This article reports on research in progress which empirically measures and examines the implementation of a land use plan. It is a case study of a statutory land use plan for the Krayot area in Israel. The analysis covers the relative influence on implementation of the plan from political factors, from the attributes of the plan, and from changes occurring in the urban system.

While the ultimate purpose of plans is their implementation, there has been surprisingly little systematic attention devoted to the relationship between planning and implementation, or plans and their performance.¹

This article reports on an empirical study of the implementation of a land use plan in Israel, investigating how the plan in fact has performed and why it has done so.

**Background to Israeli planning**

Local plans in Israel as required by the Planning and Building Law of 1965² are the major regulative tool for directing urban development. The law makes a distinction between outline and detailed plans. An outline plan is a compulsory, legally approved master plan which is roughly comparable to an American 701 comprehensive plan. It covers an entire municipal area, usually designating land use zones, the road network, general or specific densities, and sometimes also land to be expropriated. Outline plans are prepared by the local planning commissions, which in cities are composed of the elected council. Detailed plans, on the other hand, are generally comparable to the American site plan but often cover more than a particular site, designating land use, densities, and site layout more specifically and reflecting ongoing development initiatives. The latter usually stem from the initiative of developers, whether public or private.

In Israel, no development or change in use may take place without a building permit. Normally, in order for a building permit to be granted, it should accord with the detailed plan in whose area it falls, while the latter should substantially accord with the outline plan; otherwise, an amendment must be approved. The commission, however, is empowered to grant minor variations in height, bulk, or setback within legally set limits. The decision making is carried out in a three-tier system, whereby the decisions of the local commission must be approved by the district commission and appeals may be made to the national planning council. The local plan should accord with the regional and national outline plans. Thus, at least in theory, all development should accord with both the local plan and national policy.

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What more ideal conditions for implementation could planners wish for? The centralized mechanism for planning along with the requirement that all development be granted a permit makes the Israeli planning context a good laboratory for studying the extent to which the plan indeed has controlled development.

Although 92 percent of land in Israel is publicly owned, most of the private land is concentrated in urban areas. In the older and larger towns much of the land is privately owned. Furthermore, the Israel Lands Authority, which is the custodian of public land, has adopted a policy in these towns of charging a price for long-term leases which is virtually identical to the prices realized in the private land market. From this point of view the forces operating in the case study, which is located in one of the older urban areas, are not dissimilar from those with which a regulative U.S. land use plan must contend.

The empirical study which follows measures the degree to which a plan has been implemented, and then investigates the effect of various factors on the extent of implementation.

The Krayot case study

There are two possible approaches to a research design for the purposes here: the macro approach that could compare a large number of land use plans, and the micro approach, which would zoom in on a selected case study. Although both approaches have their merits, the latter was used here for both technical and substantive reasons. While this approach precludes comparison between cities of the influence on implementation from different urban systems and decision-making frameworks, the focus instead can turn to the individual decisions comprising the implementation process.

In many respects the case study selected, the outline plan for the Krayot area, a satellite town conurbation on the Mediterranean coast north of Haifa (see Figure 1), meets the requirements almost ideally. The present total population of about seventy-six thousand is that of a medium size city by Israeli standards; yet it is not so big as to be unmanageable for the research purposes. The Krayot is a conurbation of three municipalities: Yam, Motzkin, and Bialik, which have been designated to fall under one joint, local planning commission. The differences among these towns in terms of the mixed socioeconomic characteristics of the population and the varied types of housing, constructed by both the public sector and the private sector, enrich the case study by providing what is almost a microcosm of Israeli society. The outline plan is not too old, yet provides a long enough period for testing (since 1964). It is in the rigid style of conventional land use planning still predominant in Israel, specifying, in addition to the main road net-
Dependent variables (degree of implementation) and the data base

In light of the Israel Planning and Building Law of 1965, the decision-making process regarding the implementation of an outline plan can be simplified into two major sets of decisions.

1. Review of the detailed plan vis-à-vis the specifications of the outline plan
2. Review of the terms of building permits vis-à-vis the specifications of the relevant detailed plan

Two measures of the dependent variable were devised, one for each set of decisions. Focusing initially on the first of these stages, how does one compare the content of the detailed plans with the content of the outline plan? Because the outline plan is a land use plan specifying the desired location of permitted land uses, it was important to assure that the technique of measurement would supply answers not only on whether the specified amounts of the different land uses have been provided in the area as a whole, but also on whether they have been located in accordance with the outline plan at the specific places designated.

