SYSTEM THINKING AND CORPORATE STRATEGY

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Abstract

Corporate strategy is a system model describing corporate dynamics.
Ex post, once choices have been taken and the structure of the model emerges, we can recognize managerial mistakes as "mistakes" in the model adopted by management to evaluate decisions and to predict corporate dynamics; these mistakes become clear through the confrontation of the model explaining the effective corporate dynamics with the model adopted by management in taking decisions.
Ex ante, during strategy formation and before corporate dynamics are elicited, it is not possible to identify strategic mistakes as "mistakes" in the model. As a consequence, trainers should not focus on teaching strategic models. Trainers can improve the evaluation-decision process of management through improving its system thinking capabilities. Strategic creativity, i.e. the capacity of inventing new strategic models, lies on it.

The more capable company managements, those capable of developing success strategies, are often attributed such qualities as innovation, farsightedness, vision. What exactly do these attributes mean? What can we do to develop them? The pages that follow will be dedicated to trying to find answer to these question. More particularly, I shall try to show that:

1. the strategy of a business consists of a (systemic) model, be it implicit or explicit, of variable articulation and complexity;
2. the "quality" of this model defines the quality of the strategy;
3. the capacity of thinking systemically is the fundamental attribute for developing innovative business models of good "quality" and therefore also for finding and promoting valid strategies.

STRATEGIC DECISIONS, STRATEGY, BUSINESS MODEL

Every "strategic" decision is taken on the basis of an underlying model of understanding success that guides the company's management.
Let us consider the following examples, which are of different complexity:

- *At the beginning of the 'eighties, the management of Simel, a Tuscan company producing furniture and beds, were wondering about the strategy they should adopt. The business had enjoyed considerable success in the postwar period right through to the mid-'seventies, this owing to their capacity of serving customers distributed throughout Italy and designing and producing furniture of traditional taste, often highly decorated and figured, of large size, "important" and*

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"prestigious", in solid wood and at a substantial price. In the 'seventies, however, the company began to face increasing difficulties, sales dropped and profitability diminished to the point of becoming negative. Endeavouring to improve sales and profitability, the management got under way a policy of increasing the range of their models: in little more than a year, in fact, they passed from 3 to 9 models. According to the management, each new model would increase sales and recuperate profit margins. But the facts showed that they were wrong, for the model range expansion policy did nothing but aggravate the company's situation: sales did not improve at all, while losses and stocks became steadily greater; the cash situation soon became tense and difficult, and it was not long before the company was obliged to cease activities. A more lucid and less emotionally involved outside analyst might have been able to grasp that what was really needed was to change the company's traditional strategic paradigm: a change of taste and the smaller homes that were being built had led to traditional furniture becoming outdated and the aging of the entrepreneurial formula, and neither of these could be tackled by means of a simple range enlargement policy.

- *The Ardal Company, producers of aluminium articles, was set up in 1989. The business had begun by producing truck bodies in aluminium. Rendered enthusiastic by the commercial success obtained, the management soon began a policy that aimed at rapid development and growth in size: they enlarged the product range and sought customers other than their traditional ones (silos and water tanks for agricultural undertakings, aluminium articles for the electromechanical sector), increased the turnover, stepped up productive capacity by purchasing an adjacent plot of land and using it for the construction of additional premises. The managers were of the opinion that this development would bring greater profits and enhance the company's success. In actual fact, however, they had not taken into account some of the implications of the growth and diversification policy they had got under way, especially the implications connected with financial dynamics:*
  1. *the "traditional" business area did not generate satisfactory income and cash flows on account of poor management (chaos, lack of management control and others). The managers concentrated their efforts on development, neglecting improvement of what already existed. This poor management was only aggravated by the new policy and the consequent greater company complexity;*
  2. *growth in size would have called for a greater commitment not only of fixed capital, but also larger amounts of working capital; financial requirements would have been further enhanced by the investments in R&D needed to sustain the development of the new product lines;*
  3. *in fact, the new product lines constituted new business areas and would not have been able to generate positive and satisfactory income and financial flows in the short term, this in view of the need for passing through a process of experimenting and learning "by doing".*

Though the greater size could also have lead to greater profits in absolute terms, it would undoubtedly have called for greater capital investments; what really mattered was not the absolute level of the profits, but rather the relationship they bore to the employed capital. What had been neglected or undervalued was thus the impact that the development and growth policy (in conditions of modest operating profits due to the experimentation/learning phase) would have produced on financial charges and the company's net profit. Furthermore, the managers had not considered the consequences of their policy on the financial risk the company had to face.

Growth in size did not simply mean more profit, but also a whole series of consequences that had not been properly evaluated. The results were considerable growth accompanied by ever more substantial losses, ever greater financial charges and an ever more unbalanced financial structure.
A few years later, the group of people who had guided the company were obliged to sell and leave its management to others.

