THINKING HOLISITICALLY
ABOUT
URBAN AND REGIONAL PLANNING
PROBLEM SOLVING

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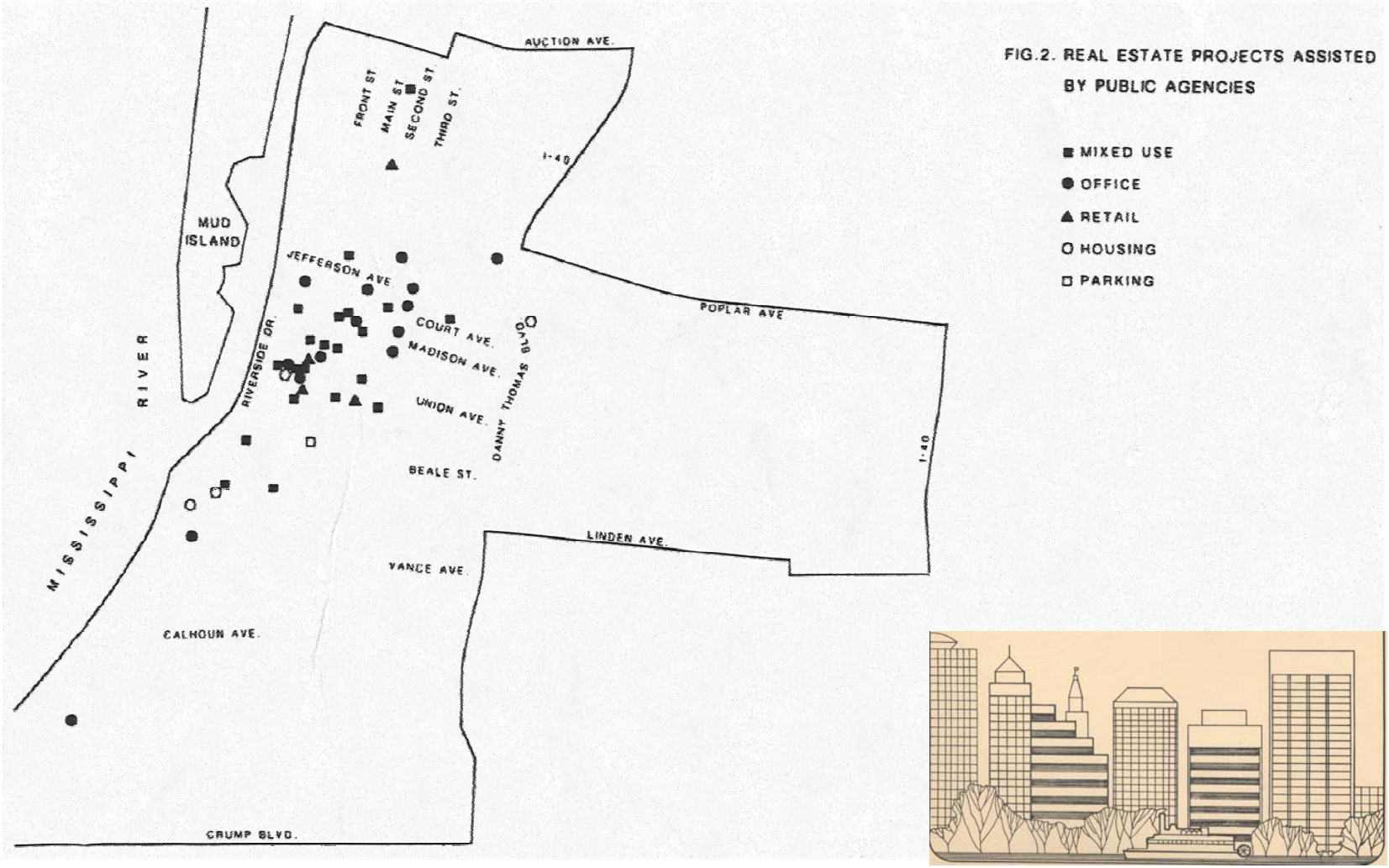
A STUDY OF THE ECONOMIC IMPACT OF DOWNTOWN REVITALIZATION ON MEMPHIS AND SHELBY COUNTY



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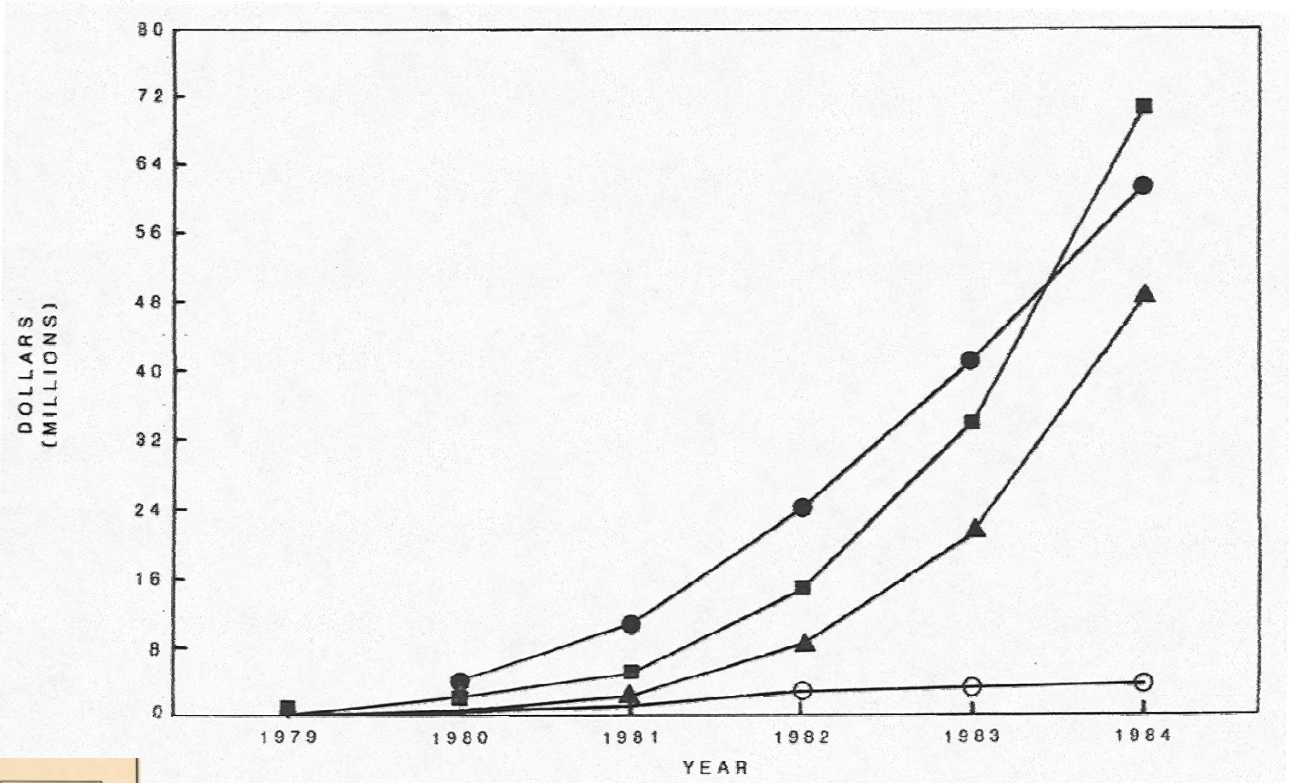
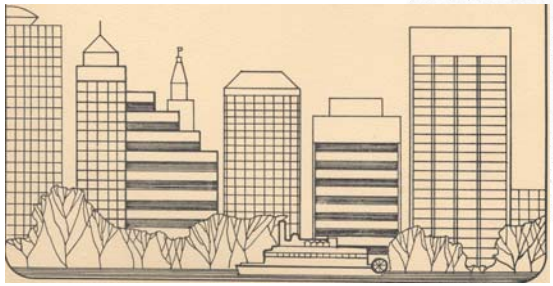