The operational measure of the degree of effectuation is obtained by comparing the land use and...
development specifications of the outline plan with the eighty-four detailed and amendment plans (amendment plans being equivalent to detailed plans for the study purposes) that were submitted for consideration during the years 1964–1974. In order to make the measure sensitive not only to quantity of area in a particular use, but also to whether it has remained in the location designated, the outline plan as well as each of the eighty-four detailed plans was divided into a uniform grid of cells (one hundred meters square or one hectare each). Accordinces and deviations were registered for each cell in terms of land areas, with the originally designated land use and the new land use being recorded. In order to allow for small fluctuations reflecting site conditions, locational re-shuffling within a cell was ignored, a deviation being registered only if it falls outside the cell boundaries. The information drawn from the grid cells was then accumulated into a matrix pertaining to each of the detailed plans.

The eighty-four detailed plans submitted for consideration constitute the population of cases for analysis. Each can be characterized by a matrix of the form depicted in Figure 3. Matrix LUSE_d has i rows, each indicating a land use category in the outline plan that applied to the area of the detailed plan, and j columns, each indicating a land use category in the detailed plan. Each element in the matrix reflects the area of land use i as designated in the outline plan which is allocated to land use j in the detailed plan. The areas recorded on the diagonal reflect complete accordance between the detailed plan and the outline plan. Areas recorded in any other element in the matrix represent deviations of the detailed plan from the land use allocations of the outline plan.

The measure of the extent of implementation, which (for the detailed plans) has been named ACCORDANCE, is the aggregate percent of land area designated for particular land uses in the outline plan which is similarly designated in the detailed plan. (ACCORDANCE is a dependent variable in the regression analysis described below.) In other words it is the percent of the total land area covered by the detailed plan which is accounted for by the elements recorded on the diagonal.\(^4\) It may be interesting to note that for the eleven-year period the overall degree of accordance calculated by aggregating the raw number matrices of all of the detailed plans was 66 percent.

Although the proposed measure remains on the decision-making (effectuation) level and does not measure actual development (execution), the latter measure has been avoided for conceptual and technical reasons (Alterman 1975, pp. 24–25). However, once a building permit is issued, the likelihood of development actually occurring is very high. Not only is effectuation a good approximation for execution, but it enables the analysis to focus on factors that affect the decision makers who are entrusted with directing development.

The second step of the process is comparison of the terms of building permits with the specifications of the detailed plan. The analysis is no longer dealing with a full population as was the case with the detailed plans, but rather with a random 20 percent sample consisting of 128 permit files within the areas of 55 of the detailed plans (requests for building permits were not as yet forthcoming in some of the areas covered by detailed plans). The dependent variable devised for the building permit stage reflects the type of legal variations which are permitted—building percentage (floor-area ratio × 100), number of floors, and setback lines. The complete variable entitled VARIANCE reflects the weighted changes of these three types. Variations were discovered in approximately 25 percent of the permit files.

Figure 3. Schematic matrix of transformations in planned land uses (matrix LUSE_d)

\[
\begin{array}{cccc|c}
\text{From} & \text{To} & j = 1 & j = 2 & j = 3 & j = n \\
\hline
l = 1 & \checkmark & & & \\
l = 2 & & \checkmark & & \\
l = 3 & & & \checkmark & \\
l = n & & & & \checkmark \\
\end{array}
\]

Hypotheses about factors affecting implementation

In addition to being able to measure degree of implementation, the study should be able to identify factors “explaining” it. To this end three broad facets, or groups of variables, have been identified which are hypothesized to be associated with the degree of implementation of urban master plans. These facets are:

1. **Political-institutional factors.** Political-institutional structure for the effectuation process (Walker 1941); influence exerted by persons with political or economic interests during effectuation (Makiel 1956, Pressman and Wildavsky 1973); role of the planner in the effectuation process (Dyckman 1971, Robinson 1965, Rabinowitz 1969, pp. 45–53; and Barr 1972, pp. 155–59).
2. **Attributes of the plan.** The planning techniques used, the type of planning team, the goals articulated, and any other attributes associated with the quality of the plan (Dror 1971, pp. 121–22).^  

3. **Urban system factors.** Processes that occur in the urban system such as pressures of population growth, changes in standard of living, changes in economic activity, etc.

These broad areas provide independent variables from which specific hypotheses can be derived about anticipated relationships with the dependent variables. Some of these factors suggest the macro approach to the analysis, an approach not adopted in the present exploratory research. This meant that not all the aspects mentioned entered the research design. Detailed descriptions of the hypotheses and variables follow.

