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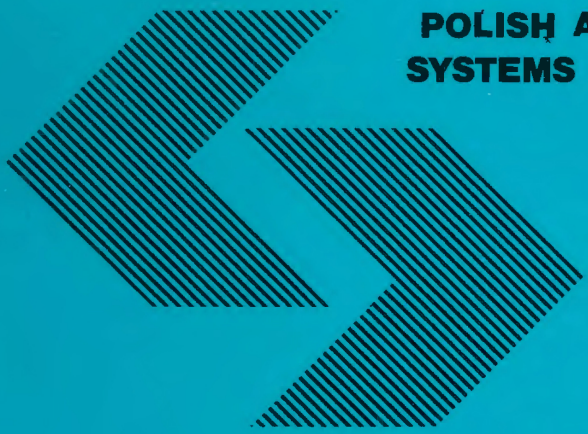

STRATEGIC REGIONAL POLICY

A. STRASZAK AND J.W. OWSIŃSKI
EDITORS

PART I

WARSAW 1985

SYSTEMS RESEARCH INSTITUTE
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STRATEGIC REGIONAL POLICY

Paradigms,Methods, Issues and Case Studies

A. Straszak and J.W. Owsiński
editors

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PART I

Warsaw 1985

I. A REGION AND A FIRM

VIABILITY PLANNING: A TOOL FOR STRATEGIC REGIONAL POLICY

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Introduction

In this paper I address aspects relevant to the organisational dimension of regional policy making: success in regional development depends, among other factors, upon the integration and coordination of multiple institutional efforts (Davies et al 1979). The tenent of this paper is that these efforts should be planned and that Beer's model of the organisation structure of any viable system (Beer, 1979, 1981; Espejo, 1983) provides criteria for this purpose. Indeed, the processes of policy formulation and policy implementation are likely to be more effective if structural functional capacity and communication and control mechanism are anticipated to support the goals of a large scale project.

Since one of the most relevant features of Beer's model is its structural recursion, not only does it lend itself very well to computer modelling but in fact it gets its full power through this modelling. Efforts in this direction have been in progress for the last year by using a database package to model organisational entities and relationships. I call this tool VIability PLANning (VIPLAN).

The organisational dimension in strategic policy

Strategic policies have an organisational dimension. Both the conception and the implementation of strategic policies depend upon networks of communication, the participation of multiple actors, and above all the capacity to achieve the commitment of multiple people... All these aspects imply as a necessity an organisation.

Indeed the very capacity to formulate and implement policies depends significantly upon the effectiveness of the organisation structures supporting the related communication and information processes. Inadequate control mechanisms increase the chances of uninformed policies, simply by increasing the likelihood of policy makers operating with unreliable information. The idea of relying in tacit organisations for policy processes, dangerous enough for one institution - if in fact its structure turns up to be ineffective - may become a major barrier on the way of success for large scale, multi-institution, development programmes.

The main theme underlying this paper is that the impact of strategic regional policy, as of any other area of strategic policy,can be substantially improved by planning, anticipating, the needs for organisational response capacity, in particular, the needs for communications and control capacity. In a way the suggestion is that effective regional policies are more likely to emerge from the on going work of an effective organisation supporting regional activities than from the on going work of think tanks concerned with specific policy issues. Simply the complexity of the issues is too large and the changes in the environment too rapid to make possible a flexible operation of centralised think tanks, particularly if they are not geared to the workings of multiple institutions and structural levels.

In previous work I have argued for distributed planning and policy making (Espejo, 1983). In fact this is a consequence of understanding the way viable systems cope with complexity (Beer, 1979, 1981). It makes sense, if the idea is the design of effective systems for strategic regional policy making, to use this understanding and develop distributed systems. Simple observation supports the view that poor performance of regional policies is, among other factors, a consequence of unnecessary centralisation both in the formulation and administration of these policies (Davies et al 1979). While in some cases

centralisation might be argued to be necessary for a variety of reasons, in others it appears to be the default position of an unthought dimension in policy making. However, whether the reasons offered - for whatever degree of centralisation is the case - are good or not, it seems necessary to have both some kind of framework to discuss the problem and tools to support the diagnosis and design of the organisations underlying regional activities.

