Design and Value: Spatial Form and the Economic Failure of a Mall

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Abstract. **Real estate analysts have not had the tools to identify the functional problems of real estate because they have not focused on configuration. Space syntax is a way to represent, describe and evaluate spatial configurations or patterns created through building and urban design. Space syntax was used to systematically describe the configuration of a failed luxury shopping mall. Shape recognition techniques transform the plan into a mathematical network that can be analyzed. Network node parameters can be related to more traditional measures like occupancy and revenues by location. Thus revealed, the underlying spatial structure of the failed mall is compared to that of a similar but successful mall and its functional deficiencies identified.**

Introduction: Real Estate Value and Design

It has been acknowledged that more and more design decisions are influenced by real estate considerations and that real estate thought needs to acknowledge the role of design (Roulac, 1996). The ninth edition of *The Appraisal of Real Estate* (1983) says, ‘‘even certain new buildings contain various forms of functional obsolescence, such as those attributable to poor design.’’ While real estate decision-makers do not need to be able to design, they need to be able to evaluate design—consistently and effectively. Design affects real estate value. The question is how?

To answer how involves presenting a problem, a failed shopping mall that was functionally obsolete from the start (but not recognized so), a methodology that describes the design problem that led to failure and issues underlying the problem of systematically describing design.

After Beau Monde opened in 1985, the developer defaulted on loan payments to Irving Trust, foreclosure began and it was sold for about 25% of its construction cost. The press chronicled the birth, short life and death of Beau Monde. An August 22, 1985 article in *The Denver Post* reports, ‘‘European-concept mall comes to town. They are calling it a ‘‘European–styled shopping mall, which, translated, means: French, classy and fashionably turned-out. It means one thing for certain: big-time retailers around

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the country will be taking new interest in Denver.'' The mall is constructed with ''many entrances so you can go right to the store you want,'' said Patti Tolley, vice-president of the Vendome Group, Inc., which is managing the Lagerfeld, Cerruti, Laroche and Christian Aujard boutiques.

Five years later, in the September 29, 1990 issue of *The Denver Post*, ''Shopping mall reborn as Happy Church. Greenwood Village–Beau Monde, which failed to lure shoppers to its turrets, towers and cobblestone walkways as a mall, is being reborn. Beau Monde has been transformed from an upscale mall to a study of contrasts, a mix of sanctuary and shops. What was once the Denver's (Denver Dry Goods) cosmetic store, filled with luxurious potions and fragrances, has become a chapel, filled with row after row of folding chairs. Beau Monde was built in 1985 for $34 million by developer F. R. Orr. After purchasing the defunct Beau Monde for $7.8 million in March, Happy Church leaders said they would lease extra space to help pay for the purchase.'' ''We are delighted. It is everything we hoped it would be—as if it were built for us,'' said spokeswoman Karen Cutler.

Value, Configuration and Facilitation

Real Estate as a Different Kind of Social Object

What is it about a space designed to be a mall that ends its life to be resurrected as a church? Consider a passage from one of the seminal works in marketing thought to understand design in the context of value. Kotler (1973) says that marketing is the attempt to produce the desired response by creating and offering values to the market. The marketer creates and offers value mainly through configuration, valuation, symbolization and facilitation. (Configuration is the act of designing the social object. Valuation is concerned with placing terms of exchange on the object. Symbolization is the association of meanings with the object. Facilitation consists of altering the accessibility of the object.)

Kotler observes that, in scarcity economies, facilitation (*i.e.*, getting the goods to the market) is the factor usually identified with marketing, whereas in affluent economies it is symbolization, the encoding of persuasive messages that often generates negative images of marketing among the audience of these messages. These observations are relevant to real estate. In investigating the relation of design and value, real estate researchers like Vandell and Lane (1987) usually equate design with architecture and regard both as packaging, some of which falls under configuration and some under symbolization. Kotler uses configuration (design) to refer to overall product development, which includes packaging but goes beyond it to include function. Vandell and Lane use function as something different from design.

Real estate is the kind of social object Kotler describes. Yet, aside from sheer size and scale, two interrelated things differentiate real estate from other social objects or products. It's not just a thing in space; it's a thing fixed in space. It is also usable space in a thing. These are more than attributes; they are fundamental properties of real estate. Attributes associated with a location can of course change. However, real estate cannot be distributed like other products; people must go to the real estate.

Configuration as Facilitation

While the earlier recitation may seem to speak the obvious, it means the facilitation problem is qualitatively different for real estate. Typically the facilitation problem in real estate is seen as selecting a location that offers, in Ratcliff's term, convenience (Pearson, 1991). Convenience is typically defined in terms of transport costs, measured as time-distance functions on an isotropic plane. The assumption here, that models of moving products to people can be used—but essentially in reverse—to model the movement of people to or in real estate, assumes away the cognitive and social realities that distinguish people from transportable products. The facilitation model, it is suggested, is not wholly appropriate.

The convenience of an object is also considered in terms of functionality, utility or, as it often is stated for a real estate object, functional utility. To the extent that functionality is involved with convenience, convenience depends on configuration or design. The way real estate is occupied and legally possessed depends on its humanly configured spatial arrangement. Though clearly addressed in practical ways, real estate as a configuration is less obvious at a theoretical level. While it can also be seen that a piece of real estate needs to be configured to be accessible and to be located appropriately within a larger manmade configuration, changes in configuration, caused by public or private action at either the small scale of the fronting street or at the large scale of the interstate highway, can dramatically alter the absolute and relative accessibility and therefore the value of real estate. Thus, in real estate, configuration is necessary for facilitation.

Representing and Describing Configured Space

The Problem

While evaluating facilitation (using transport costs or their equivalent) is not difficult, evaluating configuration, and therefore functionality, is not easy. This is clear in the exceptionally few published real estate research articles that address configuration or function. While real estate researchers have intuitive notions that configuration or design is somehow important, the way they treat it today is generally very crude. For example, in a recent study of shopping center characteristics, the shopping center designs (configurations) are classified as I's, T's, X's and L's (Eppli and Shilling, 1996). Since people respond to factors rather more complex than these gross shapes, it is not surprising the study concluded design variables were insignificant.

Describing space in the context of the way it is designed and used is a representation problem that falls between natural verbal forms and traditional geometric forms of representation. Not only do real estate decision-makers and designers approach their overlapping objectives differently, embedded in their respective perspectives is a difference in the way real estate and its improvements are made intelligible. Real estate decision-makers operate in a verbal world. Designers operate in a visual world. For designers, space is intelligible mainly in geometric terms of shape, size and dimension. In real estate, it is intelligible principally in verbal terms that are shorthand notations (jargon terms) with a basis in a combination of repeated experience and abstract analytic understanding that can be difficult to put in words. *Edge City* is a lexicon of these terms (Garreau, 1991). Researchers rely on verbal descriptions of the spatio-material world. For example, in developing their visibility index, Ordway, Bul and Eakin (1988) showed that poorly visible strip shopping centers had much higher vacancy levels. Simons's (1992) study of site attributes suggested access and visibility accounted for about 5% of the first-year sales of a sub shop franchise. Unfortunately, in both of these as well as other similar studies, access and visibility and related terms are described using subjective assessments and not the actual physical characteristics that would constitute access and visibility.

Wofford and Thrall (1997) have pointed out how, in traditional real estate problem solving, instead of adapting a problem-solving approach, a problem is bent and shaped until it fits an existing solution technique. It is the rare article by a real estate researcher that addresses configuration and functionality deeply and when it does, it does so in ordinary natural language (Rabianski, 1992), without the systematic and formal character of most other published research.

Space Syntax

Space syntax methods use shape recognition to generate a topological or theoretic formal model of spatial configuration. Spatial configuration is simply the space where people can walk and that is always represented in plan. By decomposing the space in plan to its constituent units of analysis and giving these units numeric tags, the method helps identify both patterns and their variations in order to decode spatial ordering and relate these codes to underlying social and economic logic.

It should be kept in mind that space syntax does not reduce to a set of design guidelines nor is it a design method or generator. In this context, it is a way of testing design hypotheses insofar as these take spatial form. An introduction to space syntax is well beyond the scope of this article. Interested readers may refer to Hillier and Hanson (1984) and Hillier (1996) for a full development of the theory, method and applications. An accessible description of space syntax methodology is available in Brown (1984).

Space syntax is used increasingly in anthropology and archeology (Ferguson, 1996). It has been applied to a wide variety of building and urban spatial types including urban design, health care facilities, housing, factories, neighborhoods, research laboratories, schools, corporate and professional offices. It has been used to analyze shopping centers (Brown, 1994; and Teklenburg, Aloys, Borgers and Timmermans, 1994), and to analyze configurations in eminent domain (partial takings and access cases), in intellectual property cases and First Amendment (public forum) cases.

Comparing the Configurations of Two Malls

Data and Background

Was the market not there? Did it open prematurely? Were the developers too inexperienced in retailing? Had specialty malls become passé? All of these may be partly true. However, explanations relying on economic obsolescence are insufficient. In a less accessible location, less than a ten-minute drive from Beau Monde, an older, comparable mall, Tamarac Square, continued profitable operations. All things equal, most shoppers easily alter shopping habits discarding old malls in favor nearby new ones. Here they did not. And while Beau Monde was closing, Printemps, the Paris department store, opened at another upscale, new wave shopping center (which later failed). And at the same time, another large, high-end mall was contemplated for another location a few minutes away from Beau Monde. Finally, Neiman Marcus and Saks Fifth Avenue had recently opened in a new regional mall, Cherry Creek Shopping Center, adjacent to an existing urban boutique and shopping center area several miles from a controlled-access highway, surrounded by median family income areas lower than those around Beau Monde.

This research compares Beau Monde's interior public space with that of the nearby specialty mall, Tamarac Square (see Exhibit 1). (A separate research project examined the building interior and the site configuration.) The information is based on floor plans provided by management offices and site observations in late 1988 and early 1989. The locations of vacant and occupied stores in both malls were noted. Although Beau Monde has 188,000 sq. ft. and Tamarac Square 135,000 sq. ft., they are comparable. The lower levels have a similar floor area. The upper level of Tamarac Square is mostly a single-loaded balconied walkway. While Beau Monde might be considered to have a double-loaded second level, it is accurate to say it has two connected single-loaded balconied walkways.

Beau Monde. Consisting of eighty fashionable clothing boutiques such as Lagerfeld, Aujard, Cerruti, Laroche and upscale local stores like Andrisen–Morton and Aspen Leaf as well as a mix of restaurants and other services, Beau Monde was intended to be a ''European shopping village.'' Beau Monde featured cobbled walkways, balconies, vine-covered walls, a fountain, clock towers with stairs connecting the two levels, terracotta, stucco and marble storefronts, trees, flower boxes and wrought iron lamps. The shops were housed in what was supposed to seem like eight two-story buildings connected by a continuous skylight glass roof. It was built with many

Exhibit 1
Basic Data: Beau Monde and Tamarac Square

	Beau Monde	Tamarac Square
Size (net leasable area) (sq. ft.)	188,000	135,000
Site (acres)	10	48
Initial cost ($ million)	30	15[a]
Parking (# of cars)	1,200	1,100
Interior store entries		
Lower	42[b]	30
Upper	28[b]	31

[a]Phase 1.
[b]Estimate based on occupied and vacant locations plus lineal frontage of unimproved locations.

entrances from the parking areas at both levels to give shoppers quick access to their preferred shops. There were no escalators but there was an elevator that was part of a stair tower.