FIG. 5. CUMULATIVE BENEFITS OF DOWNTOWN REVITALIZATION: 1979 - 1984



A NOTE ON THE SUBREGIONAL EMPLOYMENT IMPACT OF URBAN REVITALIZATION

log Tj = 3.36 - 2.00 log dij (2)
(employment model, 10 zones)

(12.73)(10.60)

ratio total employment of 2,262. The statistically derived estimate (the coefficient of the log-linear model above) gives 2,290.86. Thus, the local employment multiplier falls within a range of 2.262 (simulation model) to 2.290 (statistical model) for the City of Memphis, compared to

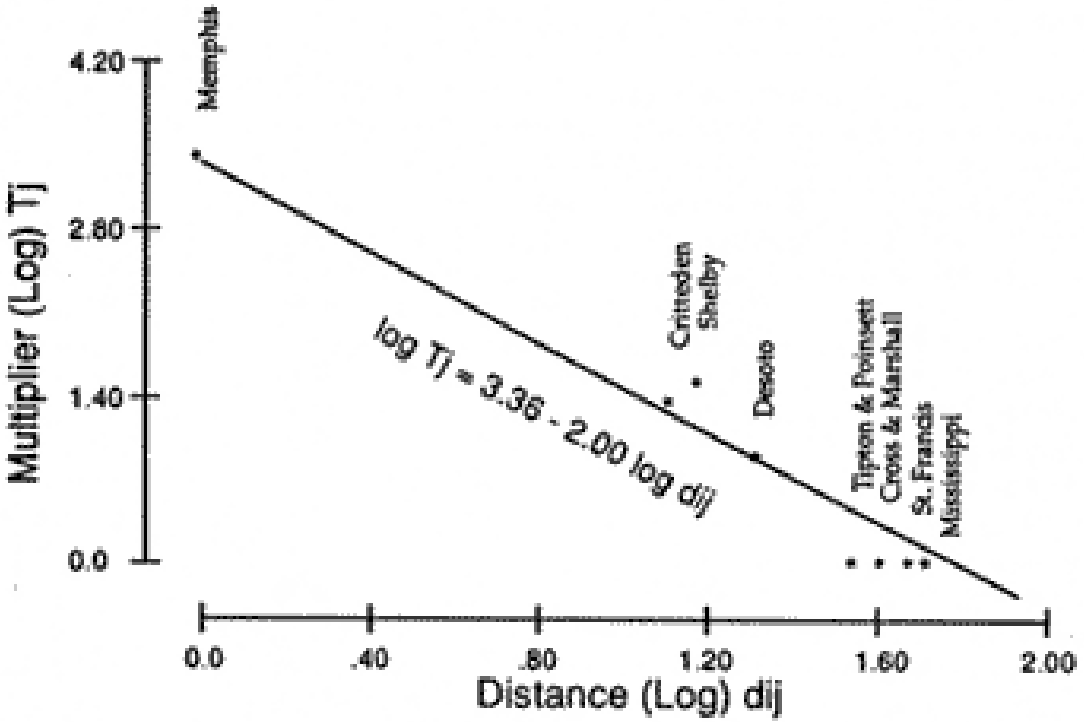
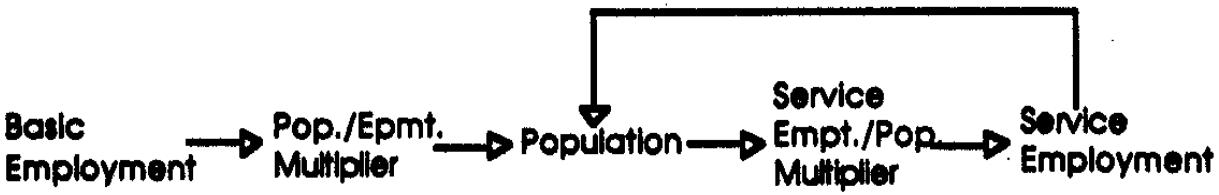