In this paper I intend to discuss one concrete tool; I call it VIPLAN, which stands for VIability PLANning, and is based in Beer's model of the organisation structure of any viable system. Indeed this tool should be useful to any social situation in which complexity is a major concern, and not only to regional systems.

A model to study organisations

Beer's model is perhaps one of the most powerful, yet least explored, theories of organisation. His work, in particular his model of the organisation structure of any viable system, addresses the problem of communications and information flows in organisations. His theory emerges from organisations which have proved to be effective both in learning from experience and in achieving adaptation to environmental changes.

Briefly, viable systems are those able to have a separate existence. Viable systems are capable of responding to environmental changes even if these changes were not foreseen at the time the systems emerged or were set up. To be able to do so a system will need to develop five basic functions; in my own terms these are the policy, intelligence, control, coordination and implementation functions (Espejo, 1983). Beer calls these five functions, necessary for viability, Systems 5, 4, 3, 2, 1, respectively.

Simplifying it can be said that the policy function is concerned with policy making something which implies not only decisions about organisationally generated options, but also the definition of issues of policy interest for the consideration of the intelligence and control functions, the two other "corporate functions". To perform well the policy function needs the support of these two functions. While the intelligence function is concerned with the long term and the outside of the organisation, the control function is concerned with the monitoring of the situation now inside the organisation. These two functions are defined by whatever structural forms are de facto filtering, for the policy function, environmental and internal information. To make this filtration effective, that is to avoid overloading the policy function beyond its information processing capacity, it is necessary for these two functions, from their particular viewpoints, to cross check their information. This implies that they should be intercommunicated and should have similar complexity with reference to the issues of concern. This relationship, which is monitored by the policy function, defines the mechanism of organisational adaptation.

The "implementation" function is defined by the set of sub-systems, with autonomy, responsible for the implementation of the organisational policies. This autonomy is necessary because the complexity of the environment is too large for the corporate functions to consider in advance the responses of the sub-systems to all the environmental disturbances. To permit consistency in the on-going activities of autonomous sub-systems, operating in the context of common corporate policies, it is necessary for them to have lateral relationships. This fact makes necessary a "coordination" function. The more effective this function is the larger is the degree of autonomy that is possible for the implementation activities without losing corporate cohesion. The corporate control of the implementation activities is defined by the relationships between the control, coordination and implementation functions; the actual forms of these relationships define the mechanisms of monitoring-control. These mechanisms underlie the problems of centralisation-decentralisation in an organisation.