**First facet: indicators of influence on decision making**

It is hypothesized that each time a detailed plan or a building permit is submitted to the planning authorities, there are underlying factors operating which increase or decrease the likelihood that the detailed plan will deviate from the outline plan, or that the building permit will be granted with permitted variation from the detailed plan. At times this likelihood may depend on objective processes that have occurred in the urban system and which may affect decision making in the effectuation process (facet three). But at other times the likelihood of deviation may depend either on the influence of the persons submitting detailed plans and building permits or on the planners involved (OWNER, INITIATOR, PLANNER; see Table 1), such that the greater their influence, the greater the likelihood of obtaining the desired deviation.

In addition, the influence of the actors may be reflected by the detailed plan's attributes such as the area that it covers (AREA) or the number of units constructed (DWELLING UNITS), where these attributes are assumed to indicate the influence of economic interests on the projects; here, too, a positive relationship is hypothesized. The influence on decision making also might be reflected by a more indirect variable—the total time it takes for the plan or permit to receive official approval (TIMELAG). These and other variables are defined in Table 1.

Most of this information was extracted from the files of the planning commission, each file containing the plan and associated letters and protocols of decisions.

**Second facet: attributes of the outline plan (flexibility)**

The second facet, attributes of the plan itself, can usually be handled by the macro, comparative design. However, this case study has special properties which permit the proposal of one variable as an attribute of plan quality—the degree of flexibility built into the specifications of the outline plan (FLEXIBILITY, measured on an increasing ordinal scale from 1 to 7). This is possible because the outline plan is not uniform in its degree of generality or flexibility, but rather includes several approaches. For example, in some subareas there are precise specifications by subdivided lot as to the particular use, height, bulk, and setbacks; while at the other extreme, mostly applying to broad tracts of undeveloped, unsubdivided land, only the dominant land use is specified, without noting ancillary services, less-than-major roads, etc. The study considers the varying degree of flexibility within the outline plan as an attribute of the subarea covered by each detailed plan. It is hypothesized that the greater the flexibility of the plan, the lesser the likelihood of deviation from it.

For technical reasons, one more variable will be regarded as an attribute of the outline plan, although it properly belongs to facet three. This is the variable PLANAGE indicating the age of the outline plan at the time a detailed plan is presented (i.e., the number of years that have passed from 1964 to the submission date). This is not a variable to which one could in any sense attribute causality; rather, it is a surrogate measure for various processes that operate through time, processes mostly associated with the urban system. It is hypothesized that the greater the time that has elapsed since the plan's approval, the greater the likelihood of deviation from it.

**Third facet: processes in the urban system**

It is hypothesized that the processes occurring in the urban system affect decision making in effectuating the plan. Such an effect could stem from two sources: the feed-forward of information about processes that have occurred in the system and are not directly related to past decisions, or the feedback of information about the effect of previous decisions (Law Yone 1974). Since the study objective is to identify the feed-forward effect, time-lagged data have been used. Generally, it is expected that pressures of population growth, of rise in standard of living, etc., would, as market forces, increase the likelihood of deviation from the outline plan while trends of decline or stability would tend to decrease it.

In view of the nature of this facet, the cases for analysis are no longer the detailed plans or building permits but rather the eleven annual periods from 1964 through 1974. The dependent variable ACCORDANCE was recalculated as a time series, so as to pertain to the cumulated measure of all detailed plans submitted each year.

The indicators selected pertain to three types of processes, each having a number of indicators or
Table 1. Defining the independent variables of facets 1, 2, and 3