Figure 1. Decay of Employment Multiplier with Distance

A SIMULATION OF THE SUBREGIONAL DEMOGRAPHIC-ECONOMIC IMPACT OF URBAN REVITALIZATION



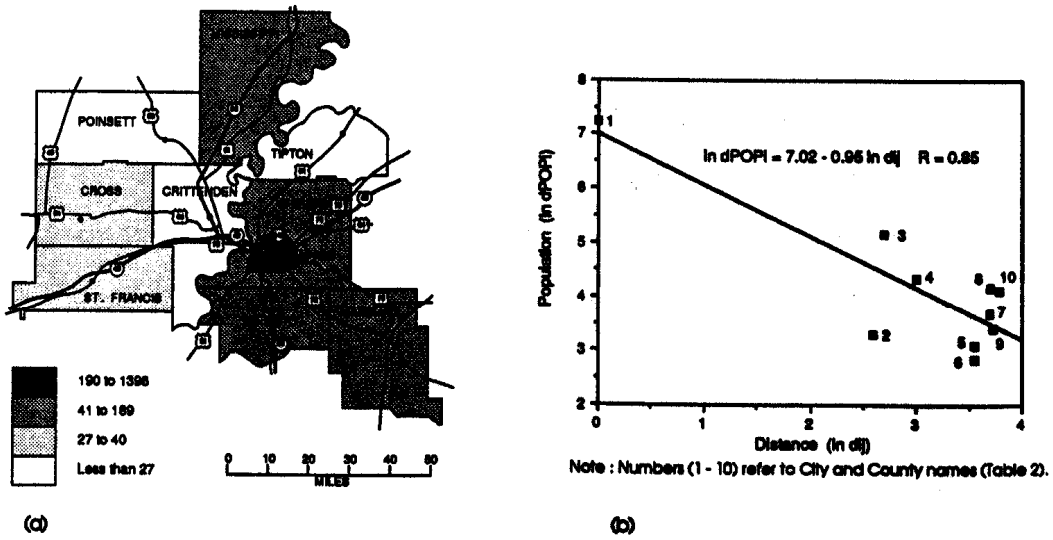


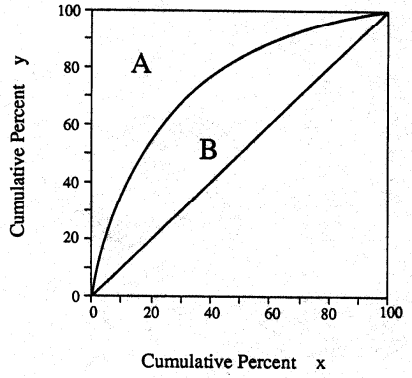
FIGURE 1. (a) SUBREGIONAL POPULATION IMPACT OF 1000-INCREASE IN CITY'S BASIC EMPLOYMENT; (b) THE DECAY OF POPULATION MULTIPLIER WITH DISTANCE.

REGIONAL INCOME DIFFERENCIALS AND THE LOCATION OF MANUFACTURING AND SERVICE ESTABLISHMENTS

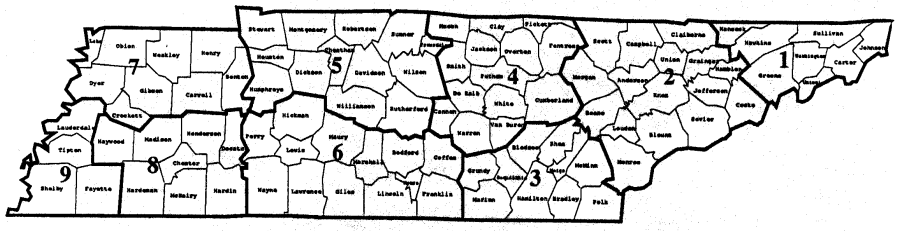
Definition of Gini Coefficient, and Outline of Development Districts in Tennessee.

Gini Coefficient (G) : $0 \leq G = B/(A+B) \leq 1$

$$G = (.50)\left(\sum_{i=1} |x_i - y_i|\right)$$



Tennessee Development Districts

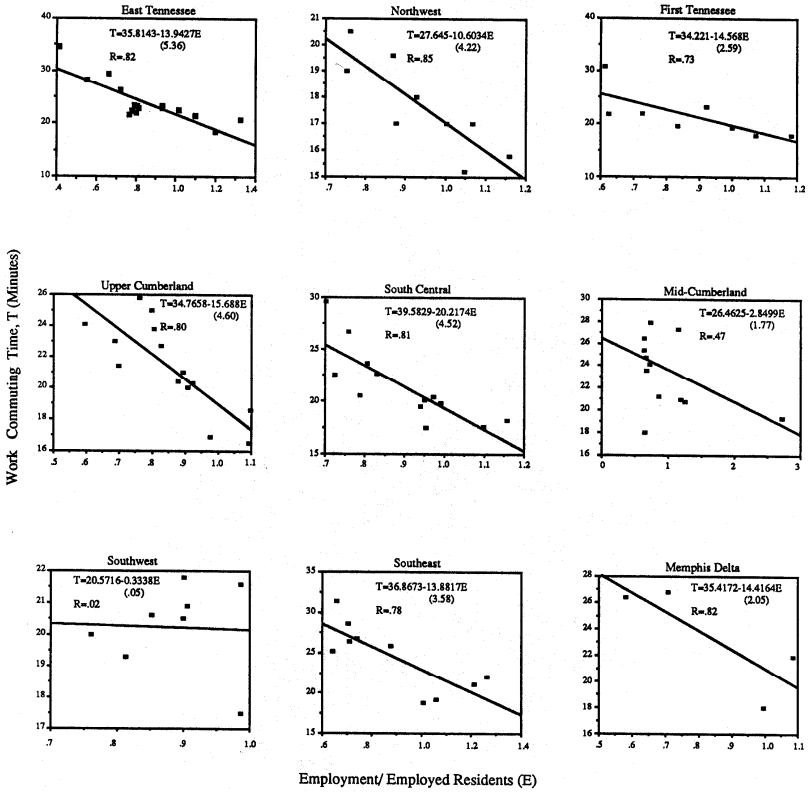


1 First Tennessee
2 East Tennessee
3 Southeast
4 Upper Cumberland
5 Mid - Cumberland
6 South Central
7 Northeast
8 Northwest
9 Memphis Delta

Map Source: Tennessee Statistical Abstract, 1988.