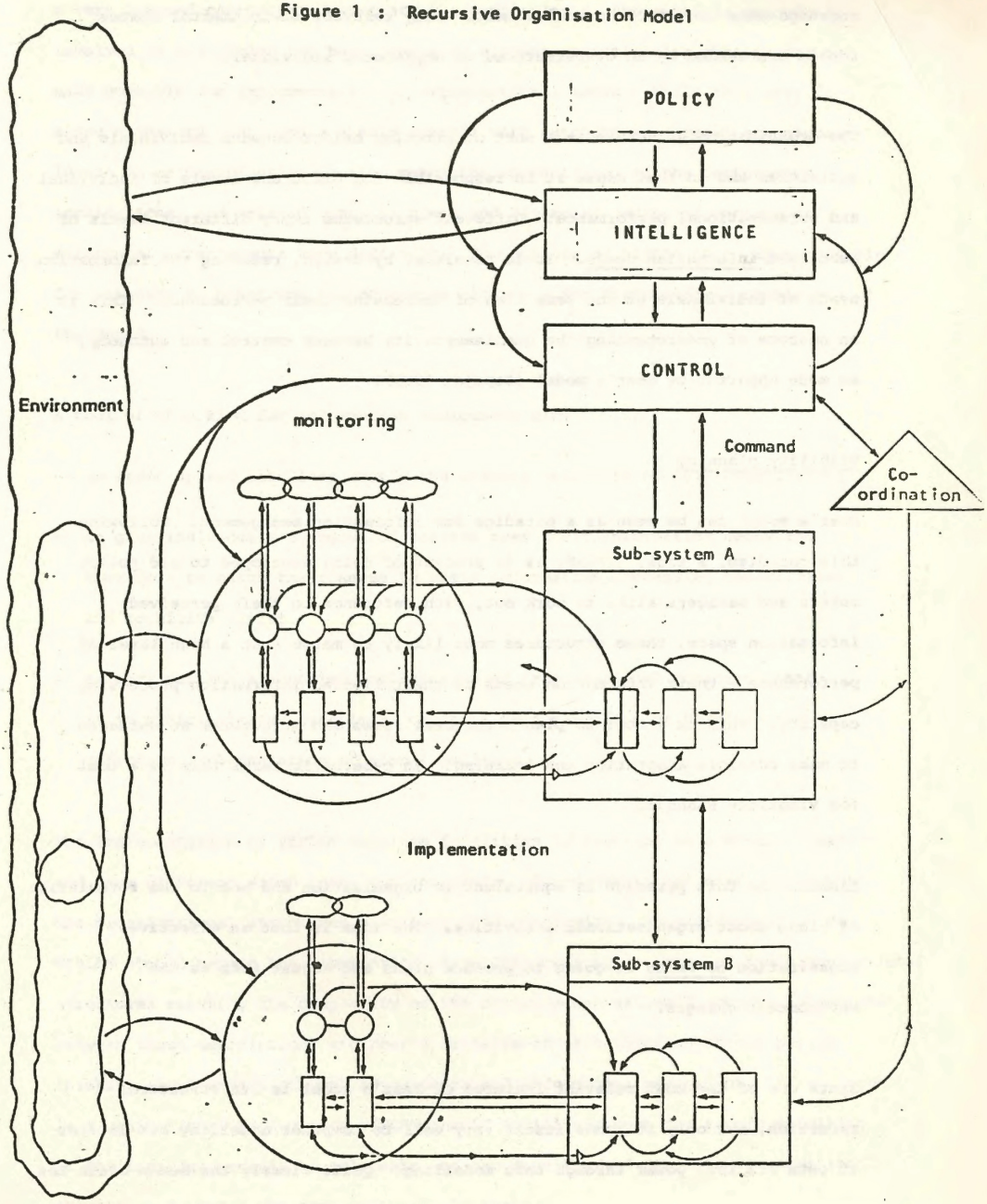
The autonomy of sub-systems implies that they themselves have to be viable too and therefore they themselves have to develop the same five functions of policy, intelligence, control, coordination and implementation. The same limitations apply to the capacity of the corporate functions at this new level; its implementation function needs of autonomy and the five functions emerge again in the sub-sub-systems. Thus the five functions and related mechanisms are recursive within any viable system. This is their property of structural recursion (Figure 1).

Beer's model from the viewpoint of policy makers

With other words, assuming viability, Beer's theory of organisation gives criteria of effectiveness and helps to understand the nature and characteristics of the structural mechanisms linking policy makers to the complexity of the activities they are accountable for, that is, to their information space. At the same time it establishes that their appreciation of these activities, that is, of their information space, depends upon the way these very mechanisms function throughout the organisation. The circularity of this proposition makes apparent the interdependence of that that is information for individuals and structural forms.

In line with Beer's theoretical framework individuals at all levels in the organisation manage, tacitly or explicitly, the resource information. This is unavoidable since they are constantly matching, albeit through the amplification of the organisation structure, at one level or another, their very limited individual information processing capacity to the proliferating complexity of their information space. Poor information management is bound to reduce performance: matching their perceived information needs, that is, the information loops left for their attention after the attenuation made by the organisation structure of their information space, at a lower level, inevitably brings a

Figure 1 : Recursive Organisation Model



corresponding reduction in achievement. Many relevant environmental states remain unattended by an overstretched or unprepared individual.

