SYSTEMS THINKING AND ORGANIZATIONAL GROWTH: PERSONNEL PRESSURE AND ORGANIZATIONAL EQUILIBRIUM SCISSORS. A CASE OF THE COMPANY "BETA"

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Abstract

The paper reviews the experience of a consultancy in the company called BETA. Two goals are pursued: cognitive and methodological. Cognitive goal refers to the System Dynamics methodology applied to a concrete case of the company growth and strategy making within a traditionally dominated accounting framework. Based on symbolic (though keeping similarity to real) data, the article presents the ithink^{TM} model construction and simulation within 3 strategic scenarios: optimistic, realistic, and pessimistic. The methodological objective contains the use of the Partitioning and Tearing Method in the problem conceptualization and model preparation. Although the scope of the paper excluded a possibility of its detailed description, it is argued that this method has proved to be very useful in working with complex problems containing many variables.

I. Problem

This paper presents the case of the company "BETA" where the author have had the first opportunity of computer supported Systems Dynamics consulting. BETA is a large, multinational chemical corporation that had established almost 26 years ago in Mexico. As other multinational companies, BETA had to accept common rules of the game searching equilibrium between state interventionism and free - market spirit, internal and external goals, economic effectiveness and Mexican tradition of the paternalism, long range planning and present pressures, all those resulting in often sacrificing entrepreneurial action in favor of psychological commodity and social tranquillity.

There have been many attempts to formulate a common basis for organizational analysis in the modern organization theory. Most of them, though very attractive, have not satisfied other criteria; part of them has recalled directly economic tradition basing their principal assumptions on well known economic theories of the enterprise. Neither of them have satisfactorily combined both, methodological requirements and practical usefulness. Any attempt of using them in the consulting work results inevitably in open disputes questioning the meaning and practical applicability of those theories. Is it possible to apply relevant analytical perspectives (economic, social, psychological, and organizational design) to a concrete case of organizational growth problem? This was an initial question that had determined decision on using some computational tools in the BETA case analysis[1].

The company BETA (acronym) has been constantly confronted with workers' and employees' pressure regarding personnel policy and the dominance of organizational hierarchy over a common sense of organizational justice. In practical terms that means that a significant lack of congruency between planned growth and company effectiveness has been detected, evidenced by increasing internal friction. As in the case of any international company operating in Mexico, the point was much more vulnerable; wages increase and hierarchical movement of the personnel was limited by strict company policy that some positions must be kept for executives from the origin country (that excluded them from the pool of available human resources policy targets). At the same time BETA has had to fulfill some company headquarters policy requirements that has become very demanding after the company went public and stock market operating. In solving that problem of an equilibrium between personnel and shareholders expectations and future economic growth, the M/B model has been used (Majluf and Hax 1984). The M/B model (Market - to - Book Value) is a blend of

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[1] Many consulting work on such mix problems gives "talking solutions" where the client's acceptance or refusal depends on some intangible criteria (originality, informal links, etc.). In analyzed case the condition imposed by the client was the elaboration of a tangible and provable model that could have served as a solid base for organizational design and policy determination of the company. Originally, the BETA company model was constructed with VENSIM®, and then, for didactic and publication purposes it was converted into ithink^{TM} language.

two perspectives of the enterprise. The book value provides accounting information on past and present resource commitment measuring the efficiency of resources use contributed by the shareholders. The market value estimates expected future payments generated by the company strategy and investments.

It is the case, therefore, of a model of the firm internalizing a hierarchical employment structure in which hired employees are differentiated by their tenures and ranks. An important outcome of this assumption is that a positive rate of return from the growth of the firm accrues to the employees owing to their expectations of the promotional and wage gains made possible from such a growth.

In theoretical perspective (Aoki 1986) it is possible that the large corporate firm is likely to obtain gains of its own through a co-operation between its shareholders and employees, and this gain - that we may call organizational rent - is distributed between them through internal bargaining. This requires, however, a co-operative game where an agreement maximizing a common interest of the employees and shareholders is agreed upon. Another requirements refers to a necessary equilibrium of the power and influence attributed to the employees and shareholders. Thus, a co-operative solution to that problem takes the form of a balanced game between them the result of which we call "organizational equilibrium" hereafter. Any deviation from that equilibrium yields internal disturbances and opposes interests of the shareholders and the employees. In the case of the company BETA that game has become disequilibried and the company economic growth and structural development has become opposite to the internal social pressure.