- *In 1991 ElettroImi, a small business operating in the industrial plant and automation sector, had to face a crisis situation.*
  This situation had been produced as a result of a combination of several factors:
- *seeking to grow in size, the company had expanded into numerous business areas "distant" from their traditional one (industrial plant); the company managers were devoid of competence in these new areas, which were therefore managed in complete autonomy by various parties. By the end of the 'eighties these areas had generated substantial losses;*
- *considerable financial resources had been taken out of the company for personal purposes at the very time it was growing and therefore stood in need of considerable funds;*
- *the company's summit had to all intents and purposes abandoned its function and had delegated the definition of marketing policy to the sales manager, who pursued image objectives (neglecting to evaluate their profitability effects) and kept on trying to acquire prestige customers. The company management intervened only ex post, when the negative income results began to be felt, putting the estimators under pressure to apply higher mark-ups to the traditional customers in the hope of recuperating a satisfactory net profit. To this end, they also sought to take advantage of the trust of some customers (only 70% of the orders were based on estimates, 30% on simple final cost), applying particularly high prices.*

In the absence of an active role by the company summit and a systemic visions, the company operated in self-contained departments:
- *relations with suppliers were understood as nothing other than seeking to obtain the lowest possible price and strong pressure was continuously exercised in this direction;*
- *relations with the staff were understood as intense exploitation of labour (the business was locally known as a "sweatshop"), accompanied by strong pressure to keep wages at the lowest possible level;*
- *relations with the banks had not given rise to problems for many years; real estate acquired for personal use had been used to guarantee the loans received, which the banks continued to provide; but tensions with these institutes clouded the horizon as soon as the crisis situation arose;*
- *the company lacked any significant relationship with the local community.*

Following some months of negotiations in the second half of 1991, the company was sold. The new management had occasion to become acquainted with the business thanks to having worked inside it for dome time (an experience they had sought precisely in view of a possible purchase). They had to face a difficult situation: *ElettroImi had acquired a good commercial image in the past and established relations with numerous customers, but nevertheless had accumulated considerable losses at the end of the 'eighties; the business continued to produce unsatisfactory income results and financial tension had become considerable; dissatisfaction became widespread and ever more*

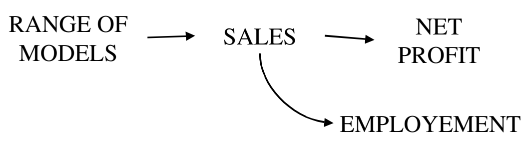
pronounced, gaining ground among all interlocutors; price policy had put a brake on the sales volume and in the course of time had lost some customers; employment had diminished and relations with both the staff and the suppliers had become tense.
The new company summit opted in favour of a complete change of policy.
Here is how ElettroImi's new Sole Administrator, Mr. Fabrizio Bignotto, describes some of the basic changes introduced at this time:
"We had to win back our traditional customers and gain their confidence by showing them right away that we had again become competitive. First of all, the business had to cover its fixed costs: *given the company's structure, the previous sales volumes would not have allowed us to survive. Fixed cost in 1991 amounted to about 700 million lire and remained such until 1994. A turnover of two billion lire was not sufficient to cover them*: *our first objective was therefore to step up the volume of our sales to achieve an economic balance. The percentage of the contribution margin could diminish, the essential thing was to increase the turnover, and this was the first indicator I would look at. A greater turnover was also needed to provide work to restore confidence among our staff, to show that the company was healthy again and that things were beginning to go as they should. And therefore every new order, quite apart from its profit margin, always meant something new and positive. Another stimulus was the fact that orders helped to satisfy the expectations of our suppliers*: *they had helped me at the time of the controlled administration and I wanted to repay them"*.

What do these examples have in common? What difference is there between the managements that adopted "mistaken" policies and their more farsighted counterparts?
If we take a closer look at the examples, we shall realize that:
a) all the managements that adopted short-sighted, mistaken policies, i.e. policies not capable of assuring a profitable business, evaluated their actions on the basis of models that interpreted company dynamics in a defective and incomplete manner, incapable of grasping the variety and complexity of the consequences these actions would produce; or, in any case, the decisions they adopted contributed to realizing and enhancing strategy models that were to prove erroneous, i.e. inadequate and incapable of grasping the company's dynamics in all their complexity;
b) the difference between the "short-sighted" managements who adopted policies not capable of assuring a profitable business and the "far-sighted" managements lies in their respective capacities of thinking in a systemic manner and consequent greater capacity of the latter of constructing innovative and articulated business models capable of fully grasping the company's dynamics and, for this reason, effective;
c) the "errors" committed by the former are due to the dynamics not foreseen by the adopted business model; in particular, they can be traced back to:
- model "errors", and
- incompleteness of the model.