The organisation structure is a sort of circular bridge between individuals and activities and in that sense it is responsible for different levels of individual and organisational performance. Different structures imply different levels of perceived information needs. It is possible, by design, reducing the information needs of individuals at the same time of increasing their performance. This is an outcome of understanding the complementarity between control and autonomy, as made apparent by Beer's model (Espejo, 1983).

Viability planning

Beer's model can be seen as a paradigm for information management. Following this paradigm, a tool, VIPLAN, is in process of being developed to aid policy makers and managers alike to work out, with reference to their perceived information space, those structures most likely to match - at a high level of performance - their information needs to their limited information processing capacity. This is a tool to plan structural forms and structural adjustments to make possible adaptation and learning. In cybernetic terms this is a tool for VIability PLANning.

Planning in this paradigm is equivalent to organisation and not to the formulation of plans about organisational activities. The idea is that an effective organisation de facto is going to produce plans and adjust them as the environment changes.

Since one of the most relevant features of Beer's model is its structural recursion, not only it lends itself very well to computer modelling but in fact it gets its full power through this modelling. Quite clearly the human brain has

a very limited capacity to penetrate the complexity of the multiple procedures involved in organising the huge number of elementary activities that in the end make possible the implementation of organisational tasks. While this very fact makes necessary that people should operate with autonomy at several structural levels in an organisation it also makes the appreciation of the performance implications, and related costs in human and financial terms, of particular structural arrangements very difficult. The purpose of VIPLAN is to make possible for managers to penetrate the otherwise elusive - for their minds - complexity of the world.

A tool of this kind for information management aims:

- to speed up and make less costly the natural processes of self-organisation.
- to give individuals a degree of control over their information needs and therefore to match their needs to their information processing capabilities and cognitive styles.
- to work out the structural implications of organisational policies, that is to anticipate the functional capacity necessary to make possible the effective implementation of global policies.

The implementation of VIPLAN requires facilities to describe in a dynamic fashion and from different viewpoints, the complexity of organisational tasks vis-a-vis the organisational structures absorbing this complexity. In a diagnostic mode VIPLAN should permit the description, from different viewpoints, of the organisational structures matching the complexity of the actual organisational output. Mismatches between these descriptions and Beer's criteria of effectiveness should permit thinking about organisational adjustments and information management. If the mode is organisational design then VIPLAN should facilitate both the expert modelling of the intended organisational tasks and the modelling of possible organisational structures to match the complexity of the tasks.

VIPLAN: outline of the tool

Progress has been made at the theoretical and methodological levels. Implementation of VIPLAN will be done using a version of Micro-prolog with database extensions.

The nature of the tool varies according to the purposes of the analyses. Possibilities are to do the analysis of an existing organisation: how effective is the structure of this organisation with reference to the implementation of its espoused missions or tasks?, or to do the analysis of the organisational implications of a new policy: which structure is likely to make possible an effective implementation of these newly defined tasks?

The first type of analysis suggests an existing organisation performing already agreed tasks and the purpose of these analyses is to make a diagnosis, from relevant viewpoints, of the way the organisation is performing. The second type of analysis is intended to anticipate the organisational implications of a policy and therefore its purpose is the design, with reference to particular viewpoints, of effective structures.

For the sake of simplicity in what follows I will deal only with the former analyses, however it should not be difficult to infer from these how to carry out the latter type of analyses.

To do organisational diagnosis it is necessary to structure an effective organisational data model. The problem is to make feasible the collection of useful, consistent and comprehensive data from the exceedingly large complexity of an organisation. These data are necessary to make possible the organisational analysis.

Methodologically the problem is to define both the structure of the data model and the method to collect the data. Indeed any decision on the structure of the data model is going to have implications in the kind of queries that will be possible once the database is formed. As for the methods used for data collection they should be geared to the relevant viewpoints perceiving the complexity that is being described. Keeping in mind these two aspects an organisational data model has been defined with data entities - nouns, verbs and conjunctions - that are well recognised by the organisational actors.

