Richard L. Meier

Qualities of Urban Life And the Evolution of World Cities

Reprint No. 231

Institute of Urban and Regional Development

University of California at Berkeley

Reprinted from *Advances in Urban Modeling*, B. Hutchinson and M. Batty, eds. Elsevier Science Publishers B. V. (North-Holland), 1986.

ABOUT THE INSTITUTE . . .

The Institute of Urban and Regional Development serves the faculty and students of the University of California at Berkeley conducting research into a wide array of policy-relevant questions. Its foci of inquiry are the processes of urban and regional growth and decline, the consequences that alternative styles of governance have for patterns of development, and the scientific bases for development policy and for policy planning.

Toward these ends, current research is directed to the economics of urbanization in the West and in the Third World; techniques of environmental management; effects of using new energy sources; emergent patterns of suburbanization and central area reconstruction; evaluation of alternative modes of transportation; design of effective means for supplying social services; contemporary issues in housing policy; regulation of urban growth and uses of land; determinants of urban livability and the factors shaping urban life; and potential improvements in methods of analysis, evaluation, and planning.

The Institute's members are drawn from departments throughout the Berkeley campus; it prints and distributes many of their research papers which are later published in professional journals and commercially distributed books. A catalog of the Institute's publications is available on request.

QUALITIES OF URBAN LIFE AND THE EVOLUTION OF WORLD CITIES

Richard L. Meier

Institute of Urban and Regional Development
University of California, Berkeley
Berkeley, CA 94720
United States of America

A world model is constructed whose actors are great cities. A world city is a multinational organization anchored to a site using knowledge, capital, entrepreneurs, telecommunications, and airlines to exploit global opportunities. The metropolis upgrades attractiveness, or quality of life, in five dimensions -- Income, Prestige, Service, Glamour, and Culture. Students of the respective cities play roles of strategic planners in a gaming simulation responding to scenarios incorporating general expectations for climate, food, fuel, tourism, religious conflict, and finance endeavoring to improve global rankings in urban quality.

INTRODUCTION

The responsibilities of city planners are rapidly enlarging. Instead of rationalizing internal structure to fit the joint requirements of local residents and visitors from the hinterland, or of national environmental policy, they are expected to recognize opportunities in the community they serve, and simultaneously save the local sources of livelihood from being snatched away. The strongest competitors for the activities that constitute the local economic base are increasingly likely to emerge on another continent. This study is

1. an attempt to model the expected state of affairs globally,
2. to play out a sequence of possible strategic actions, and
3. to train future members of the profession to take an expanded outlook.

Planners resorted to computer simulation in the past with enthusiasm, but indifferent success. Douglass Lee (1973) summarized the outcome in his "Requiem for Large Models". The early computer simulations were too elaborate, required costly editing of data, consumed more time than anticipates, and were not easy for policy-makers to understand. Updating

was a major chore too easily neglected. Later uses have been applied to data base management and optimization within a sector, such as internal transport, (Perry and Kraemer, 1979). The problems addressed were normally those of growth. Recently, however, a policy model for Cleveland (Ohio) undertook to quantify the implications for long term decline, and to assess the potential contributions of policies intended to stem the decline (Bradbury, Downs and Small, 1981).

Another kind of simulation was developed for teaching purposes (Greenblat and Duke, 1975; Duke, 1974; Meier and Duke, 1966). It was most useful when addressed to dynamic principles that were conceptually difficult and could not readily be conveyed by case studies, diagrams, or verbal argument. A working model, usually based upon a typical instance which had been studies in depth over an extended period, and which condensed time and space, was prepared. People were allowed to play the roles of decision makers, and an appropriate mix of competition and cooperation introduced.

The model is constructed within the medium of group process, and the computer, if present at all, is a device that speeds up the action. The principal output is the experience gained by the players that seems to fit situations in the real world. These impressions can be

referred back to a "slice of system evolution" that had been created by their role-playing interactions.

The important criticisms of gaming simulation as practised are that (i) the underlying data and the systemic relationship drawn form the most thorough case studies become obsolete and thus much less relevant for the training of professionals, and (ii) the accepted social and economic theory employed is often a poor fit to the phenomena incorporated (e.g., imperfect markets, partial knowledge on the part of actors, etc.). The simplicity of the model is often mentioned, but it is not a fault at all, since it allows one to trace causal relationships more unambiguously.

PROCEDURE

Students in an "Urban Futures Laboratory" class first familiarized themselves with the he materials scattered throughout the University library which threw some light on the manner in which large cities interact with one another and the more distant parts of the world. They also gathered information about the relative quality of life experienced in them. The chief categories of relevant information were:

1. International air travel (also road, rail, marine)
2. Foreign Trade (especially container movements)
3. Tourism

4. Wealth (also GDP/cap estimates, banking activity, insurance, etc.)
5. Organizations, community and region-serving
   multinational firms
   international non-government
   international governmental agencies
6. Universities, enrollment, academic strength
7. Literary production, publishing, film production, television producing
8. Architecture, office buildings, landscaping of public spaces
9. Museums, opera companies, theaters, symphony halls, etc.
10. Medicine, public health, potable water
11. Cuisine, restaurants, enforced taboos
12. Recreation provisions, clubs
13. Housing for all income levels and minorities
14. Automobile use, traffic control
15. Personal safety, crime rate
16. Openness to outsiders, their ideas, alien ideas

It was then possible to set up criteria for identifying which of the thousands of metropolises that have grown up have a global outlook and contain significant world-serving activities. Tables 1 and 2 identify the major world cities. A manuscript was then prepared which explained how an Urban Quality Contest could be modelled, and what the roles of

strategic planners might be in guiding their globally oriented actions. It needed to be drafted in simple non-theatrical language at the same time that the students themselves chose a world city to represent. They were encouraged to choose a city that they knew well, or would like to visit soon, and then become acquainted with the structure, precedents, activities, internal politics, and external relations using the previously mentioned data sources. They prepared themselves to give advice to the public decision makers on how to respond to foreseeable Global Events and Opportunities whose timing and intensity remain unpredictable.

Thus is was possible to develop reasonably knowledgeable advisors on policies affecting urban quality for Hong Kong, Manila, Mexico City, Moscow, Paris, San Francisco, Shanghai, and one person was willing to study cities-in-general, about 100 other world cities. After six weeks of study they were able to assemble an Urban Quality Profile assessment for a time two years in the future (1985) with very little disagreement as shown in column 3 of Table 3. They would also assess the aspirations fo the respective cities, and thus establish the emphases that their General Development Plan would very likely incorporate, if any were to be prepared as shown in column 3 of Table 3.

As these studies and determinations were undertaken, the simulation designer was busy framing scenarios that affected the world as a whole or would especially affect the chosen cities. Twenty-two scenarios, each compressed into a single page, were synthesized; the titles included such sequential developments as "The Next Great Energy Crisis", "ASEAN Cities Propose a Common Market", "Food Trouble in the Soviet Union", "The Next Global Food Crisis", "Refugees from South Africa", "Cultural Competition Using TV Spectaculars", etc. The specific expectations were drawn from journals, especially Science, Far Eastern Economic Review, the foreign service of the Los Angeles Times, and Business Week.