II. Problem - Operational Specification

A. Equilibrium Module

It is a common phenomenon that employment structure of large firms is internally confined to promotional hierarchies and its basis for promotion uses to be the principle of seniority. It is not necessarily an "evil solution" as many investigations have proved it (Akerlof 1976, Koike 1984).

A gradation of pay accompanies the promotional hierarchy and the employees' prospect earnings depends heavily on the rate of promotion. A higher rate of growth will entail the expansion of internal organization promoting a higher rate of promotion. Because of the latter argument one may expect that the managers, organized hierarchically, would support the maximization of the growth rate of the corporation (Marris 1964). On the other hand, this argument is true only if the wage level is maintained regardless of the company growth rate during a given period. This means that the employees salaries cannot contain cost of advertising, new equipment, R&D, training, and so forth. It is not real that the growth cost is to be accrued only to shareholders and not to the employees. In addition, if the growth rate is high, the rate of promotion must be higher as a new generation of work-force may accept an employment offer of a lower starting salary in prospect of higher earnings in the future. The growth rate must determine the external pressure on new employment and on the internal promotion rate pursuing and that - in turn - increase the cost of the company growth.

In the company BETA the promotion problem has always been associated with the pressure on employment increase, supported by trade-union aspirations. Employment increase depends heavily on the company growth that, in turn, is determined by both, shareholders and managers attitude toward it. The company growth requires resources to be available and assigned for that specific purpose. In this context the shareholders and management staff have conflictive objectives; shareholders support is short-ranged and the growth is assessed in terms of the equity and dividends, while the managers tend to relate the growth with wages increase and employment level. Employment increase/decrease is, therefore, a main flow in the Equilibrium Module.

B. Strategic Funding and Company Value Modules

In issuing the problem of organizational growth two questions have always arisen. First - although growth is the process that in medium- and long run generates company profit, in short term it requires the company business portfolio to be balanced. This activity spans several dimensions of concern; perhaps the most crucial one is the determination of the short-term profitability versus long-term growth. The decision on the growth preference affects the distribution of the company resources; long-term growth changes the present distribution of the resources that otherwise could be assigned to share value increase. To some extent that is the question of seeking some equilibrium between sources and uses of funds in the company that usually is

expressed in the company cash flow. And second - regardless of the preferences for the short time spending or long-run growth there are some economic limits to the growth that we call a maximum sustainable growth hereafter.

Thus, the company BETA grows in function of the total strategic funds available. For the modeling purposes a simplified version of the strategic funds has been assumed and it consists of (Hax, Majluf 1984):
* earnings (source),   * dividends (use),
* new debt (source),   * debt repayment (use),
* new equity issuing (source),   * reinvestment (use),
* growth cost (use).

In a profit making organization, it is a widely accepted economic criteria that the benefits of a growth strategy should be assessed in terms of total value created for the company shareholders. In the case of the company BETA this means that the shareholders expectations have been conflictive - to some extent - with the growth as BETA strategic objective. The shareholders expectations have been based upon accounting profitability of the company (earnings magnitude and book value), ignoring its real growth capacity. This can be expressed in terms of the differences between book and economic (market) value of the company where psychologically meaningful book value strives for faster company growth and the economic value of equity limits BETA capacity to handle it. Strategic funds, company book and market value form 3 basic flows in this module.

C. Sustainable Growth Module

The basic components of this module are: the company debt, total equity, and return on equity and assets. Maximum sustainable growth is, therefore, calculated as a growth the company can support by using its internal resources and its debt capacity (with occasional new debt, conceived as extraordinary growth financing.) In calculating the maximum sustainable growth a relation proposed by Zakon (1976) was taken; although it is a coarse approximation of the company affordable growth, it provides a valuable guidance to be taken into consideration in strategy formulation. Thus, this module has 2 basic flows reflecting the behavior of the company debt and equity, where that latter is determined by the maximum sustainable growth.