The organisational data model permits to define, among other aspects, the organisational entities within the organisation at multiple structural levels, their functions, the inputs to the functions, the sources of the inputs, the outputs of the functions as well as their destinations.

The functions of an organisational entity should then be analysed to distinguish between "primary activities" and "functional activities". The former are those derived from the "identity" ascribed to the organisation by relevant viewpoints, that is, are the activies responsible for the output of the organisation to its environment. The latter are those managing or supporting the primary activities. Rules have been worked out to permit an automatic separation of primary activities at different structural levels. Primary activities are responsible for the implementation of the organisational policies (vis-a-vis the environment) and are the objects of management regulation. In this sense primary activities are the parts entailed by the "implementation function" in Beer's model.

The model of primary activities that emerges from the analysis of functions at different structural levels defines, in fact, the technological model of the organisation. This is because primary activities are precisely those making the transformations of inputs from the environment into the outputs which finally go to the environment. They define the know how of the organisation. An

instance of a technological model of this kind is given in Figure 2. The model that is produced in the form just described is a model of the technology-in-use in the organisation. An expert in the technological processes of concern would be in the position to comment whether the processes-in-use are well balanced, whether necessary activities have been left out or unnecessary activities have been taken on board. It should be perfectly possible for the expert to suggest alternative technological models to carry out the same missions or tasks.

The technological models have useful implications. The model-in-use suggests the actual distribution of organisational functional capacity, that is the actual matching of the complexity of primary activities with the regulatory capacity of organisational entities. The implication is a hierarchical model of the unfolding of regulatory capacity vis-a-vis technological activities (Figure 3). As an extreme it may become apparent that a very detailed activity is keeping the attention of very high level managers, however less dramatic discoveries are more likely to be the rule. On the other hand, a technological model developed by experts, relaxing some of the existing constraints, may be the basis for structural adjustments.

Once primary activities have been analysed in the organisational data model, then we can turn our attention to "functional activities". Queries of the data model, which by now has knowledge of the primary activities, can produce knowledge of the functional activities affecting each primary activity. This knowledge can be organised in tables of the form described in Figure 4. These tables describe the distribution of discretion and autonomy in the organisation at each structural level. In Beer's terms functional activities at different structural levels are systems 2, 3, 4, 5 activities (coordination, control, intelligence, policy activities) at different recursion levels.

