economies that represent the future.

While the exhortations for growth in productivity necessary for survival in an increasing competitive world economy have been directed toward manufacturing, services have been the real productivity laggards. As labor shortfalls loom—and as a byproduct, labor costs increase—the imperatives of mechanization in the service sector are evident. Demographic and economic parameters strongly suggest a far greater degree of receptivity to new technology—borne of necessity. Predicting its impact, however, is far more problematic.

PREDICTING TECHNOLOGICAL IMPACT

While we have suggested the level of uncertainty in forecasting demographics, much less is our capacity to envision the technological future—and perhaps even more strikingly the levels and pace of adaptation to the alternatives that it makes possible. It is not yet a generation since the concept of the computer utility dominated technical literature with a vision of super high speed central computers whose capacities were so unique as to require relatively few of them—with users tied in via dedicated wire networks.[1] Project Multics, the principal effort in this regard, cost the General Electric Company its taste for competing in the computer field—and this despite enormous levels of financing and a massive input at MIT.[2] At least as of this writing, the free-standing small scale computer linked as a peer to a broad network—with no necessary central point—is now being viewed as the pattern for the future.

The uproar on video games as a defiler of youth—with commercial versions absorbing somewhere on the order of 25 billion quarters in 1982

and even greater market penetration predicted with new technological lures—has moved to the land of the hula-hoop. The best selling toys of 1984 were not computers—they were not even electronic—but rather the Cabbage Patch doll and its incident number of accessories and knockoffs. Modernity fell out, dolls fell in.[3]

But technological innovation can have far-ranging ramifications, changing our folkways. Dedication to location was evidenced in the past by the vast network of baseball leagues. Does anybody still go to the Class A League Albany Senators? The memory of the Newark Bears and the Jersey City Giants has passed into legend, but they have been replaced by new TV loyalties, seemingly independent of place. The Dallas Cowboys are now advanced as "America's Team" in football.

In a recent suburban garden apartment study conducted by the Rutgers University Center for Urban Policy Research (Horowitz 1983), respondents tended to describe their location in terms of highways and shopping centers, not municipalities. Areal orientation remains; its axes and artifacts, however, are altered. The immediacy of the local movie theater and its accompanying handful of stores in small town America has largely disappeared, but the regional shopping centers have become "teenage villages." Adaptation has many forms; there are relatively few technological imperatives with such vigor as to support instant forecasts. Retailing provides an insightful example of the complexities at work.

The Retailing Evolution

The ambivalent nature of technology in altering areal patterns and organizational formats is exemplified by retailing. The pattern of communications of a hundred years ago revolved around major city wholesalers who concentrated the products of small-scale manufacturers, and/or imports, and in turn maintained traveling sales forces that serviced the decentralized pattern of small merchants located at every crossroads location, U.S.A. As so ably pointed out by Chandler (1977) in *The Visible Hand,* prior to the Civil War, with the exception of the industries that rose to service the railroads, manufacturing was conducted in very small, individually owned facilities. The railroads provided the transit facilities for the drummers, and for delivery of goods. The communications lines typically were the mail service—again typically carried by the railroads—as well as the telegraph, which commonly used the same rights of way.

Given the seasonal character of a largely agricultural society, credit provision was central, both from retailers to consumers—and from wholesalers to retailers as well. Despite the early rise of advertising, its media and potency were relatively limited. Quality was essentially locally certified, and this was increasingly the case as individual retailers grew in scale. As late at 1910 a minority of Americans lived in urban areas, with localism a dominant. The rise of cities was accompanied—and perhaps aided as well—by a synergistic relationship between the expansion of local newspapers and local retailing. The growth that ensued permitted the development of the classic department store, an optimization of the economics of central place that was to continue practically to our own time. The high-speed press fostered this expansion. The newspaper was king, and retailing its most prominent patron.

Certification of quality was a function of having bought at Bambergers' or Lazarus or Altman's or any of the other major downtown facilities. But this dominance of what was in effect local branding, paralleling the equivalent hegemony of local advertising media and communications, was challenged in the years immediately prior to World War II—and has nearly disappeared in recent decades.

While the first rise of national magazines of significant circulation occurred around the turn of the century, the rise of true national brands was a function of the development of radio. There had been pioneers before in exotic consumer goods, such as brands of cigarettes, but soon they were joined in by a broad variety of other nondurable consumer goods. This was the era of Jello and Chase and Sanborn coffee.