III. Model Design - Methodological Considerations

Behind a broad and expansive Systems Dynamics bibliography there is still a lack of a comprehensive and simple technique that would enable users to map their knowledge and to construct a systemic model of a problem. According to classical distinction between "single-loop" and "double-loop" organizational learning (Argyris and Schön 1978), managers instinctively think in terms of immediate results of their behavior and decisions but they hardly can visualize systemic structure underlying actions and decision problems. Among many limits to the Computer - Based Learning Environment (Isaacs and Senge 1992) there is one fundamental obstacle in producing enduring organizational results and in using Systems Dynamics methodology for solving organizational problems. That obstacle is managers' lack of systematic systems background and, consequently, their inability to see problems as systems phenomena.

The first 3 weeks of author's experience with the company BETA have proved extensively that opinion. At the beginning, BETA top management had thought that systems analysis instruments could be taught and learned in a short time. Although the consulting project had been accepted on a single problem solving basis, yet the idea of "learning organization" and very suggestive text written by Senge (1990) was very important in the initial talks and compromised the author not to confine work to that specific problem but to accept broader responsibility for future decision knowledge mapping in the company.

Systems Dynamics thinkers belong to a very exclusive club. Most problem solvers, defended by their education, professional experience, and instruments used daily in their work (e.g. spreadsheet, data base, and even many AI shell integrated packages), cannot think using feedback, time lags, and hidden structural laws. There could be some doubts whether or not true systems thinkers use the feedback thinking in statu nascendi or it emerges in analysis as a combination of single linear influences that eventually are converted into a feedback loops... In any case, systems thinking, notwithstanding the importance of formal education and training, is a highly intuitive intellectual process enabling us to discover counter-intuitive behavior of problems.

First sessions with BETA managers were problem oriented. Dealing with time pressure and with the necessity of causing more active involvement of the participants in problem structuring and modeling, the author decided to use less intuitive approach in promoting the feedback concept in the group. First, the problem itself and its components were presented as systems and conceptualized as units where the conversion of inputs into outputs takes place. Such a conversion can be called "systems reactivity" (see: Mazur 1966, Greniewski 1969) determining the behavior of a loose system. Systems can be described by their structure and semantics. The structure is a simple map showing the systems components and their interrelationships. The system semantics concerns how the components affect each other. The BETA managers knew how to present graphically system structure; while analyzing the company earnings system they even reached high disaggregation level, summing the total number of components superior to thirty.

The explanation of the system semantics was much more difficult. Dealing with systems dynamics and complex systems problems requires more than a common knowledge of a problem. In order to move smoothly from the systems structure to system semantics we had to proceed with a formalism guaranteeing that no links among the components could have been lost that led us along a series of easily comprehended steps the systems final structure. The system procedure that we used for this purpose was a developed and adjusted for not experimented users interpretation of the Partitioning and Tearing Method. The Partitioning and Tearing Method was invented by Gerald Kron for solving complex and large equation systems by "tearing" (Kron 1963; Steward 1981) where tearings correspond to the system feedback loops. The version of this method used in the company BETA contained 7 steps:

Step 1: Free discussion on the topic; any opinion was encouraged and all were registered in a "session report"
Step 2: Preparation of the Problem Variables Inventory; PVI is a complete list of the variables having direct or indirect effect on the problem under consideration.
Step 3: Elaboration of the symmetric matrix where all problem variables appear as rows and columns; the diagonal of the matrix was crossed as no problem variable can directly affect itself.
Step 4: Controlled discussion on the problem semantics; each problem variable was confronted with any other variable (on one- to - one basis) with a view of determining whether or not one variable can directly affect another one; if it can, a cross was put in the intersection cell.
Step 5: Partitioning the matrix; this eliminates the crosses above the diagonal leaving only those that reflect true feedback loops within the problem structure. In addition, the partitioning orders the problem variables in such a manner that they are grouped into blocks of variables and there are no feedback loops between the blocks. Blocks are groups of variables among which the feedback exists.
Step 6: Tearing the matrix; this leads to a relative ordering of the variables within a block and provides a simplified "critical " structure of the whole problem.
Step 7: Graphic presentation of the systemic structure of the problem.