The expected impact upon the ranking of these eight cities could be specified as a kind of "fair gamble." Simultaneously opportunities could be opened up for bargaining or co-operation with some Other Cities which could mitigate the damage of catastrophes, or enhance the overall benefits from opportunities. These scenarios draw upon the expertise and the consensus of many experts on our faculty, distilling their feelings about what consequences seem most plausible, and including the likelihoods of occurrence in each quinquennium. Where appropriate, the formal deals made between world cities would be subject to risks of failure set by establishing Business Conditions selected by a stream of random numbers produced by the computer.

All cities were encouraged to modify their current profile by investing some of their Income in other dimensions of attractiveness, such as culture, services, etc. They could thereby approach their ideal outcome or goal. Such investments can be lost due to risks inherent in global business conditions. This risk of loss ranged from negligible in a BOOM environment to 50% in a quinquennium of DEPRESSION. Thus an element of development timing was also introduced.

TABLE 1

WORLD CITIES - POPULATION 1985, IN MILLIONS

1.	Tokyo	23.0	27.	Philadelphia	5.5
2.	New York	17.0	28.	Canton	5.5
3.	Mexico City	16.0	29.	Istanbul	5.5
4.	Seoul	14.5	30.	Lenigrad	5.0
5.	Sao Paulo	12.0	31.	Bogota	5.0
6.	Shanghai	13.5	32.	Teheran	5.0
7.	Calcutta	12.0	33.	Lima	4.5
8.	Cairo	12.0	34.	Detroit	4.5
9.	Los Angeles	11.5	35.	Santiago	4.5
10.	Buenos Aires	11.5	36.	Madrid	4.5
11.	Manila	10.5	37.	Madras	4.5
12.	Beijing	10.5	38.	Rome	4.5
13.	Paris	9.5	39.	Sydney	4.5
14.	Moscow	9.0	40.	Osaka/Kobe/Nagoya	4.5
15.	Bombay	9.0	41.	Lagos	4.5
16.	Jakarta	9.0	42.	Alexandria	4.5
17.	Rio de Janiero	8.5	43.	Dacca	4.2
18.	Chicago	8.0	44.	Toronto	4.0
19.	London	7.0	45.	Houston	4.0
20.	Delhi	6.5	46.	Athens	3.8
21.	Karachi	6.5	47.	Caracas	3.8
22.	Washington/Baltimore	6.0	48.	Melbourne	3.7
23.	Hong Kong	6.0	49.	Ankara	3.6
24.	San Francisco	6.0	50.	Warsaw	3.5
25.	Bangkok	6.0	51.	Dallas	3.3
26.	Pusan	5.5	52.	Boston	3.2

TABLE 2

LESSER WORLD CITIES
(in alphabetical order)

Abidjan (Gold Coast)	Dhahran	Munich
Amsterdam	Frankfurt	Nairobi (Kenya)
Atlanta	Geneva	New Orleans
Baghdad	Hamburg	Pittsburg
Barcelona	Hanoi	Prague
Beirut	Honolulu	Recife (Brazil)
Belgrade	Havana	Rotterdam
Berlin	Johannesburg	San Diego
Brisbane	Kathmandu	San Juan
Brussels	Kuala Lumpur (Malaysia)	Seattle
Bucharest	Las Vegas	Singapore
Budapest	Lisbon	Taipei
Cape Town	Mecca	Tel Aviv/Jerusalem
Cleveland	Miami	Tunis
Colombo (Sri Lanka)	Milan	Vancouver
Copenhagen	Minneapolis	Vienna
Damascus	Montevideo (Uruguay)	Zurich
Denver	Montreal	

TABLE 3

PROGRESSIVE CHANGES IN AN URBAN QUALITY CONTEST
RANKING IN DECILES, HIGHEST IS 10, LOWEST IS 1

City		1985	1990	1995	2000	Goal
Hong Kong	Income	8	7	6	9	9
	Prestige	7	8	8	7	8
	Service	5	5	5	7	8
	Glamour	8	8	?	8	5
	Culture	5	5	5	5-4	5
Manila	Income	4	3	5	6	9
	Prestige	6	6	6	7	8
	Service	4	6	6	6	6
	Glamour	7	7	7	8	5
	Culture	7	6	6	7	6
Mexico City	Income	7	6	8	8	10
	Prestige	7	7	7	7-8	7
	Service	4	6	6	6	6
	Glamour	7	5	6	7	7
	Culture	7	6	6	7	6
Moscow	Income	8	7	6	8	7
	Prestige	8	4	5	9	6
	Service	6	6	4	6	8
	Glamour	7	5	6	7	7
	Culture	3-4	4	4	6	4
San Francisco	Income	10	10	10	10	10
	Prestige	10	10	10	10	10
	Service	10	10	10	10	10
	Glamour	10	9	9+	10	10
	Culture	10	10	10	10	10
Paris	Income	9	9	8	9	9
	Prestige	10	10	9	10	10
	Service	8	8	7	9	8
	Glamour	10	10	10	10	10
	Culture	10	10	10	10	10
Shanghai	Income	4	3	2	5	5
	Prestige	3	3	2	5-6	2
	Service	3	5	5	4	5
	Glamour	2	2	2	4	2
	Culture	2	2	2	3-4	2
Tokyo	Income	9	9	7	9	9
	Prestige	8	8	8	8	8
	Service	5	5	5	6	5
	Glamour	6	6	6	7-8	6
	Culture	7	7	7	8	8
Other Cities		5-6	5-6	5-6	5-6	5-6

The model as a whole is sufficiently transparent to enable each player to calculate quite closely, but not exactly, where his city should stand when each stage was completed. Each could challenge the outcomes reported by the computer if an error should be made in transcribing the reports back to the players or in the program itself (each was encountered, but the difficulties could be overcome by quick checking as the exercise progressed). The principal function of the computer was the manage the effects of change, wherever they entered, and to provide an outline record of the decision making and the outcomes.

An additional option was provided to the students playing the role of strategic urban planners that added to the flexibility and depth. They could do favors for each other of the kind that were permitted by national governments (technology transfer, cultural infusion, business cooperation, international banking, etc.). These deals and arrangements were recorded on cards outside the computerized responses to Global Events and Opportunity scenarios. It was observed that the skill and personality of the planner led to many background initiatives. In this case, Manila, Shanghai, and San Francisco emerged with invisible assets which they could draw upon in a troubled future.

A description of the model, its inherent logic, and its reduction to gaming simulation dimensions had to be

presented to the student players in a simple, unambiguous, non-technical version. Thus this kind of simulation can speak for itself and that version follows.

URBAN QUALITY CONTEST

A new kind of world city is coming into being. Each is becoming an actor on the world scene in its own right, overcoming the barriers set up by national sovereignty and operating beyond the purview of the state authorities. The new metropolis is increasingly analogous to a multinational organization -- both are communities of people that work together for agreed upon incentives, import many products and services from the outside, export a wide range of others, and search the world for opportunities -- but the metropolis is anchored to a site. A multi-national operates in many locales, and can shift its key personnel, assets, and even its headquarters, in order to improve the overall prospects: a large city must make itself so attractive that these floating assets and scarce skills will migrate to it at a greater rate than they drift away.