Beau Monde was situated in what would be considered an ideal geographic location visible from and immediately off a heavily used major north–south interstate highway in the growing and prosperous southeast sector of the metropolitan area. It was next to the Denver Technology Center, a very large office–research–hotel complex, which accounted for most of the 17.5 million square feet of nearby office space. Median income of families residing within a three-mile radius ranged from $50,000 to $70,000.

Beau Monde was developed through a partnership between a large local contractor (F. R. Orr Construction Co. Inc.) and a subsidiary of a Colorado Springs savings and loan bank, Otero Savings and Loan. Published reports put the cost of the development at about $30 million. The Irving Trust Company of New York provided a $23 million construction loan in 1983. An additional $6 million loan to complete interior finishing was made in 1985.

Tamarac Square. As the first specialty retail mall in Denver aimed at shoppers who did not like large, impersonal shopping centers, Tamarac Square paved the way for Beau Monde. It was designed to have small shops, sidewalk cafes and spaces encouraging interaction. An enclosed courtyard with a skylight gives interior access to the approximately ninety shops including a six-screen theater complex and an area called an artisans way—a working and selling area for about thirty artists and craftspersons. Because of sloping site conditions, the two-level mall can be entered at either level. Two-thirds of the mall is at ground level making most of the second level a single-loaded walkway. There are no escalators or elevators.

Tamarac Square is on a major arterial in the same growing and prosperous southeast sector of the metropolitan area, less than a ten-minute drive from Beau Monde in an area developed more than a decade earlier. Directly across the arterial is another smaller specialty mall with a less upscale tenant mix. Tamarac Square was developed by Trammel Crow of Dallas who has had previous experience with the Embarcadero Center in San Francisco, Peachtree Plaza in Atlanta and the International Trade Mart in Brussels. The developer had built two similar and successful specialty malls in Dallas. Tamarac Square's specialty mall cost about $15 million and was phase one of three that would include a convenience shopping center as well as a hotel and offices costing a total of about $32 million. Permanent financing was arranged by the Connecticut General Life Insurance Company.

Tamarac Square opened in 1976 with about 60% of its space occupied and took several years to reach full occupancy. Nevertheless, it developed in the atmosphere of Denver's growth economy, which continued to expand into the early 1980s. By 1982, all phases of the development were complete and it was regarded as one of Denver's most successful retail developments.

Methodology

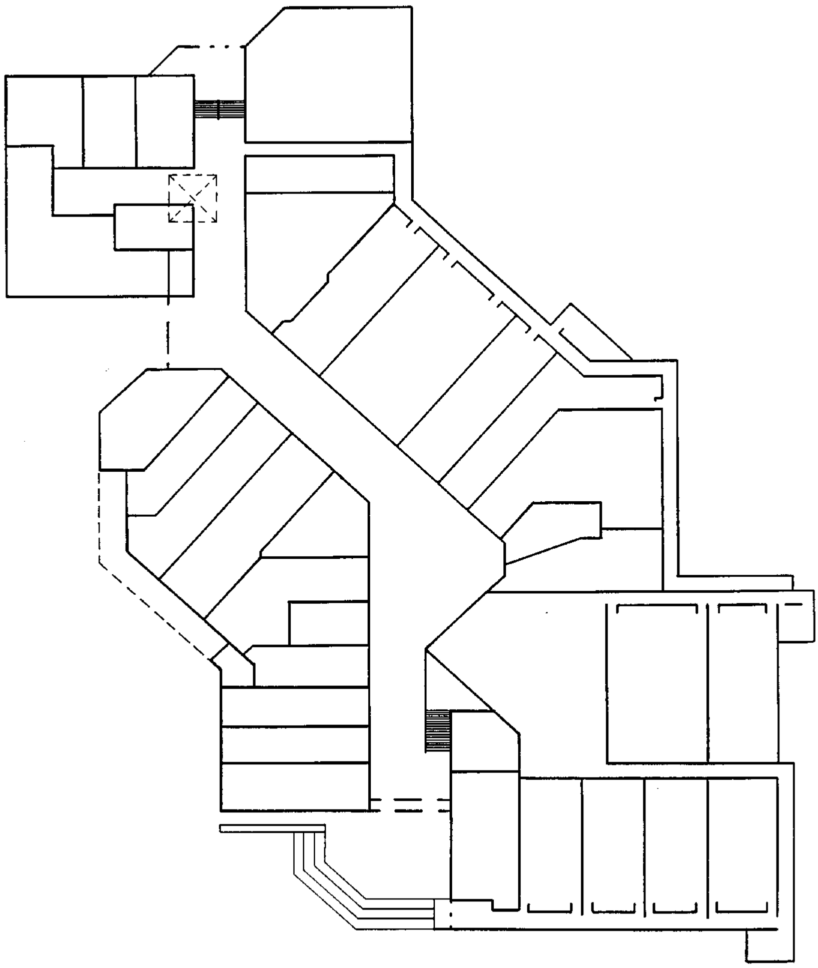
The method involves the following five steps. While steps two, three and four are now automated; they are described in detail below:

1. Developing an accurate plan that represents actual material conditions (like walls, doorways and fixtures) defining the configuration of the subject space. A graphic representation of the floor plan. The floor plan, in this case, is that of the interior public areas from the mall entrances up to the entrances of the stores.
2. Applying a shape recognition process that decomposes the spatial configurations of the plans (the interior and exterior plans of buildings, sites and neighborhoods) to a set of elementary shapes that function as units of analysis.
3. Constructing a network linking these shapes or units using them as nodes.
4. Applying a network measuring process (Syntactic analysis) that generates numeric tags for each node indicating how each node relates to the other nodes and the overall network.
5. Interpreting syntactic measures and relating appropriate non-spatial parameters like pedestrian movement or vacancy or use to them.

Representation of the subject's configuration. Floor plans provided by mall management were field checked and redrawn to develop an accurate floor plan that represents actual material conditions defining the subject space within which people move. Most floor plans of centers available from management offices are not accurate representations, no more than schematics. Even when presented as as-built, many are out-of-date and material elements such as furniture, planters, fountains and store entry threshold modifications do not appear. These elements change the spatial arrangement and consequent traffic movements in subtle but significant ways. Exhibits 2 and 3 illustrate the difference between promotional plans and actual conditions of Tamarac Square. A proper due diligence with respect to physical conditions involves ensuring floor plans are accurately field-checked.

Shape recognition. Space syntax typically uses three elementary units of analysis—bounded spaces, convex spaces and axial lines—to decompose spatial configurations (interior and exterior, buildings, sites and neighborhoods) to a set of elementary shapes that function as units of analysis. Bounded spaces (typical enclosable rooms with doors) usually correspond to functional use designations and inventory labels. Convex spaces (deformed circles representing the largest unobstructed space within a 360° radius from a central point) relate to a person standing. A bounded L–shaped room will have two convex spaces. Convex units identify the extent of spatial decomposition and usually correspond with privatization and localization of space. Axial lines (unbroken straight visual/walking lines) identify the extent of spatial continuity from the entrance to the system through it and usually correspond with flows and globalization of space. An axial line relates to a person walking. Virtually every building needs to have simultaneous local and global potentials: to have parts potentially private and individualized on one hand, the local system, and potentially public and accessible on the other, the global system.

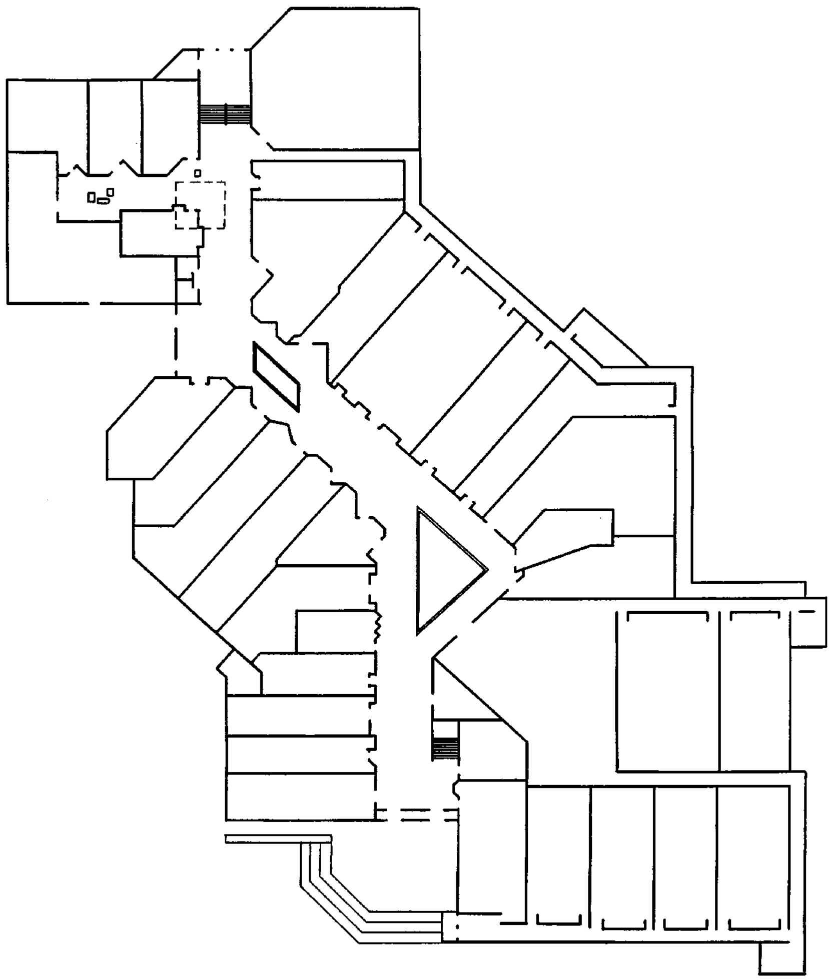
Exhibit 2
Tamarac Square Shopping Center
Lower Level Promotional



Because the interior common space of a mall is essentially one bounded space, this analysis used convex space and axial lines. Convex spaces were overlaid on the plan following a protocol that begins with the largest, fattest spaces ending with the smallest, thinnest but still convex spaces until all space is filled. Each convex space is numbered sequentially. Axial lines are overlaid on convex spaces beginning with the longest lines coming in from each entrance that such all convex spaces are crossed and no axial line is free standing. Each axial line is numbered sequentially. Exhibits 4 and 5 illustrate convex and axial decomposition applied the lower level of Tamarac Square.

Identifying and enumerating shapes generates a set of aggregate measures shown in Exhibit 6. Aggregate measures include the comparative number of convex spaces,

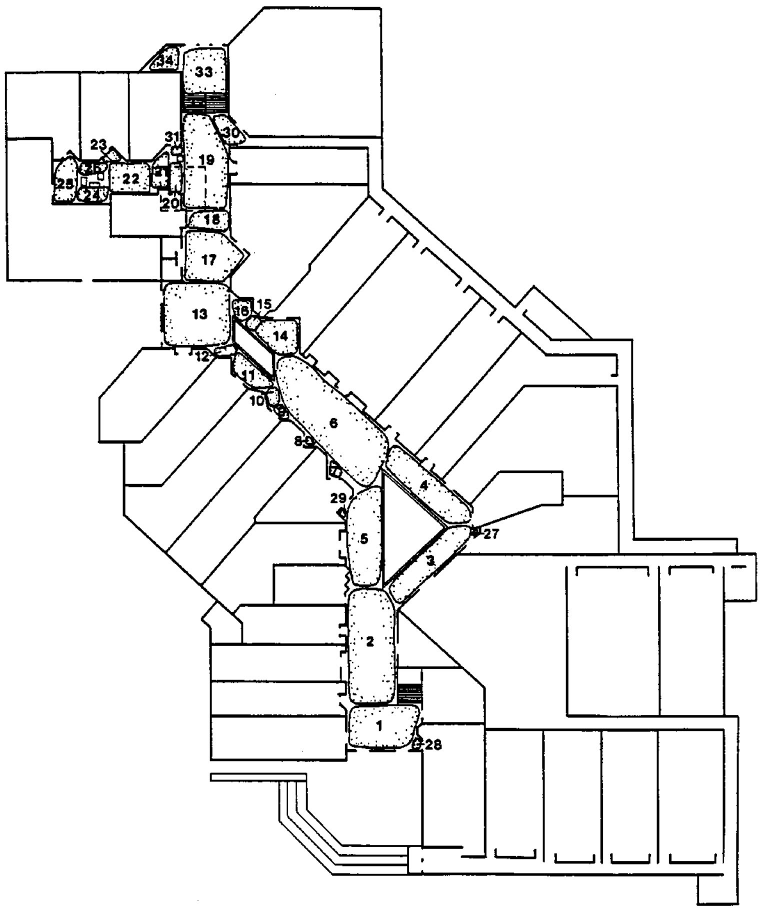
Exhibit 3
Tamarac Square Shopping Center
Lower Level Existing



axial lines, ratios of convex spaces to axial lines and the relation of store entrances and leasable area to convex spaces and axial lines. While the key to the analysis lies in the syntactic or pattern analysis, simple aggregate measures can be useful diagnostic elements. Beau Monde has a total of 173 convex spaces and 51 axial lines. Tamarac Square has 72 convex spaces and 20 axial lines.