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Description</th>
<th>Type of scale</th>
<th>Variable name</th>
<th>Description</th>
<th>Type of scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FACET 1 (re detailed plans)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWNER (D)</td>
<td>type of major land owner (by assumed potential influence; highest influence first); ranging from public body, through quasi-public, mixed public-private bodies, to large private builder and private resident</td>
<td>ordinal</td>
<td>AREA (D)</td>
<td>total area size of the plan (in hectares)</td>
<td>interval</td>
</tr>
<tr>
<td>INITIATOR (D)</td>
<td>type of major initiator of the detailed plan, as above</td>
<td>ordinal</td>
<td>DWELLING UNITS (D)</td>
<td>number of residential units to be built (for initiatory plans only)</td>
<td>interval</td>
</tr>
<tr>
<td>PLANNER (D)</td>
<td>type of planner (by assumed potential influence) ranging from planner employed by public agency to planner acting as a small consultant</td>
<td>ordinal</td>
<td>TIMELAG (D)</td>
<td>total time lag between presentation of plan and final approval (for plans that have been finally approved only); measured in years</td>
<td>interval</td>
</tr>
<tr>
<td>FUNCTION (D)</td>
<td>plans whose primary function is initiatory to develop land;</td>
<td>nominal (dummy)</td>
<td>MUNICIPALITY (D)</td>
<td>municipality (YAM, MOTZKIN, or BIALIK) to which the plan belongs</td>
<td>nominal (dummy)</td>
</tr>
<tr>
<td><strong>FACET 1 (re building permits)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INITIATOR (P)</td>
<td>type of initiator of permit request</td>
<td>ordinal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USE (P)</td>
<td>type of land use for which permit is requested, ranging (by assumed economic stake) from commercial, through mixed</td>
<td>ordinal</td>
<td>TIMELAG (P)</td>
<td>time lapse in months between presentation of permit request and its approval</td>
<td>interval</td>
</tr>
<tr>
<td><strong>FACET 2 (re detailed plans only)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLEXIBILITY</td>
<td>degree of built-in flexibility in the specification of the outline plan; scores assigned on scale 1 to 7, in an increasing order</td>
<td>ordinal</td>
<td>PLANAGE</td>
<td>age of outline plan (in years) at time detailed plan is presented</td>
<td>interval</td>
</tr>
<tr>
<td><strong>FACET 3 (re detailed plans as time series)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POP. SIZE</td>
<td>population size for each of the 11 annual periods 1964–1974</td>
<td>interval</td>
<td>NET MIGRATION</td>
<td>net migration</td>
<td>interval</td>
</tr>
<tr>
<td>POP. CHANGE</td>
<td>change (growth) in population size</td>
<td>interval</td>
<td>BLDG. STARTS</td>
<td>number of building starts</td>
<td>interval</td>
</tr>
<tr>
<td>POP. RATE</td>
<td>rate of change in population size</td>
<td>interval</td>
<td>BLDG. CHANGE</td>
<td>change in building starts</td>
<td>interval</td>
</tr>
<tr>
<td>IMMIGRANTS</td>
<td>number of persons entering the area (excluding new immigrants)</td>
<td>interval</td>
<td>BLDG. RATE</td>
<td>rate of change in building starts</td>
<td>interval</td>
</tr>
<tr>
<td>OUTMIGRANTS</td>
<td>number of persons leaving area</td>
<td>interval</td>
<td>CAR OWNERSHIP</td>
<td>ownership of private cars per 1,000 persons in urban area</td>
<td>interval</td>
</tr>
<tr>
<td>IMMIGRANTS</td>
<td>number of new immigrants entering 1968</td>
<td>interval</td>
<td>CAR CHANGE</td>
<td>change in car ownership per 1,000 persons</td>
<td>interval</td>
</tr>
</tbody>
</table>

(D) = Variable pertaining to detailed plans.
(P) = Variable pertaining to building permits.

variables (all measured on an interval scale; see Table 1): 8

- Population growth (total population, population change, rate of growth, immigration, net migration, etc.).
- Development activity (building starts, change in building starts, and rate of change).
- Local standard of living (indicated by private car ownership per 1,000 population, change in car ownership, and rate of change). 9

Because these all are measures of market forces, high interrelationships were expected, and therefore, appropriate precautions were taken to investigate only a select number of variables at a time.

The analysis is carried out in two stages: the first
deals with facets one and two, the second deals with facet three and the time series data.

The research design is staged for methodological reasons. Passage from stage one to stage two is made conditional upon the level of explanation achieved by the first two facets. In other words, should most of the variation in the dependent variable be explained by the variables of facets one and two, then one need not search further. However, in view of the nature of facets one and two which pertain to the attributes of the planning process and the assumed influence of various actors on the decision makers, it would be surprising indeed if they should account for all or most of the variability; it is expected that environmental, social, and other substantive considerations would nevertheless be paramount in decision making. The research design has therefore been prepared so that the search for explanation could continue into stage two, where substantive changes occurring in the urban system are considered.

Findings

The purpose of the statistical analysis is to test which, if any, of the independent variables helps to explain why the decision is or is not in accordance with the outline plan. The results of the first stage will be presented in two sections, one for detailed plans and one for building permits.

Results of stage one for detailed plans: the effect of political-institutional factors and the attributes of the plan on the extent of plan implementation

In the first stage of the research, variables of facets one and two were analyzed by multiple regression (for statistical elaboration and tables with complete results, see the appendix). Of the variables considered, regarding detailed plans, only four played a significant role in the explanation (Table 2).

The results show that these four variables can explain one-third of the variation in the data ($R^2$ of 0.34). But for this level of explanation it is necessary to know to which municipality the plan belongs. If the dummy MUNICIPALITY variables are excluded, the remaining three can explain about one-quarter (27 percent) of the variation, in the same order as in Table 2.