Figure 2: **Manufacturing flowchart**

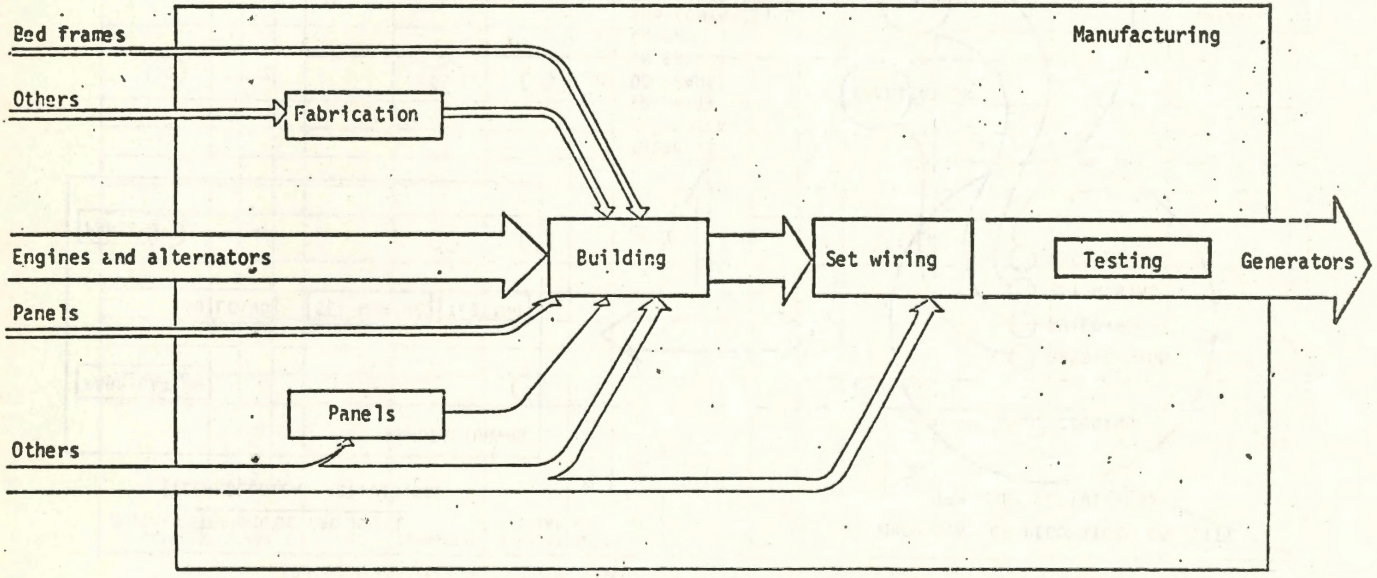


Figure 3: TECHNOLOGICAL AND PRIMARY ACTIVITIES

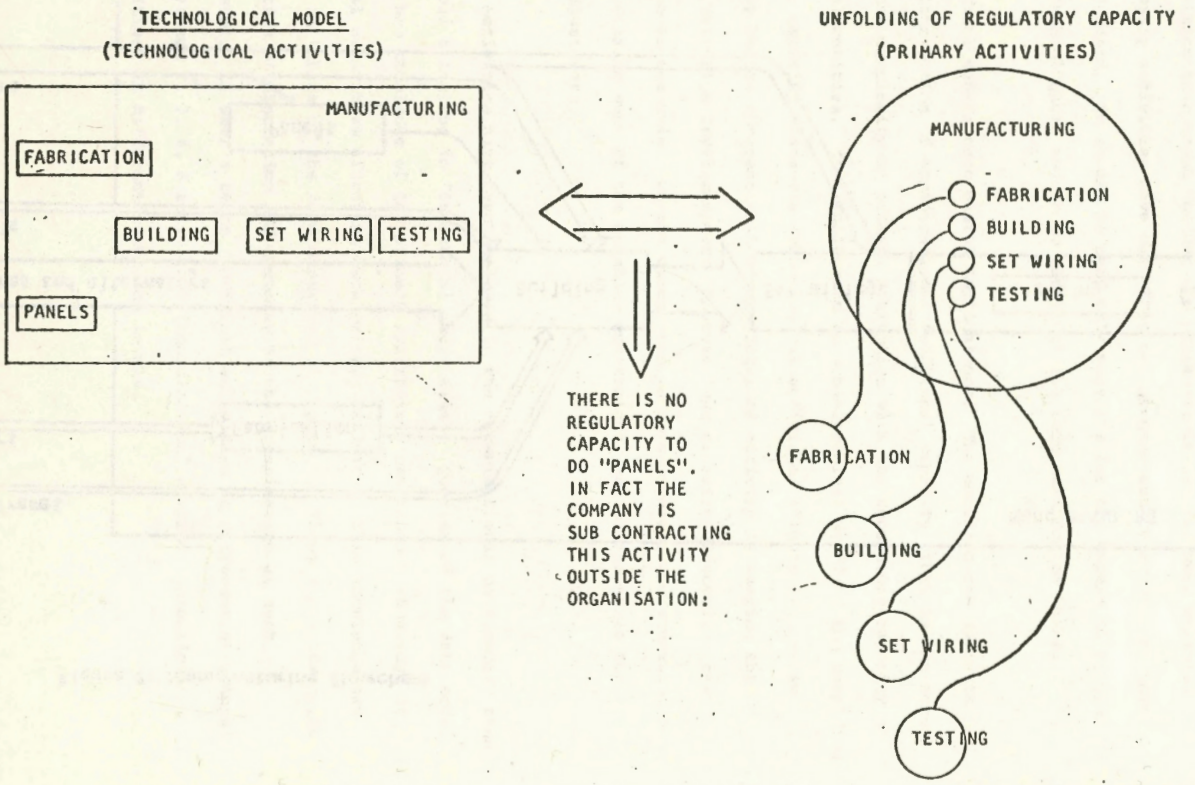


Figure 4: ACTUAL FUNCTIONAL DISCRETION AND AUTONOMY OF LEVELS IN WW HOLDINGS

LEVEL OF RECURSION \ FUNCTION			PRODUCTION		BUYING & STOCK CONTROL		MAINTENANCE		TRANSPORT /DESPATCH		SALES & PRICING	PERSONNEL	EDP	FINANCE			COSTING & ESTIMATING
			Planning	Control	Paper	General	Routine	Repair	Own A/c	Contract				Cash Flow	Profits	Wages	
High Street			(x)	(x)			x	x		x	(x)						(x)
Composing				x			x										
Platemaking				x			x										
Printing				x			x										
Binding				x			x										
	WW Web Offset		(x)	(x)	x	x		x	x	x	(x)	(x)			x		(x)
Cut & Fold				x													
GST				x													
Perfect				x													
Insert & Wrap				x													
	Daventry Binders		(x)	(x)			x	x		x	(x)	(x)			x		(x)
Composing				x													
Platemaking																	
Printing				x													x
Prompt			x	x			x	x	x	x	x	x			x	x	x
	Garden House Press		(x)	(x)	x	x		(x)	(x)	(x)	(x)	(x)			x		(x)
		WW HOLDINGS			(x)	(x)							(x)	(x)	(x)	(x)	

New analysers of the data base are necessary to recognise whether the particular functions of the organisational entities, as named by relevant viewpoints in the data collection stage, are any of the above remaining four types of organisational functions. Work is in progress for these analysers.

Three main points can be advanced about these analysers:

Firstly, an organisational entity either is a primary activity or is within a primary activity. By definition the global organisation under concern is a primary activity since it is transforming environmental inputs into environmental outputs of one kind or another.

Secondly, the source and destination of inputs and outputs, whether these are in the same organisational entity or other organisational entities, whether these other organisational entities are primary activities or not, and finally whether these sources and destinations are in the environment or not, are key to the identification of particular organisational functions in Beer's model.

Thirdly, if an aggregation of functional activities within a primary activity, like for instance the activities which could be clustered under the so called finance function, are contributing only to the control and coordination of the related lower level primary activities, then it can be concluded that this primary activity has only discretion in the administration of that function and that its autonomy does not entail the financial dimension. In figure 4 crosses imply that a given structural level has only discretion in the related functions. A circle around a cross implies that the autonomy of this primary activity includes that functional dimension. In other words it is possible to have a primary activity which has autonomy in deciding what to produce and how to produce, but is unaware of the costs and financial implications of its decisions: these dimensions are the concern of the primary activity encompassing this primary activity.