Network construction. The next step is to connect all adjacent convex spaces with each other to create a network with convex spaces as nodes and to connect all overlapping axial lines with each other to create a network with axial lines as nodes. The resulting convex network is planar; the axial network is non-planar.

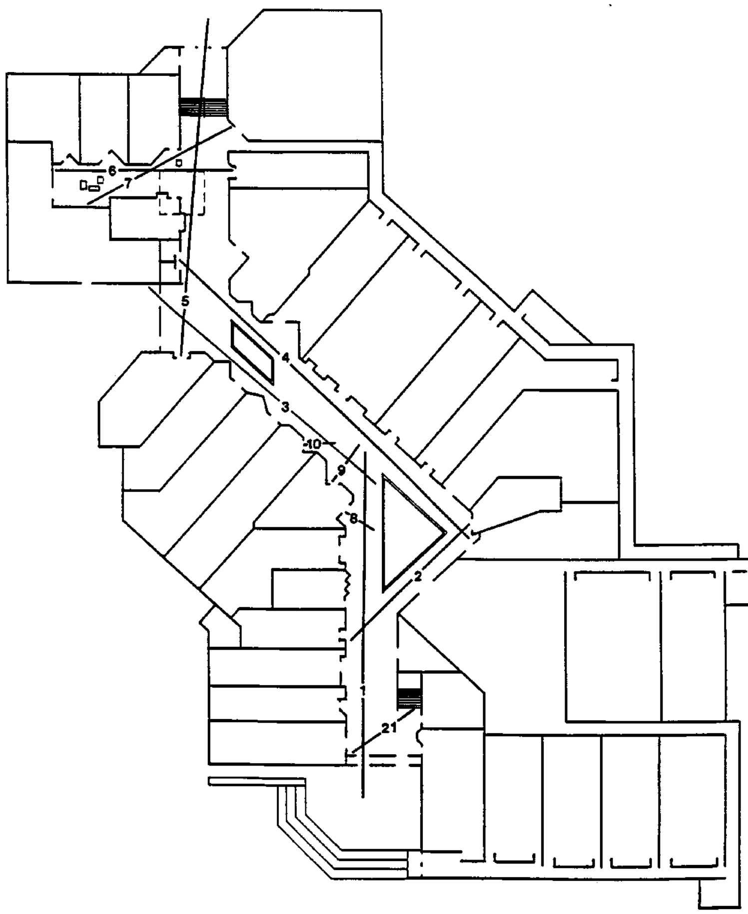
Exhibit 4
Convex Spatial Units
Tamarac Square Shopping Center
Lower Level



Network measurement. The next step applies a process that generates numeric tags for each node indicating how each node relates to other nodes and the overall network for each, convex and axial network. There are three principal measures: integration, control and ringiness. Measures of ringiness were not needed. All measures of integration and control are shown in Exhibit 5.

By simply enclosing and restricting space, every building creates differentials in the way its spaces are connected (*i.e.*, no space is equally connected to every other space); some are more interconnected than others. Those that are more interconnected are called integrating spaces; less interconnected spaces are segregating.

Exhibit 5
Axial Spatial Units
Tamarac Square Shopping Center
Lower Level



The syntactic measure relied on here is integration, which measures the relationship between each individual node and all other nodes in the network. In Exhibit 7, integration is expressed as RA, which means relative asymmetry in space syntax terminology. Asymmetry (and symmetry) here refer to logical relations, not visual or aesthetic relations. RA is an ordinal metric and values vary between 0.0 to 1.0. The lower the number for a space, the more that space integrates. Syntactic measures are shown rank-ordered by RA values and control values in Exhibit 7. Each panel is organized in three master columns: the left master column lists the highest one-third RA (segregating or fringe spaces) values and control values; the right master column the lowest one-third RA values (integrating or core spaces) and control values; the middle master column the middle one-third.

Exhibit 6
Aggregate Spatial Measures

	Beau Monde	Tamarac Square
Convex units (total)[a]	173	72
Convex units (lower level)	91	39
Convex units (upper level)	66	35
Axial units (total)[a]	51	20
Axial units (lower level)	22	12
Axial units (upper level)	20	10
Convex/axial ratio (total)	3.1:1	3.6:1
Store entrances/convex space		
Lower level	0.46	0.77
Upper level	0.42	0.89
Total	0.4	0.85
Store entrances/axial line		
Lower level	1.91	2.5
Upper level	1.4	3.1
Total	1.37	3.05
Net leasable area/convex space (sq. ft.)[b]	1,087	1,875
Net leasable area/axial space (sq. ft.)[c]	3,686	6,750

[a]Totals are more than the sum of the levels because of stair connections.
[b]See Exhibits 10–13.
[c]See Exhibit 14–17.

To get to this measure, the constructed graph is first 'justified' by reorganizing it in such a way that each successively connected node is placed in an ordinal progression from the node for which a measure (or numeric tag) is sought. The notion of justify here is that which is used in aligning print on a page (*e.g.*, right justified, left justified). For example, if the starting node is a convex space at a main entrance, and the main entrance convex space connects to one convex space, which then connects to three convex spaces each of which connects with two more spaces, there would be one node at the first level, one at the second level, three at the third level and six at the fourth level. The shape of this justified graph will vary depending on position of the starting node with respect to all other nodes. The fewer the nodes to pass through to reach the furthest nodes from the individual starting node, the more that node integrates all the others in the network. The graphic pattern of integration is a short, bush-like shape; of segregation a tall, pine tree-like shape. This results in a measure of mean depth from any specific cell or node:

$$MD_x = \frac{\sum_{i=1}^{n} k_i(i)}{k - 1}, \tag{1}$$

where x = the specific cell or node; k = the number of cells, or nodes, in the system; and i = the ordinal depth level from x. For example, Exhibits 18 and 19 are justified

Exhibit 7
Syntactic Values

Fringe								Core		
Node #	RA	Node #	Control	Node #	RA	Node #	Control	Node #	RA	Node
Panel A: Convex space—Beau Monde										
102	0.21	135	3.33	17	0.16	2	1.67	138	0.14	34
101	0.20	62	2.03	145	0.16	127	1.67	6	0.14	164
103	0.20	54	2.03	107	0.16	5	1.08	75	0.14	158
81	0.19	15	2	78	0.16	154	1.08	113	0.14	72
99	0.19	58	1.95	123	0.16	53	1.08	118	0.14	140
100	0.19	17	1.83	161	0.16	86	1.08	139	0.14	113
13	0.19	119	1.83	87	0.16	84	1.08	15	0.14	118
104	0.18	123	1.83	141	0.16	136	1.08	30	0.14	173
91	0.18	100	1.83	142	0.16	167	1	57	0.14	92
156	0.18	59	1.78	11	0.16	166	1	55	0.14	108
98	0.18	43	1.75	28	0.16	165	1	33	0.14	106
163	0.18	88	1.75	150	0.16	35	1	124	0.14	99
152	0.18	111	1.75	131	0.16	159	1	140	0.14	44
105	0.18	115	1.75	82	0.16	26	1	37	0.14	169
80	0.18	33	1.7	153	0.16	71	1	74	0.14	1
12	0.17	157	1.37	146	0.16	70	1	120	0.13	21
20	0.17	125	1.67	149	0.16	131	1	121	0.13	28
110	0.17	107	1.67	134	0.15	130	1	122	0.13	49
90	0.17	82	1.58	2	0.15	170	1	64	0.13	147
155	0.17	12	1.5	132	0.15	129	1	119	0.13	145
18	0.17	29	1.5	130	0.15	171	1	51	0.13	51

Exhibit 7 (continued)
Syntactic Values

Fringe								Core		
Node #	RA	Node #	Control	Node #	RA	Node #	Control	Node #	RA	Node
25	0.17	144	1.5	86	0.15	172	1	38	0.13	137
89	0.17	68	1.5	147	0.15	93	1	49	0.13	76
97	0.17	133	1.5	157	0.15	94	1	41	0.13	4
109	0.17	97	1.5	111	0.15	95	1	66	0.13	8
22	0.17	42	1.5	115	0.15	109	1	44	0.13	37
96	0.17	9	1.42	148	0.15	52	1	50	0.13	30
106	0.17	6	1.37	8	0.15	40	0.95	123	0.13	63
4	0.17	79	1.37	7	0.15	124	0.92	53	0.13	121
162	0.17	3	1.33	164	0.15	153	0.92	47	0.13	122
95	0.17	19	1.33	56	0.15	77	0.87	39	0.13	89
26	0.17	39	1.33	129	0.15	168	0.83	31	0.13	103
84	0.17	23	1.33	133	0.15	20	0.83	72	0.13	16
151	0.17	24	1.33	14	0.15	36	0.83	173	0.13	14
19	0.17	150	1.33	34	0.15	22	0.83	42	0.13	47
79	0.17	155	1.33	165	0.15	25	0.83	45	0.13	143
94	0.17	151	1.33	144	0.15	160	0.83	71	0.13	65
108	0.17	48	1.33	16	0.15	149	0.83	48	0.13	134
21	0.17	161	1.33	29	0.15	45	0.83	52	0.13	41
1	0.17	46	1.33	77	0.15	27	0.83	73	0.13	156
3	0.17	162	1.33	137	0.15	148	0.83	172	0.13	152
93	0.17	146	1.33	166	0.15	69	0.83	54	0.13	163