As hypothesized, it is clear that the likelihood of a deviation in a detailed plan, as well as the magnitude of the deviation, increases with the passage of time (PLANAGE): the plan becomes less relevant over time, probably reflecting changes that have occurred in the urban system. This raises questions about the one-time style of land use planning with no comprehensive updating or formal monitoring of changes.

The second variable entering in stepwise regression is FLEXIBILITY. The greater the flexibility of the specifications for the subarea in question in the outline plan, the lesser is the deviation likely to be, as had been hypothesized. This means that the more general the terms of reference in the outline plan, the less likely is a detailed plan to conflict with them. The finding accords with one's intuitive expectation and seems to provide support for some recent planning notions.

The findings pertaining to OWNER and INITIATOR seem to indicate, somewhat surprisingly, that the small private builder is more likely to obtain a deviation from the outline plan than the larger, semipublic or public builder. It was surmised that the builder's desire to deviate from the plan reflects economic motivations (more built-up area or enhancement of lot value); while the decision makers, being local people, are more attuned to the interests of local builders, or may more easily succumb to their persistent lobbying. Apparently larger (publicly owned) building firms are more inclined to accept the constraints of the outline plan or are less able to deviate from them. In any event, the hypothesis regarding the effect of influence on implementation decisions seems to hold.

The role of MOTZKIN in the regression equation is a more difficult finding to explain. What is it about Kiryat Motzkin that singles it out among the three municipalities? The Motzkin mayor is regarded as the most ambitious of the three mayors, expecting to become the head of the joint city, once that transition comes to pass. From an interview with him (as well as with his counterparts), the impression was gained that by contrast with the mayors of Yam and Bialik he is eager to increase the size of his municipality. Apart from enhancing the power of the municipality, size of population is one of the major criteria for increasing the per capita government grants on which, to a great extent, local governments subsist. Possibly, this has led him to sanction deviations from the outline plan that lead to greater population capacity. This

<table>
<thead>
<tr>
<th>Variable</th>
<th>$R^2$ (cumulated)</th>
<th>Direction of effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANAGE</td>
<td>0.12</td>
<td>$-$</td>
</tr>
<tr>
<td>FLEXIBILITY</td>
<td>0.22</td>
<td>$-$</td>
</tr>
<tr>
<td>MOTZKIN</td>
<td>0.29</td>
<td>$-$</td>
</tr>
<tr>
<td>OWNER-INITIATOR</td>
<td>0.34</td>
<td>$-$</td>
</tr>
</tbody>
</table>

* For full results see appendix, Table A1.
* Significant at 0.01 level.
* One of the MUNICIPALITY dummy variables expressed as either 0 or 1 that enters the regression results.
* OWNER-INITIATOR is a combination of INITIATOR and OWNER, representing the combined scale. When not combined, only INITIATOR would enter yielding $R^2$ of 0.33.
* Significant at 0.05 level.
conjecture appears to be supported by the finding that the overall ACCORDANCE with the plan is significantly lower for MOTZKIN (48 percent) than it is for BIALIK (62 percent) and YAM (77 percent).

Results of stage one for building permits: the effect of political-institutional factors on the extent of plan implementation

The bivariate correlation between VARIANCE and INITIATOR is 0.40—a high correlation for a variable measuring political influence. The \( R^2 \) level is 0.16 with a positive effect, significant at the 0.001 level. Of all the variables considered, this was the only one found to be significant.

This finding means that small, private entrepreneurs are more likely to request and to be granted variations of the various types of large, public bodies. It is apparent that the type of initiator in the case of building permits explains more of the variability than the owner-initiator variable did in most cases of detailed plans. A plausible explanation is that the scale of a building permit, every extra square centimeter of permitted construction is directly translated into greater money value. For the small commercial builder this extra profit figures more importantly than for the large public company, or even for the larger private construction company. The small builder also is more likely to be a local resident, and thus to have avenues of influence on the local planning commission.\(^{10} \) By contrast the larger public building companies, in spite of their resources and influence, are less likely to depend on small increments at the stage of obtaining their building permit.

The larger public builders are less likely to be in need of obtaining a deviation in the first place, both in the detailed plan stage and, by extension, in the permit stage. The reason is that there is a tendency on the part of public initiators to build on the extensive, publicly owned, unsubdivided land in areas where the outline plan’s specifications themselves often permit higher overall densities and more flexibility in their implementation. The privately owned sites often permit much less room for maneuvering.