REGIONAL INCOME DIFFERENCIALS AND THE LOCATION OF MANUFACTURING AND SERVICE ESTABLISHMENTS

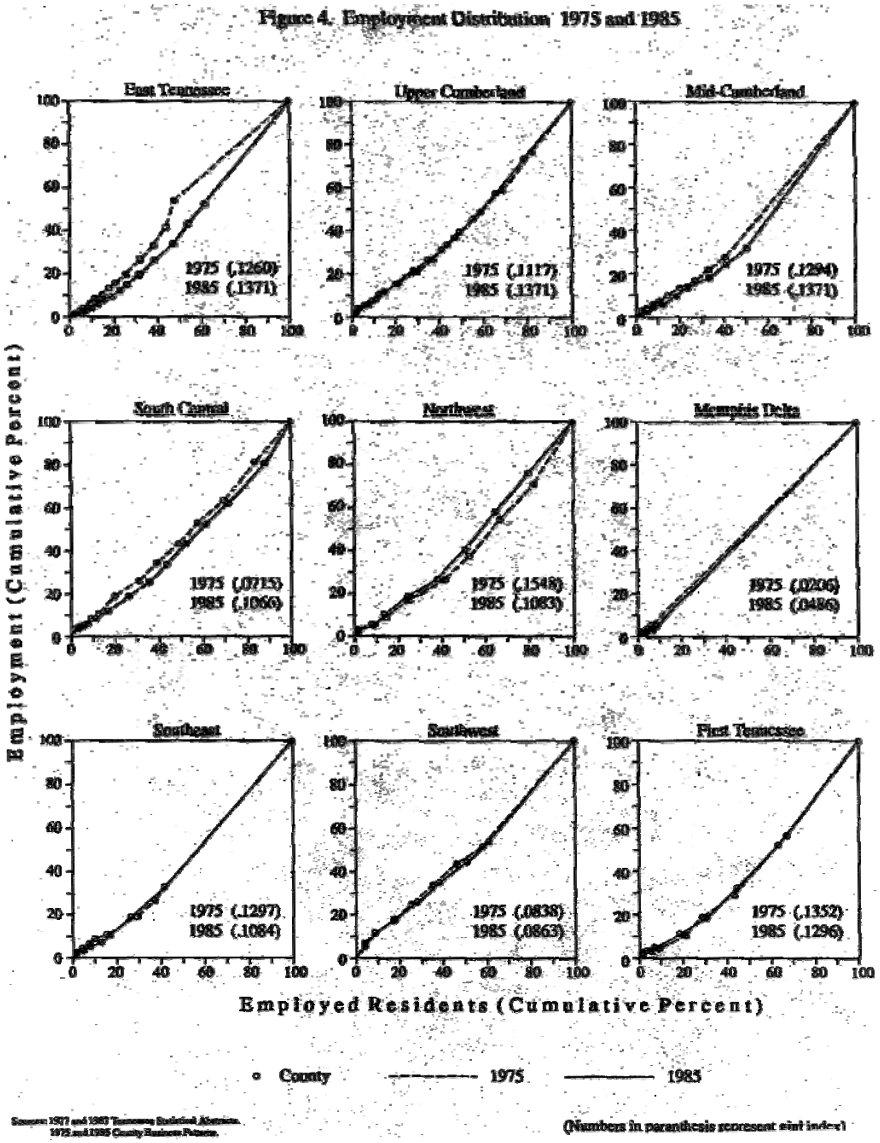
Figure 5. Commuting Time (T) in relation to the Ratio of Employment to Employed Residents in Tennessee Development Districts



Dependent Variable: T, Work Commuting Time (Vertical Axis).
Independent Variable: E, Ratio of Employment to Employed Residents (Horizontal Axis).
(Numbers in Parantheses are t - values).

Sources: 1983 County and City Data Book.
1980 Census of Population (Tennessee).

REGIONAL INCOME DIFFERENCIALS AND THE LOCATION OF MANUFACTURING AND SERVICE ESTABLISHMENTS



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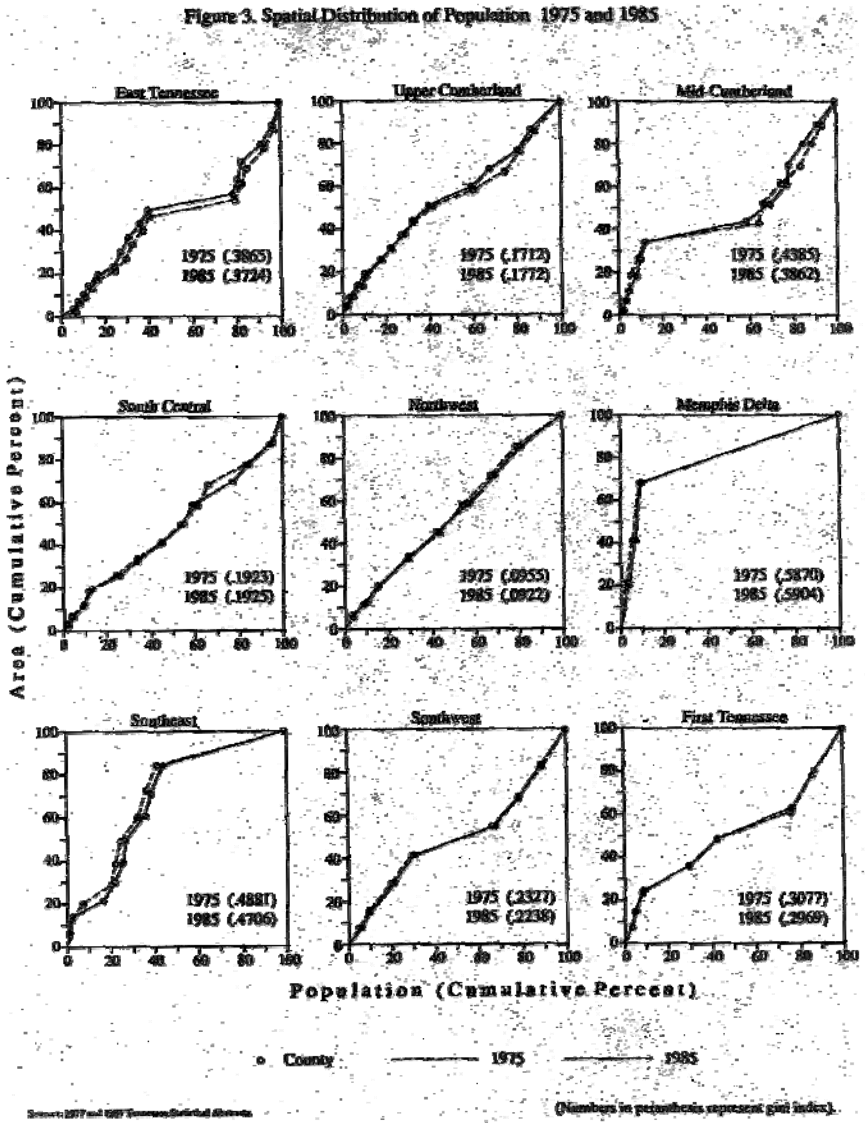