Exhibit 7 (continued)
Syntactic Values

Fringe								Core		
Node #	RA	Node #	Control	Node #	RA	Node #	Control	Node #	RA	Node
114	0.17	50	1.33	76	0.15	73	0.83	40	0.13	67
116	0.16	138	1.33	143	0.15	132	0.83	43	0.13	56
83	0.16	75	1.33	35	0.15	74	0.83	46	0.13	81
92	0.16	11	1.25	128	0.15	139	0.83	70	0.13	91
10	0.16	38	1.25	167	0.15	128	0.83	171	0.13	102
9	0.16	55	1.25	112	0.15	112	0.83	61	0.13	32
23	0.16	120	1.25	117	0.15	117	0.83	60	0.13	60
159	0.16	80	1.25	125	0.15	105	0.83	63	0.13	13
27	0.16	90	1.25	135	0.15	96	0.83	170	0.13	18
85	0.16	104	1.25	168	0.15	110	0.83	69	0.13	126
158	0.16	101	1.25	32	0.15	98	0.83	65	0.12	114
88	0.16	10	1.25	36	0.15	78	0.78	169	0.12	116
160	0.16	87	1.25	136	0.14	61	0.78	62	0.12	64
154	0.16	31	1.2	67	0.14	85	0.78	68	0.12	57
24	0.16	66	1.2	127	0.14	83	0.78	58	0.12	141
				5	0.14	7	0.75	59	0.12	142
Panel B: Axial lines—Beau Monde										
45	0.22	13	3.17	11	0.19	26	1.08	14	0.17	22
30	0.22	8	2.17	40	0.19	27	1.08	34	0.17	48
2	0.22	37	2.08	46	0.19	28	1.08	7	0.17	17
3	0.22	1	1.92	47	0.19	3	1.03	25	0.17	35
44	0.21	42	1.58	43	0.19	47	1	26	0.17	12
20	0.21	29	1.58	38	0.19	50	1	27	0.17	16

Exhibit 7 (continued)
Syntactic Values

Fringe								Core		
Node #	RA	Node #	Control	Node #	RA	Node #	Control	Node #	RA	Node
41	0.21	43	1.5	48	0.19	23	0.96	24	0.16	38
28	0.20	20	1.5	9	0.18	6	0.92	32	0.16	41
29	0.20	15	1.33	10	0.18	4	0.87	23	0.16	30
4	0.2	32	1.33	17	1.08	51	0.83	50	0.16	2
31	0.20	33	1.33	16	0.18	24	0.83	49	0.16	9
35	0.20	11	1.25	37	0.18	25	0.83	51	0.16	10
21	0.20	5	1.2	36	0.18	7	0.78	8	0.16	44
18	0.20	36	1.08	1	0.18	46	0.75	13	0.16	31
19	0.20	40	1.08	22	0.18	49	0.75	15	0.16	14
42	0.19	39	1.08	5	0.18	18	0.71	33	0.16	21
6	0.19	34	1.08	39	0.18	19	0.71	14	0.15	45
Panel C: Convex spaces—Tamarac Square										
64	0.43	6	3.38	52	0.29	51	1	46	0.29	62
45	0.42	19	3.5	50	0.29	36	1	1	0.26	63
62	0.40	55	2	40	0.29	50	1	4	0.26	38
63	0.39	33	2	66	0.29	26	1	10	0.26	40
44	0.38	1	1.83	53	0.28	25	1	11	0.26	46
61	0.37	3	1.83	49	0.28	37	1	9	0.26	65
26	0.37	13	1.5	67	0.28	64	1	12	0.35	56
25	0.36	22	1.5	54	0.28	49	1	39	0.26	58
43	0.35	39	1.5	29	0.28	48	1	38	0.26	54

Exhibit 7 (continued)
Syntactic Values

Fringe								Core		
Node #	RA	Node #	Control	Node #	RA	Node #	Control	Node #	RA	Node
60	0.35	44	1.5	68	0.28	47	1	2	0.26	18
23	0.35	5	1.5	55	0.28	41	1	37	0.26	20
24	0.35	60	1.33	48	0.28	42	1	36	0.25	9
42	0.34	61	1.33	69	0.28	43	1	5	0.25	14
57	0.33	71	1	34	0.28	2	1	18	0.25	32
59	0.33	70	1	7	0.28	72	0.83	35	0.25	45
22	0.32	69	1	8	0.28	16	0.83	15	0.25	4
41	0.31	10	1	70	0.28	12	0.83	17	0.25	28
56	0.30	15	1	47	0.28	17	0.83	14	0.25	27
58	0.30	68	1	30	0.27	57	0.83	16	0.25	29
27	0.30	11	1	31	0.27	59	0.83	33	0.25	34
21	0.29	67	1	71	0.27	21	0.83	6	0.25	30
28	0.29	66	1	72	0.27	35	0.83	13	0.25	31
65	0.29	53	1	20	0.27	23	0.83	32	0.25	7
51	0.29	52	1	3	0.27	24	0.83	19	0.25	8
Panel D: Axial lines—Tamarac Square										
18	0.58	3	2.5	10	0.39	14	1.08	2	0.32	7
19	0.49	1	2.25	16	0.39	11	0.08	13	0.32	15
17	0.48	5	1.75	4	0.37	2	0.75	3	0.28	18
6	0.44	16	1.75	8	0.35	20	0.75	12	0.27	19
7	0.44	13	1.5	5	0.35	4	0.75	11	0.25	8
15	0.42	17	1.33	14	0.34	6	0.75	1	0.24	9
9	0.39	12	1.08					20	0.24	10

graphs showing all convex and axial nodes from one of each mall's lower level entrances.

The degree of spatial integration is determined with the measure of relative asymmetry, which compares the actual depth of the spatial system with its theoretical maximum and minimum depth. The numeric tag given to a node represents the shape of the network from the nodes.

$$RA_x = \frac{2(MD - 1)}{k - 2}. \tag{2}$$

The control value for a node is calculated by enumerating the number of connections to each adjacent space, taking the reciprocal of that number and summing the reciprocals. In the example above, assuming none of the three spaces at level three are connected with each other, each would have three connections, and the space at level two would have four connections. Thus, the space at level four would have a higher control value. Within each master column, the last column lists control values for the nodes to the left. Control was not used in evaluating the designs.

$$C_x = \sum \frac{1}{C_n}, \tag{3}$$

where C_n = number of connections to each node neighboring x.

Ringiness measures the number of non–overlapping rings (loops or recursions) in the network. A ring allows one to move and return to the point of origin without traversing the same path in the opposite direction. Ringiness, which is extensive in Beau Monde and minimal in Tamarac Square, is limited in shopping centers. Because the differences are obvious on inspection, ringiness was not computed.

Relation to non-spatial parameters. The last step is to interpret the syntactic measures on their own and to link the syntactic measures for the nodes to other information specific to the location of that node. Other information can include pedestrian counts, vacancies, crime levels, uses, social categories and rent levels. In this case, occupied and vacant space were noted. For example, three vacant stores were next to convex spaces 23, 24, 25 and 26, one next to space 27 and one next to space 40 in Tamarac Square. In Beau Monde, the occupied locations were next to convex spaces 51, 56, 91 and 126 (all mall entrances) and 121 and 142.

Results: Functionally Obsolete by Design

The data can be examined three ways: (1) by inspection of the convex and axial mappings; (2) by analysis of aggregate convex and axial numeric indicators; and (3) by analysis of the syntactic or pattern indicators. For the syntactic indicators, the relative values of the numeric tags are represented in the plan using the initial convex and axial mappings expressed as core and fringe spaces and lines. Core (most integrating) spaces are not necessarily at the center or centroid of the spatial configuration. To minimize article length, core and fringe representations for each level only are shown, syntactic measures for each level are not.

Visual Indicators

Just by constructing the initial convex network, it is evident that the configuration of Beau Monde's public space is different from Tamarac Square's. Given the comparable floor area of the lower level, it is clear the public space is broken up into smaller spatial units. The other clear difference is that Beau Monde has a number of major and minor rings. Beau Monde has two visually isolated rings on the ground level (a condition found occasionally in very large shopping centers) and five visually connected rings on the upper level. Tamarac Square has no visually isolated rings at all, and two visually connected rings on its lower level. Its upper level is mostly single–loaded (rooms on only one side of the corridor).

Aggregate Indicators

The aggregate measures show that Beau Monde is a far more decomposed or localized spatial system than Tamarac Square. The net leasable measures are key indicators. Shoppers walk through a mall, slowing and stopping at various locations to survey what they see. Think of the convex space measures—1087 sq. ft. and 1875 sq. ft.— as simple containers, one about 33 feet on each side, the other 43 feet. Imagine standing in the center of each container and surveying its contents (see Exhibit 8). The 33 foot square can contain only 58% of the relevant information content of the 43 foot square.[1]

Alternatively, we can enumerate the number of store entrances or entries in each mall and relate this number to spatial patterns. The differences are equally convincing. The aggregate measures for store entrances per convex and axial line in Exhibit 9 show that shoppers would consistently encounter about two times as many store entrances in every spatial unit in Tamarac Square compared with Beau Monde. Thus, each space gives double the choice in Tamarac Square. Shoppers will simply see more goods and have greater choice in the larger container. This does not mean it is better to build

Exhibit 8
Comparative Average Net Leasable Area per Convex Public Space

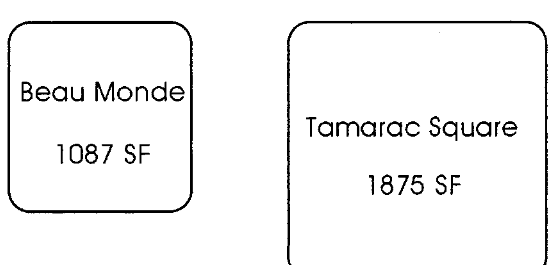
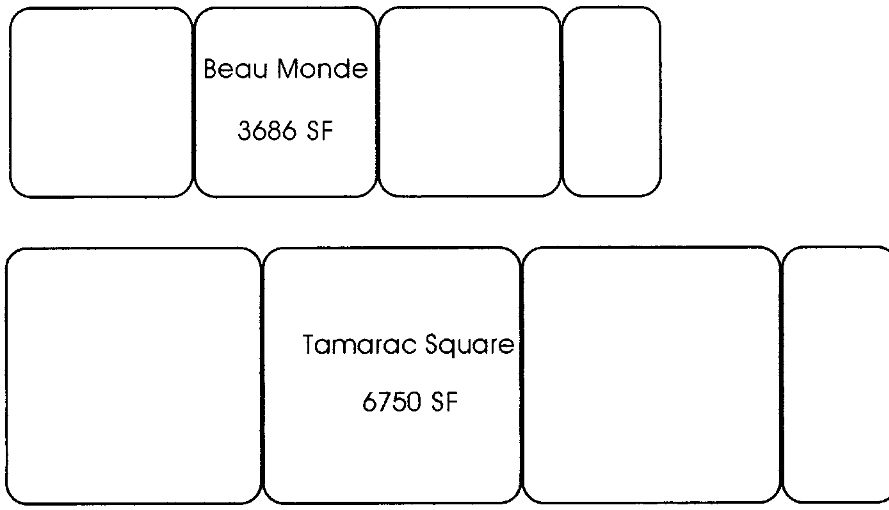


Exhibit 9
Comparative Average Net Leasable Area per Convex / Axial Public Space



bigger shopping centers. It means the public area of the mall needs to make the goods sold in the mall accessible to the shopper.

While there are upward limits to convex space size, which will vary with the overall size of the center, there are probably also lower limits that Beau Monde exceeded. One way to overcome these lower limits and make a system of smaller convex spaces work is to link a number of them with simple, direct axial connections. Imagine the containers linked by a path the way beads are held together on a string. In this way, movement patterns can compensate for standing patterns. The convex/axial ratio shows how many convex spaces are linked by one axial line. Though Beau Monde (3.4:1) and Tamarac (3.6:1) are about equal on this measure. But for axial lines (which indicate movement possibilities) to link the equivalent amount of space and therefore store entrances, Beau Monde would need a ratio of 6.2:1, or half as many axial lines. This means that, with equal effort, shoppers can orientate themselves to almost twice as much information (store entrances) in Tamarac Square than in Beau Monde.

Syntactic Indicators

Syntactic measures describe the underlying structure of the spatial configuration and the relationship of non-syntactic parameters to the underlying structure of the spatial configuration. These show up as patterns. The first pattern is the underlying structure of the configuration, which can be seen as the relation of the most integrating spaces in the system (the core) to the least integrating spaces in the system (the fringe). This is done for each level. The second pattern examined is the connection of the upper and lower levels, the stairs. The third is the relation of the store entrances to the whole with reference to vacant and occupied store locations. The fourth is the relation of the mall entrances to the whole.