This completed the stage of systems structuring. The difference between the system structure and semantics is much analogous to the distinction between syntax and semantics in the linguistics. Syntax is a sentence described in grammatical terms ("subject", "predicate", etc.), while semantics concerns what the sentence means. Semantics, therefore, is making sense out of a system. Even with ordered system structure it remains not quite simple for understanding and interpretation of the problem behavior. Again, attempting to work with BETA managers and to make sessions really interactive, we used the example of simple company growth engine (only two components: growth and earnings) introducing the concept of the feedback as a sum of two simple one- way (though counter - acting) relations; simple calculating showed that the behavior of coupled systems differs significantly from that of loose systems.   This also made it possible to define arbitrarily no more than 6 types of feedback differing in terms of the behavior. Qualitative changes in the coupled system behavior stems from the interaction between their reactivities; if we compare the product of the coupled systems reactivities with "0", then their positive value implies the positive feedback and the negative value - negative feedback, respectively. If we compare the absolute value of their reactivities product with 1, then the result is the distinction between constant, convergent, and divergent feedback loop (Mazur 1966). Each of distinguished system feedback show different behavioral characteristics and play different role in the system semantics. By analyzing their behavior and drawing diagrams of their reactions over time, the participants became much less reluctant in accepting the feedback and time lags as problem structure fundaments. They understood the "why" and "how" of system dynamics arquetypes.

IV. Model Construction

In the BETA company model construction we will follow the methodology explained in the previous part and used during the sessions, presenting only results of each step. Step 1 was partially presented here, as

the company problem was a fear of a disequilibrium between planned economic growth, shareholders' pressure, and employment structure changes in the company. The sessions with the management staff corresponding to the problem brainstorming have generated many ideas that easily could have been considered problem variables themselves. In that case, however, the BETA growth problem would have contained more than 140 variables and its complexity could exceed its operationality and the managers' capabilities to handle it. For that reason the last session (3rd) of the Step 1 was dedicated to the problem simplification and, finally, the total number of the variables was reduced to 26.

For the purposes of this paper, we present the problem variables starting with Step 5, where a discussion on internal relationships among all involved variables generated an initial problem semantics map - diagram. The complexity of the problem semantics map excluded the possibility of intuitive construction of the problem. Fortunately, any system can be equivalently presented in a matrix form that after its partitioning generates the ordered matrix showing all authentic feedback loops (shadowed cells above diagonal). Additionally, partitioned matrix groups all problem variables into blocks where the feedback loops can exist only within a block and never between them (Fig. 1).

SUCCESSORS \ PREDECESSORS	CPP	Debt interest	New debt	Profit ret rate	Reinvest factor	ROA	ROE	Book value	Max sust growth	Perc retained earnings	Total equity	Impact on debt	Strategic funds	Dividends	Earnings	Equity issue	Reinvestment	Stakeholders support	M to B	Market value	Total debt	Av wage	Impact on growth	Mgt support to growth	Total employees	Employees turnover
CPP	■																									
Debt interest	■	■																								
New debt			■																							
Profit ret rate				■																						
Reinvest factor					■																					
ROA						■																				
ROE							■																			
Book value						■		■	■																	
Max sust growth		■			■			■	■																	
Perc retained earnings			■			■				■																
Total equity											■															
Impact on debt											■	■					■									
Strategic funds		■									■	■	■	■						■						
Dividends						■	■						■	■												
Earnings							■						■		■											
Equity issue											■		■			■										
Reinvestment					■							■		■			■									
Stakeholders support							■											■								
M to B						■													■							
Market value		■						■	■											■						
Total debt		■	■					■													■					
Av wage	■																					■		■		
Impact on growth									■		■				■								■			
Mgt support to growth																							■	■		
Total employees							■				■											■	■		■	
Employees turnover																									■	■

Fig. 1　　　　BETA Problem Partitioned Matrix

Tearing the final matrix is the next step. Tearing is aimed at the definition of crucial problem components and critical feedback loops existing in the problem. The result of tearing is a highly reduced and simplified problem structure (Fig. 2); in our case, the BETA problem contains 26 basic variables (proposed by

the participants) and the intuitive construction of the ithink[TM] model of the problem could be difficult without these algorithmic procedures. Certainly, we may trust our knowledge of the problem and make a semantics based design. Semantics is, however, inseparable from the intuition. Can we trust in our intuition in discovering counter - intuitive structure and behavior..?