The world cities that existed earlier were imperial capitals, centers of military power and mercantile enterprise that determined the destinies of most other cities. London, Paris, Washington, and New York, Moscow, Berlin, Madrid, Vienna, Rome, Lisbon, Amsterdam/Hague,

Brussels, Istanbul, Peking, and Tokyo must now act differently to maintain a position among top rank cities. Quite a few are not doing well because there are strong upstarts like Mexico City, Sao Paulo, Shanghai, Los Angeles, Seoul, Bombay, Hong Kong, San Francisco, Bangkok, Manila, Cairo, Tel Aviv/Jerusalem, Nairobi, and quite a few others that are becoming either bigger, or better, or both. Being a fountainhead of extended political and economic power is no longer enough to generate dominance and attract the prestige, the culture, and the glamour associated with a world role. New formulas have been found to achieve eminence; very likely more will be forthcoming.

What does it take to become a world city in the 1980s? What is needed to maintain that status? Which are the chief actors on the global stage now? What will the future competition be like? What are the effects upon the other cities following in their wake, some of which are trying to join their ranks? Some of the answers were foreseen by Doxiadis and Papaioannou (1974) in their City of the Future study conducted in the 1960s. A number of features were added by Meier (1974). More recently, Friedmann and Goetz (1982) have posed the issues in political, social, and dialectical terms.

The answer these questions it is necessary to set up a model. Because the questions are very large, the model must

be transparent, and very general. Its relevance and consistency must be easily explored. The characteristics chosen are as follows:

1. A city is a living system made up of people, some animals, more plants, habitat, artifacts, infrastructure, vehicles, automata, organizations, and know-how; it has a highly permeable and elastic boundary. The settlement is denser than its immediate environment, usually by a factor of ten or more.

2. A world city transacts far beyond its immediate hinterland, depending upon an international airport, global telecommunications, overseas trade, universal knowledge, and a cosmopolitan leadership. The biosphere presently supports about a hundred of these enterprising urban ecosystems; more are entering this avant garde stratus than are dropping out.

3. Competitive and cooperative interactions between the world cities are increasing over time, with the competitive being more evident during time of recession, and the cooperative capturing attention at other times. World cities must be alert to maintain their niches in the hierarchy, so opportunities must be grasped promptly, otherwise competitors will do so. Disasters of all kinds must be recognized in advance and avoided. Cooperation is often negotiated for common purposes; it requires that an

interface be found between differing legal systems and that cultural exchange, from cuisine to news and tourism, if not more, be expedited.

4. Transactions between cities are rarely completed by chiefs, as with nations, but primarily by participants in the urban community, as individuals, groups or organizations. Urban communities are never disciplined, monolithic action units, but much resemble an assemblage of actors with various ties to a collectivity.

5. A catastrophe is a scenario of political or natural change that leaves the world as a whole noticeable poorer as a consequence. It will have differential effects upon the attractiveness of cites, a few perhaps profiting from the miseries of others.

6. An opportunity is a scenario of discovery and development of a natural resource of some other potential. An opportunity may be so large metropolitan regions may have to collaborate to take advantage of it.

7. A power structure is a network by which choices are made for the metropolis. In the newer world cities it is often compartmented and uncoordinated, but it evolves toward a hierarchically organized framework or a collection of contesting pressure groups with a mechanism for determining

which of their respective preferences dominate. External relations rarely receive a high priority when competing with publicized internal issues.

World Cities

The world cities are pacemakers among urban settlements; they march into a future followed by a miscellany of lesser agglomerations. They have emerged as a result of the efforts of individuals and groups with larger ambitions, as reflected in the construction in international airports, telecommunications systems, harbors, container trans-shipment, modern office buildings, and the establishment of consular services, banks, and insurance. Regional headquarters of international and multinational organizations constitute indicators that a metropolis has created an internal environment that allows it to play a leading role.

A list has been prepared which contains those centers that seem to fit the popular image of a world city, but contains a few others that play equally important roles (such as Mecca). As individual borderline cases are considered, it is interesting to discover a number of cities thrusting themselves into worldwide attention, and a few that are relinquishing that status as home-bred world-serving organizations decline or are absorbed into larger

organizations based elsewhere. In one or two cases the political will to participate on the world scene is lost but, overall, the "comers" are much more numerous at this time than the "losers".

We are interested in comparisons as normally made in governmental, business, and professional circles around the world. Reputation is far more important than reality; however, image tends to lag behind performance by as much as a decade. Therefore detailed comparisons of urban infrastructure and competences are not necessary. It is important to know, however, whether a metropolis is judged to be among the top ten percent of the world cities, the second 10 percent, or much lower. This judgement may be gleaned from an inspection of the current literature and from measures of internal activity.

The remaining 50 or so leaders will be listed alphabetically. The estimates of population of 1985 will run between one and three millions for the most part, except for a city like Mecca where this size will be reached only during the holy month of Ramadan, and others with sojourners over a more extended period.

There are nominees of rising importance that may soon join their ranks: Kunming, Tianjin (Tientsin), Tashkent, Algiers, Surabaya, Kaohsiung (Taiwan), Kinshasa (Zaire),

Guadalajara, Bandung, Casablanca, Monterrey, and Perth (Australia). There are others of currently declining importance that were once globally far more significant: Ho Chi Minh City, Rangoon, Pyongyan, Buffalo, Baku, Milwaukee. They are mentioned so as to convey a feeling for the kinds of choices which have been made. The nominees for future inclusion are growing in population and expanding the range of contacts with the outside, while those whose influence is dwindling are cutting off communications with the rest of the world, either because their chief industries have gone into decline or they are subject to extraordinary political restrictions. If China and India open up more completely, a half dozen cities in both countries may be expected to gain "world city" status.

One of the critical tests for world city status is the state of its international airline connections. large cities in China, for example, have only feederline status, with only Beijing, Shanghai, and Canton possessing multiple connections to the world. Kunming, in the southwest, is on the old route to Karachi, which opens out to West Asia, Europe, and Africa, with which ties are expanding rapidly, so its special nodal position may soon cause its elevation to world city status. Tianjin, with more than 7,000,000 population, should, on the basis of size alone, be such a city, but it depends upon Beijing for air connections. Its historic entrepot role for China, starting from the harbor,

suggests that a supermetropolis may emerge in that district resembling Tokyo, but Tianjin playing the role of Yokohama, were the shopping/manufacturing/commercial functions predominate.

FACETS OF QUALITY OF LIFE

A review of the world cities list suggests that the cities near the top have accumulated many attractive features and have distributed them throughout the metropolitan region, although quite unevenly. They have high pay scales in the central districts to attract the talent, banks and markets which invite the deposit of funds, transport and communication services which encourage entrepreneurs to work actively at creating organizations, government posts to offer to professionals, hotels and amusements to entice the tourists, good universities and libraries that appeal to scholars and students, pleasant residential districts for higher income families, and opportunities to operate one's own automobile, a much sought-after convenience.