Deep structure: core and fringe spaces. We defined the 33% most integrating spaces as the core; the 33% least integrating (most segregating) as the fringe.[2] Exhibits 10–13 show the core and fringe of the convex decomposition of both malls. Exhibits 14–17 show the core and fringe of the axial decomposition of both malls.

Cores are marked in solid thick lines; fringes in slanted or slashed lines. By this convention, there will always be core and fringe spaces and they will always be a percentage for each center, not an absolute number. The key is not the number but their pattern. There are three diagnostic questions. What are the locations of the cores and fringes? How much do the local and global cores overlap? And are the cores continuous or discontinuous?

Exhibit 10
Convex Spatial Units
Beau Monde Shopping Center
Upper Level

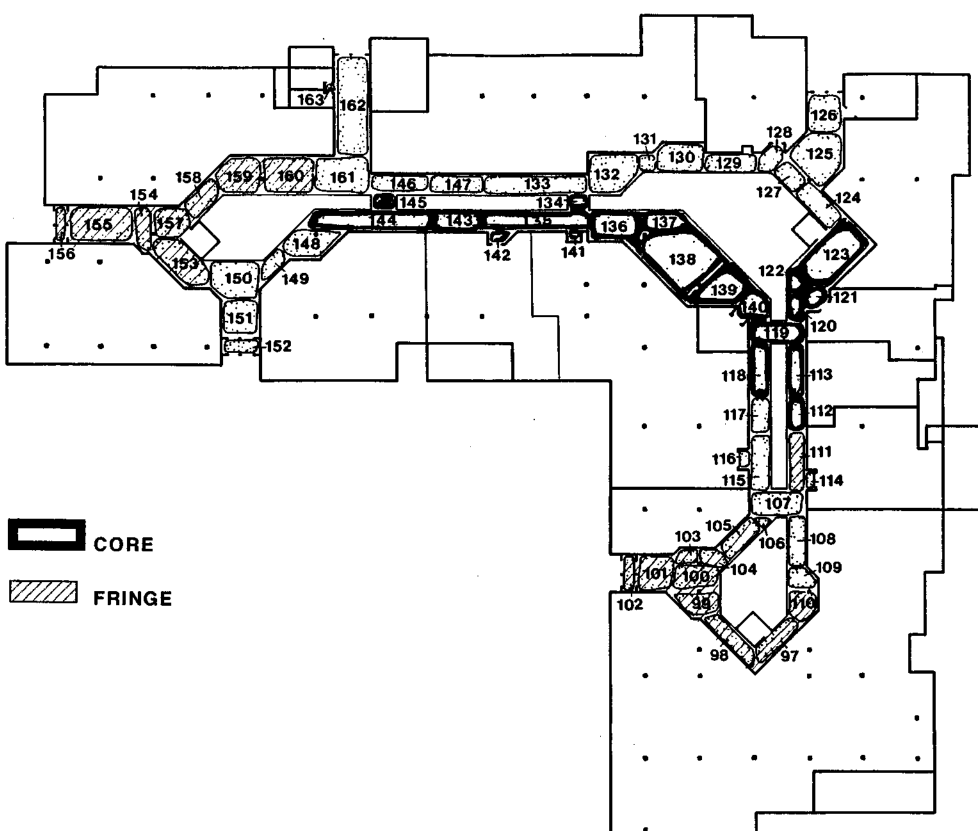
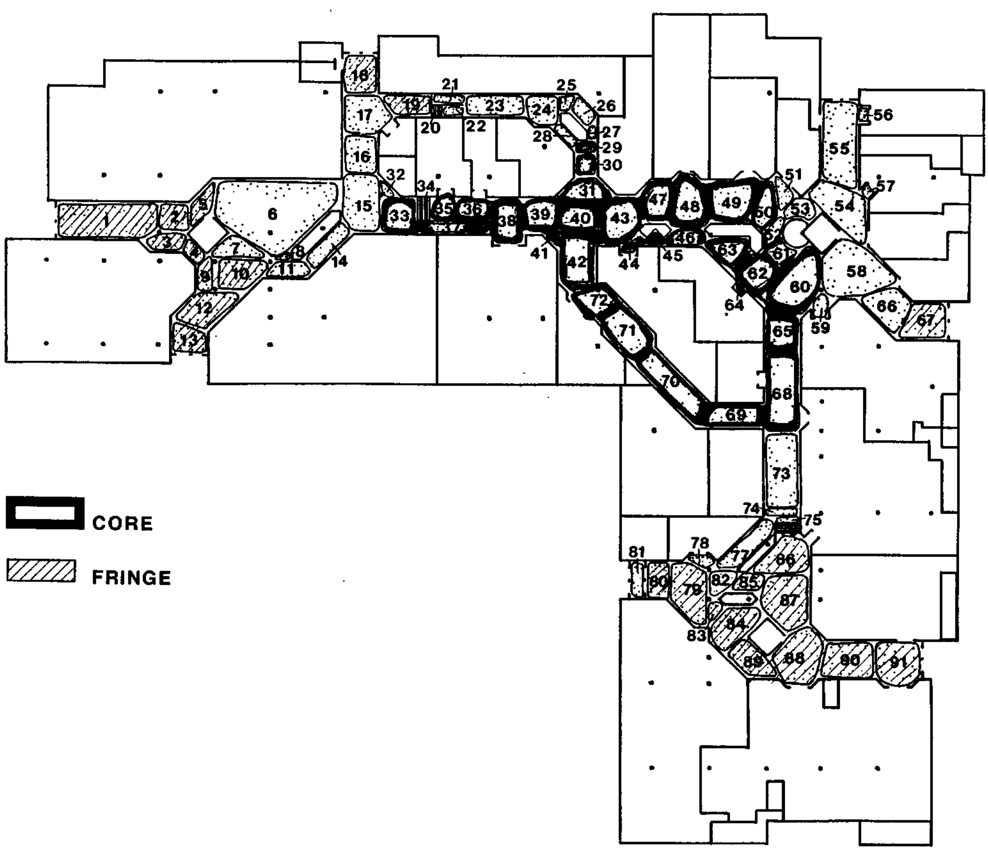


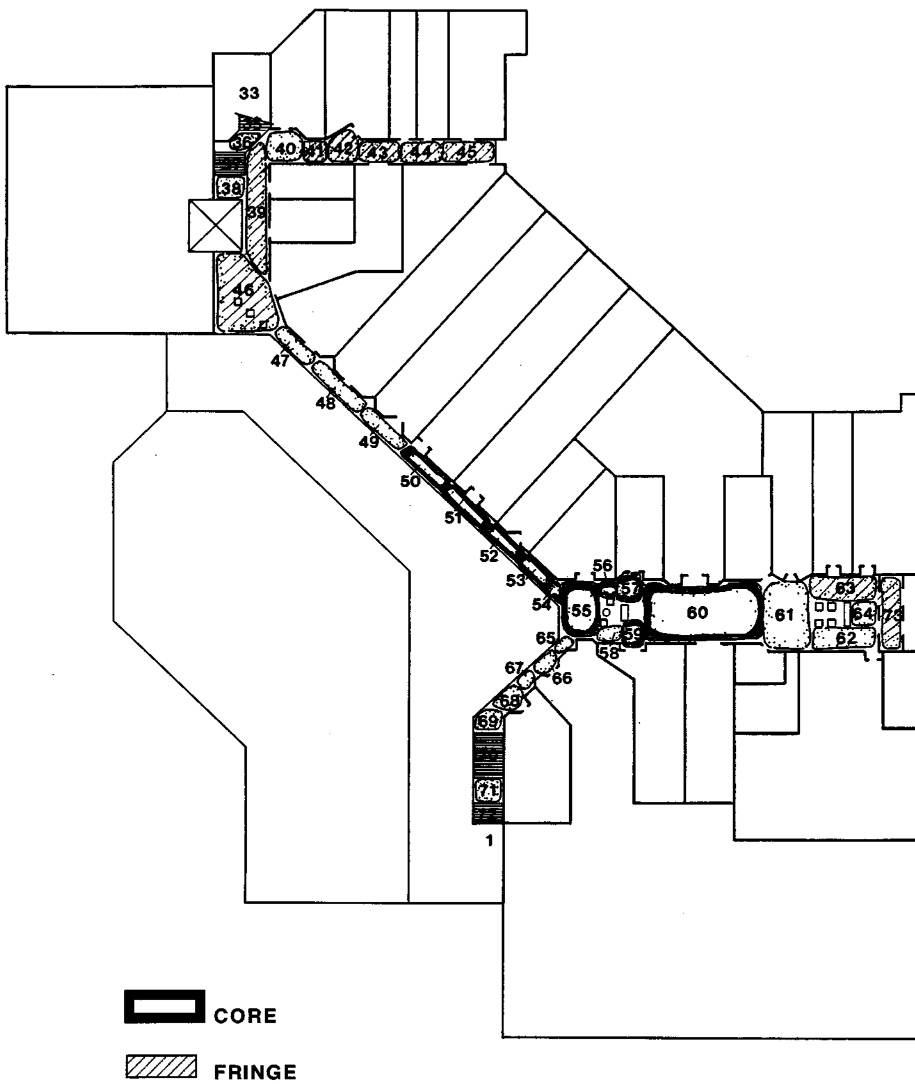
Exhibit 11
Convex Spatial Units
Beau Monde Shopping Center
Lower Level



As Exhibit 11 shows, at the lower level, Beau Monde's core is a set of continuous spaces on a ring in its virtual center. It is not surprising that the stores once fronting on these spaces included Lagerfeld, Ann Taylor, Guy Laroche, Cerruti, Aujard and Benetton. This ring of spaces is distinctly separate from the floor's fringe locations, which are at every entrance area but one. The upper level core (Exhibit 10) is not quite continuous because one restaurant entrance (space 114) is separated by a fringe space. The core is slightly offset from the lower level core. The fringes do not include two entrances.