Let us subject each of the three examples to a detailed examination. What happened in the case of Simel? What was the strategic paradigm adopted by the management? What business model had enabled the managers to assess the new policy in a positive manner and had *de facto* led them to adopt it? In other words: what was the model for interpreting company dynamics that the managers had used to read the various possible lines of action?
The example enables us to see that the company's summit read the new situation and their decision within the traditional strategic paradigm that for many years had assured the company's success. This paradigm was based on the capacity of realizing furniture in a somewhat Baroque style, "rich" and "heavy", used also for conferring importance and

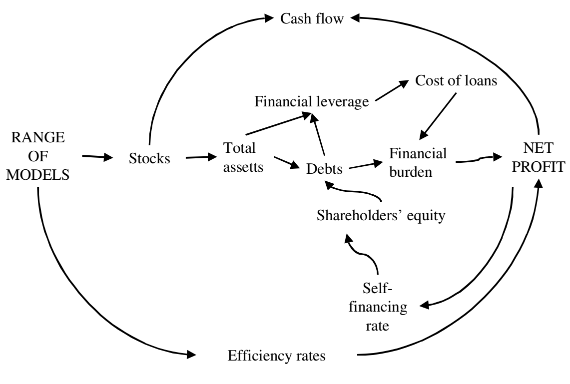
prestige upon the home they adorned. This furniture was in line with the tastes and the living style of a part of the population of the day. The policy adopted by the management never called this model into question (they never wondered whether such period furniture was still appropriate, whether the tastes, culture and living models of their customers had changed, etc.), but simply sought to complete it with a new strategic variable (range of models) and new assumptions regarding the relationships that, according to the company's executives, could assure success: a larger number of models meant greater sales and therefore improvement of the company's net profit and employment, so that it would tend to integrate the traditional model as shown in Figure 1 or, in any case, assign greater importance in the company's success to the following relationships:

Fig. 1: Relations conceived by Simel management



In actual fact, however, the consequences assumed by the managers did not take shape, giving way to others that had not been foreseen (Figure 2):

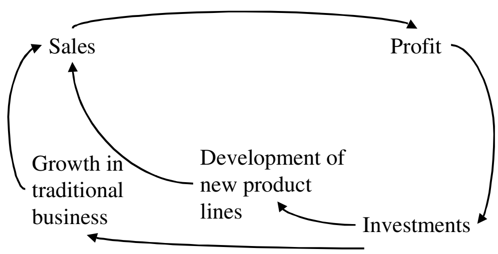
Fig. 2: Dynamics not conceived by Simel Management



The managers thus made a twofold error: they had not understood the causes of the crisis and could not therefore tackle them in a positive manner (change in tastes and living style → change of style / type of furniture); they continued to operate on the basis of the old model, which had become outdated, and proved unable to make the leap to a new business model and a new strategic paradigm; *de facto*, the variables "style", "consumer taste", "home characteristics" had not even been taken into consideration or, possibly, had been taken for granted: this led them to reduce the manoeuvre to just a few variables and rendered them more or less impotent. Furthermore, the proved incapable of understanding the complexity of the company system and thoroughly grasping all the consequences of their actions (highlighted by

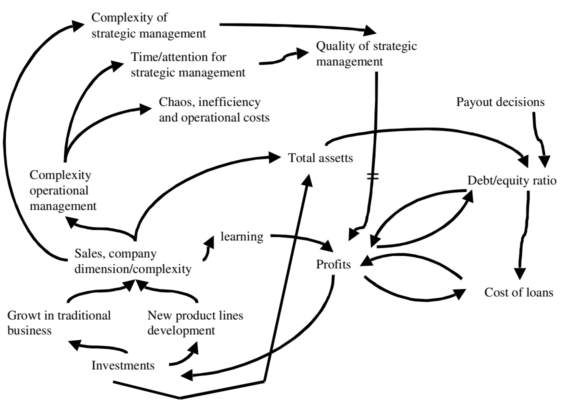
the part of the company model shown in Figure 2). They thus ended up by introducing a policy that could not have the company's problems, indeed, that could not but aggravate them. The model by means of which these managers interpreted company dynamics was defective and incomplete, and for this very reason unsuitable for grasping the real underlying dynamics.
Similar considerations can be made in the case of Ardal. In this case, however, we do not come face to face with a management incapable of modifying an outdated business model: the new business idea with which they are actually working contains elements of interest (experience and capacity of processing aluminium, good market potential etc.) and has yet to be fully developed. As in the previous case, nevertheless, here we have a poor management, people who lack a systemic vision of the business and are quite unable to correctly grasp the consequences of their actions: they assess their actions on the basis of a few cause-effect relationships, that is to say, on the basis of simplicistic business patterns / models (Figure 3), and overlook important dynamics.