The tearing requires shunt diagrams to be traced. The shunt diagrams are combinations of those variables that are crucial for a block (they are central components of the feedback loops). The shunt diagrams, when put together, indicate a hypothetical generic structure of the problem. Fig. 2 presents the generic structure of the BETA problem, based on previously defined shunt diagram.
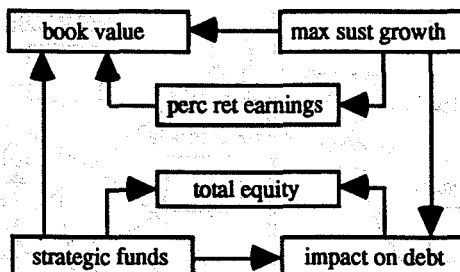

Fig. 2 Generic Structure of BETA Problem (based on shunt diagram)

The partitioning method proved to be very useful in ordering the problem variables and adjusting them to ithink[TM] requirements. Having had the main flows for each module defined, it was possible to draw the problem structure around them. Original number of the variables increases as the flows require some inflows and/or outflows to be included into the model. The definition of the variables completed the model design (Fig. 3). The accompanying list presents more important variables for each of 4 modules:

STRATEGIC FUNDING

STRATEGIC_FUNDS(t) = STRATEGIC_FUNDS(t - dt) + (chgs_in_sf - reinvestment) * dt
      INIT STRATEGIC_FUNDS = 0
  INFLOWS:
        chgs_in_sf = equity_issue+new_debt+earnings-dividends-debt_pmnt
  OUTFLOWS:
        reinvestment = earnings*reinv_factor
        dividends = (1-max_sust_growth)*ROE*BOOK_VALUE
        earnings = ROE*BOOK_VALUE
        equity_issue = total_equity*max_sust_growth
        impact_on_debt = IF (STRATEGIC_FUNDS≤reinvestment) THEN (ABS (reinvestment-
        STRATEGIC_FUNDS)) ELSE 0
        new_debt = pulse(15,3,0)
COMPANY VALUE
BOOK_VALUE(t) = BOOK_VALUE(t - dt) + (bv_chgs) * dt
      INIT BOOK_VALUE = 297
  INFLOWS:
        bv_chgs = BOOK_VALUE*(max_sust_growth*ROE)
        MARKET_VALUE(t) = MARKET_VALUE(t - dt) + (mv_chgs) * dt
        INIT MARKET_VALUE = 362
  INFLOWS:
        mv_chgs = ((ROE-max_sust_growth)*(1+max_sust_growth)^(TIME-
        DT)*BOOK_VALUE)/(1+debt_interest)^TIME
        M_to_B = MARKET_VALUE/BOOK_VALUE
ORGANIZATIONAL EQUILIBRIUM
TOTAL_EMPLOYEES(t) = total_employees(t - dt) + (new_employees - empl_outflow) * dt
      INIT total_employees = 393
  INFLOWS:

new_employees = IF(total_employees*max_sust_growth≥ (impact_on_growth +impact_on_debt)/av_wage) THEN INT(((impact_on_growth+impact_on_debt) /av_wage)+empl_outflow) ELSE INT(empl_outflow+total_employees*max_sust_growth)
OUTFLOWS:
    empl_outflow = INT(total_employees*empl_turnover)
    av_wage = 1+((M_to_B-1)*(mgt_support_to_growth)+cpp)
    impact_on_growth = IF (impact_on_debt=0) THEN (STRATEGIC_FUNDS+reinvestment) ELSE 0
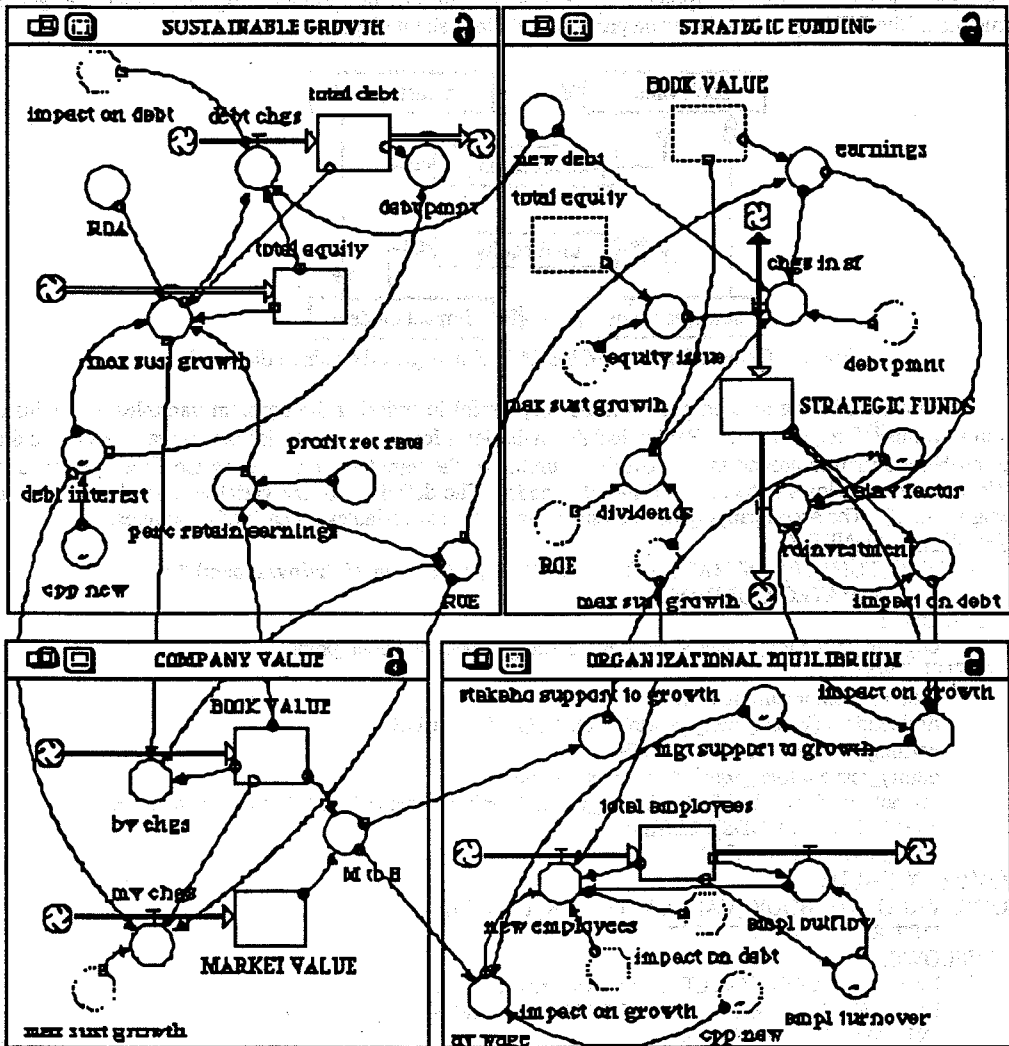
Fig. 3   BETA Problem - ithink^{TM} Diagram

SUSTAINABLE GROWTH
TOTAL_DEBT(t) = total_debt(t - dt) + (debt_chgs - debt_pmnt) * dt
    INIT total_debt = 37
  INFLOWS:
    debt_chgs = total_equity*max_sust_growth+new_debt+impact_on_debt
  OUTFLOWS:
    debt_pmnt = -PMT(debt_interest,40,total_debt,0)
    total_equity(t) = total_equity(t - dt) + (max_sust_growth) * dt

INIT total_equity = 296
INFLOWS:
        max_sust_growth = (perc_retain_earnings*ROA+perc_retain_earnings*total_debt*ROA/
        total_equity-perc_retain_earnings*total_debt*debt_interest/total_equity)/10
        perc_retain_earnings = BOOK_VALUE*profit_ret_rate*ROE