Exhibit 13 shows Tamarac Square's lower level core is a group of continuous spaces that includes an entrance space. Its fringe is distributed among the two other entrance spaces, an entrance to a vacant location (space 27) and a group of spaces fronted by a number of vacant locations (spaces 22 to 26). The upper level core (Exhibit 12) is

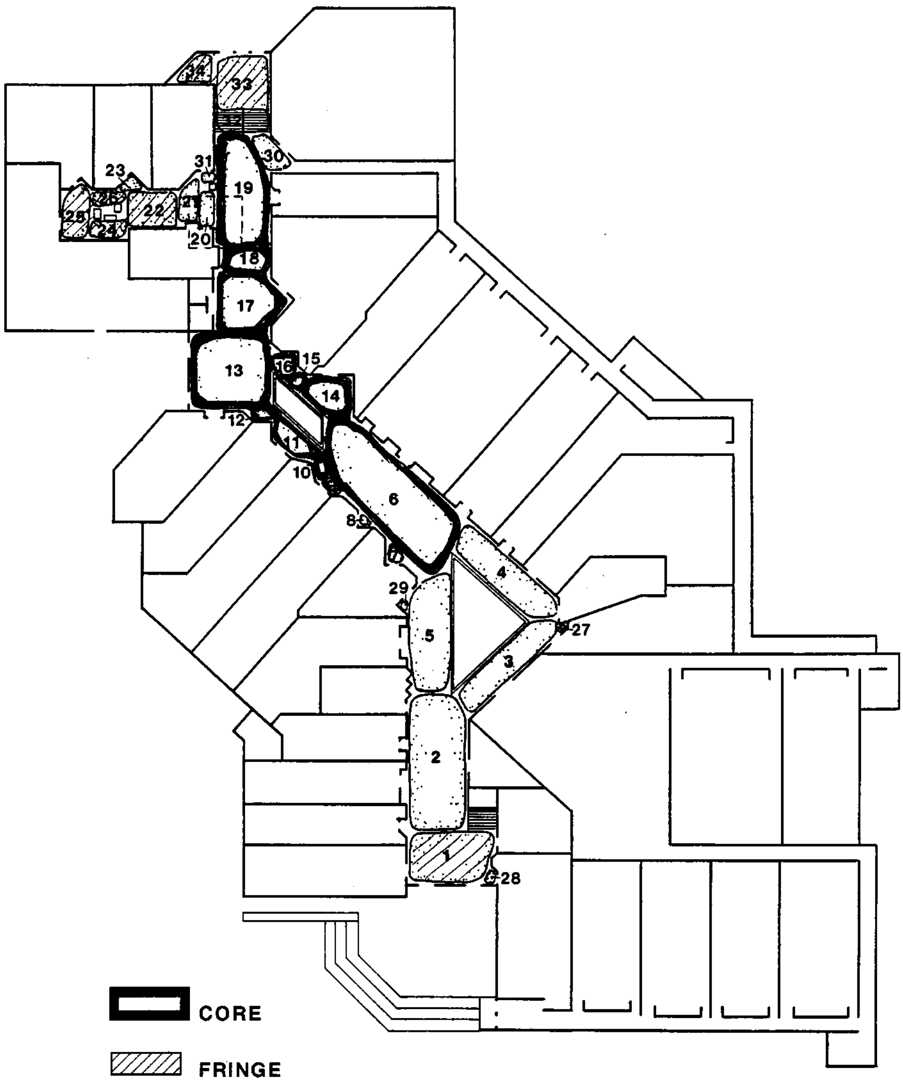
Exhibit 12
Convex Spatial Units
Tamarac Square Shopping Center
Upper Level



continuous and considerably offset from the lower level core. With one exception (space 65), upper fringes are clustered at entrances or just off stairs.

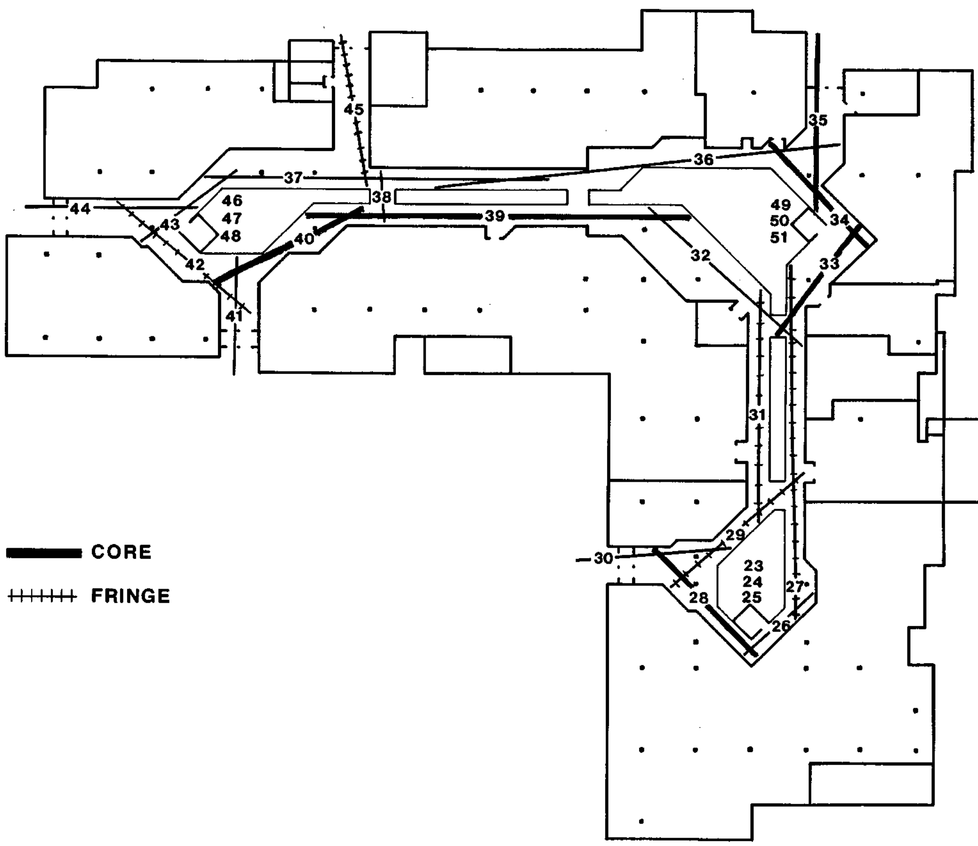
Exhibit 15 shows the global core on the lower level is continuous and overlaps the local core extending it slightly. On the upper level, however (Exhibit 14), the global core is discontinuous and consists of three separate parts. Fringe areas on both levels are around three entrances but extend deeply into the local core locations.

Exhibit 13
Convex Spatial Units
Tamarac Square Shopping Center
Lower Level



Tamarac Square's lower level global core is not only continuous but extends to include the entrances (see Exhibit 17). The global fringe includes no entrances and mainly fronts on the same group of vacant spaces (spaces 6 and 7) as the main local fringe. The upper level global core is also continuous (Exhibit 16) and considerably extends the local core and pushes the global fringe to the same east–west corridor (space 18) at the north end of the center.

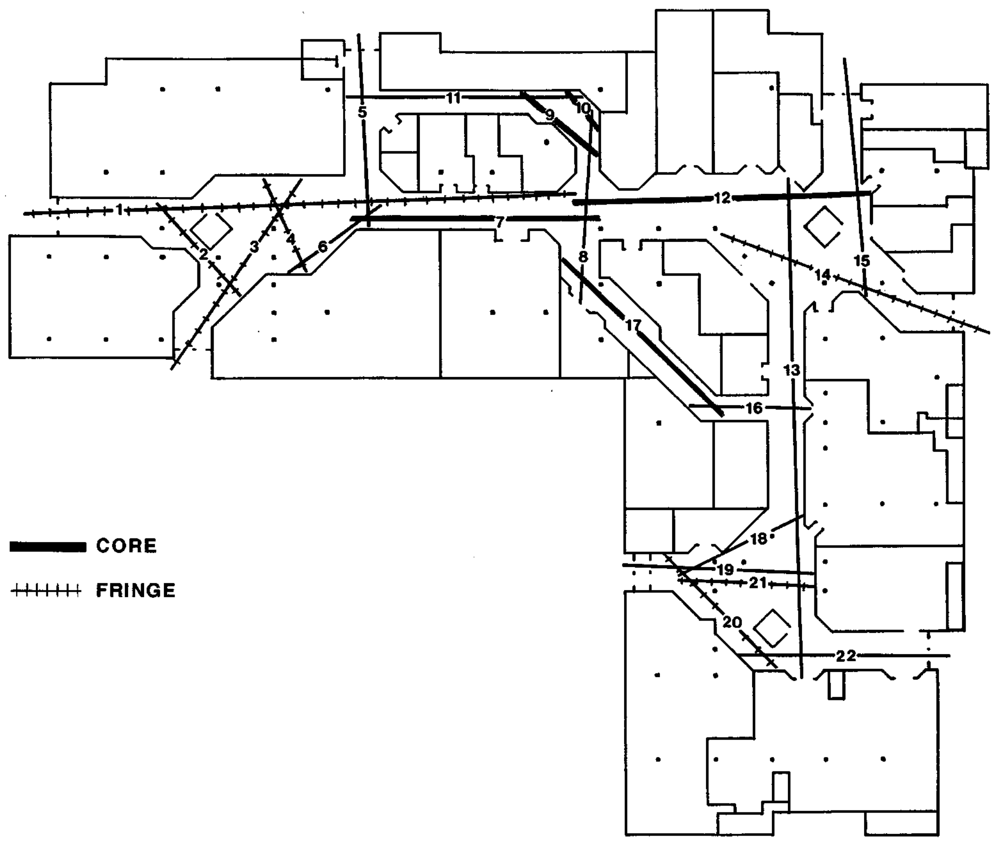
Exhibit 14
Axial Spatial Units
Beau Monde Shopping Center
Upper Level



Upper and lower levels. Considerable anecdotal evidence indicates the upper of many two-level shopping centers, particularly smaller, non-enclosed centers, is difficult to lease, especially to retail operations, although enclosed malls can approach the problem differently. Multi-level regional malls overcome this problem with multiple parking levels connected to the shopping levels by escalators. Beau Monde and Tamarac Square attempt to overcome the upper level problem by providing direct exterior entrances to each level—Tamarac Square with its split-level site, Beau Monde with parking garages giving access to each level so that each level could function independently. It makes sense that the separate levels should be able to function independently as well as together.

To function together, levels need almost seamless links. The Beau Monde stairs connecting each level, like the levels themselves, are more spatially decomposed than the Tamarac Square stairs. Each of the three Beau Monde stairs is made up of five

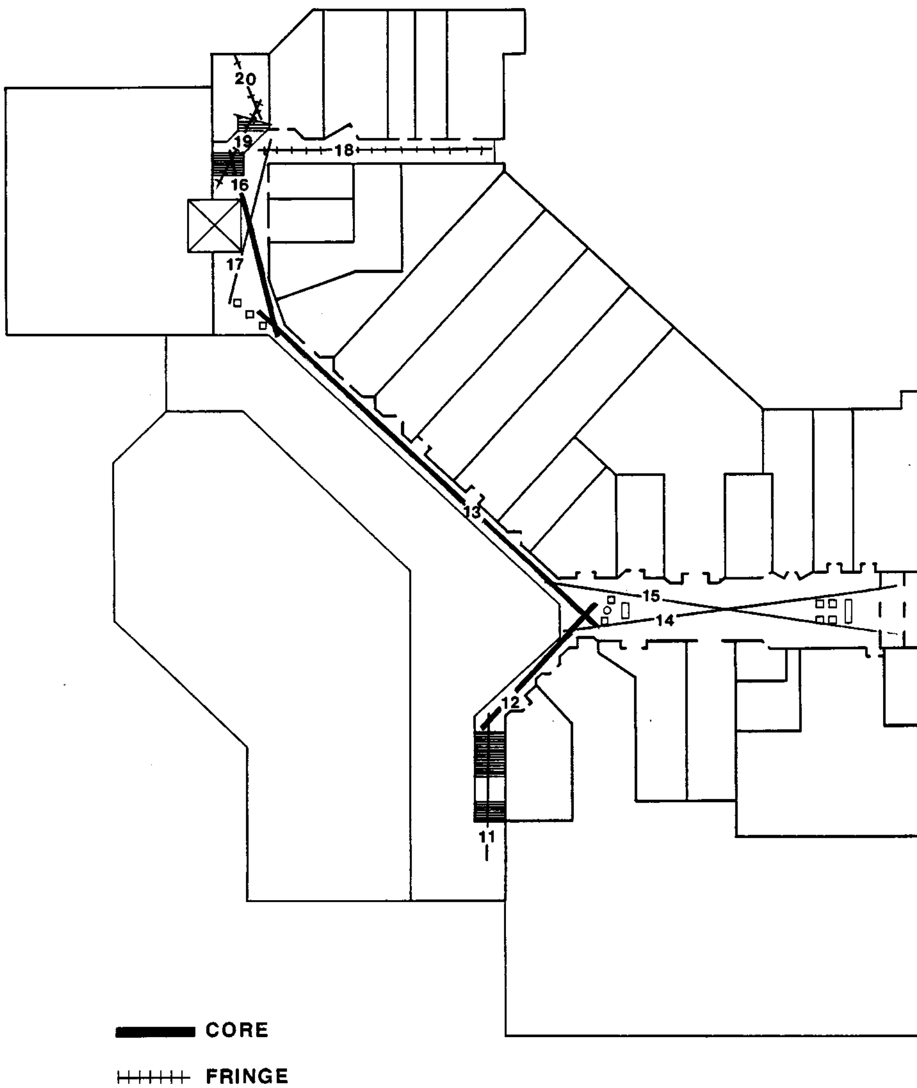
Exhibit 15
Axial Spatial Units
Beau Monde Shopping Center
Lower Level



convex and three axial lines. In Tamarac Square, one monumental stair (now an escalator) is composed of three convex spaces and one axial line, the second of five convex spaces and two axial lines. In this second stair, however, both the axial lines lead directly to the exterior making it a strong exterior link. While Tamarac Square's two levels *can* function independently, Beau Monde's two levels *must* function independently. This is why each mall was analyzed as two independent shopping levels as well as a whole.