Fig. 3: Ardal Management Business Model



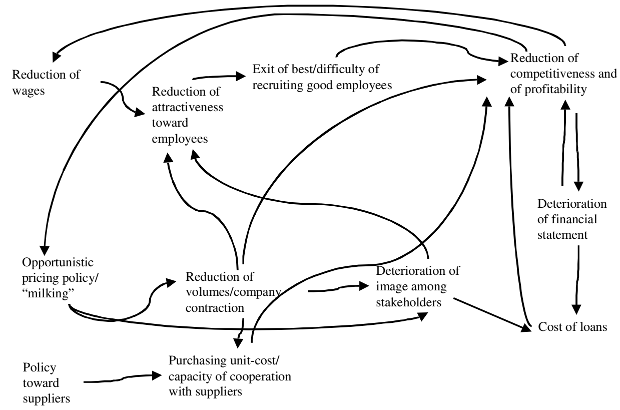
A more capable management, with greater capacities of vision (the one underlying the model shown in Figure 4), would have made a better evaluation of company policy and realized a success model by means of their successive decisions.

Fig. 4: some of the consequences of the growth policy not perceived by Ardal Management



The ElettroImi case provides yet another good illustration of the different capacities shown by the two managements in evaluating the consequences of their actions. The old management had a short-term perspective, in the sense of seeing only the more immediate consequence of their actions: reduction of staff remuneration → greater profits, prices increase / greater mark-up policy → greater unit margins → greater profits, and so on; what they did not see, on the other hand, were less immediate, less obvious consequences of their actions, namely the consequences that could have been produced in the longer term by means of more complex and articulated cause-and-effect chains such as the following:

Fig. 5: consequences of its policy not foreseen by ElettroImi Management



In the mind of this particular management, the causal chains expressing the relationships between the employed levers (prices, staff remuneration, etc.) and company profits were simple, unarticulated, immediate, with few passages. But they failed to grasp the more "subtle", complex relationships, the causal chains destined to produce effect on company profits through a large number of passages and variables that they had not even imagined, and often only after the lapse of considerable time[2].
Nor did they grasp the system composition of the different variables and policies (personnel policy, product policy, positioning policy, etc.) and the unitary nature of the company system.
The various decisions are never taken in isolation, but are composed into a system by what has been called the "entrepreneurial formula" (or business model). They can even be taken (or revised) in successive moments and form part of an "incremental" learning process (and this is what generally happens), but they always come to

[2] This brings out a fundamental aspect of the difference between "short-term" and "long-term" orientation of company managements. The behaviour of company systems is often non-intuitive and non-immediate [Forrester, 1971; Morecroft, 1983; Ballè, 1994], this in the sense that one and the same action can give rise to cause-effect relationships of more immediate perception that produce positive results on company profits and more subtly structured and complex cause-effect relationships that will show their negative effects on profits only later, sometimes with considerable lags (just think, for example, of the effects produced by the various policies adopted by the old ElectroImi management to face the company crisis or the policies implemented by the Simel managers). A short-term orientation indicates a capacity and aptitude of the managers to grasp only the first type of relationship; the long-term orientation, on the other hand, denotes the capacity of the managers of grasping also the second type of relationship and therefore the dynamic of the complex company system. Characteristics common to the three cited company managements is their incapacity of grasping the latter type of relationship. In other words, the managers with a short-term orientation fail to grasp the long-term effects of their policies on company profits; they grasp only the more immediate effects, which may even be positive, but fail to see the more retarded effects, which may become very negative in the course of time, so that the complex dynamics of the system escape them. As we shall see later on , the capacity of developing a long-term approach depends on knowledge of the company system and the capacity of systemic thinking.

constitute a system, together with other policies and decisions adopted either at the same time or defined in the past or yet to be taken in future. There thus come to be established links between different decisions taken at one and the same time and different decisions taken at various other times [Bertini, 1975; Bertini, 1990; Ferrero, 1982]. For example, the decision whether or not a policy of increasing prices and unit margins should be adopted must be considered together with the decisions inherent in such other matters as product innovation, quality, service, personnel selection and remuneration, etc., just as a decision to limit remuneration has to be assessed in the context of general policies concerning personnel, product positioning, and so on. In this systemic logic, indeed, a policy of containing staff remuneration (like the one originally adopted by Eletrolmi) could conceivably be implemented if it were to be accompanied, for example, by a policy of investments, development and growth offering a stimulating work environment, possibilities of learning and professional growth, image, and so on. But what could not be implemented at one and the same time, as in the case of ElettroImi, was a policy of price increases / "squeezing" customers → loss in the course of time of volume and image / decrease in size → shrinkage in the course of time of the possibilities of development, learning and professional growth / loss of job security and a policy of "squeezing"/reducing the remuneration of the personnel. There are very many variables that a company management may seek to maneouvre - be it simultaneously or in successive moments – in their search for equlibrium, but the complexity of the valuation and decision process is equally great.
The more valid managements have the constant capacity of considering each of their choices (price decisions, personnel remuneration, etc.) within the context of the overall company policies and thus to keep their eyes firmly fixed on the system and the overall company dynamics that they come to constitute [Beer, 1981; Roberts, 1978]. Every time a new decision is taken, this valuation process requires the managers to reconsider all the causal chains, all the loops, all the relationships and circuits that they will jointly activate; in other words, a re-examination of the entire company dynamics interpretation model conceived by the managers, with the attendant possibility of having to modify it. For this reason, one may affirm that each and every decision is underlain by the whole of the company's complex overall strategy.
The poorer managements, on the other hand, lack this capacity. They value their choices in "splendid isolation", within a limited and particular field of view, seeing the direct and immediate cause-effect relationships they will produce, but without reconsidering all the relationships /consequences that, given the policies adopted in other functional areas and in the company as a whole, are likely to stem therefrom.