Results of stage two: the effect of processes in the urban system on plan implementation

The next step in the investigation was to determine what effect processes occurring in the urban system may have had on decisions regarding effectuation. The time that has elapsed since the plan was in force turned out to be of importance only with regard to the dependent variable ACCORDANCE between the detailed plan and the outline plan. It was not significant for VARIANCE, the dependent variable reflecting deviation of the building permits from the detailed plan. It was decided at this stage to deal only with ACCORDANCE (after it had appropriately been con-verted into a time series, now representing the accordance of all detailed plans presented in each annual period).

After ensuring against multicollinearity and autocorrelation,\(^{13} \) the combined variables CAR OWNERSHIP and OUT MIGRATION turn out to be significant explanatory variables yielding a high adjusted \( R^2 \) of 0.75 (Table 3).

<p>| Table 3. Regression results re urban system variables (N = 11 time periods)(^{a}) |
|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>( R^2 ) (adjusted)</th>
<th>Direction of effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR OWNERSHIP</td>
<td>0.33</td>
<td>+(^{b})</td>
</tr>
<tr>
<td>OUT MIGRATION</td>
<td>0.75</td>
<td>+(^{b})</td>
</tr>
</tbody>
</table>

\(^{a}\) For full results see appendix, Table A3.
\(^{b}\) Significant at the 0.001 level.

Since in Israel car ownership is a good indicator of standard of living, it is clear that a rise in demand is associated with greater deviations from the outline plans. This, as had been hypothesized, shows that the plan has not been able to accommodate pressures of growth. Also as hypothesized, the increase in the number of persons leaving the urban area, on the other hand, has an opposite impact on degree of effectuation. Outmigration would seem to reduce pressures to deviate from the outline plan.

These forces for accordance or deviation do not operate directly but are mediated by the perceptions of the decision makers. They constitute feedback into the decision process. From the relatively high level of the \( R^2 \) obtained, it seems that these considerations play an important role indeed in the effectuation decisions.

Conclusions: implications for planning

Pressman and Wildavsky state in their book, *Implementation* (1975, p. 109): “The cards in this world are stacked against things happening, as so much effort is required to make them move.” To what extent is this point of view corroborated by the present work?

The degree of accordance with the master plan in this case study has been found to be as much as 66 percent of the land area planned. This degree of implementation may be regarded as an indication that the outline plan for the Krayot has in fact had a significant impact despite the sizable amount of deviation. This finding is somewhat surprising when one recalls that the study deals with a conventional rigid land use plan, a type of plan that has been the target of extensive criticism (Planning Advisory Group 1965, Perin 1967, Branch 1971, Adler 1971, Rondinelli 1973, Kaplan 1973).

Political influence reflected in the type of initiator or land owner seeking development permission was found to affect the implementation process, although to a lesser extent than the other factors discussed. If such influences are to be contained or at least anticipated on the Israeli planning scene, better criteria of decision making regarding proposed amendments and variances would have to be instituted. Guidelines for decision making are still largely missing, with the result that amendments to the outline plan and variations in building permits are approved with little awareness of the broader implications for the urban system (a point further developed in Alterman and Ragsdale 1977).

The deviations from the plan should be understood in the context of developments occurring in the years following the plan’s approval. In the ensuing decade, which was characterized by rapid population and economic growth in Israel, pressures for higher densities were created in the Krayot. Indeed, about half the deviations from the original plan were in the nature of an increase in the allowed density of development.

How well has the plan stood up to market pressures in the urban system? The finding about the effect of rise in car ownership—a measure used to indicate demand for goods including housing—shows that market pressures have tended to work against implementation of the plan as promulgated. Although in the case study the plan has stood up to these pressures relatively well, this qualified success cannot be attributed to any conscious attempt to attune the plan to changes occurring in the urban system, rather, perhaps, to other attributes already mentioned.

What means could the planner employ to make the plan more attuned to changes in urban market demand, thus increasing its effectiveness? In addition to better forecasting, these approaches might include the use of plans providing for “conditional flexibility,” whereby different decision paths are anticipated a priori, pending input of monitored information on the occurrence of changes in the urban system (McLoughlin 1969). If a higher degree of implementation is to be achieved, much emphasis would have to be placed on developing appropriate monitoring mechanisms, to avoid the one-time style typical of traditional land use planning. From this point of view, the requirement to be found in the new American Model Land Development Code (section 8–105) of preparing a land development report on an ongoing basis for a range of one to five years, without which the master plan would be void, seems a positive change from traditional master planning and may increase the likelihood of effectuating the plan.
Appendix