For the upscale market the national magazines had increasing style/brand potency, and with it centralization of manufacture. Just prior to World War I, for example, there were more than a thousand individual manufacturers of pianos in America. Steinway and Baldwin, in tune with *Vanity Fair* and the early version of *The Saturday Evening Post,* soon signaled a very substantial curtailment, with an equivalent process taking place in automobiles. To make a genius of the obvious, this was just the beginning as we moved into the television era, which provided a much broader spectrum of information, of dynamic visuals, and national—and increasingly international—brands. The role of local retailers as certifiers of quality gave way before the rise of these national entities whose very scale permitted the development of technology. The relationship was an enormously dynamic one. Color television without the potential availability of advertising dollars would at the very least have waited for another generation—and perhaps forever.

What was the impact on retailing? In the very act of providing brand certification, the goods in question became commodities. The package of services, of aura, and most of all credibility given by the local retailer was subsumed by the manufacturer and certified by national media. The Good Housekeeping Seal was alive implicitly before it was formalized. Grocery stores might decry the very low markups available and lack of price protection on national merchandise, but they had to carry the goods—they were literally pulled through the channels of distribution. The rise of the discount house and other forms of reasonably efficient distribution left the old mechanisms—and their historic areal distributions—in disarray. *Where you bought something became much less important than what you paid for it. The definition of staples/commodities was enormously broadened by the new communications channels.* And Main Street America became obsolete.

Paralleling this development, and to a certain degree contravening it, was the rise of the chain store operations. These called for a rigorous standardization of operation, an assumption of replicability of market and location, and the capacity to merchandise and administer from a central node. Again coming to full vigor roughly around the turn of the century, their dominance of the urban scene was epitomized by Sinclair Lewis's *Main Street* with the presence on every Main Street in America of Thom McAn, A&P, JCPenney and the like. And the scale of these operations—without the abilities of our new high technology—was considerable indeed. JCPenney's, for example, prior to its current consolidation, had more than 1,600 units—A&P at its peak more than 30,000 (Moody's Investor Service Annual).

The technologies involved were all in place three generations ago: rail and then truck shipping, telegraph and telephone for communications, and dependable mail service both for parcels and unit-control purposes (i.e., detailed information on a daily base of items sold, stock needs and the like, forwarded to a central location for information processing and response). While chain store dominance of small town America has been decried, it permitted a substantial broadening of market centers, which flourished as a function of—and undoubtedly facilitated—the thickening of urban America which so vigorously characterized the 1920s.

None of these institutional developments can be characterized simply as either centralizing or decentralizing in their nature. There is strikingly little in current technology that so far has altered that generalization. Machine-readable unit-control tickets were envisioned in the 1920s

—and came into being in the beginning of the 1950s. So far they have merely replicated the information available utilizing flocks of clericals. At least in the United States, videotex shopping has been notable by its failures. A more vigorous effort in this regard under government auspices is being promulgated in Western Europe, particularly in France. Again, however, the vision of shopping at home, while continuously reinforced by the vigor of mail order, has not significantly altered the broad spectrum of retail merchandising. The modern suburban shopping center, in its replacement of Main Street, is much more a tribute to the national highway program (and, if anything, a belated tribute) than it is to communications or information technology.

The influence of technologies and informational processing *past* is evident in the retailing configurations *present*. These in turn certainly have impacted on the areal distribution of economic activity and population concentrations as well. As of the moment, while there is much in the way of new information/communications technology that could produce significant shifts in the near-term future, there is little in the way of market success. Even the computer has facilitated but not basically altered extant functions.

Mail order, which a generation ago was viewed as a leftover remnant of an understored, rural America, has expanded. In substantial part this is a tribute to the speed, cost efficiency, and excellence of reproduction made possible by modern color printing mechanisms particularly when linked with the consumer targeting and partitioning made possible by the computer.

Videotex, which would be the next logical development in nonstore retailing, is certainly technologically feasible. As of the moment it requires the equivalent of a Sarnoff, with the level of commitment and fiscal competence that was required to deliver color TV. The threshold conditions are so substantial as to have defeated the several entrepreneurial groups that have assaulted it in this country. Even at its most grandiose, it is difficult to believe that it would serve as a passive surrogate for present-day shopping—so much of it is particularly in the suburban shopping center, a tribute to a recreational/social outing as much as it is for exclusively retail purposes.[4] The two-worker household may lean more heavily on nonstore marketing, but the heft of sales is traditional.

The prepunched computer control tag has replaced some of the clericals, hard-wired sales registers linked to computers have abated some of the problems of sales audits, and new self-service fixturing combined

with brand identification has limited the expansion of sales help; and these and similar elements clearly will be implemented in the future. Similarly, warehouses have given way to the distribution center with concomitant declines in the carrying costs of inventory. This is linked with a far greater capacity to limit costs and target merchandise or short order with real-time information processing. And it has altered labor force requirements and the loci of employment.