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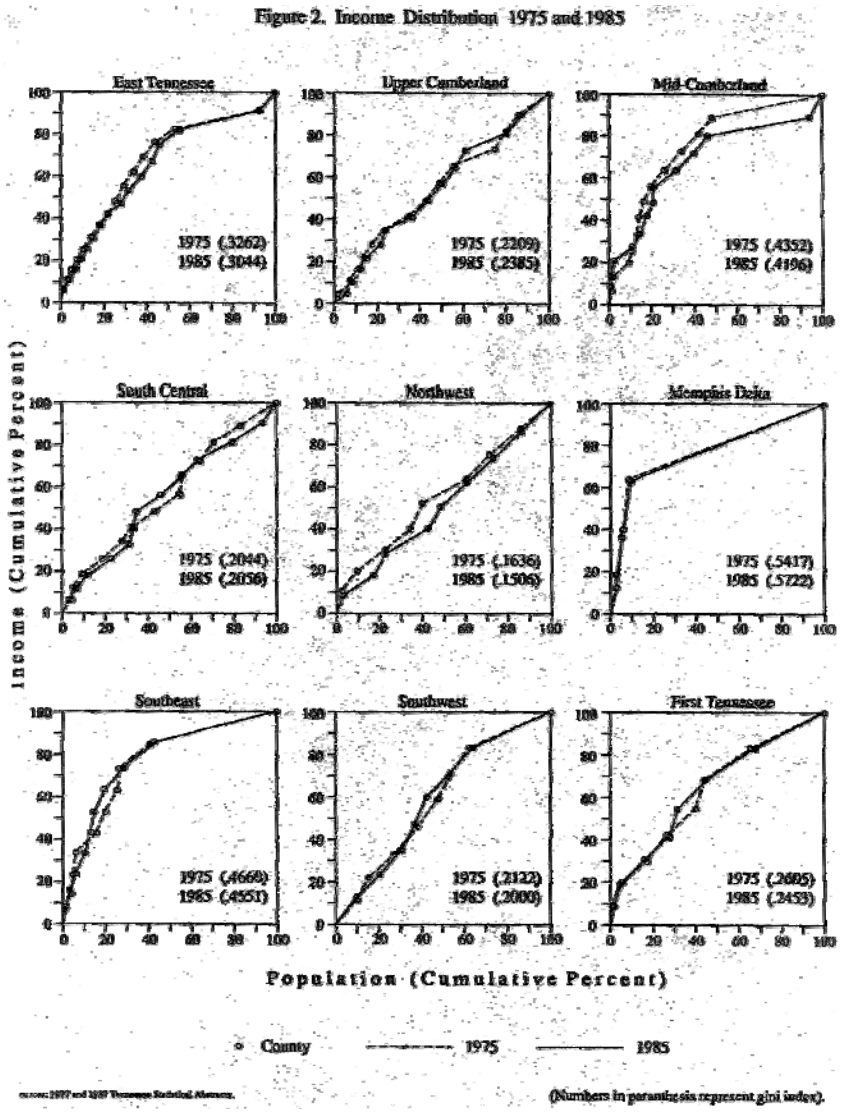
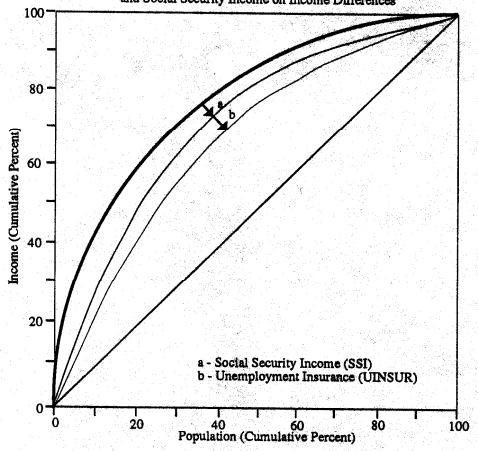


REGIONAL INCOME DIFFERENCIALS AND THE LOCATION OF MANUFACTURING AND SERVICE ESTABLISHMENTS

Figure 6. Impact of Unemployment Insurance and Social Security Income on Income Differences



1. Impact of AFDC
   GINI85 = 0.209 + 0.005 AFDC85
   (2.313) (1.285)
   R^2 = 0.191

2. Impact of Unemployment Insurance
   GINI85 = 0.863 - 0.012 UINSUR
   (4.510) (-2.935)
   R^2 = 0.552

3. Impact of Food Stamps
   GINI85 = 0.053 + 0.004 FDSTAMP
   (0.290) (1.463)
   R^2 = 0.234

4. Impact of Social Security Income
   GINI85 = 0.583 - 0.004 SSI
   (2.935) (-1.411)
   R^2 = 0.221

5. Impact of AFDC and Unemployment Insurance
   GINI85 = 0.748 + 0.004 AFDC85 - 0.011 UINSUR
   (3.702) (1.306) (-2.812)
   R^2 = 0.651

6. Impact of Unemployment Insurance and Social Security Income
   GINI85 = 0.888 - 0.011 UINSUR - 0.001SSI
   (4.158) (-2.167) (-0.398)
   R^2 = 0.563

7. Impact of AFDC, Unemployment Insurance, and Food Stamps
   GINI85 = 0.627 + 0.002 AFDC85 - 0.010 UINSUR + 0.002 FDSTAMP
   (2.438) (0.679) (-2.582) (0.810)
   R^2 = 0.691

8. Impact of Unemployment Insurance, Food Stamps, and Social Security Income
   GINI85 = 0.497 - 0.004 UINSUR + 0.006 FDSTAMP - 0.006 SSI
   (2.365) (-.899) (2.188) (-2.051)
   R^2 = 0.850

(Numbers in parantheses are t- values)

DEALING WITH UNCERTAINTY AND FUZZINESS IN DEVELOPMENT PLANNING: A SIMULATION OF HIGH-TECHNOLOGY INDUSTRIAL LOCATION DECISION-MAKING BY THE ANALYTIC HIERARCHY PROCESS