Strictly speaking, regression analysis should be applied only if all variables are measured on an interval, numeric scale. In recent years, however, there has been growing acceptance of the use of regression and other parametric techniques for cases where the dependent variable is measured on an interval scale, but where some or all of the independent variables are measured on an ordinal scale (Berhardt and Carter 1971). To be on the safe side, several precautions have been undertaken, including: the comparison of the bivariate correlation with the nonparametric Kendall’s Tau, the insertion of nonparametric correlations as input into the regression program for the purpose of testing, and testing for sensitivity of the ordinal variables to changes in the absolute numbers on their scales. Because the dependent variable ACCORDANCE is a percentage distribution, it was necessary to check whether a transformation might be needed to stabilize the variance and to avoid heteroscedasticity. The variable ACCORDANCE underwent the arcsine transformation for stabilizing the variable, but the results differed negligibly from the untransformed variable, indicating that the regular variable could be used. To test for the existence of interaction effects, multiplicative terms were brought into the calculation along with the main effects. It was concluded that the main effects of the independent variables could be used on their own without violating the assumption of additivity. Analysis of variance (called ANOVA in the SPSS program), a technique tailored specifically to deal with ordinal and nominal variables, was used as an added check on results obtained through the ordinary regression.

Technically speaking, because the detailed plans are a full population and not a sample, one has no need of tests for significance and may cite any of the findings; but if one views the population as part of a theoretically broader realm, the population in a larger time span, then one may wish to be on the safe side for making generalizations about other possible cases. This analysis was made from the latter point of view.

Table A1. Regression results re detailed plans population (N = 77 detailed plans; seven were dropped due to missing data)

<table>
<thead>
<tr>
<th>Variable</th>
<th>R²(cumulated)</th>
<th>Multi R</th>
<th>F(step)</th>
<th>Beta</th>
<th>F(Beta)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANAGE</td>
<td>0.12</td>
<td>0.35</td>
<td></td>
<td>−0.38</td>
<td>15.1*</td>
</tr>
<tr>
<td>FLEXIBILITY</td>
<td>0.22</td>
<td>0.47</td>
<td></td>
<td>0.29</td>
<td>9.0*</td>
</tr>
<tr>
<td>MOTZKIN*</td>
<td>0.29</td>
<td>0.54</td>
<td></td>
<td>−0.31</td>
<td>9.9*</td>
</tr>
<tr>
<td>OWNER-INITIATOR*</td>
<td>0.34</td>
<td>0.58</td>
<td>9.0*</td>
<td>−0.23</td>
<td>5.6*</td>
</tr>
</tbody>
</table>

* Significant at 0.01 level.
* One of the MUNICIPALITY dummy variables expressed as either 0 or 1 that enters the regression results.
* OWNER-INITIATOR is a combination of INITIATOR and OWNER, representing the combined scale. When not combined, only INITIATOR would enter yielding R² of 0.33.
* Significant at 0.05 level.

Table A2. Regression results re population of building permits (N = 111 seventeen dropped due to missing data)

<table>
<thead>
<tr>
<th>Variable</th>
<th>R²(cumulated)</th>
<th>Multi R</th>
<th>F(step)</th>
<th>Beta</th>
<th>F(Beta)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIATOR</td>
<td>0.16</td>
<td>0.40</td>
<td>21.2*</td>
<td>0.40</td>
<td>21.2*</td>
</tr>
</tbody>
</table>

* Significant at 0.001 level.

Table A3. Regression results re urban system variables (N = 11 time periods)

<table>
<thead>
<tr>
<th>Variable</th>
<th>R²(cumulated)</th>
<th>Multi R</th>
<th>F(step)</th>
<th>Beta</th>
<th>F(Beta)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR OWNERSHIP</td>
<td>0.33</td>
<td>0.57</td>
<td></td>
<td>−0.90</td>
<td>23.1*</td>
</tr>
<tr>
<td>OUT-MIGRATION</td>
<td>0.75</td>
<td>0.88</td>
<td>14.3*</td>
<td>0.74</td>
<td>15.8*</td>
</tr>
</tbody>
</table>

* Significant at 0.0001 level.
* Significant at 0.001 level.

Authors' note

We acknowledge with appreciation the advice and helpful comments of Prof. Yehezkel Dror during the conceptual stage of this research.
Notes

1. Notable exceptions are: Mandelker (1971), who measures the effect of a comprehensive plan on zoning decisions from a legal point of view; Dubin (1973), who uses plan performance for evaluating several plans for Toronto; and Eckhoff (1979), who proposes an approach for measuring degree of implementation of goals for the purpose of "ex-post evaluation."