Credit

The subject of the provision and sources of credit over time deserves much more attention than we are able to give it. The old pattern of credit provision by wholesalers to retailers and, in turn, by them to individual customers of a century ago gave way in time to a bifurcation: Small retailers continued this pattern—the larger ones went into the credit business on their own. By working directly with manufacturers and depending only upon normal trade terms—indeed sometimes paying cash—they were able to bring down price. In turn they extended credit to their consumers based on their own fiscal competence and became increasingly dependent on the profitability of consumer credit per se. The range of price, merchandise offerings, and credit certified the unique position of the central city retail giants. They, in turn, assured the pulling power and dominance of the cities they occupied.

Each institution individually provided credit to the same customers; the amount of credit checking and general paper work was enormously redundant. The rise of central credit facilities (i.e., American Express, Visa, and their equivalents) represents a very substantial compaction of this process. Enormously more credit transactions can be undertaken with a reduction of staff per transaction as a function of centralization and the automation of procedures that it permits. While precise data on this point are lacking, it is clear that the competence of the new information technologies has permitted an enormous expansion of credit. While person power per transaction has been reduced, the sheer growth of the operation has provided even more in the way of jobs than would otherwise be the case.

Not the least important reflection of the centralization of credit (even some of the major department stores are foregoing the exclusive use of their own credit cards) has been a lifeline extended to relatively small-scale operations. Local vendors now can be represented in shopping

centers and other high transient areas—where they do not know their customers—but still extend credit based on central information processing. *Personal knowledge gives way to formalized centralized information processing. The former is coterminous with sales place, the latter relatively independent. The rejuvenation of decentralized retailing is in part a reflection, therefore, of the centralization of consumer credit.* The back room of the local retailer—once devoted to unit control, to credit files, and perhaps as well even to payroll and sales audit—now can be transported through hardware to an infinite range of locations; and along with them, the jobs that are involved.

The Retail Dynamic and the Limitations of Technology

Perhaps the most consequential innovation of the last fifty years in retail distribution has not been a function of technology, but rather conscious or unconscious systems analysis. This has revolved around the substitution of the customer as order picker for paid labor. Beginning in the depths of the Depression, this was pioneered by the early supermarkets. Clerks behind counters who served as order pickers gave way to bulk stocking (initially in packing cases with, at most, primitive fixturing). The customer served as order picker. The results in terms of efficiency of distribution, largely as a function of the reduction of labor costs, were truly revolutionary.

Efforts at high-tech approaches to the same functional juncture—such as going from wholesale lots (cases) to individual orders—have failed (because of the low costs made possible by self-service). Thus, as early as the 1920s, there were efforts to mechanize order picking with primitive electromechanical devices. Similarly, in the 1940s and 1950s, Grand Union failed with the same approach. Home delivery of foods, attempted in Sweden through centralized warehousing and customer-telephoned orders—accompanied by some measure of electronic gadgetry—foundered on the same rock. Customer self-service is tough to beat in cost. The development of the shopping cart was much more consequential than the new code marking—and the laser registers that have come in its wake. At this writing, the latter innovations have made possible the use of lower class labor (or is it the same class of labor with poorer educations and less arithmetic capacity?) but are dwarfed in consequences by the much more basic systems change. Customer order

picking has been so efficient that it is now used in a variety of nonfood areas, as witness the fixturing of the modern-day liquor store, hardware store, home improvement center—and increasingly soft goods merchandise emporiums as well.

As we have indicated earlier, information technology has been more significant in providing access to broader based, areally dispersed selective networks of specialized consumers. This has been fostered by specialized publications—the *Radio Controlled Modeler, The American Orchid Review*—and literally thousands of other media. It is complemented on a broader base by the increasingly sophisticated utilization of census data for specialized mailing—that is, the *Sharper Image* catalog and the ready-to-wear offerings of rugged clothing for the "*L.L. Bean*-ized" urbanite. The total scale of these special mailing efforts has been enormously facilitated by the rise of credit mechanisms independent of specific retailers.

STASIS AND INERTIA

The basic locomotion devices employed in the journey to work have been relatively little changed in a half century. As far back as 1929, the United States turned out as many cars per capita as it did last year;[5] and while the trolley has given way wholly to the bus, the commuter railroads have altered little or at all.