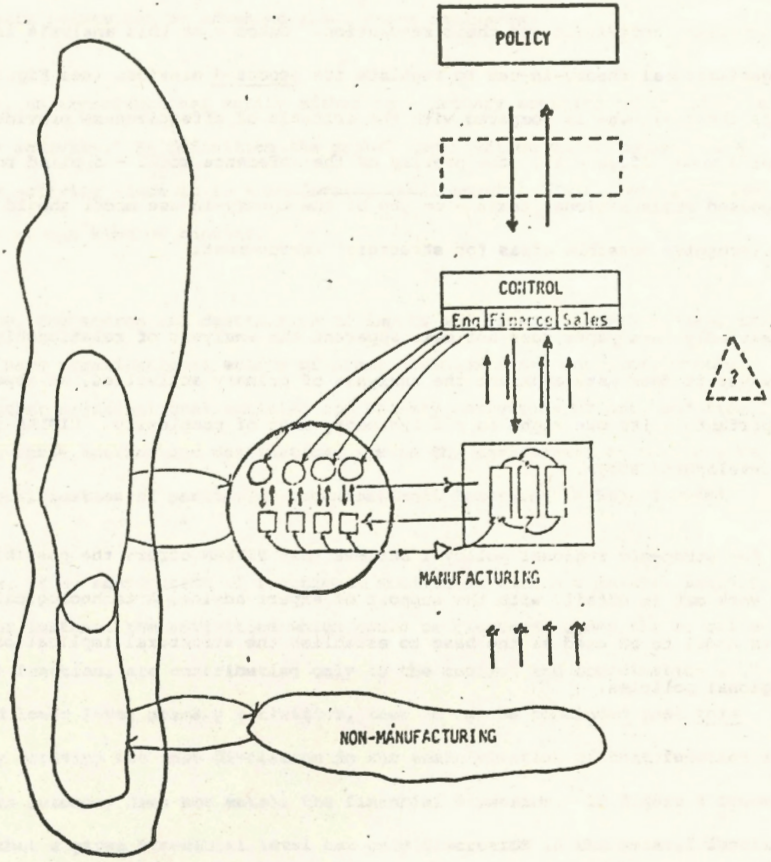
Conclusions

The previous section was intended to be an introduction to use of data models to produce a database adequate to support organisational analysis. The mode used to explain the tool was "organisational diagnosis", that is, it was assumed that there was an organisation and the problem was to make apparent its primary activities and their regulation. Outcome of this analysis is the organisational theory-in-use to regulate its espoused missions (see Figure 5). This theory-in-use is compared with the criteria of effectiveness provided by Beer's model (figure 1): the overlay of the reference model - applied to the espoused organisational tasks - on top of the theory-in-use model should permit to recognise possible areas for structural improvement.

Admittedly this paper does not make apparent the analysis of relationships, however it does make apparent the analysis of primary activities, an aspect important in its own right to aid the management of complexity. VIPLAN is in a development stage.

As for strategic regional policy I believe that VIPLAN offers the possibility to work out in detail, with the support of expert advice, a technological data model to be used as the base to establish the structural implications of regional policies.

Figure 5: **P.M. Organization: theory in use**



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DISCUSSIONS*

Paper by A. Kochetkov

Discussion participants, in chronological order: P. Joynt, R. Bolton, U. Loeser, R. Kulikowski, A. Straszak, L. Kajriukstis, A. Kochetkov.
Questions raised concerned the kinds of models implied in the paper, ways of compensation for regional company activities, the leading mechanism of these activities and the course of the IIASA project considered.

With regard to models two types were said to be distinguished, namely conceptual and quantified models.
Compensation was said to be made out of a special fund, not excluding a form of subsidy. Other potential compensation mechanisms were pointed out: economic, organizational or legal.
As far as driving forces are concerned - both planning and market should be accounted for in a due harmony, notwithstanding difficulties in its attainment. This harmony should extend further to such fields of development as economic, social and environmental.
The course of the IIASA project was said to contain a number of future meetings and a closure in 1986, after major directions of work would have been exploved.

Paper by R. Bolton

Discussion participants: K. Polenske, S. Dresch, D. Boekemann, G. Bianchi, R. Bolton.
At the beginning discussion centred around the shape of indifference curves and the riskwise attitudes, which was explained by referring to assumptions made in the paper. This discussion, however, led to other, more general questions, related to modelling of utility in cases when income does not account for all of it and when political considerations enter the scene.

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* as indicated, for the sake of shortness and clarity discussions shall be presented in summarized form (eds.).

The paper, of course, does not consider these questions, but the approach can be extended to encompass some additional aspects, e.g. in the case of distinct multi-subregional planning, through treatment of each subregion as an asset in a national portfolio.

Paper by R. Espejo

Discussion perticipants: A. Kochetkov, S. Dresch, G. Bianchi, U. Loeser, R. Espejo.
Discussion focussed on the rules of application of the recursive scheme and its details. References were made to works by S. Beer and by R. Espejo, where deployment of the scheme is shown in more detail. Discussion participants have shown interest in the software developed and in its practical applications. One such application, other than described in the paper, was roughly outlined.

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