Relation to mall entrances. One of the most important aspects of the spatial layout of shopping centers, from the shopper's point of view, is orientation to the center as a whole upon entering it. The public areas of a shopping center are supposed to function like a traditional shopping street. Imagine walking off a side street onto a busy street lined with stores. You should have a good though not detailed view of storefronts and signs. Entering a shopping center is something like this. It is easier to see what is across the street than what is down the same side. (In supermarket and library aisles,

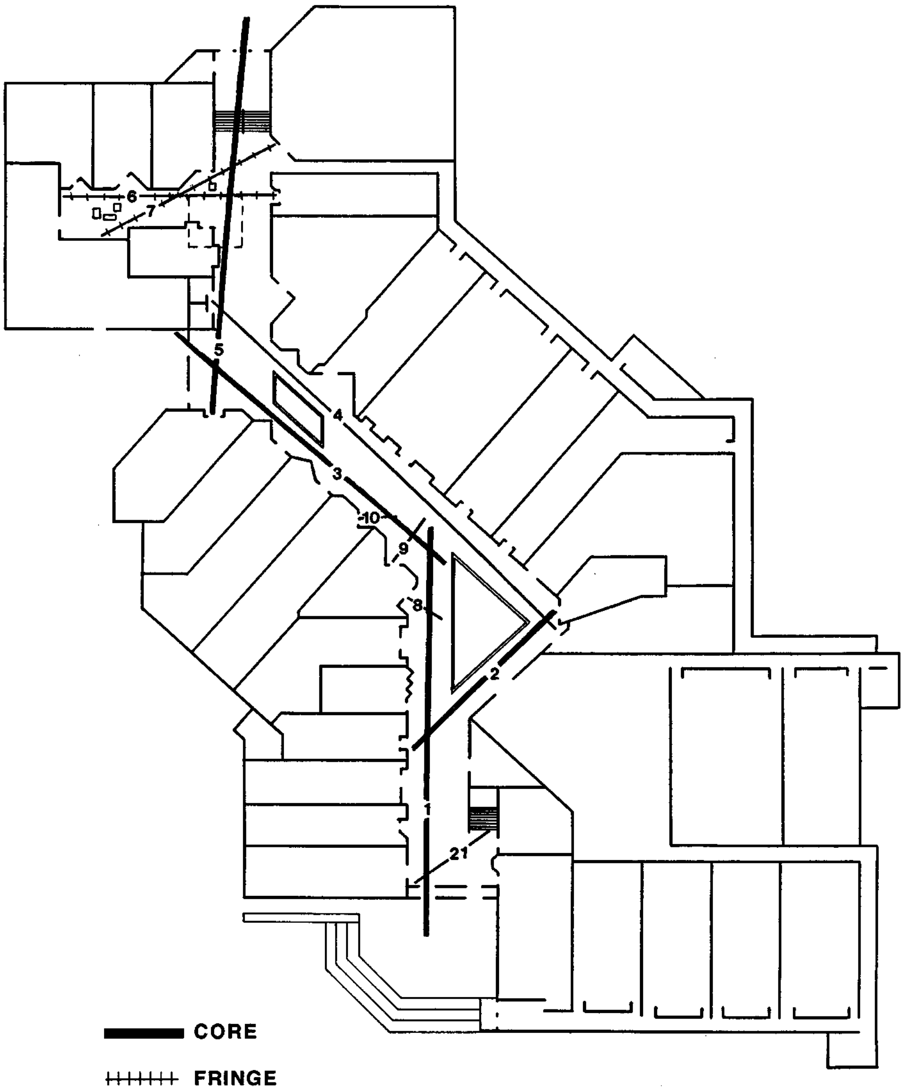
Exhibit 16
Axial Spatial Units
Tamarac Square Shopping Center
Upper Level



it is easier to step back a bit and scan the shelves.) But, if there are significant barriers to crossing, you will walk down the closest side. Mall design often minimizes this problem by angling stores to the changing sightlines of moving persons.

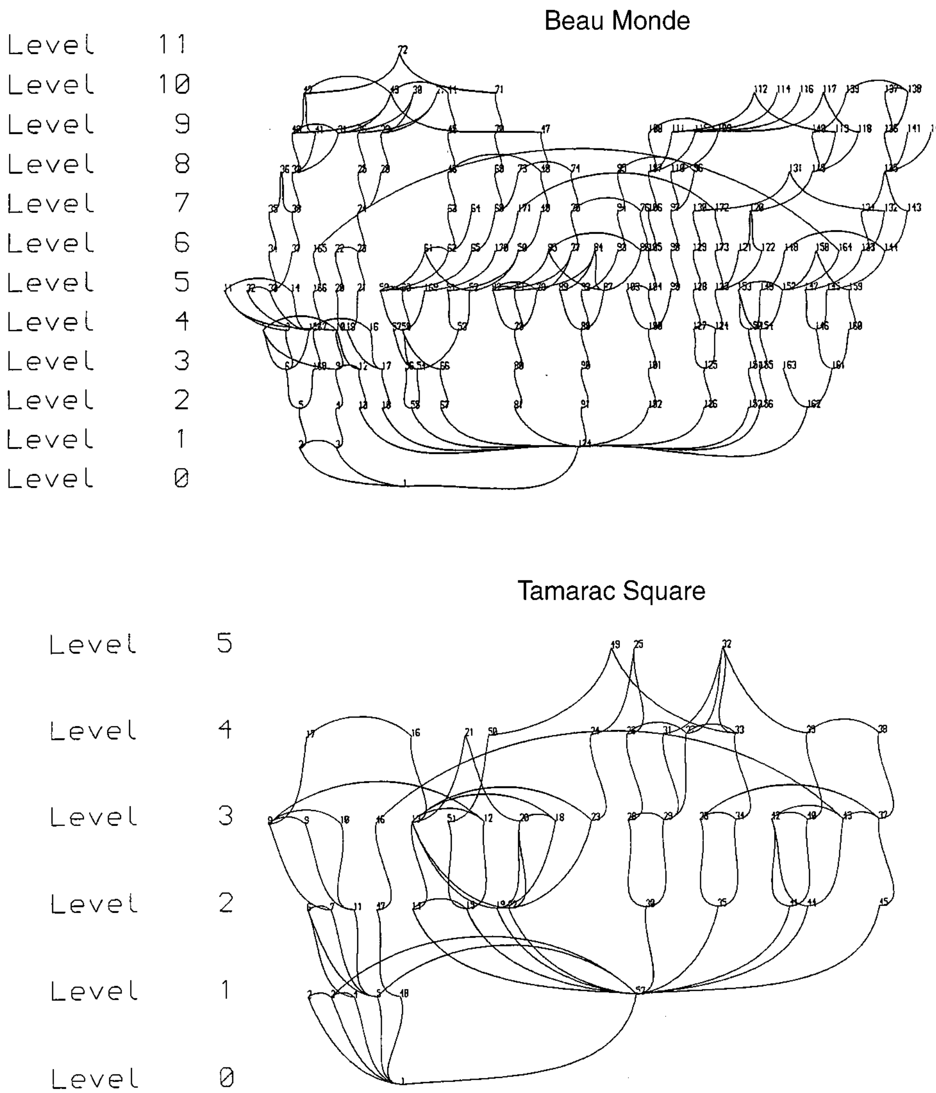
Exhibits 18 and 19 are justified network graphs of spatial steps drawn from the main entrances of each mall as a whole. They show the number of spatial steps and the

Exhibit 17
Axial Spatial Units
Tamarac Square Shopping Center
Lower Level



number of spaces at each level in sequence from the main entrances in the mall. Exhibit 18 shows convex spaces; Exhibit 19, axial lines. Exhibit 20 identifies by number and percentile of integration each entrance to the two centers. The higher the percentile number, the greater the likelihood a shopper will comprehend the system and orientate to it. For Beau Monde, the average percentile for the convex space at the entrances is 15.33 and 35.25 for the axial line. For Tamarac Square entrances, the

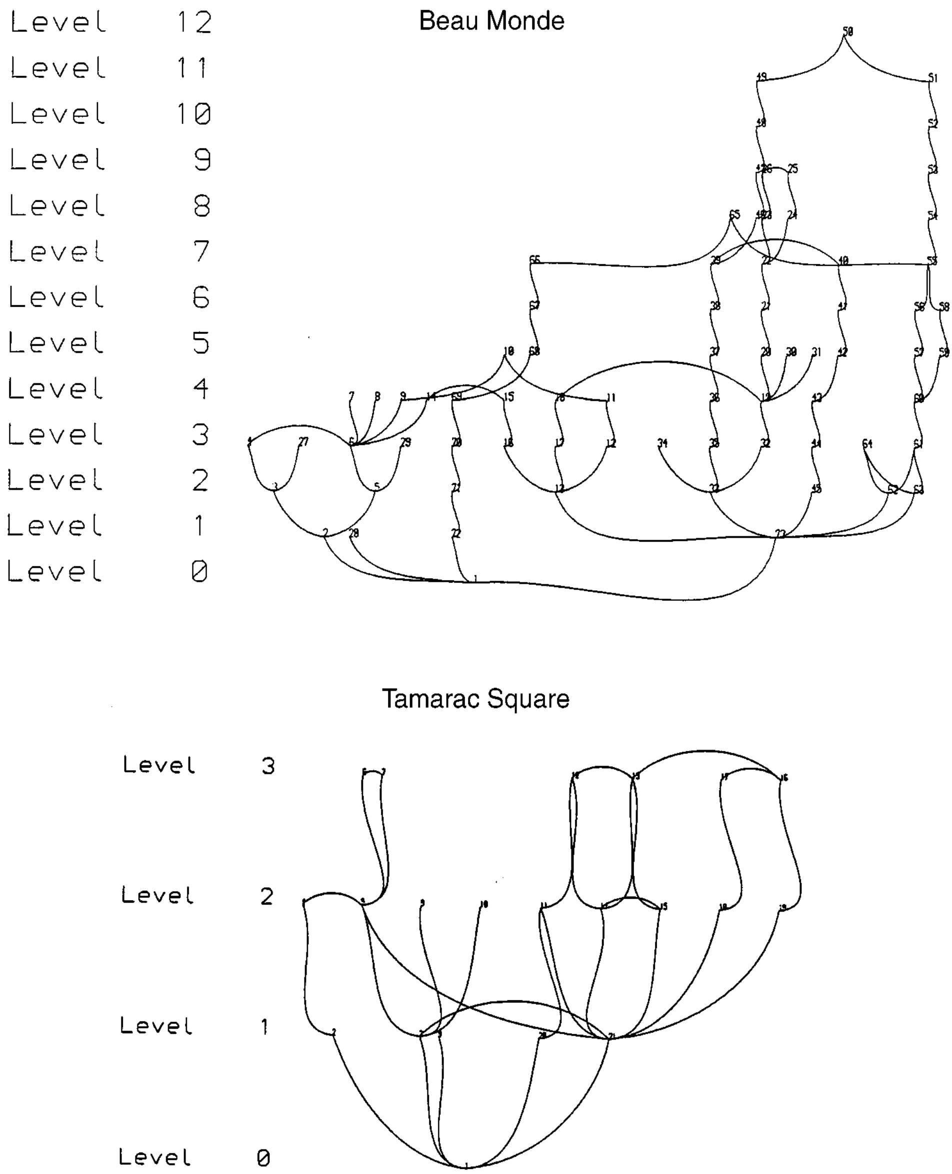
Exhibit 18
Justified Convex Network



average percentiles for convex spaces and axial lines are 36.20 and 61.75, about twice Beau Monde's. The results of both axial and convex analyses clearly show that the entrances to Beau Monde functionally segregate the interior from the exterior on each floor.