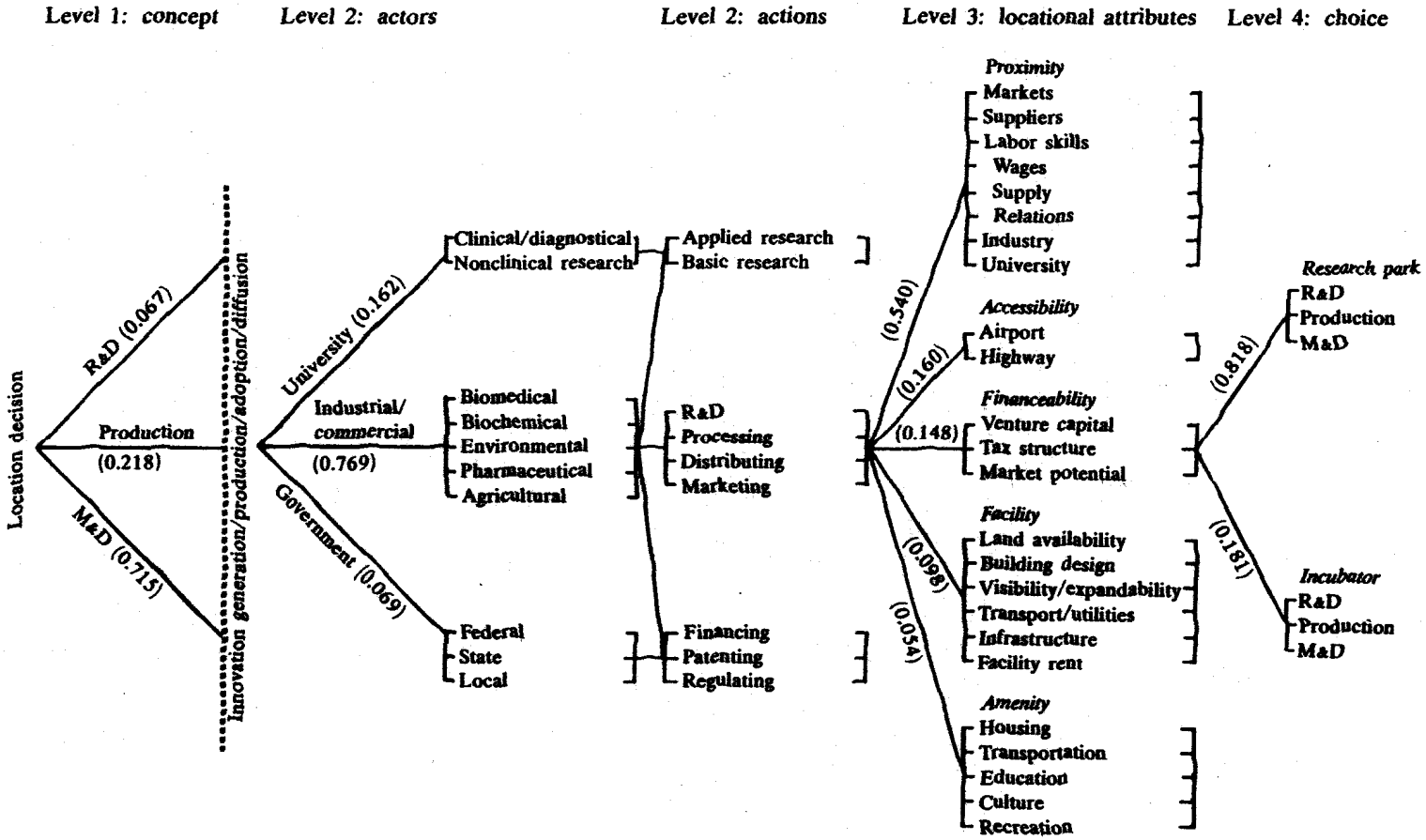


Figure 2. An AHP simulation of a hierarchy of high-technology location decisions.

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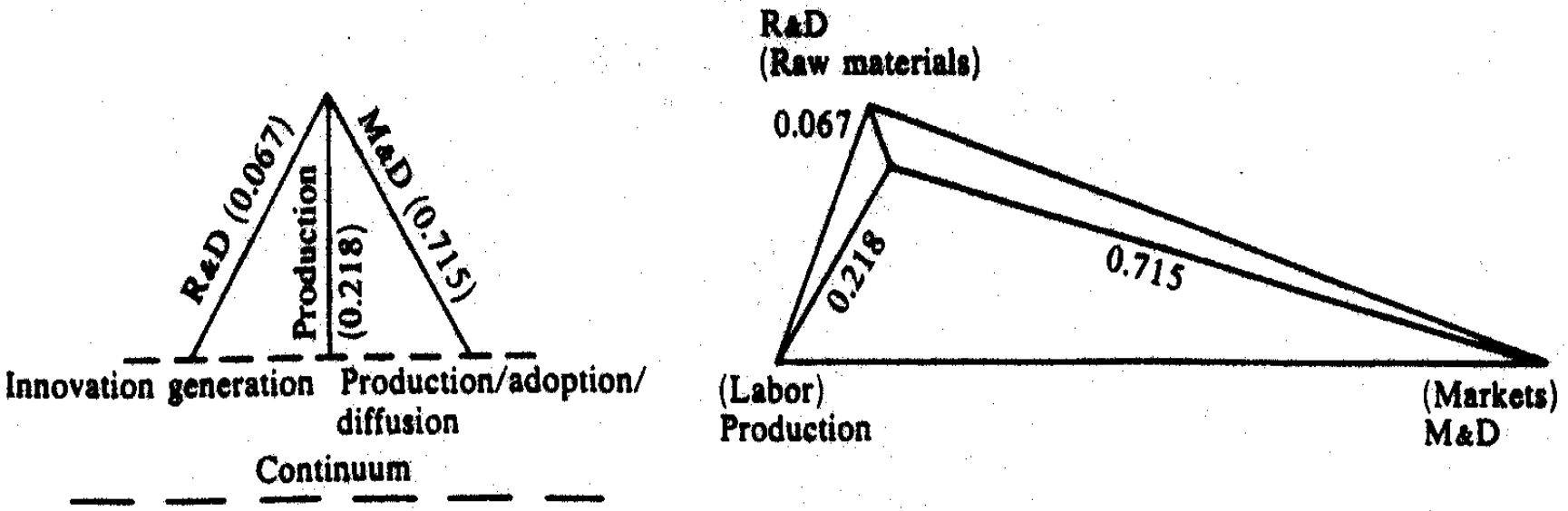


Figure 3. A representation of the relative weight of factors in a locational tree and/or triangle.

DEALING WITH UNCERTAINTY AND FUZZINESS IN DEVELOPMENT PLANNING: A SIMULATION OF HIGH-TECHNOLOGY INDUSTRIAL LOCATION DECISION-MAKING BY THE ANALYTIC HIERARCHY PROCESS