As compared to other centers with which they were in competition the very large metropolises transformed their internal environments to draw in and hold the missing resources. However, many residents remained in need, so they started sending out deputations to lure certain kinds of organization, and they hired lobbyists to represent them

in the national arena where pressure groups influence budget-making and contract-letting, thus assuring themselves of at least their share of government spending. The very large cities had obviously learned how to grow, i.e., how to digest immigrants without completely choking up.

Further down the list one encounters metropolises with strong specializations, such as manufacturing oriented to international trade (Osaka, Hong Kong, Pusan), pilgrimage countries (Mecca, Jerusalem, Rome), tourism (Athens, Miami), international government (Geneva, Nairobi, Vienna), while many are capitals specializing in bureaucratic management.

If equivalent data in great variety were available for the metropolises that behave like world cities, it should be possible to identify factors which were responsible for their ascendancy. However, such data are fragmentary (some that are given out are pure fabrications!) and largely non-existent. Therefore at the present time we must depend upon odd strands of information and experience, most of it collected by people who were drawing inferences for whole societies, rather than communities, or making comparisons between Western cities, which have many more commonalities.

At this stage we must make some observations about the quality of life in cities concerning what has been learned to date. The concept termed "quality of life" crystallized

in America around 1968-9 more as a political slogan invented by spokesmen for a body of people which later come to be known as environmentalists. The meaning was intended to be larger than welfare as defined by economists, especially incorporating judgements about the natural surroundings and the physical, or built environment. Politicians in the uniter States and Canada quickly adopted the theme and passed the task of improving the quality of life onto administrators. However, if a government has promised to improve conditions that seem to be threatened, it must have some index which enables it and the public to determine whether its programs do indeed make a difference. Logically, the government should evaluate that it does, thus setting into motion some societal learning.

The first approach used an economist's image which allowed intervention by government. Liu (1976) proposed a production function, identifying at least four major input components. In order to apply it to metropolitan areas and cities in the US, comparing their relative status, he was forced to seek out some proxy variables, indicators of a single dimension of quality. For example, ozone levels in the atmosphere were already being reported; this happens to be quite a good indicator of one common kind of air pollution. In choosing the index for noise pollution he was not so fortunate; the number of motorcycle licenses per thousand of population was unsatisfactory because they

included the trailbikes so common in the West which are not used in urban precincts and therefore did not contribute to the decibel level. A serious error was also made when he tried to be objective and not make personal judgments about the relative importance of the four major components, and therefore rated them equally for all cities in all regions. The report turned out to be a major political liability because the best city (Portland, OR) did not want the publicity, believing that it would attract a flood of undesirable immigrants which would diminish the qualities they prized the most, and the world (Selma, AL) complained that it was being pilloried because its people liked to live with a minimum of sidewalks, septic tanks instead of sewers, sociability instead of libraries, etc. Later models by economists that looked at society in general were politically neutral, but they failed to take account very much of people's feelings of satisfaction with the life they led.

Social psychologists believed that probing people's feelings offered a more valid approach. Two groups at the University of Michigan which had had experience attempting to explain choices during Presidential elections set out to explore the possibilities. At first they tried to extend prior world on happiness and satisfaction with conditions of life, believing that quality of life combined these two concepts. By this means they achieved levels of explanation

far superior to what was obtained when the basket of variables employed by the economist was assessed.

Expanding on this approach Andrews and Withey (1976) plumbed feelings even more comprehensively by using a lead question: "How do you feel about life-as-a-whole?" using a seven point scale (Delighted --. --. Mixed, --, --, Terrible) followed by about eighty carefully selected questions intended to find underlying factors that explained the feelings about life-as-a-whole. Their findings were reproducible, stable over periods of a year or two, and usually quite understandable when people changed their report (loss of job, death in family, divorce, etc.). They were also able to account for 50-62% of the variance, depending upon the way the question is framed, which is an astonishing achievement for such soft data. Their surveys show that high income people do tend to feel better about life, so there is real incentive to acquire income. However, education leads frequently to dissatisfaction, so it appears quite reasonable for an educated person to migrate to an urban environment that promises to be better. All this work is based upon national sample surveys and does not say much about urban comparisons.

Cities must be attractive to skills, organizations, knowledge, and the kinds of capital needed to bolster long term stability. This means that the world cities must pay

special attention to professional life styles and typical values of members of these minorities, many of which are residing elsewhere in the world. Community needs suggest that the quality of life for some specialists may for a while be assigned a higher priority than any others, because without them all of the others will experience a restriction in choice and a lessening of overall well-being. The obvious strategy for a city that feels some serious deficiencies is to look around its own society, or the world, for cities which have created an apparent surplus in that category.

The facets of urban life that currently dominate inter-metropolitan competition in the world are presented in Fig. 1 together with an urban quality profile for a typical Third World primate city. Indicators that contribute tot he respective facets are identified along with the kinds of immigrants needed to maintain it.

The build-up of metropolitan muscle depends upon the availability of certain critical components that can be fitted together with standard organizational parts to produce a stable structure. In a resource-rich city (Dharan, Kuala Lumpur, Bagdad, Houston) ordinary workers may be s, so immigrants must be allowed to serve as guest workers. Elsewhere educated professionals, or even scarcer talent, especially entrepreneurs, inventors, managers,

scientists, and professors, need to be attracted; once there the conditions must improve enough to hold them there, because they can easily migrate again to a superior environment. Therefore, in the competition between metropolises each is attempting to close a gap in the quality of life of a key component of its own population, a minority, sometimes quite small, of a total residential population. Quality of life for these cities is quite different from the society-wide sampling utilized by the Ann Arbor investigators. Cities must give priority to well-being in facets that are in the city from which the least acculturated foreigners would operate, because it contains the embassies or consulates, the foreigner's clubs and schools, the restaurants with unusual cuisines, appropriate cinemas and churches, temples, or mosques, small hotels, libraries, lawyers, accountants, and translators. Add to these delicatessens and book shops. Some of the architecture and urban design may be introduced to suit the occupants. Quite a few metropolises have made a good start in this direction.

Thus a world city that maintains its place among the leaders must be a cosmopolitan settlement; it must be able to deal with the world conveniently and comfortably. We are concerned here with the image it projects and the action it undertakes.