Strategy therefore consists of the model that the managers adopt from time to time to pursue "success". This model represents the manner in which the managers pursue success and even the selfsame concept of "success" that inspires them, that is to say, their concept of the relationship that exists between the various results (ends) pursued by the company (competitive, income or social results, etc.) [Coda, 1988; Brugnoli, 1996].
The modal indicates the different variables that the managers deem to be important in the company's "success" and the manner in which these variables play their part (manners inevitably expressed by chains of causal relationships. It also indicates the lags with which the causality relationships between these variables will manifest themselves and therefore the times that are needed to reap the benefits or other effects of a new policy.

In particular, each model is characterized by the following elements:

- variable considered (number, type);
- relationships between variables (which are indicated by the relationships and the type of relationship);
- the lag with which the relationships make themselves felt.

Among others, the model specifies the relationships existing with the company's various interlocutors (contributions made, contributions asked, possible relationships between in and the other) and, consequently, also the relationships that exist between variables that measure the capacity of satisfying these various interlocutors (income success to measure the capacity of remunerating the providers of capital in the form of dividends or bonus share issues, employment, remuneration, conditions and prospects for measuring the capacity of satisfying the expectations of the labour force in the course of time, etc.) [3].

If we understand company strategy as the system model adopted by the managers, by the same token we have to understand strategic management activity as the activity that leads to the construction, revision and overhaul of the model.

To this end, we may make a conceptual distinction between activities and decisions performed "within the model" (i.e. performed simply to realize the model and make it function, the so-called "functioning" activities and decisions that seek to ensure the functioning of a given model) and activities and decisions that modify the model, seek to change the variables, the relationships between variables and so on (strategic activities and decisions). For example, the routine activity re-ordering materials, if not aimed at changing the role of stocks in company strategy (or the role that stocks play in the interpretative model of company "success") is a "functioning" activity. Viceversa, a change in stock policy that seeks to modify the part that inventories play in company strategy (for example, changing the relationships that link stock with other variables) is to be considered a strategic activity.

Ex-post, i.e. once the strategies have been realized and their dynamics have manifested themselves, we can recognize that strategic mistakes of a business as "errors" in one or more of the features of the model (omission of important variables or causal chains, mistaken interpretation of the relationships between variables, etc.). In other words, we can construct a model describing the effective company dynamics, just as we can render explicit the model interpreting the dynamics that underlay the choices made by the managers, and then compare these two models to pinpoint the "errors" or omissions of the latter as compared with the former. This operation is possible when things have happened, i.e. when the relationships between the variables have fully emerged and therefore the model, as it were, has already manifested itself.

The question has to be posed in very different terms if we place ourselves in the shoes of the managers *ex ante,* i.e. at the moment when very complex valuations have to be made and the strategy of the company is taking shape. In this case the relationships between the variables have not yet manifested themselves and it is almost never possible to say with any certainty how the company dynamics are going to react to a new policy under consideration. This obliges us to consider the model formation process, whether the validity of strategy can be verified (strategy assessment), and creativity in the formation of a strategy.

[3] The model constitutes the scheme for interpreting and assessing the strategy and the strategic decisions. Speaking of the assessment of strategy means speaking of assessing the model (for interpreting the company dynamics) that, in the mind of the managers, leads in the course of time to the attainment of various company scopes, including the desired income results.

THE FORMATION PROCESS OF THE STRATEGIC MODEL

The examples we have looked at may have induced us to think that we are simply concerned with a problem of *interpreting* reality, but it is not by any means so. Company managements are continuously faced not only with the problem of interpreting reality, but with constructing or *inventing* reality.

The variables and the chains of cause-effect relationships that a company management may use for "constructing" a success strategy are very numerous; often they are overlooked by the companies of a given sector and do not find their way into the traditional business models. For example: in the case of Lmn Alfatex, a company producing impregnated fabrics for stanchions and counterforts, the managers conceived an innovative strategy based on the use of strategic variables that had been traditionally neglected by their competitors: readiness to produce small-sized lots, flexibility and speed of delivery.