The revolution of suburbanization, we would suggest, has been as much a function of affluence as of technological revolution. Within the latter domain, it is much more a tribute to the national highway program than to communication devices, at least in its first generation (roughly through 1970). It was the Depression of the 1930s, plus five years of wartime constraint, that inhibited the complementary dispersion of population and economic function that was the appropriate complement of the information and transportation innovations of the 1920s, principal among them the telephone. The omnipresence of this incredibly inexpensive device as a facilitator of both centralization and decentralization has often been cited—its prominence is worthy of reiteration.

But even given the constraints of the 1930s and World War II, there was a very long gap between technological competence and societal reaction. The first major enclosed suburban mall dates from the early 1950s, but the large-scale suburban shopping center really did not come into full blossom until the succeeding decade (Sternlieb and Hughes 1981).

It was not until the mid-1970s that the major part of office construction moved out of the central city (Sternlieb and Hughes 1984).

There is a powerful flywheel of custom that leads to inertia. This is particularly the case when it is linked with the enormous sunk costs and slow replacement cycles that characterize American society. We have both the conservative virtues and demerits of long-term affluence and development. A good housing year is one in which starts are roughly equal to 2 percent of the extant stock, portions of which go merely to replace facilities that are scrapped. In New York City, for example, over the last ten years new housing starts have averaged on the order of 10,000 units a year. Given a base of nearly 2.8 million, this would suggest a building replacement cycle on the order of 300 years. While equivalent data on industrial facilities suffers from changes in their nature over time, the average age of the gross stock of fixed nonresidential business capital hovers around the 10-year mark (U.S. Bureau of the Census 1984a). *Thus there can be a much more abrupt response to changes in information technology on the part of production facilities than holds true in terms of settlement patterns.* The latter are complicated by the enormously potent role that housing plays in the United States as a source of personal savings. More than 60 percent of the equity of Americans is frozen in personal housing ownership (Federal Reserve 1984). The conflict between these two elements—the first with a fifty-year "replication cycle," the latter with one only a fifth as lengthy—is particularly striking as we move toward the end of the twentieth century. It has served as a stabilizer of older settlement patterns. Much of what we see as suburbanization or regional shift is a belated response of the latter to new economic spatial imperatives.

Journey to Work and the Electronic Cottage

The journey to work data available from the 1980 Census illustrates in considerable detail the growing congruence between work and residence place. Journey to work times have not expanded; indeed, there is some indication of their contracting. The central city as the major focal point clearly has given way to peripheral, point-to-point, commutation, and with this, a growing dominance of private means of transport as against public conveyors.

The incongruity between the vast amounts of funding that the latter are absorbing versus their declining utilization raises some very real issues

as to their continuance. The degenerative spiral of declining usage leading to increased fares, and declining maintenance/service leading to further patronage declines, seems to characterize our older facilities. These tend to set up frictions in commuting to places that are dependent upon public transit—particularly rail transit.

The prototype is New York City. As the commuter linkages begin to generate much more in the way of friction (costs, timetables, and comfort), there is a split in response. On the one hand we have those who can afford to live proximate to the workplace—typically Manhattan—doing so. The long-term decline of Manhattan's population—a process that has nearly seventy years of antecedent—now seemingly has, at the very least, plateaued. But a growing proportion of its job base is maintained by commuters—and there is some indication that their faithfulness to this process has been and will be reduced in time (Stegman 1985). Thus the rise in peripheral locations (northern New Jersey being a premier example) of competing office facilities yields a shift to closer proximity of workplace and residence place. Just as the cutting and styling and selling operations of New York's garment center lofts can remain there while the sewing shops moved to cheaper locations with linkages of interstate trucking, so we see back room office facilities moving peripheral to the city—and sometimes at far greater distance. This latter process in information handling has its equivalent technological enabling mechanisms: the era of the computer—and high-speed communications linkages. Clearly the end of this dynamic is not at hand.

In 1983, with roughly similar sized populations, New Jersey secured four times as many new housing units—and northern New Jersey by itself alone twice as much office space—as New York City. While final data for 1984 are lacking at this writing, current estimates suggest an equivalent disproportionate development. And jobs are increasingly footloose. They can follow as well as lead people.[6]

The close linkage of workplace and residence place is exemplified by journey to work patterns.[7] In 1980, there were approximately 75 million workers sixteen years of age and over resident in metropolitan America. Of the 29 million of them who lived in central cities, fully 25 million worked inside the SMSA of their residence, but barely three million of them in the central business district of their central city. The combined total of those working inside another SMSA—or working outside SMSAs—barely exceeded the million mark.