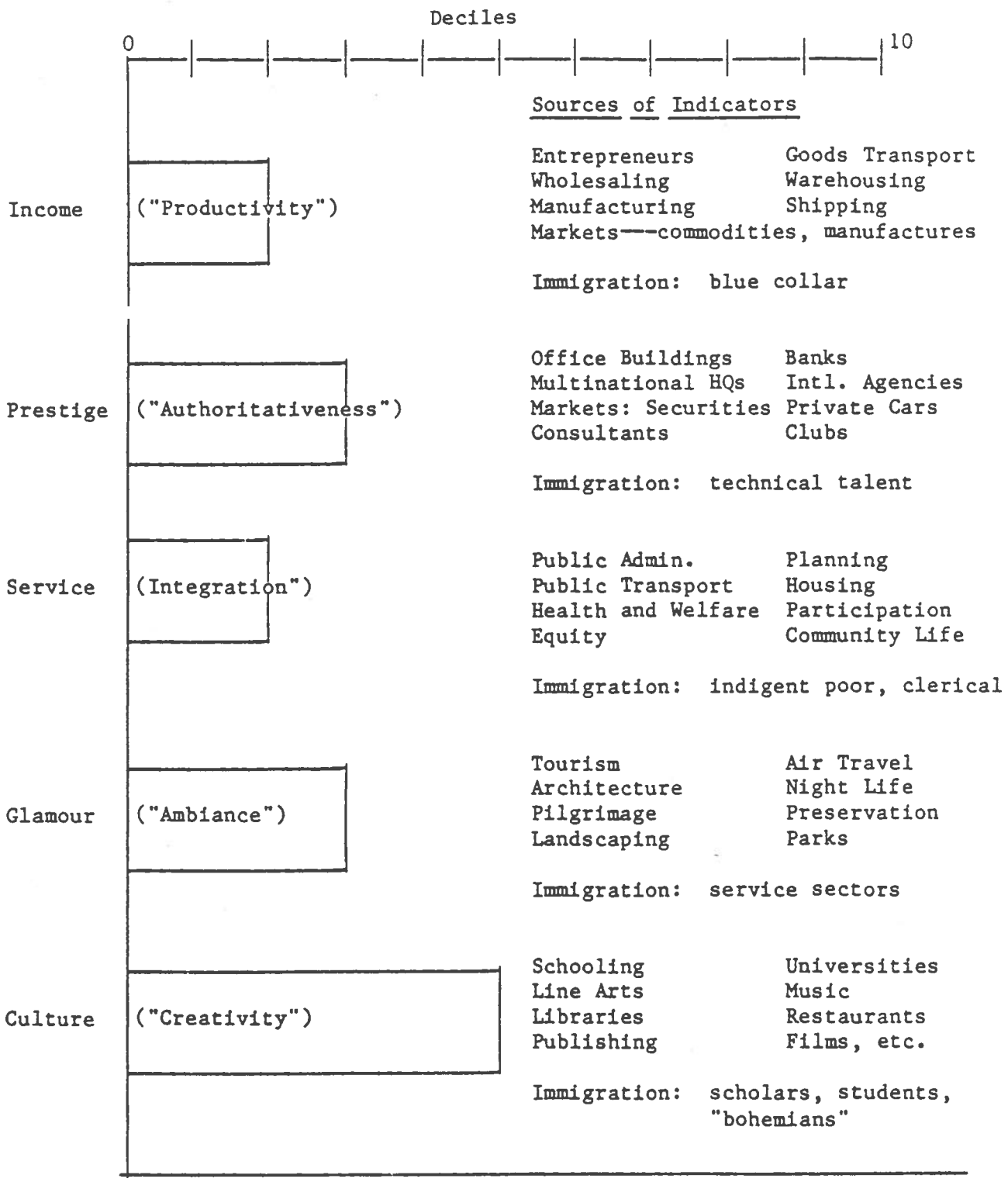

Figure 1 - Urban Quality Indices for a Poor Third World Metropolis

INCOME

The important thing about having more money is that it can be spent on obtaining other things of value. Many cities over the past several decades have learned to become cash cows, or income generators for the residents, firms, and the Government. The most successful of these have been Tokyo, Seoul, Hong Kong, Singapore, Bangkok, Frankfurt, Milan, Sao Paulo, Athens, Bombay, Shanghai and Houston.

The formula they have used for the enhancement of wealth involves the stimulation of new industries. This means that the public sector cooperates with the entrepreneur in getting business started. One way, for example, is to rationalize the goods transport in the metropolis, and to enhance the efficiency of distribution. The provision of infrastructure supports a variety of large markets for commodities, semi-manufactures, and the wholesaling of finished products. Such action may be extended to the construction of low cost, relatively unsubsidized rental housing for the workers, but only to the extent that it promises to contribute to productivity.

Since we are dealing with income expectations over a quinquennium, our INCOME facet of Urban Quality is really the sum of many leading indicators of economic development in cities. Gross Domestic Product per capita is an

aggregated indicator. At the starting point for the simulation, the world cities are roughly ranked according to the expected GDP in 1985. Since figures are not available for most cities, they must be deduced from the national figures as compiled by the World Bank, making allowances for lesser productivity in the remainder of the nation.

For cities below the top decile in GDP per capita, manufacturing has generated the most income-producing activity. Therefore blue collar workers are attracted to the metropolis. Such a labor force requires middle school educations to compete on world markets. Similarly, some minimal levels of housing, water supply, health, transport, and community organization seem to be necessary. These services must be expanded to provide a basis for rising INCOME in cities.

INCOME is a unique index in that it can be invested so as to provide higher Urban Quality in the other indices (with a lag of about five years before realization, and with some risk of failure). Therefore it is possible for a strategist in charge of a world city to direct some wealth away from the production of more wealth, and use it to promote Glamour, Prestige, Culture, or Services.

SERVICES

It is the aim of many governments in the world to construct a welfare state. They are concerned with equity in the distribution of human services, and they proceed to build large bureaucracies for the provision of essential goods and socially desirable services. They tend to subsidize public transport heavily, offer schools and clinics for everyone, while fostering participation in communal affairs. Typically the standards for publicly supplied housing (new) are kept rather high, thus requiring sizable subsidies, which quickly drain away the available funds. Therefore the right to decent housing is honored in words, but not in reality. The scale of the redistributive intentions in a World City requires a major planning effort; even then the implementation may frequently leave much to be desired.

Despite official declarations, the build-up of services in the cities is achieved more rapidly than in the countryside; this is because the urban densities speed up the organizing of services. As a result the cities become attractive for the very poorest people in the countryside. When these low status people arrive, they create by their very presence new demands for service. As mentioned earlier, some cities respond with a policy for rationing entry; they require the

carrying of passport-style identification and official permission for residence in the major cities (equivalent to a visa). The response of the part of the people kept out is to bypass the law, outwit the system, and find some kind of residence informally. They rent a back room or they squat on vacant land.

An investment in SERVICE is needed to match increasing sophistication of manufacturing and commerce. As the productivity of these latter activities improves, the urban services must also improve. Thus we observe that SERVICE seems to lag no more than two deciles behind INCOME. On the other hand, an inordinate attempt to promote SERVICE will tend to depress the generation of INCOME, and would soon detract from the quality of SERVICE provided to residents. Thus, it appears that SERVICE cannot get ahead of INCOME by any more than two deciles over the middle run (five years).

PRESTIGE

A capital city normally accumulates the trappings of prestige. The facades, furnishings, personal grooming, uniforms, automobiles, and calling cards transmit images of power, rank, status, profession, and connections. Offices are appropriately graded by the quality of the address, as well as the dimensions and style. Clubs are specialized and exclusive. Important multinational organizations will want

to locate in such cities, whether they are in business, benevolent activities, religion, sports, or a dozen other activities.

A few cities acquire such PRESTIGE without being capitals of nations. New York is the most outstanding, but then it became the seat of the United Nations. Toronto and Sao paulo are others in the Americas; Shanghai and Bombay have done so is Asia; Johannesburg did it in Africa, and both Sydney and Melbourne in Australia.