And, finally, the last operation in the model design phase was the determination of those variables that are endogenous and to a certain point controllable from within the company. We called those variables "decision points"; although decision points have no special relevance for the model construction and design, they are crucial for the problem simulation. Simulation is analogical to the sensitivity analysis: in both cases we look for the explanation of "what will happen, if..." and that "if" refers to the variables playing a key lever role in the problem. The partitioning method makes it possible to determine the decision points as they are those variables that have no predecessors in the final matrix. For BETA the decision points are the following:

* Profit ret rate (profit retention rate),   * New debt
* Retain earnings (retained earnings)   * Equity issue
* ROE (return on equity)   * Dividends
* ROA (return on assets)   * Reinv factor (reinvestment factor)

V. Problem Simulation

The simulation of the BETA growth was done using 3 different scenarios: realistic (Fig. 4), pessimist (Fig. 4), and optimistic (Fig. 5). Although it has not been possible to use real data of the company, the values assigned to variables tend to respect general proportions. Table 1 present the differences among all three scenarios:

	Pessimistic	Realistic	Optimistic
ROA	0.11	0.17	0.24
ROE	0.16	0.29	0.38
Profit ret rate	0.27	0.37	0.41
New debt	debt of 30 in 3 quart.	debt of 15 in 3 quart.	without new debt

Comment: surprising values corresponding to the scenarios are only slightly modified data claimed by BETA managers. One possible explanation of that could be a highly inflationary economy within which the company exists. These data, however, fit practical purposes very well.

Tab. 1 Three Simulation Scenarios

Budgeting and financial control are perhaps the earliest manifestations of strategic effort. BETA has always paid much attention to financial ratios and the measurement of its performance has been based traditionally on accounting concept of the profitability. After a period of substantial reorganization and declining performance, the company has confronted, for the first time, serious and not very tangible pressures on growth. That pressure was articulated from various standpoints; workers, feeling uncomfortably with new performance standards pushed towards loosening work discipline and postulated the employment increase. BETA managers, though refusing the idea of the workers, they accepted generally a rapid growth as the company goal; manpower requirements would provoke in the future necessary adjustments in the workers number. There was a conflict between them, therefore, regarding the conceptualization and means used for BETA growth. Both, workers' and managers' notion of the growth would conduce to the same point over a time (according to simulation results). On the other hand, the company main office suggestions called for austerity and cost reduction without loosing BETA present efficiency.

Under those conditions the simulation sessions implemented in the company (with the participation of all involved parts) was aimed at conjuring away a danger of future open conflict as well as at questioning the accounting approach to strategy formulation in BETA. Participating executives have never thought of the strategy issue in terms of the maximum sustainable growth. The growth cost, in their opinion, was a question of existing funds and single decision on how to assign the resources to the growth goals. The simulation has proved that in a real, cross - functional situation it is impossible to determine causes and results and in a long range planning (the simulation was programmed for 5 years) all function - tailored growth strategies that causes present friction, they disappear. The maximum sustainable growth (continuously decreasing in the simulation) showed that the company growth is an objective and impersonal process that does not depend on internal power distribution and resources negotiation.

Perhaps the most important result of the simulation sessions was a reconciliation of the "eternal" conflict between the managers with business and engineering background and the company finance supervisors. As one of the participants mentioned: "I've been working for BETA for 15 years and I've never been able to talk the same language with the people from the 2nd floor (Finance Department). Our model killed them with their own weapon (financial variables) and I managed to understand 'how' ".
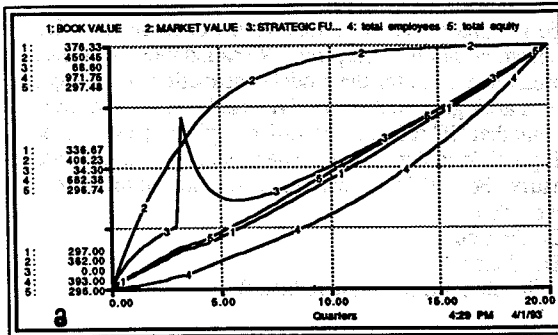