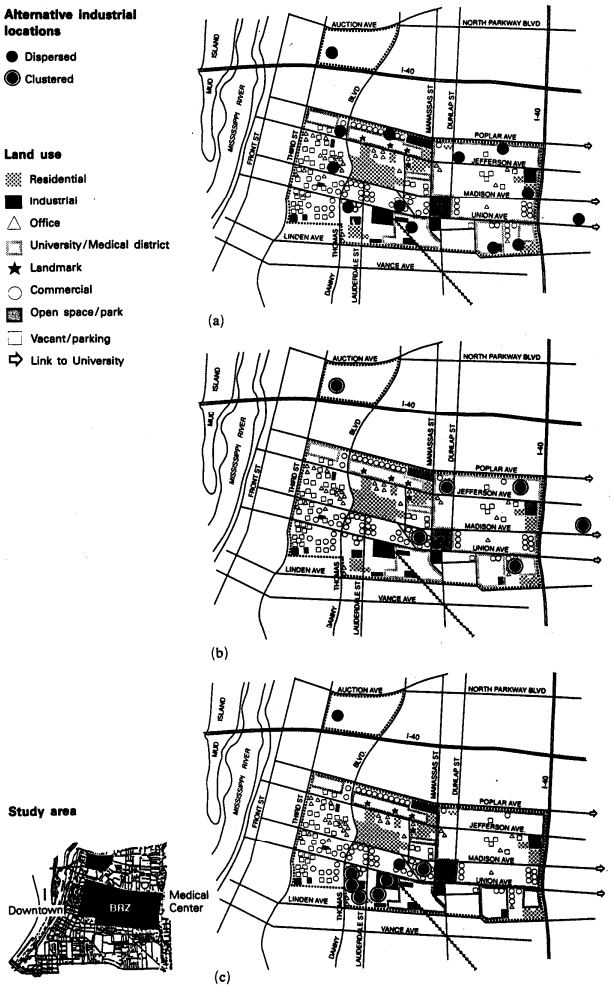


Figure 1. Alternative industrial scenarios for the zone of high-technology biomedical industry, Memphis, TN. (a) Dispersed location throughout the zone, (b) clustered pattern, (c) concentrated near incubator. Source: adapted from Memphis BRZ (1985).

TOWARD A SYNTHETIC MEASURE OF GOOD SETTLEMENT FORM

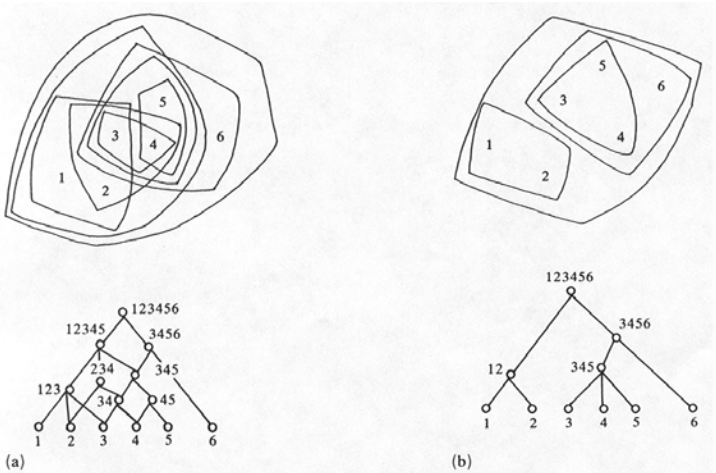


Figure 1. The structure of (a) a semilattice compared with (b) a tree (source: adapted from Alexander, 1965).

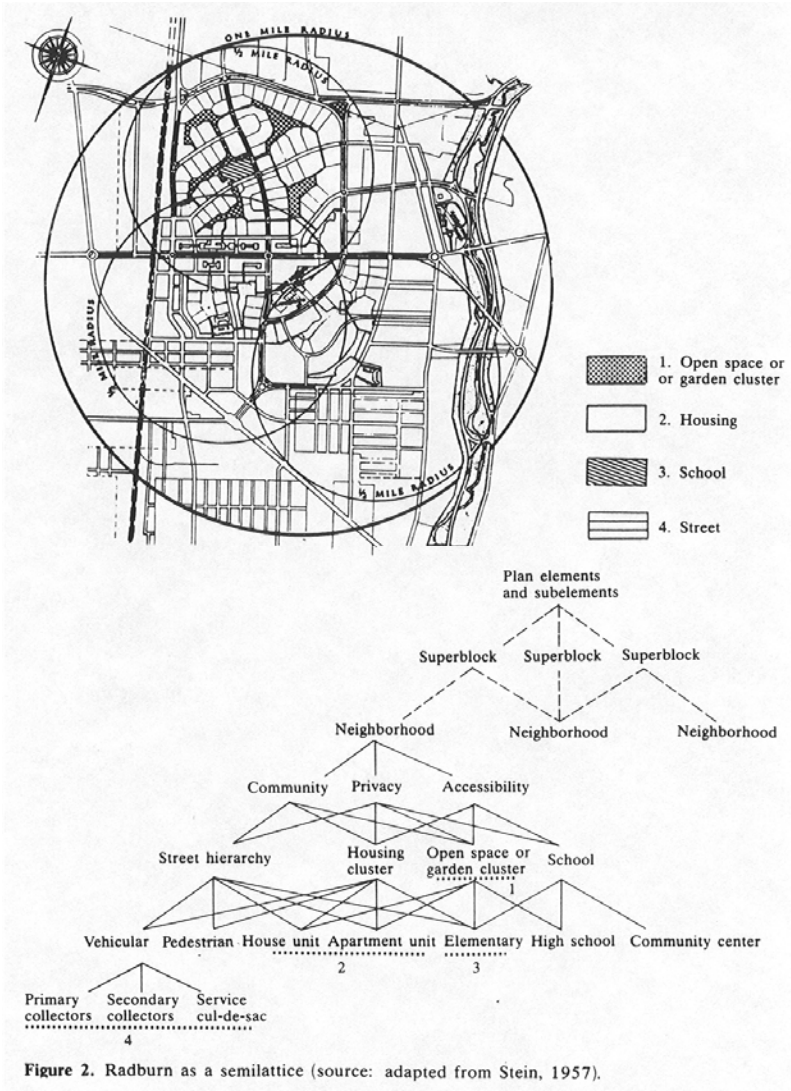


Figure 2. Radburn as a semilattice (source: adapted from Stein, 1957).