Similarly, Steno Marcegaglia, founder of a very successful business, succeeded in constructing an innovative model based also on the capacity of making proficuous use of a new variable (percentage of waste) that had until then been ignored by the managements of the other sectoral companies.

But there is yet more, for there are also many different ways of combining these variables and there is the possibility of continuously inventing new relationship models that can help a company to become more profitable. In short, the work of the managers is not just a question of interpreting reality, but rather a question of continuously constructing-inventing reality, and is realized by conceiving and implementing new and innovative business models based on new variables and new relationship systems, as also on verifying in the course of time whether these models are still capable of assuring a profitable company. It is not by chance that one of the comments that one sometimes hears from management trainers (specially when they concentrate their attention on the solution rather than the method or the skills, on the fish rather than the hook) is that it is easy to say how things ought to have been done ex post, and that the problem only exists ex ante.

Here we touch upon another fundamental aspect that contributes to explaining why it is impossible " to define a priori and with certainty business models that will prove valid in a given situation and a given company": the verification of the strategy (strategy assessment).

Typically, new strategies manifest their validity on "as time goes by", where this expression is intended in the twofold sense that:

a) they rarely manifest their validity with immediate results (but only with income. competitive and social results obtained in the course of time); and
b) if they are valid, they will tend to assure a proper company equilibrium both in the short and the long term.

For this reason, they cannot be assessed on the basis of previously achieved results (profitability of the company's own means, etc.) and the traditional assessment methods (balance sheet analysis, index analysis, etc.), though very useful for evaluating the validity consolidated entrepreneurial strategies and formulas, can be applied to innovations only with great discretion.

Strategy assessments thus leave a great deal of space for subjectivity and this space can be "reduced" only by means of a thorough confrontation of the various business models that guide the different managers of the company: at any given moment and *on the basis of exactly the same information* , two company executives may well express a different opinion as to the validity of a certain strategy; this may be due to different previous experiences (more or less transferable and repeatable in the new

company context) or because they interpret the given strategy on the basis of different interpretative business models[4].
For the reasons just set out, it would be mistaken to provide managements with repeatable and generally valid business models, just as it would be limitative to try and imprison a complex reality in typical strategy models that could be repeated as and when required in different company contexts. Such an effort could prove useful only if these typical models were conceived more as didactic models capable of contributing to developing of the capacities of participants or trainees than as instruments intended to offer concrete solutions to the ever changing problems that company managers have to face.
The great variety of concrete situations, the continuous possibility of inventing new business strategies and models, of operating with new and not previously employed variables, of inventing new causal relationships, etc., render the task of cataloguing reality extremely arduous and probably neither useful nor scientifically correct.
Our previous analysis does however enable us to come to grips with two other questions concerning:

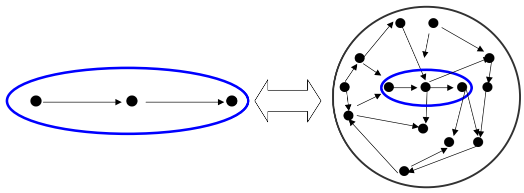
a) the formation process of a new strategic model and, more particularly, the relationships that exist between decisions and model (which comes first: the decisions or the model?); and
b) strategic creativity and the manner in which it can be developed.

As far as the first aspect is concerned, the model construction process is not univocal. Typically, it can be characterized as a trial and error process that can be supported by a greater or lesser capacity of system thinking.
There are company managements who, whenever they have to take decisions that contribute to defining their company's positioning in the environment, let themselves be guided by an overall view of the business and its present and possible future dynamics and assess each individual decision in the light of this overall picture. They have a model for interpreting its ongoing dynamics; faced with the individual decision, they assess it in the light of the model; whenever appropriate, that is to say, when the new decisions and situations make it clear that company profitability cannot be assured on the basis of the existing model, they change and reconfigure the model; in this sense, therefore, the individual decisions and new situations provide continuous occasion for rethinking the model. Otherwise, whenever the new decision can be coherently inserted in the exiting model, they are capable of taking it, after having given it due consideration, without having to reconfigure the model and, in any case, taking a decision that contributed to the general equilibrium of the system.
These managements continuously display a great capacity of inserting the particular in the general and, more particularly, operating in a process in which they start from the particular (the specific decision that has to be taken from time to time), check it against the general context, reconfiguring it whenever appropriate and culling new cues and inspiration from the general for acting on the particular.
These managements have a continuous capacity of passing from the particular (the individual decisional variable, the more immediate relationships it activates) to the general (overall business model of the company) and viceversa, a kind of iteration process that enable them to define both the one and the other [Senge, 1990]. In the

[4] Assessing a strategy is first and foremost a qualitative rather than a quantitative problem of assessing the model itself. For this reason, the efforts made on the quantitative assessment front (see, for example, the effort made in applying the theory of value creation to the strategy assessment process) can make useful contributions, but, all said and done, shift attention to a secondary aspect. The core of the strategy assessment problem consists of qualitative aspects and can be tackled only by means of a continuous effort to explicit the business models that guide the managers and underlie their assessments and the confrontations to which they give rise.

decision process of these managements the particular is guided by the general and, in its turn, the general is thus subjected to reconfiguration and rethinking by the particular, realizing the said iteration process particular ↔ general in which each level helps to configure the other and the two levels jointly define each other.