Enough has been said to suggest how this general category of PRESTIGE is built up. The investment is in institutions of various kinds which have a capacity to project the consequences of its actions over a great distance. Telecommunications/computing services and airline connections are particularly potent, as are the accreditation and standards-setting agencies. If a city can make itself attractive to multinationals looking for regional headquarters, and launch its own corporations into the outer world, it will acquire high prestige. If no such organization desires to move to it, the PRESTIGE must be low.

CULTURE

If the impression was given that PRESTIGE was somewhat superficial, emblematic, and organizational, the related phenomena constitute a new dimension when viewed in depth, complexity, and originality. The word culture seems to best fit these phenomena, if we emphasize the creative, knowledge-based aspects.

The respect generated for the school systems, the libraries, the science and fine arts will be a good indicator, but various forms of bias or prejudice must be avoided. For example, in the Western world a split is made between high culture and popular culture, with the latter granted a looked-down-upon status. This dichotomy is not found in most of Asia and Africa, where rock music is rated at least as important as the classical and Hollywood and Disney World are as significant as opera and theater in Paris or London. This breadth of interest greatly extends the range of cultural performance; for example, we must recognize that the highest art of Hong Kong, Singapore, Taipei, and Canton is found in the cuisine.

To have CULTURE we must assume that the best teachers, academic investigators, chefs, book collectors, and museum directors have already become established. They will

attract students, apprentices, and appreciators of their efforts, some of whom have the ambition of breaking into these esoteric circles. Thus cities with cultural reputations, like Paris, Boston, Los Angeles, San Francisco, Tokyo, Beijing, Cairo and Moscow will attract scholars and the avant garde from all over the world. The flowering of a city, an ultimate purpose if any can be adduced, is to be found in its achievements in science and the arts.

GLAMOUR

Fun city is a sector of the metropolis that is well equipped with cinemas, nightclubs, and hotels. Recreation is a preoccupation, so tourists are attracted. The associated shopping facilities carry in stock a large supply of cute discussion pieces (most are called "kitsch"). The music provided is almost always a product of the mass media. The architecture is gaudy, and hidden behind neon lighting at night. Sensationalism prevails, to the delight of the visitors.

Cities specializing in glamour can be highly organized and disciplined, as indicated by the success of Las Vegas, which makes almost all of its living by attracting glamour-conscious petty capitalists, and Singapore, which consciously markets a clean, green image along with all but the most debilitating sources of pleasure while depending heavily upon socialist enterprises.

To promote GLAMOUR a city must first attract the entrepreneurs who understand how it is produced and sold, and then keep them by offering supports ranging from access to credit, permissions to build, and a tolerant, understanding police force. They need the freedom to attract entertainers from all over the world as well as technical equipment ranging from lighting fixtures to computers to close cooperation with airlines. After the resorts have become dated and unfashionable, and the tourists have moved on the new attractions, this district of the metropolis is likely to accommodate the pensioners and other heavy users of residential hotels.

STRATEGIC DECISION MAKING

When scanning the newspapers of world cities looking for reports on strategic decisions, we see almost everything reduced to local terms; competition with other cities is very rarely mentioned, and instances of direct cooperation are not at all newsworthy. The infrastructure needed to make a difference (airports, container-handling docks, tourist hotels, schools, research and development laboratories, downtown urban design, etc.) is discussed in terms of drain upon local budgets and credit-worthiness. The educational institutions are rated by the success of their football teams, or the demand for graduates, rather

than the attractiveness for top scholars. The office buildings are the outgrowth of financial success for home banks and regional corporations, but the flair of a local promoter who fits the pieces together into a viable proposition gets the most attention. However, if we go into the lesser offices of the planners, managers, and consultants who formulate the proposals for the politicians and the promoters, we see heavily used trade journals which allow competitive comparisons to be made, and on the same shelves are the professional journals which report upon the cooperative efforts.

In this model fo the future urban world we see events from he viewpoint of the system of world cities. In particular the cities linked by direct airline connections, telecommunications, and trade most strongly constitute a kind of peer group which will gauge the significance of a change in a given city. The assessments are likely to take the form of memoranda between executives, using idiomatic analogs to history, sports, religion, or the arts, and remain qualitative. We will judge the moves that cities make in terms of how they affect the standings, the ratings in urban quality or collective well-being.

This is a time when nation-states are losing their ability to defend settlements and control their initiatives. Agencies within cities more and more act directly of the

rest of the world without benefit of diplomacy. The model must be simple enough to be quickly understood, so that players can match chains of consequences against their own (analogous) experience.

The tokens for the game, the units of bargaining, investment, damage to the environment, and quality improvements, are ranking among the world cities. Although the real decision within a city may be to raise taxes so that it is possible to commit more of the budget to an important priority like higher education, it is defined in this model as reducing the earning capacity of a city in order to add to its cultural status; in short, spending INCOME ranking in order to improve the CULTURE ranking. The urban strategist must think in a way that is analogous to that of a football executive trying to raise his club into the first division, or a university board of trustees trying to elevate their institution in the ratings made by the academic fraternity.

Because many of these city-city comparisons are ambiguous and fuzzy, particularly in the bottom half of the world city ranking, our capacity to discriminate urban quality is no better than a decile, which means (given the population of a trifle more than a hundred world cities) that ten to twenty metropolises are regarded as roughly equivalent.

Since investments should have expected rewards (ie., anticipated payoff times likelihood-of-realization) greater than the normal discount rate, we regard the minimum investment as being a half decile of INCOME which will result in the acquisition of one decile of CULTURE, SERVICE, PRESTIGE, OR GLAMOUR within five years. There is always some risk that the payoff is likely, but not absolutely certain. The half token unit of INCOME is handled as a 50/50 chance of losing a whole decile, and the outcome is determined by using a random number to decide what the fates will. The risk of loss in the investment process depends upon the onset of bad times in the global economic activity; in boom times there is virtually no risk at all.

The players are presented at the beginning of each quinquennium with a number of short scenarios based upon knowledge of the world and its trends. Some are Global Events over which cities have no control (eg., climatic disturbances having strong commodity price effects, ideological extremism, guerilla warfare, transnational bank crises, etc.). The probable net consequences, positive as well as negative, for all the affected world cities have already been estimated and are included in the scenario. These Global Events are exogenous factors affecting the strategies of cities and are sometimes called the acts of God which redirect the competition

Examples are (i) the apparently uncontrollable price of sugar, (ii) the effects of tropical volcanic eruptions upon the solar energy available at the various latitudes, and (iii) outbreaks in the continuing conflict between Shia and Sunni Moslems. Manila, for instance, would be affected by the first and second directly, and the third by its impact on the flow of petroleum form the Middle East.

The player strategists are simultaneously presented with opportunities. These potentials may arise from the discovery of new resources, the appearance of powerful new technologies, or new capabilities for cooperation. Sometimes collaboration between cities must be negotiated in order to take advantage of the opportunity scenarios. Often these negotiations are carried out across two opportunities ("you help me, I help you"), but city administrations may store up favors, so that they have a chance to ask a return favor at a propitious time in the future. It is useful for the record to have this IOU recorded, perhaps as an expression of gratitude, so that the relative strengths of the leading cities can be more accurately appraised. Hidden assets remain assets, even if they sit in the file.