This is confirmed when the data on workers living outside the central city is viewed. Fully 38 million of the grand total of 45 million for

whom data is available worked inside the Standard Metropolitan Statistical Area (SMSA) of residence—but only a third within the central city. The basic technology of communications and information processing now being implemented have been available for at least twenty years. The lag again caused by the fly wheel of custom leaves a gap between technological competence and market fulfillment, but this is rapidly receding into the past.

The absolute measure of this spatial dispersion is most difficult to quantify. The extremes may well be the export of the task of updating mailing lists to the English speaking parts of the Caribbean, or the much noted shift of Citibank's credit facilities to the Dakotas, or of Philadelphia's Sun Oil's credit operation to the South and the like.

There are countervening forces at work as well. Estimates by Regina Armstrong at the Regional Plan Association, for example, suggest that roughly one-half million jobs in the New York region are dependent upon foreign investment. And more than 100,000 of these jobs stem from foreign firm operations in Manhattan (Armstrong). A tribute to this hegemony is the new wave of national centralization of banking, brokerage, and insurance facilities within that city. The World Trade Center may have been a premature title—it is now representative of a potent reality.

While covered more fully elsewhere it is evident that information technology has subverted localism in terms of banking. Despite the scar tissue of legislation left over from the Depression, the defacto nationalization of banking is at hand. It is evidenced by the Bank of America consolidating 2,000 employees in New York City; its international equivalent is revealed by the enormous flow of foreign establishments into the city.

Question must be raised in this context, as to what happens to the old regional centers with the rise of a national and world economy. Philadelphia, at least in banking, is becoming a branch city. Even Chicago is threatened by the same fate.

Some measure of the rise of the new dominance of New York in this context is shown in Table 7–11, which indicates the flow of international phone calls from various major cities in the United States. New York City alone accounted for more than 20 percent of them. "More than twice as many overseas message units were generated by New York City as by Los Angeles. When New York City, northern New Jersey, Long Island, and the four New York State counties north of New York City are added together, the New York metropolitan region accounts for almost 30 percent of the total" (Moss 1984). While some of this flow

Table 7–11. Overseas Message Units.

AREA CODE	
New York City 212	22,718,027
Los Angeles 213	9,310,028
San Francisco 415	4,535,474
Chicago 312	4,028,709
Northern New Jersey 201	4,639,122
Connecticut 203	2,129,146
Westchester, Putnam, Orange and Rockland Counties (NY) 914	1,897,576
Nassau-Suffolk, Long Island (NY) 516	1,705,740
Total (USA)	115,001,763

Source: AT&T Communications. Secured from Mitchell L. Moss. 1984. "New York Isn't Just New York Anymore." *Journal of the International Institute of Communications* 12, no. 4/5 (July/September).

undoubtedly represents nonbusiness calls—proportionate to New York's enormous ethnic population—there is no question of its uniqueness.

The ambiguous role of new information technology with regard to centralization or decentralization is exemplified in the growing challenges to the monolithic role of utility companies, which had central places as their focal point. The new technology is much more spatially ambiguous. For example, NYNEX (the Northeast's regional phone company) derives a disproportionate share of revenues from its largest business customers, with 3 percent of them providing a third of its business revenues; one percent of New York Telephone's business customers generate 25 percent of its revenues. Fully eighty-five out of one hundred top revenue producing customers of New York Telephone Company are located in Manhattan; the borough in and of itself contains 46 percent of New York Telephone's business access lines and contributes 35 percent of its total revenues.[8]

The very scale of the major customers however, permits them to develop bypass operations for their own proprietary use and/or to participate in alternative inexpensive approaches geared to large-scale users. An example is the New York Teleport being built by Merrill Lynch, Western Union, and the Port Authority of New York and New Jersey.

This is a communications complex nearing completion on Staten Island designed to connect customers in the New York metropolitan area with all outside calling points. The customers in turn are linked directly to the Teleport by fiber cable rather than through New York Telephone facilities. Heavy line users were once substantially tied to central city, but how close to the central "exchange" does one have to be in order to take advantage of these efficiencies of scale?

Present technology involving laying of cables, interestingly enough, is following the rights of way of the railroads. Does this suggest office development will be areally defined by the railway line disposition put in place nearly a century ago? Or is there a greater measure of freedom even within today's parameters, much less those of tomorrow? Cable television, for example, provides a second bypass threat to the New York Telephone Company. Commercial data transmission services will soon be available connecting directly to New York and the American Stock Exchange with link to the Teleport, thus enabling subscribers to bypass the local loop completely.