2. Laws of the State of Israel, Vol. 19, 1965, p. 350. The law was the offspring of the Town Planning Ordinance of 1936 introduced by the British during their mandate over Palestine. Although some significant changes were made in the new law, especially with respect to national land use planning, for the present purposes the two laws could be regarded as more or less the same. For partial descriptions of planning law in Israel see Goldmann (1968), Strong (1971) and Katin and Virshubsy (1972).

3. The population of the Kravot is a mixed one, composed of middle-class oldtimers with a European background (typical of Bialik), of working-class residents, predominantly of Middle-Eastern origin (typical of Yan), and of a mixture of the two (Motkin). Its built-up form reflects a cross-section of Israeli housing: some modest older, suburban private houses (Bialik and Motkin) with a large number of more recently publicly constructed housing in all three municipalities. The proportion of private to public housing resembles the national average of half and half. The public housing itself contains representative examples of the changing standards and styles in Israel's short history beginning in the early '60s, with low-density but also low-density housing, and up to the massive new projects of the '70s of higher density and also higher standard construction. The Kravot is typical of many other Israeli towns in another respect as well: it is situated along the coastal strip where the majority of the Israeli population lives, experiencing similar climate and topography.

4. The measure proposed is unweighted, every type of change being regarded as equal to any other type of change. The effect of assigning weights is discussed elsewhere, as are the findings pertaining to the degree of implementation obtained for land use classification (Alterman and Hill 1976, Alterman 1975).

5. The dynamics of such processes have been described by Meyerson and Banfield (1958) and by Altshuler (1965) in two well-known case studies. Makland (1966) has made similar observations in a case study of zoning in New York, while Pressman and Widdowsky (1973) have documented a similar process in the case of an employment program.

6. Unfortunately, there seems to be almost no previous literature reporting on empirical findings about the relationship between the elusive concept of plan quality and implementation. However, Dror (1968, chapter 4) has recommended the use of net output as the major direct criterion for judging quality of policy making. Within the structure of the proposed research design such a criterion would, of course, lead to circular reasoning. Dror (1971, pp. 121-122) also suggests another criterion which is the "objective expectation of desirable impact on reality"—i.e., a priori expectation that the plan will be implemented as desired. This last suggestion comes remarkably close to the rationale of the present research.

7. Flexibility of decision 7 is the absolute flexibility associated by definition with the few areas marked "for future planning," while flexibility of decision 1 has the use, height, and bulk specifications prescribed in detail for small areas; intermediate cases are ranked ordinarily relative to the extremes that obtain in the case study.

8. We would have liked to include data on land value, floor-area value, etc., but their collection was beyond the capacity of this work.

9. In Israel, car ownership is an excellent indicator of standard of living.

10. Because INITIATOR and OWNER, in effect, pertain to the same dimension, although tackled in different ways, it is legitimate to combine the two into a single variable with a combined scale, thus avoiding loss of information (otherwise, their intercorrelation would force the exclusion of one or the other). The combined multiplicative term is OWNER-INITIATOR.

11. The fact that plans are rarely, if ever, rejected lends plausibility to the conjecture that much of the negotiation with the local initiator is undertaken informally, outside the statutory process, and has usually not been documented in the files of the detailed plans scrutinized by us. During the eight months spent in data collection at the offices of the local planning commission, the researchers have had some opportunities for observing the lobbying in action—but more on the level of building permits than of detailed plans, for reasons to be discussed later.

12. When asked (in interviews) to explain the finding regarding INITIATOR (p), the three mayors all offered this point of view, thus corroborating our explanatory conjectures.

During perusal of the permit files, many cases were found where the local builder recruits the support of the future or just-new residents of his building, signing them up on what are often standardized forms in which each resident claims that the kitchen, or bedroom, is too small and an extension into the balcony is necessary as a remedy. It seems that this is an almost automatic procedure, intended to increase whatever might have been the densities permitted in the recently obtained building permit.

13. Some of the variables in stage two have been found to correlate with each other very highly (higher than 0.70). High intercorrelation among the variables (multicollinearity) can cause problems in the calculations (Nie et al. 1975, p. 350). To avoid these, the set of indicators was partitioned into several subsets so that intercorrelations would not be overly high; then, only one version of each variable was introduced at a time, along with other variables which do not exhibit multicollinearity problems. The absolute number versions of variables (where the number cumulates by definition from year to year) were entirely excluded. A related danger is autocorrelation. It should be made clear that there is no theoretical interdependence in the variables, whether dependent or independent. As a further safeguard, we applied the sign test and the run test for autocorrelation (Malinvaud 1966, pp. 389-392) and found them negative.

References


Alterman, Rachelle, and Ragsdale, W. 1977. The higher conscious- edness of plans and planners: lessons from Israel and NEPA. The Urban Lawyer summer, 588-598.