TOWARD A SYNTHETIC MEASURE OF GOOD SETTLEMENT FORM

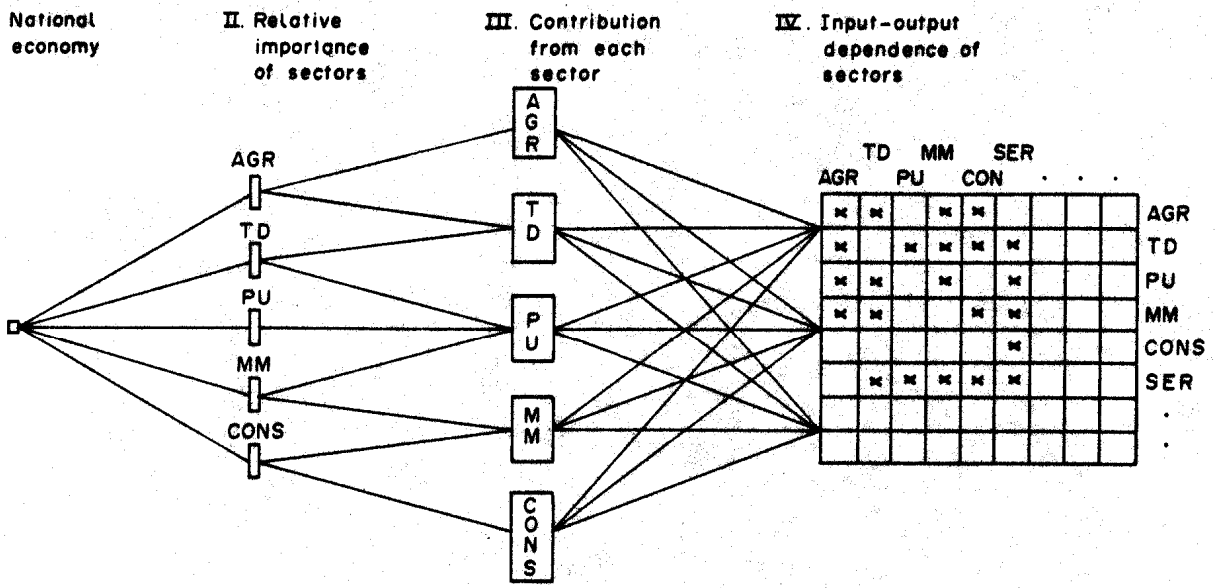
$$
\underset{(4\times 3)}{w_{ijk}} \quad \underset{(3\times 1)}{w_o} \quad \underset{(4\times 1)}{\text{Composite weights } w_c}
$$

$$
\begin{bmatrix} 0.0439 & 0.0442 & 0.0494 \\ 0.6448 & 0.5581 & 0.6196 \\ 0.0916 & 0.1270 & 0.0889 \\ 0.2195 & 0.2705 & 0.2419 \end{bmatrix} \begin{bmatrix} 0.1634 \\ 0.5396 \\ 0.2969 \end{bmatrix} = \begin{bmatrix} 0.05 \\ 0.59 \\ 0.11 \\ 0.25 \end{bmatrix}.
$$

Table 4. Land-use distribution in the Radburn neighborhood: observed versus estimated.

Land-use category	Observed distribution		AHP estimate (composite weights, w_c)
	(acres)	(% of total acreage)	
Open space or garden cluster	6.097	0.025	0.05
Housing	140.058	0.581	0.59
School	26.781	0.111	0.11
Street	67.964	0.282	0.25

DOMINANCE AND DEPENDENCE IN INPUT-OUTPUT ANALYSIS



COMBINED METHODS

1. Eigenvalue method (EM):

$Aw = nw$

$A: a_{ij} = 1/a_{ji}: a_{ii} = 1$

$\sum_{i=1}^{n} \lambda_i = \mathrm{tr}(A) = n$

$\lambda_{max} \neq \lambda_i = 0$

$Aw = \lambda_{max} \cdot w$

$a_{ik} = a_{ij} \cdot a_{jk}$: condition of transitivity

$[n(n-1)]/2$: number of judgments

$[\lambda_{max} - n]/[n-1]$: test of consistency

2. Networks:

$Ww = w$

$w(k) = \lim_{k \to \infty} W^k$: limiting impact priority (LIP)

3. Input–output:

$X = (I - A)^{-1} Y$

Fig. 2. The structure of interactions among sectors of a national economy.

DOMINANCE AND DEPENDENCE IN INPUT-OUTPUT ANALYSIS

Raising the resulting matrix to powers we obtain the following matrix of the overall (economic) system weights:

	AGR	TD	PU	MM	CONS	SER
AGR	0.3143	0.3143	0.3143	0.3142	0.3142	0.3143
TD	0.4930	0.4930	0.4930	0.4930	0.4930	0.4930
PU	0.0540	0.0542	0.0560	0.0596	0.0516	0.0529
MM	0.0814	0.0881	0.0777	0.0928	0.0943	0.0843
CON	0.0434	0.0400	0.0436	0.0352	0.0402	0.0428
SER	0.0136	0.0102	0.0151	0.0049	0.0063	0.0124

Now taking any one column of this matrix (as they are approximately identical) and comparing with the results obtained by Saaty and Vargas [1] on the relative importance of sectors:

		AGR	TD	PU	MM	CONS	SER
AHP	[1]	0.3108	0.4934	0.0248	0.0546	0.0546	0.0608
LIP	[any column] of W	0.3143	0.4930	0.0560	0.0777	0.0436	0.0151

Note that the sectors' total relative index of importance obtained by the two methods are close. This provides evidence, and corroborates the network structure initially assumed for the typical economy.

TRAVEL DEMAND (MODAL SPLIT) ESTIMATION BY HIERARCHICAL MEASUREMENT

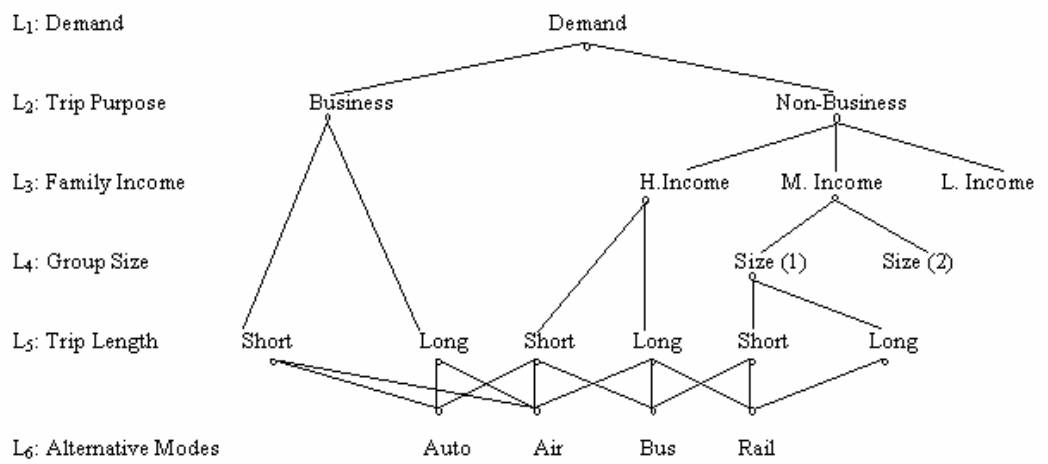


Figure 1. A hierarchy for intercity travel demand (modal split).

Table 2. Observed and estimated modal split.

	Observed (NCT, 1969) (1968 mill. pass. Miles)	Observed Normalised	Estimated Eigenvector
Auto	4226	0.62	0.66
Air	1391	0.20	0.17
Bus	432	0.06	0.06
Rail	767	0.11	0.10
Total	6815		

A METHODOLOGY FOR *THE IMAGE OF THE CITY*