Though Beau Monde and Tamarac Square have the same number of syntactic levels of convex spaces, it is apparent that in Tamarac Square, many spaces are at lower levels (*i.e.*, close to the entrance) and few are at higher levels. Beau Monde, on the

Exhibit 19
Justified Axial Network



other hand, has relatively few spaces at lower syntactic levels (*i.e.*, close to the entrance) and many at higher levels. The axial network graphs, though similar in shape, differ in number of levels: Beau Monde has two more than Tamarac Square. Both the core-fringe distribution and the network graphs show that the entrances bring shoppers deep into Tamarac Square but they keep them at the edge of Beau Monde.

Exhibit 20
Syntactic Measure: Mall Entrances

Beau Monde		Tamarac Square	
Cells	Integration %ile	Cells	Integration %ile
Panel A: Convex patterns			
Lower level			
1	09 (fringe)	1	2 (fringe)1
13	04 (fringe)	13	99 (core)
18	24 (fringe)	33	29 (fringe)
88	41		
67	27 (fringe)		
81	01 (fringe)		
91	00 (fringe)		
Upper level			
102	00 (fringe)	45	01 (fringe)
126	38	62	31 (fringe)
152	09 (fringe)		
156	02 (fringe)		
162	29 (fringe)		
Average %ile	15.33		36.2
Panel B: Axial patterns			
Lower			
1	59	1	92 (core)
3	06 (fringe)	3	99 (core)
5	63	5	83 (core)
14	69 (core)		
15	94 (core)		
19	27 (fringe)		
22	61		
Upper			
30	02 (fringe)	11	40
35	22 (fringe)	14	70 (core)
41	12 (fringe)	15	60
44	08 (fringe)	18	20 (fringe)
45	00 (fringe)	19	30 (fringe)
Average %ile	35.25		61.72

This is why most of the few remaining occupied locations in Beau Monde are located at or very near a few entrances.

Relation to store entrances: vacant and occupied spaces. Whether its entrance is on the core or the fringe can affect a store's success. During initial research on convenience shopping centers and a small specialty mall in the Phoenix area, we noted shops at certain locations that appeared to have high tenant turnover or were often vacant. Persons familiar with these centers commented that these areas did not get the foot traffic attracted by the rest of the center. These turned out to be fringe locations. It was also noted that large anchor stores occupied the fringe locations in regional malls. Their mass marketing capabilities countervailed their fringe location.

The low occupancy levels in Beau Monde makes evaluation of vacancy patterns somewhat inconclusive. Except for a restaurant and a gallery in the second floor core system, the only occupied locations are on the fringe on, or next to, mall entrance space. But for Tamarac Square, it is important to note that most of the few vacant store locations are on one fringe corridor. No vacant store location is on the core, and only one is not on the fringe. Most vacant locations in Tamarac Square were on non–entrance fringes. Exhibit 21 summarizes syntactic measures for vacant and occupied locations.

Summary

At its most fundamental and effective, shopping center design simply links streets (and parking) and specific store merchandise and confers whatever advantage its location possesses on its interior real estate. When spatial configuration is properly structured, this link (the shopping center) works top–down from the macro level of the street to the micro level of merchandise, global to local, not bottom–up. Sometimes a well–designed and otherwise attractive shopping center can countervail a poor location. And while a poorly designed shopping center can be redeemed by a good location, it is not inevitable, especially when a shopper has a choice where to shop.

Exhibit 22 summarizes the spatial differences between the two malls. For a shopping center to work top-down, the core must be continuous and axial lines must extend the

Exhibit 21
Syntactic Measure: Stores Entrances

Beau Monde[a]		Tamarac Square	
Cells[a]	Integration %ile	Cells[b]	Integration %ile
Lower level			
59	56	23	14 (fringe)
51	63	24	15 (fringe)
91	01 (fringe; mall entrance)	25	10 (fringe)
78	20 (fringe)	27	26 (fringe)
55	41 (mall entrance)		
Upper level			
121	76 (core)	40	36
126	38 (mall entrance)		
14	82 (core)		

Note: Exhibit is for convex spaces only.
[a]Occupied only.
[b]Vacant only.

Exhibit 22
Summary Comparison

Beau Monde	Tamarac Square
Panel A: Core patterns	
Lower level	
Continuous local core (local core was occupied first)	Continuous local core
Continuous global core	Continuous global core
Upper level	
Slightly discontinuous local core	Continuous local core
Discontinuous global core (3 parts)	Continuous global core
Panel B: Store entrance (occupied/vacant) patterns	
Lower level	
No remaining occupied spaces in the core	No vacant spaces in the core
Remaining occupied spaces in fringe & mall entrances	Almost all vacant spaces in the fringe
Upper level	
Two (2 of 3) remaining occupied spaces in the core	One vacant space adjacent to two fringe spaces

Note: Mall entrance patterns: no entrances (0 of 11) integrate inside with the outside half of the entrances (3 of 6) integrate inside with outside.

global core to the entrances to bring shoppers to the local core. Stairs should get shoppers from one level to another as effortlessly as possible. Tamarac Square does this; Beau Monde does not. A better Beau Monde would have fewer, larger convex spaces, fewer, longer axial lines, fewer or no rings and simpler and more direct connections between levels. Beau Monde's lower level core does not extend globally and its upper level core is fragmented. Neither of these conditions occurs in Tamarac Square. Both local and global levels of Tamarac operate together to extend the core close to the entrances. The global pattern dominates the local one. In this condition, vacant spaces are likely to be in the fringe where shoppers are less likely to go. But it is the reverse in Beau Monde: the local level dominates the global. In this condition, shoppers come in but simply do not connect to the global system.

Conclusion

A few years ago, when ‘‘intelligent buildings’’ were put on the agenda, it was glib to say that an intelligent building was one that was fully leased. In a way, that is right. The real intelligence, the central nervous system of a building, is its spatial configuration. The spatial central nervous system choreographs interface patterns: person to person, goods to person. If not adequately interconnected, parts of the building served by its spatial interconnection, or even all of it, will atrophy.

Beau Monde, like similarly problematic shopping centers in other cities, is a pathological case among shopping centers and its spatial pattern is not likely to be repeated frequently. But because it is pathological, it offers a good example of a poor spatial pattern and is, in a sense, a standard to know and avoid. Tenants and shoppers avoided it. Investors and lenders, like Irving Trust, did not.

The symptoms were there on paper, in the design documents. Beau Monde's greater number of convex spaces results partly from frequent indentations for store fronts, more convolutions in wall or vertical surfaces and many columns throughout the various public areas. In plan the columns appear as insignificant, small, black squares. In reality, they are massive brickwork elements about two feet on a side—considerably wider than a person and deflectors of vision and movement. Walking through Beau Monde, it is impossible to miss the extreme variety of floor surface materials, store-front or facade treatments and ceiling and roof conditions. All of these create visual discontinuity, reinforcing the effect of the spatial scheme. At the same time, the attention they command distracts attention from the spatial pattern.

The design of Beau Monde emphasizes local identity of the individual stores and this emphasis associates with a decomposed and fragmented spatial pattern. Exhibit 23, a photo of the interior, cannot convey the full impression gained from walking around. In sum, these aggregate conditions make Beau Monde a more localized and constricted space than Tamarac Square. In addition, Beau Monde's exterior of heavily rusticated stone conveys a similar impression—impregnability. From the comments of developers and designers in newspaper articles, this appears to have been the intention. It was a mistake: it makes the user or shopper in Beau Monde more aware of the container than its contents.

Could Beau Monde be redesigned to be an effective shopping center? Perhaps. A redesign would involve changing the mall entrance locations, store facade positions and entrances, stair locations and configurations, corridors, bridges and walkways, furniture, fixtures, floor and wall coverings. Any design changes would have to be tested against existing structural patterns, bay systems, electrical, mechanical and lighting systems. Would a redesign be expensive? Very. Is it better off as a church? Probably. Worse, the interior is only part of it. Though it is not addressed here, the rest of the center also has design problems.

Beau Monde is what is called marginal product. As Dotzour, Grissom, Liu and Pearson (1990) pointed out, ''The perception of excess returns has brought out much marginal product . . . (which is) the first to be eliminated from the market supply in a down market.'' The problem, which the space syntax methods effectively solve, is how to identify marginal product. The space syntax methods give substance to the aphorism that people vote with their feet.

The design of Beau Monde was based on the concept of the ''European shopping village.'' It is arguable whether this is a concept or a metaphor. Designers often use metaphor instead of method and developers often buy into these metaphors.

Exhibit 23
Beau Monde Interior—View to Entrance and Stair Tower

The European village, with its clumps of houses and shops, small, intimate spaces and meandering street arrangements set sometimes within defensive walls, seems like an intimate and enduring place. It was a popular bottom-up design and development idea in the 1970s and 1980s. Even though a metaphor can reshape the familiar to something new, it can not be tested like a model before it is built. What is not apparent is that the plazas and unusual street arrangements of European villages have well–defined global patterns quite unlike Beau Monde's (Hillier and Hanson, 1984). Furthermore, the "shoppers" in medieval towns centuries ago were those who went to the street market for commodities. Those wealthy enough to afford the expensive goods like those sold in Beau Monde had tradesmen come to them; they did not "go shopping." Beau Monde is configured in an American tourist's image of a medieval town. The model for Beau Monde never really existed.

Bagnoli and Smith (1998) state the "major problem and the Achilles heel" of the real estate analysis process lies in the lack of precision of inputs like "architectural attractiveness" and "locational convenience." In their fundamental article on human problem solving, Simon and Newell (1970) clearly state the inadequacy of natural language descriptions adding ". . .the pain and cost of acquiring the new tools must be far less than the pain and cost of trying to master difficult problems with inadequate tools." Evaluating design is a very difficult problem. It could be argued that virtually all the rigorous, quantitative, analytic problem solving steps following description (*i.e.*, explanation, prediction, judgment and implementation) and all their associated theories and insights, are based on descriptions of empirical built realities that are fundamentally unsystematic and subjective. In many practical situations, this may not matter. But, in some instances, it is risky and in terms of advancing knowledge, it is a major deficiency. The acquisition of space syntax tools will help real estate analysts describe what is really there.

Notes

[1] This is a way of analyzing the space. It is not a design guideline suggesting mall spaces be composed of large square areas.

[2] The selection of percentages to use in discriminating between core and fringe spaces depends on the data, the subjects being compared and patterns of discontinuities. There is no indication that ranges of integration follow a normal distribution. Core spaces will be below the median; fringe spaces above.

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