Fig. 6: Company decisions and strategies in the case of more capable managements



But there are also managements less capable of establishing this continuous iteration process between the general and the particular. They do not possess this capacity of thinking at one and the same time of the tree and the forest; on each occasion they see the particular (the specific decisions and the more immediate results they produce), but do not see the general, do not grasp the feedback and the more general, less immediate effects that these decisions will have in the course of time. Whenever they taker a decision, they are guided solely by a vision of the particular (Simel, ElettroImi, etc.) or by a visions of the more immediate and limited relationships triggered by their decisions, whereas they lack the wider, general view of the business and its equilibria, the sum total of the causal relationships into which each individual decision has to be inserted and to which it contributes.
Even in this case it may happen that the management, by means of a series of incremental decisions (though on each occasion seeing some relationships and a part of the model), succeeds in pitting together a successful business model, but the process will inevitably be fortuitous, a pure matter of chance. The specificity of the more valid company managements (and therefore their superior capacity of constructing a valid business model) consists precisely of their capacity of grasping the feedback and the less immediate, more "difficult" and non-intuitive dynamic and causal relationships, and this sense they really do see "further ahead". Only very rarely will a particular vision of a few and immediate causal relationship not inserted in an overall view lead to the formation of a balanced system. More probably, as in the cases we discussed at the beginning, they will activate feedbacks, return effects that will undermine company "success" with various lag periods. In particular, it is most unlikely that these managements, guided by no more than partial visions, will succeed in constructing a balanced systems in which the more immediate relationships, appreciated as part of the limited field of view, will seemingly lead to success and that the more general relationships / feedbacks (which make themselves felt with greater lags, through more complicated relationships, and which can be grasped only when one has an overview of the company as a system) will act to the detriment of profitability.
It follows that if we want to improve the capacity of company managements of developing success strategies, we have to enhance their "faculty of discernment",

where this term is intended to convey the idea that we have to improve their capacity of grasping not only the more immediate relationships (triggered by a given decision), but also apprehending / inventing the less immediate relationships that come to the fore in the more distant future through the involvement of variable that seemed irrelevant at first sight, and getting them to understand on each occasion which of these relationship chains are relevant or capable of being used.
Just as the specific examples made us understand, strategic creativity manifests itself in the capacity of conceiving innovative business models or, if you will, in the capacity of conceiving a proficuous utilization of new and previously neglected variables (see the Macegaglia case, for example), of inventing new causal relationships or recomposing the existing variables in a different way, in short, inventing new systems that promote profitability – and were not previously imagined by others – by means of a continuous decomposition and recomposition of the variable that lend themselves to being used (be they new or merely previously unconsidered). This work is done by trying to configure the existing variable and relationships in a new manner or trying to insert new variables and trying in one's mind's eye to see whether the postulated system could enhance profitability; if the answer is negative, you simply have to start all over again: decomposing the system, possibly preserving some parts that could function, inserting some new variables or modifying some of the existing parts, recomposing the system and then asking oneself once more whether – in this new form – it could render the company more economic. And this destruction-construction process has to be continued, stimulated anew every time the managers have to take a new decision.
From this point of view, then, there is some resemblance between the work a child does when putting together the pieces of a Meccano set, trying each time to put them together in a new way and inventing new structures, and the work a company management does when it tries to draw up new strategies. But there is also a great difference that renders the work of the management more complex but also potentially more creative: the variable that can be used for composing a new business model are not given, but have to be continuously re-invented or discovered by the managers within the ambit of an extremely variegated reality that keeps changing all the time; in other words, the "pieces" are as yet unknown when you start.
If they are to undertake this creative work, the company managers must have a great capacity of systemic thinking; the quality of their work depends to a very large extent on this capacity, where I understand systemic thinking as the capacity of the people concerned to grasp the complex interrelations that explain the overall dynamics of a given reality, as well as their capacity of recombining existing variables and or new variables and imagining / constructing new systems (in the case of strategies: capable of assuring company profitability).
And only if the company's managers do effectively have this great capacity of systemic thinking, will they be able to invent new business systems: only if they have a great capacity of systemic thinking, will they be able to abandon traditional schemes and models and venture into the construction of new realities. And only if they have this capacity, will they succeed in imagining new systems, visualize how they might function and mentally assess their validity in relation to company profitability, destroying them in case of a negative outcome and then constructing new ones with a view to assessing the validity of yet other possible variables.
There thus exists a close relationship between capacity of systemic thinking and strategic creativity, this in the sense that the former is essential if there is to be the latter.
The analysis we have just made leads us to yet another series of considerations.