On the one hand, we can envision this type of development as permitting large-scale firms to stay in what is a high-cost location—and making permanent its job base and related settlement pattern as well. But even if technology is so limited as to require this close proximity—the potential feedback on the cost structures of those firms that are not able to take advantage of the new elements must be viewed with some trepidation. Telephone service (and indeed many other elements of New York) is a very high fixed cost operation. A reduction in the user base could require catastrophic increases in the pro-rated charges to the balance of the utility's customers. This in turn could speed decentralization.

These possibilities are far from unique to New York. We would suggest, however, that they are most potent in our older metropoli with fixed capital costs that are particularly sensitive to reduction in usage. This has already been evidenced in the case of the subways and public transit in general—and these may only herald things to come.

As pointed out by Mitchell L. Moss (1984), however, there are requirements imposed by a world economy that may have a very serious feedback, given the limitations of New York City as a whole—and Manhattan in particular. The 24-hour business day is premier among them. The very costs of infrastructure, and the requirements for providing services and information on a worldwide base, impose equivalent staffing requirements. And New York City is not an easy place within which to provide required security. The trans-Hudson City of Manhattan—

northern New Jersey—may play a much more imposing role in the future in this regard. Security difficulties may impose limitations on the growth of Manhattan and the other boroughs as well.

The perfection of communications opens up a variety of alternative locations. The very cost structures of the city and its limited capacity to provide housing for middle management constricts crucial labor force flows. The elite can buy space proximate to work while youthful aspirants are willing to accept very poor housing conditions in order to be close to the dynamo. Other less affluent or less flexible homeseekers are, however, driven away.

Amidst an enormous flow of plenty seen by visitors to New York is the harsh reality of median 1983 renter household incomes under $13,000—and of median homeowner (including co-ops and condominiums) incomes of $25,000 (Stegman 1985). A thin veneer of the rich glamorizes the eye and distracts it from a rather broad spectrum of the poor. However, the sheer animal vitality of the city and its increasing focus—as pointed out very presciently more than a dozen years ago by Eli Ginzberg (1973)—on production services, provides a rare base of opportunity. Even here, however, there is some indication that an increasing proportion of this growth is going to commuters. In 1979 roughly 6 percent of Manhattan's jobs were held by New Jerseyans. Estimates by the Port Authority of New York and New Jersey (1985) indicate that approximately 23 percent of the growth in jobs in that borough over the last five years have flowed to New Jerseyans. Ultimately the jobs will follow the people.

New forms of coaxial cable, optical fiber, and microwave transmission facilities—and as yet unknown and unseen mechanisms—will be put in place. What they suggest is an increase in bifurcation: of centralization of functions on the one hand, and a capacity to spread them out on the other. *In this context we would suggest that technology is an enabling element rather than a determinative one. The impact of technology must be viewed through a matrix of societal elements that shape its ultimate areal resolution—and settlement patterns as well.*

Nowhere is this requirement more evident than in predictions of a society of "electronic cottages." The pinnacle of industrial urbanization was the central city that emerged in the nineteenth century, built on massed population, productive power, and industrial technology. In contrast is the view that the end point of the communications revolution is the electronic cottage. The information era will bring decentralization, just as the industrial era wrought centralization. Households will be

free of spatial ties as they work at their dispersed residences—information will commute, not people. A vision of post-industrial cottage industries is raised; knitting is replaced by information work.

The reality to come will not be nearly so extreme. Just as the regional shopping center flourishes despite the potentials of electronic retailing, so too will the office remain a viable workplace. People will still want to be with people. As Naisbett has suggested, the more technology we pump into society, the more people will seek the "high touch" of the office and shopping mall. "The gee-whiz futurists are always wrong because they believe technological innovation travels in a straight line. It doesn't. It weaves and bobs and lurches and sputters" (Naisbett 1982).

NOTES

1. See Security and Exchange Commission (SEC) Registration for C.W. Adams Associates, 1961.
2. See Organick (1972) for background on this point. See also Brooks, Jr. (1979).
3. The data cited here were secured from a series of investment research reports prepared by Goldman Sachs & Co.
4. For a more positive view, see Gordon (1984).
5. This conclusion is based on automobile production and population data secured from Motor Vehicle Manufacturers Association (1979) and the U.S. Bureau of the Census (1984a).
6. Data secured from the New Jersey Department of Labor, Trenton, New Jersey.
7. The data in the following two paragraphs were secured from U.S. Bureau of the Census (1984b).
8. Data obtained from Goldman Sachs (1984) report on NYNEX Corporation.