How do world cities compete? In essence, they are like the nice girls who live at home, deciding how they should dress, behave, offer dowries, or learn to cook in order to attract the prizes out there. A city's major assets are

used to fish for entrepreneurial capital, technical talent, mobile organizations, factories, consultants, scholars, tourists, etc. They also set up better contingency plans, so that if the worst scenarios prevail, they can pick up assets for a song and improve their competitive position in the hierarchy of world cities as compared to cities incapable of planning to avert disaster. The similarity to the community ecology of plants was once strong, but is being lost due to telecommunications and jet travel.

The simulation game has an overall director who has the power to slow, or even halt, the action so as to allow more consideration and discussion of the implications (some parts of the future cannot be compressed as much as others). More often his role is that of consultant to the most confused of the players, explaining the options available to them in their role of planning strategist. Players who feel confused are encouraged by reminding them that office holders in the real world are frequently changed, and the new occupants are equally confused by the demands of the real world. The destiny of cities is often in the hands of amateurs. (End of description for players).

OUTCOMES

An elementary test of the model employed here was first undertaken in December, 1977 with manual computing. Cities

chosen by the students then were only partially overlapping with those brought into the simulation reported upon here. Although the students were highly enthusiastic, it was evident that at some point their behavior, decisions, and strategies would develop anomalies, possibly due to fatigue, which could be obstructive in the long run. What they were learning might not be realistic.

This experience led to:

1. an elaboration and updating of the Global Events and Opportunities scenarios;
2. an assessment of current urban quality based upon much more systematic information; and a better definition of the world city population;
3. the introduction of explicit urban quality goals;
4. synchronization of the Business Cycle to cover the whole Earth;
5. the attempt to employ a micro-computer to speed *upt he play and intensify the action; and
6. encouragement of the players to extend "favors" and have them informally recorded, in order to add further richness to the interaction.

Students then were most impressed with the apparent vulnerability of top-ranked cities, such as San Francisco. One serious mistake could cause noticeable slippage in less

that a decade, but there seemed also to be an underlying capacity to recuperate quickly, if an enlightened strategy was employed.

In the March 1983 operation of the simulation the stream of random numbers (fates) selected a sequence of scenarios that did not seem bizarre. Business conditions proceeded from steady growth, to slow growth, to recession. Recurrent food shortages, a financial panic, and civil war in the Middle East cause the greatest perturbations. Therefore the overall path followed into the future was well within current expectations as indicated in Table 3 and Fig. 2.

Everyone was surprised that the kind of decision-making likely to be employed by technocrats in developing metropolises, such as Manila and Mexico City, would have such a strong positive effect. Hong Kong did well by being ingenious; it resolved the crisis of lease termination in 1997 by building the next new town and office center on floating platforms, so that the multi-nationals could hire a tug or two to take them to the nearest metropolis that extended a real welcome. This gave them leverage

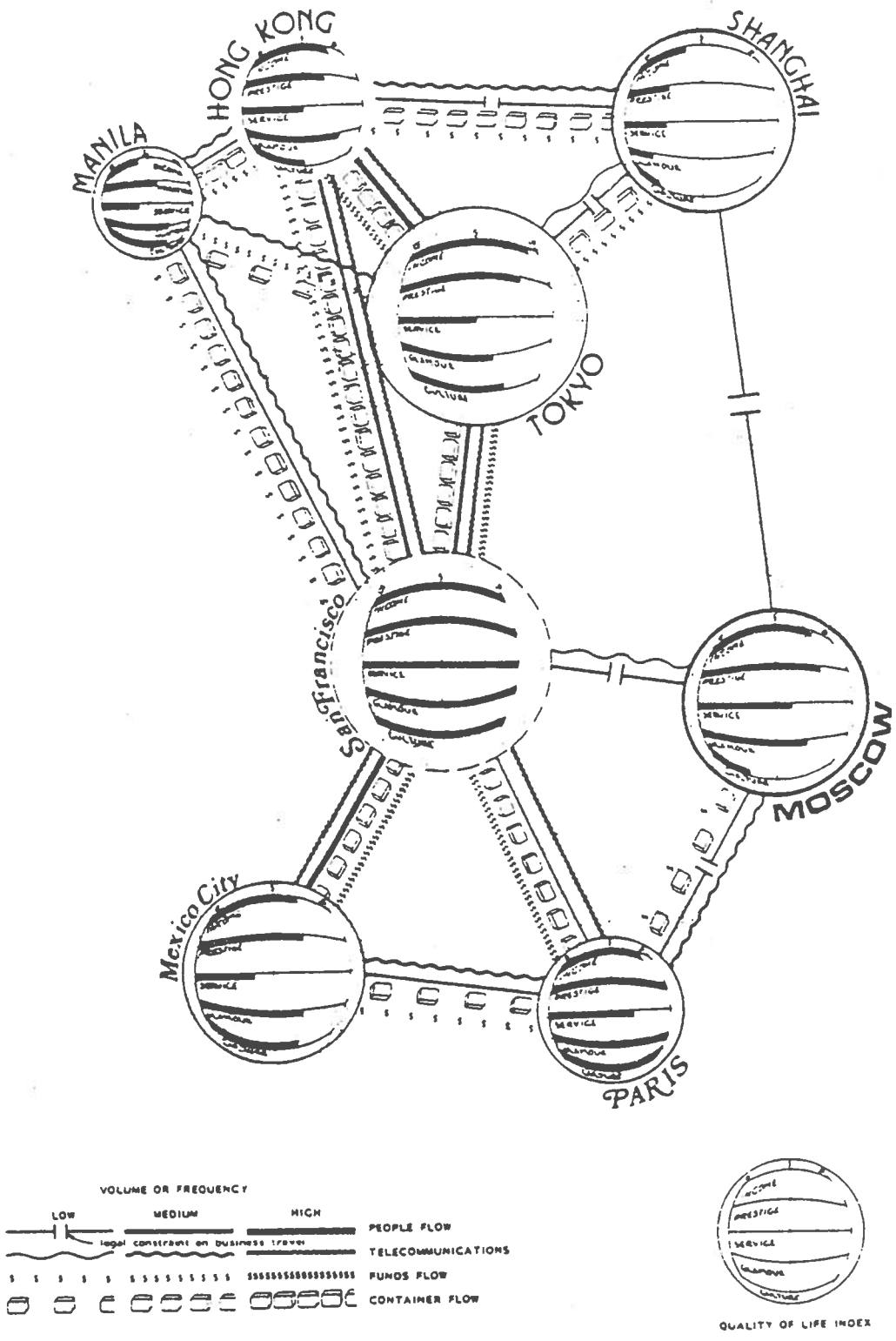

Figure 2 - Structure of the Facet of World City Interaction Treated in the Simulation

in negotiations with China (represented by Shanghai, its nearest industrial competitor). The nuclear threat was postponed to the 21st century, and the play stopped before it was resolved.