The great variety of company situations, the continuous possibility of composing old and new variables and inventing new company systems make it quite impossible to attempt an a priori definition of valid strategies, to find “the” solution. Once it is all over, we can readily recognize the errors of the strategies adopted by the managers as “errors” in one or more of the component factors making up the model underlying their work: lack of one or more important variables (see, for example, the cases of Simel or Alkom), lack of important causal relationships or assumption of relationships between non-existing variable, mistaken interpretation of the relationships between variables or of the lags involved.
This is not possible ex ante. If we do not know ex ante which is the “right” strategy model, how could we possibly know the “errors” that are being made?
We know the errors only afterwards, never before; paradoxically, we do not know them until we know that we know, for beforehand we do not even know that we don’t know. Beforehand we lack knowledge in the sense of the existence of laws, of a structured interpretative model of reality; ex ante we have only information, notions; and a greater or lesser capacity of systemic thinking.
With important implications as regards the formation of company executives.

IMPLICATIONS FOR THE FORMATION OF COMPANY MANAGERS

What can we do to facilitate the training of valid company managers capable of conceiving good strategies? In the light of what we have just seen, if ex ante (i.e. before the new strategies are drawn up) there are no structured models, but only information and the capacity of systemic thinking, it is on these two levels that we have to work rather than on actual models. When we do this, the teacher or trainer puts himself in exactly the same position in which managers find themselves when they come face to face with the problem of company development and helps them to develop capacities that prove useful for tackling the problem in a positive manner.
The possible roads for finding solutions to concrete company problems are neither predefined nor can they be predefined, they can only be invented by means of man’s creative work as described above. This leads us to shift the focus of attention from the search for, analysis and reproposition of solutions (the various strategies by means of which managements have from time to time found solutions to company problems) to the development of capacities that help to find them; I would go even further and say that didactics and actual company cases are of value only if they, as also the presentation of any “solutions” derived from them, contribute to developing these capacities.
The activity of training company managers should therefore be conceived in such a way as to furnish information and notions and to promote the capacity of systemic thinking, putting the accent at various times on either the one or the other of these aspects [Morecroft, 1988; Forrester, 1992; Delauzun-Mollona, 1999].
To this end, indeed, it might prove useful to plan a systematic didactic activity for developing the capacity of systemic thinking: seeing which of the various capacities that make up what we have somewhat summarily called the capacity of systemic thinking (i.e. capacity of grasping new variables; capacity of grasping all the possible relationships between existing variables and selecting the relevant ones; grasping lags; simulating system dynamics, etc.) it is desired to develop by means of various exercises, case histories and company lessons; designing exercises and cases intended to develop each of these capacities individually, as also all of them taken as a whole, and thus to promote the faculty of discernment. It is true that we can recognize the mistakes made by managers as “errors” in one or more aspects of the model only after

the fact. Beforehand there is only a greater or lesser presence of a series of capacities. Let us help managers to develop the capacities that will help them to reduce the possibility of making these mistakes.

REFERENCES

Ballè, M. (1994). Managing with System Thinking, McGraw-Hill, London

Beer, S. (1981). The brain of the firm, Wiley, Chichester

Bertini, U. (1975). L'azienda come sistema cibernetico. In Scritti in onore del Prof. Alberto Riparbelli, Cursi, Pisa

Bertini, U. (1990). Scritti di politica aziendale, Giappichelli, Torino

Brugnoli, C. (1996). Concezione sistemica dell'impresa e scelte aziendali, Egea, Milano

Coda, V. (1988). L'orientamento strategico dell'impresa, UTET, Torino

Delauzun, F. and Mollona, E. (1999). Introducing System Dynamics to BBC World Service. An insider perspective. Journal of the Operational Research Society 50, pp. 354-371

Ferrero, G. (1982). Composite Model of Management Systemic Analysis. Economia Aziendale 1

Forrester, J.W. (1971). Counterintuitive behaviour of social systems. Technology Review 73-3

Forrester, J.W. (1992). Policies, decisions and information sources for modeling. European Journal of Research 59, pp. 42-63

Morecroft, J.D.W. (1983). System Dynamics: portraying bounded rationality. Omega, The International Journal of Management Science 11-2, pp. 131-142

Morecroft, J.D.W. (1988). System dynamics and microworld for policymakers. European journal of Operational Research 35, pp. 301-320

Roberts, E.B. (1978). Managerial Applications of System Dynamics, The MIT Press, Cambridge-Mass.

Senge, P. (1990). The Fifth Discipline, Doubleday, New York