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DISCUSSION OF CHAPTER 7

Peter Linneman

The authors have written a readable and provocative essay on how future demographic patterns will alter the adoption and impacts of technological innovations. One of the most enjoyable aspects of the paper is their efforts to "gaze into the crystal ball" and make forecasts about both demographic and innovation patterns. These projections, while fascinating in their own right, are most interesting because they highlight the historic failing of the social sciences to predict very far into the future with any degree of accuracy. Although their projections for the most part seem absolutely sensible, the cynical reader knows with close to certainty that they will be wrong—but not *why* they will be wrong! Examples of this type of problem abound in the literature. For example, no one foresaw the economic shock of upward spiralling oil prices in the 1970s, or the almost equal downward spiral in these prices (in real terms) in the 1980s. One cannot help but wonder what unexpected economic shock will ruin the authors' forecasts and projections.

In their analysis of the future regional population forecasts, the authors adopt the traditional view that the northeastern Standard Metropolitan Statistical Areas are suffering because they have experienced much lower population growth rates (often static or even slightly negative). These patterns, however, may reflect simply that these more mature areas have already achieved something akin to their optimal size (in terms of the trade-offs between positive and negative externalities).

The notable dimension in population growth patterns may well be that other areas of the country are finally moving towards more optimal sizes.

In evaluating the growth of the Sunbelt in the past two to three decades, I feel that the authors underemphasize the contribution of technological advances in facilitating this growth. One tends to forget how innovations in air navigation and air transportation have reduced the costs associated with traveling to and from the Sunbelt, particularly for the middle class. Similarly, technological advances in irrigation, land management (including land reclamation), pest control, indoor climate control, and telecommunications, to name but a few, have enhanced the "livability" of the Sunbelt. For example, the advent of satellite disks, VCRs, cable television, and "superstations" have transformed many of the more remote areas of the Sunbelt from "cultural wastelands" to offering the same (and often greater) television choice as major urban centers such as New York. This is not to deny the importance suggested by the authors of the interstate highway system in this process, but rather to indicate the importance of technological innovations to the development of the Sunbelt.

The authors present a very thorough description of the historic evolution of the retailing industry's response to technological forces. Their argument that as centralized credit analysis was enhanced by technology, the need for centralized shopping facilities was diminished is particularly insightful.

The authors predict that technology will continue to effect employment patterns. They also foresee that the labor force will increasingly be employed in the service sector. For this reason, the authors argue that technological advances will be particularly needed in the service sector. While not denying the logic of these arguments, it is important to remember that much of the employment in the service sector reflects "face-to-face" interactions between customers and service providers. While lawyers, doctors, hair stylists, and the like can certainly gain more effectiveness from technological advances, many of the services they offer are truly personal in nature. For example, no matter what technological advancements occur, baseball (as we know it today) will still require nine players for each team. The service sector is well advised to realize the importance of personal interactions before it tries to replace them with technological interaction. The very low response rate for "computerized" telephone interviews is a current example of this type of problem. Survey respondents are far more willing to hang-up on a

machine than a human. This suggests that certain areas of the service sector may be expected to remain relatively immune to technological advances.

Sternlieb and Hughes present a well-conceived and interesting exploration of future possibilities for information technology. I plan to hold onto this paper for fifteen years so that I can evaluate to what extent "economic shocks" cause their forecasts to be wrong.

DISCUSSION OF CHAPTER 7

Mitchell Moss

There are two major schools of thought regarding the effects of information technology on cities. The most widely held view is that new information technologies will ultimately lead to the demise of cities by allowing electronic means of communication to substitute for face-to-face transactions. Advanced telecommunications technologies, in this context, make it possible to obtain all the benefits of urban life, such as access to a diversity of cultural and information sources as well as contact with work and family, without confronting the frictions of urban life—such as commuting, crime, congestion, and pollution. Ronald Abler (1970) was one of the first geographers to suggest that as cities evolved from manufacturing to information centers, the very location of a city could be called into question.

> Advances in information transmission may soon permit us to disperse information-gathering and decision-making activities away from metropolitan centers, and electronic communications media will make all kinds of information equally abundant everywhere in the nation, if not everywhere in the world. When that occurs, the downtown areas of our metropolitan centers are sure to lose some of their locational advantages for management and governmental activities.

The idea that information technology would obviate the need for cities was also raised by urban planners, such as Melvin Webber (1973)

who asked: "Could the forthcoming and unprecedented demands for long-distance communication combine with the space-spanning capacities of the new communications technologies to concoct a solvent that could dissolve the city?" (Webber 1973) One writer has even suggested that "telecommunications has done more than anything else, since the invention of money, to reduce the constraints of the physical environment on organization" (Kellerman 1984).