Again, the top-ranked cities (San Francisco, Paris, and Tokyo, among those chosen by the students) inadvertently slipped in the standings, but the strategic planners took advantage of a combination of circumstances to recoup. Moscow's indices of quality declined due to the recurrent food shortage world-wide, but it was also apparent that a few favorable Global Events could cause it to forge forward. Shanghai exerted tremendous effort, but was held back by the inertia of a billion Chinese in its hinterland, and it showed remarkable improvement at the turn of the century.

INTERPRETATIONS

Model designers should be skeptics; if they are good scientists, they should not believe in the models they construct. Each model is a conceptual framework that must be tested to the point of failure before it merits some confidence. If a model is efficient, it must be comparatively simple, and therefore must have a boundary of applicability beyond which it will produce anomalous outcomes, (Rapoport, 1981).

This argument is reinforced by the views of Schwarz and Hoag (1982), which extend those of Schwarz, Svendin and Wittrock (1982). However, it is possible to go a notch further than Rapoport's (1981) criticism of the complex environment-rich simulation in this case. Experience with a gaming simulation enables an advice-giving professional to ask an added number of systems-oriented questions in any relevant instance he encounters thereafter. It is a strong enough experience to cast doubt upon the narrow discipline-oriented inquiries, and thus causes the participant to expand his outlook. The task of a professional requires that he comprehend the context within which he is working, and then acquire as much cogent and relevant information as possible in a limited period of time. Playing in a gaming simulation is high intensity experience, and we generally trust experienced professionals much more than those who have not been tested.

The model employed here for the Urban Quality Contest, which affects about 110 world cities, revealed no inconsistencies. The choices and the bargaining behavior remained plausible going into the 21st century, so the model has face validity. It is too time-consuming, however, to discover much about its sensitivity, but it is sure to fail if international trade suffers a sharp setback.

One worrisome feature was that most cities increased their rank during the course of the game, and a number of them quite significantly. At steady state the contest for rank is a zero sum game, where losses should roughly equal gains. However, the real world being modelled is not in steady state, since over the next two to three generations the number of world cities is expected to increase markedly, and almost all the new entries are expected to be injected into the lower ranks. Therefore established metropolises, such as those chosen by these students, should achieve significantly improved rank during this period, even if their actions were inspired by average planning competence. Moreover, students tend to avoid adopting cities with problematic destinies (such as Teheran, Havana, or Calcutta), therefore an extra bias toward upward mobility is superimposed upon aggregate performance.

The modellers at IIASA (Yared, Stahl and Assa, 1982) claimed to discover differences between expert professional decisions regarding water services for metropolitan regions and rational choices according to game-theoretic calculations. Presumably the gamers were responding to bureaucratic experience not incorporated in the generalized model. Such performance causes us to scrutinize the historic decision ruled embodied in the institutional processes. Can they be changed to improve performance?

In our case the situation is different. The students are the technocrats of the future, or their critics. The simulation illuminates how objective facts obtained through literature research and on-site observations interact with the choices that must be made by the metropolis as a unit. No theoretical optimum can ba computed, but the exploitation of opportunities in the global environment is shown to be rewarding, apparently more so than expending the bulk of one's effort rationalizing traffic, land use, housing, health services, education, race relations, and the like, which make up the predominant share of their studies. Besides, though as serious as any final examination, it was much more fun!

What did the designer learn from the exercise? He came away realizing that field studies methodology assessing potential changes in Third World cities (Meier, 1980) did not adequately take into account the possibilities inherent in the mobility of the activities from one world city to another, both losses and gains. Rankings in the system of cities are determined in important part by the moves made by competitors. Much more attention needs to be placed upon the networks of cities interacting with facets of a given metropolis; the strategies of the others in these networks must be gauged. With better appraisals of potentials, the planning will more often achieve desired results.

A model of the future competition and cooperation expected on the part of world cities has been constructed in the form of a simulation game. Students become familiar with the characteristics of a world city of their own choosing and prepare themselves to play the role of strategic planner for it. They react to various world events and choose among opportunities so as to make their metropolis an attractive place for capital, entrepreneurs, scientific and technical talent, scholars, students, artists, tourists, and offices of multinational organizations according to the predilections of the citizens. Fifteen years of further world city evolution is compressed into about five hours.

Twenty-two scenarios were constructed which spelled out possible changes in the societal relationships, and in economic conditions, which could affect the cities highlighted for strategic planning. Likelihoods of occurrence of the respective scenarios were assigned on the basis of climatic statistics, business cycles, and beliefs of experts. The timing of these catastrophes and opportunities was elicited by a stream of random numbers.

Urban quality in five different dimensions (labelled Income, Prestige, Service, Glamour, Culture) was estimated for the near future, the launch date of the simulation, in the form of their ranking with respect to the total population of world cities (about 110). With the

information available it was relatively easy to come into agreement regarding the appropriate decile in which each should be ranked. Movement of a city in the indices of the respective urban qualities provided the basis for scoring. Informal opportunities presented by the immediate context, almost all of them cooperative in nature, were reported on cards outside the computerized features of the model; they very much enriched the simulation as a learning experience. No anomalies were uncovered, so the simulation is in a relatively finished form.

REFERENCES

Andrews, F.M. and Withey, S.B., 1976, Social Indicators of Well-Being, Plenum, New York.

Bradbury, K.L., Downs, A. and Small, K.A., 1981, Futures for a Declining City: Simulations for the Cleveland Area, Academic Press, New York.

Doxiadis, C.A. and Papaioannou, J.G., 1974, Ecumenopolis: The Inevitable City of the Future, Athens Center for Ekistics, Athens.

Duke, R.D., 1974, Gaming: The Future's Language, John Wiley, New York.

Friedmann, J. and Goetz, W., 1982, World City Formation; An Agenda for Research and Action, International Journal of Urban and Regional Research, 6, 309-344.

Greenblat, C.S. and Duke, R.D., 1975, Gaming Simulation: Rationale, Design, and Applications, Halsted-Sage Publications, Beverly Hills, CA.

Lee, D.B., 1973, Requiem for Large Models, Journal of the American Institute of Planners, 39, 163-178.

Liu, Ben-Chieh, 1976, Indicators of Quality of Life in U.S. Metropolitan Areas, 1970-1975, Praeger, New York.

Meier, R.L. and Duke, R.D., 1966, Gaming Simulation for Urban Planning, Journal of the American Institute of Planners, 32, 3-17.

Meier, R.L., 1980, Urban Futures Observed, Pergamon, New York.

Perry, J.L. and Kraemer, K.L., 1979, Technological Innovations in American Local Government: The Case of Computing, Pergamon, New York.

Rapoport, A., 1981, "Realism" and "Relevance" is Gaming Simulations, Human Ecology, 9, 137-150.

Schwartz B. and Hoag J., (1982), Interpreting Model Results; Examples from an Energy Model, Policy Sciences, 15, 167-181.

Schwartz, B., Svendin, U.N.D. and Wittrock, B., 1982, Methods in Futures Studies: Problems and Applications, Westview Press, Boulder, CO.

Yared, R., Stahl, I. and Assa, I., 1982, Gaming, Options (International Institute for Applied Systems Analysis), Spring 1982, 10-17.