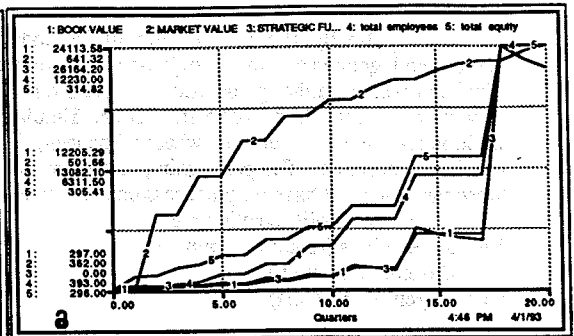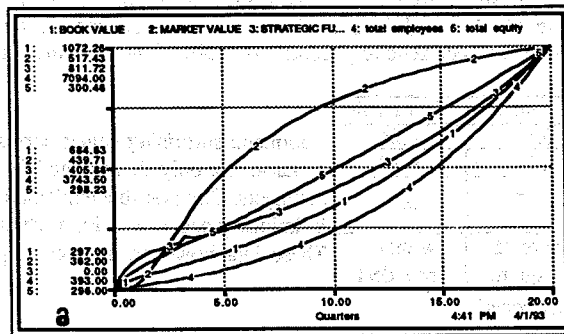| Fig. 4   BETA Company - Pessimistic Scenario | Fig. 6   BETA Company - Optimistic Scenario |

Fig. 5   BETA Company - Realistic Scenario

The simulation results, as discussed during the sessions, could be interpreted as follows:

1) The company growth is not a question of wishful thinking but it requires a leading variable - guidance for the assessment of what is viable and what is not. That leading variable was the Maximum Sustainable Growth determining BETA internal capacity to promote its own growth. Although it is not presented explicitly here, the Maximum Sustainable Growth presented declining tendency in all scenarios; this resulted in such a behavior pattern of the Strategic Funds that practically excludes a possibility of the growth financing with BETA own funds (without New Debt).
2) Accounting profitability cannot be a factor for the growth measurement. A company can be profitable (books in black) and still incapable of sustaining its growth.
3) Growth goals are often established without any reference to its economic profitability. If a company is profitable, then its ROE must exceed its cost of capital (Debt Interest). If so, growth significantly helps in increasing its market value. In BETA case ROE can hardly respect this condition and new growth instruments have to be searched for. One alternative could be new Equity Issuing. The shareholders welfare is not conflictive, therefore, with a company economic health.
4) Over a time, there is no conflict between manpower increase plan and financial goals of the growth.
5) A careful analysis of the model and its behavior proves that there are 4 factors that are essential to BETA growth:
* positive difference between BETA ROA and the cost of capital (or any other compensating solution),
* the rate of BETA earnings reinvestment (Percentage of Retained Earnings),
* the number of years during which BETA will fulfill the first condition,

* the market to book value (M to B) that could be a viable measure for the efficiency of BETA growth .
6) The model, or any other elaborated with the same methodology, could be a valuable strategic instrument - not only for internal company evaluation but also for the external competitive analysis.

At the beginning of consulting work, BETA representative insisted on the elaboration of a real model that could have been able to quantify major decisions to be taken in the company. Over the period of 4 months, their attitude have been gradually changing and their interest have been shifting from exact numbers to general tendencies in the company. In the last session, hold in January, we discussed the advantages and disadvantages of used methodology in the context of future managerial use. According to prevailing opinion, the Systems Dynamics methodology could open new horizons in managerial thinking and problem solving but this requires many changes in professional preparation of the executives as well as a new organizational design that should be more appropriate for collaborative planning sessions. They appraised the use of the Partitioning and Tearing Method explaining that "...without it we would have spent hours and hours discussing possible connections among variables and looking for advantageous localization of those part of the model that represent particular interests of our divisions. In addition, the Partitioning and Tearing Method is very useful as a 'catch - point': the first attempt to understand systems modeling is very 'touchy - feely' and a tangible, almost engineering algorithm is an excellent ice - breaking aim".

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