The alternative perspective, drawn largely from the history of the telephone, holds that communications technologies can facilitate both concentration and dispersion of economic activities. As Jean Gottmann (1977) has stated, "The telephone's impact on office location has thus been dual: first, it has freed the office from the previous necessity of locating next to the operations it directed; second, it has helped to gather offices in large concentrations in special areas."

George Sternlieb and James W. Hughes' essay, "Information Technology, Demographics, and the Retail Response," builds upon the Gottmann thesis by examining the way in which economic and demographic forces have contributed to both centralizing and decentralizing trends. The authors believe that technology is an "enabling element rather than a deterministic one. The impact of technology must be viewed through a matrix of societal elements which shape its ultimate real resolution—and settlement patterns as well." They present a detailed analysis of demographic trends in the United States, highlighting the processes of decentralization of cities, suburbanization, and regional shifts from the Northeast and Midwest to the South and West.

Sternlieb and Hughes' principle argument, however, concerns the "homogenization of space," the way in which "information technology has made much of the historical functions of the older core areas obsolete or, at best, opened them to very substantial and increasingly successful competition." Drawing upon a case study of the retailing industry, they demonstrate how communications and information technologies have led to the rise of the national chain stores, the decline of the traditional downtown locally owned retail department store, the growth of computerized credit bureaus, and the end of credit based on personal ties and knowledge.

The interaction of technology with spatial patterns does not often work in predictable ways, as the authors insightfully note: "The rejuvenation of decentralized retailing is in part a reflection, therefore, of the centralization of consumer credit." Indeed, it is one of the great ironies

of consumer services that the availability of national credit cards, in combination with the 800 telephone number system, has stimulated retail growth in what are geographically remote stores, such as L.L. Bean's in Maine, Land's End in Wisconsin, and a variety of other specialized establishments. Telecommunications has converted the "mail order" catalogue operation, initially designed for farmers far from cities, into an electronic shopping center—utilizing long-distance telephone, on-line credit verification, and mail-distributed print catalogues—that extends the geographic reach of stores in rural areas to urban and suburban households throughout the nation.

The issues raised by Sternlieb and Hughes highlight the need for a greater understanding of the relationship of information technology to patterns of urban development. Clearly, technology does not, by itself, bring about locational change. Yet new telecommunications systems do open up opportunities for development that were not previously available, and not all cities and regions are able to take advantage of the opportunities presented by technological change effectively. The growth of national banking operations in Delaware reflects the strategic role of state tax and regulatory policy in attracting footloose financial service firms. Where firms once located manufacturing plants near natural resources and transportation networks, the information based services of the 1980s and 1990s will require access to high-speed data networks, a skilled labor force, and a favorable set of residential and educational services—all of which are subject to public intervention.

Moreover, there is growing evidence that the process of technological innovation is quite uneven and that the deployment of new fiber optic systems will occur in large metropolitan centers first, thus giving major urban centers a "technological edge" over small- and medium-size cities (Moss 1986). In fact, despite the popular rhetoric about telecommunications leading to geographic dispersion, advanced producer services are predominantly concentrated in the largest American cities (Noyelle 1983).

Although many firms have moved out of central cities, most of the movement has been to outlying suburban areas and to a handful of cities in the South and West, not to a randomly distributed set of places across the North American continent. Far more attention is given to a locational change resulting from a move out of a central city than to the equally pervasive expansion of financial or management service firms within the central business districts of large world cities. What is perhaps most remarkable about the growth of new information technologies is

the fact that we have not yet found a substitute for face-to-face contact. There are far more bits of information transmitted through the business lunch than through the videoconference. The challenge for researchers is to determine how interpersonal contact has been enhanced through the use of advanced telecommunications systems. For example, the "trading room" of an investment bank is designed to accommodate an elaborate telecommunications infrastructure and an equally high level of informal information exchange among the traders who sit "cheek by jowl."

Our knowledge of information technology is far greater than our understanding of how such technologies influence the day-to-day activities and locational choices of individuals and firms. The distinctive contribution of Sternlieb and Hughes has been their analysis of how demographic trends are likely to shape the future use of new technologies. It is not enough, however, to examine one social parameter as a guide for understanding the impact of technology. The use of information technology generates its own set of social and economic consequences. Our intellectual frameworks for studying urban regions need to recognize the dynamic nature of communications technology and its influence on the operations of the manufacturing and service sectors. To date, far more attention has been given to the false prophets who predict the potential impacts of information technology than to the more important task of assessing actual effects of new information technology so that we can formulate an informed and intelligent policy to assure the economic health of cities and large metropolitan regions.

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