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January 2002

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Modelling performance in a Balanced Scorecard : findings from a case study

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Résumé: Cet article s'intéresse à la mise en place de l'approche dite du "Balanced Scorecards" dans des unités opérationnelles plutôt qu'au niveau d'une direction générale. Il s'appuie sur une étude de cas. On propose de traiter les questions relatives à la coordination, à la fixation des objectifs et au contrôle en s'appuyant sur une méthodologie originale pour construire le modèle d'interaction entre les différentes entités de l'organisation. Cette méthodologie fait une part importante à l'apprentissage organisationnel permettant ainsi une compréhension mutuelle des degrés de liberté individuels et une meilleure observation réciproque. Cette approche "horizontale" est mieux adaptée à ce type de contexte que l'approche "verticale" plus traditionnelle du BCS.

Abstract: This paper discusses the implementation of Balanced Scorecards. A specific approach is suggested to emphasize organizational learning in the model building process. This approach is well suited for the middle management level as illustrated by a detailed case study. At that level mutual understanding reinforces co-ordination while mutual observability reinforces individual incentives. As such this paper provides an interesting counterpart to the more traditional top down vertical approach of BSC in which model building is viewed as a way to link global and local objectives.

Mots clés : Pilotage, tableaux de bord, incitations, apprentissage organisationnel

Key Words : BSC, Control, incentives, organizational learning

Classification JEL: L21, M00

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1. Introduction (Key issues)

In a 1992 article published in the Harvard Business Review¹, Kaplan and Norton (henceforth KN) presented a new framework for corporate control systems. They called it the Balanced Scorecard² (henceforth BSC). This approach is considered by Anglo-Saxon literature as one of the most significant managerial innovations of the past decade (Ittner and Larcker, 1998). It received a lot of academic attention (Butler *et al.*, 1997; Atkinson *et al.*, 1997, Mooraj *et al.*, 1999; Norrekilt, 2000) as well as a largely positive answer from companies (a recent survey estimates that 60 percent of Fortune 1000 firms have experimented with the BSC, Silk 1998).

BSC was developed in response to criticisms of traditional management systems. These had been based on the twinning of operational management (focused on physical indicators and on short-term local improvements) with accountancy-based (and therefore fundamentally past-oriented) financial management (Johnson and Kaplan, 1987).

The originality of BSC, as proclaimed by its supporters, related to two fundamental principles: the multidimensional nature of performance, measured over a whole set of indicators that were combined into four separate perspectives (financial; customers; internal processes; innovation and learning); and the existence of an underlying model linking the various indicators to one another.

In their pre-2000 writings, KN did not describe their know-how for eliciting a model of cause and effect. Moreover they did not say how the model was used and what were the consequences of BSC on target setting, remuneration or monitoring procedures (Otley, 1999; Lipe and Salterio, 2000).

Empirical research emphasises the design of the cause-effect model as the critical question for the implementation of BSC (Ahn, 2001). In fact many issues related to the design and the use of the model remain opened and seem particularly unclear in practice (Malmi, 2001).

In their latest work (Kaplan and Norton, 2001), KN tried to tackle these issues through the use of around 20 examples of BSC implementation - the approaches that had been followed, and the benefits thereof.

The major conclusions to be drawn from this latest book were that:

- BSC is an attempt to strengthen collective learning about the conditions in which a certain level of performance might be achieved
- BSC's effects are more significant when individual pay packages are linked to it.
- BSC must be broken down at the lower hierarchical levels

On the first point, KN underlined the role of the model of cause and effect, of which they gave detailed examples. Through these examples, they gave some details on how this model helps learning by top management on the relevance of the strategy. But its impact on the collective dimension of learning remains unclear: they only make the assumption that a better communication of the strategy will lead the employees to be more involved.

On the two other points, KN provided some details on the link between BSC and remuneration at the business unit level but not at lower hierarchical levels. Their main observation was that BSC-related bonuses are usually related to collective targets. KN briefly discussed the problem of free riding. In their opinion, it was possible that this problem had been overestimated, and in any event other mechanisms such as peer

control dampened its effects wherever colleagues were able to observe each other's efforts.

We can therefore summarise the control proposition that the Balanced Scorecard approach contains in the following manner:

- global objectives are broken down into local objectives as long as the interactions between the local entities involved are not too strong, and if models can be established linking local objectives to global objectives
- wherever it is difficult to break local indicators down into their components due to an excessive interconnection of individual actions (i.e., wherever co-ordination problems are significant), control can be enacted via incentives that are related to shared objectives.
- Collective learning is improved by a better communication of the strategy.

In our opinion, the ability to define individual objectives (as a basis for setting remuneration) and to ensure that they will allow collective learning remains an important issue in environments marked by significant co-ordination problems. In fact, it is often in such environments that people are least able to attenuate the effects of free riding (i.e., via pressure from one's peers).

The purpose of the present paper is to advance in this direction. It draws from the implementation experience of a major international cement company to elaborate a reformulation of the BSC approach, specifically addressing the collective learning issue in complex environments. This management experience consisted of renovating the existing *tableaux de bord* battery of performance indicators in order to improve operational control. It did not involve rebuilding all of the firm's control systems. In this instance, the BSC approach continued to be a crucial benchmark (in the sense that the

new performance indicators did incorporate new dimensions). Inversely, the intellectual affiliation with a rejuvenated system of management control made it possible to devise practical responses to the issue of individual objectives – and it achieved this by pursuing a different approach to the building of a performance model (Chassang, 1987). This case leads us to come up with a reformulation of the BSC approach. Our proposition is a translation of two fundamental ideas. The first is inherent to a French context but may apply as well in other non Anglo-Saxon environments. In this type of environment, there is a need to capitalise on the "*tableau de bord*" (battery of performance indicators) concept that so many companies have been developing since the 1950s (Gray and Pesqueux, 1993; Chiapello and Delmond, 1994; Lebas, 1994). Several authors have focused on the proximity and differences between this sort of approach and a BSC one (Bourguignon *et al.*, 2001), particularly as pertains to the multidimensional nature of performance measurement (Epstein and Manzoni, 1998). In addition, the second idea, which has a wide applicability, is that management control has advanced in steps with other new forms of piloting - forms that emphasise a re-forecasting of targets rather than the analysis of variances, and which stress horizontal inter-departmental co-ordination rather than the attainment of local objectives (c.f., Chassang, 1987, but also all of the literature that has come out on the "Japanese school of management"³). Ignoring these advances makes it difficult to establish a new operational system within a firm. These new orientations prefer to focus the design of new procedures (Just-in-Time, project management) rather than on the development of models. The proposed reformulation intends to fully integrate these two business facts in the BSC: the pre-existence of tableaux de bord and the emphasis on the design of procedures.

Capitalising from this experience, we offer a reformulation of the BSC approach. The major novelty associated to this reformulation concerns the elaboration of models. KN developed in their latest book several models of cause and effect to explain the various performance indicators. They do not address the question of what process is involved in developing such models. However, they do support the idea that the models are being devised by executive committees. KN offer an *a priori* "template-shaped" causal model. This aspect has been the target of severe criticism, notably from Norreklit, 2000.

Our reformulation makes possible another elaboration - one that is capable of devising a performance model which will rely more on management procedures than on ex ante thought processes. As a matter of fact, it associates both a "top-down" and a "bottom up" approach.

The present paper is organised as follows. Section 2 reviews the main orientations of a BSC approach (2). We then present our own methodology (3), and subsequently the case in which we participated (4). We then offer an analytical framework that summarises the main elements in the suggested reformulation and its principal differences with BSC (5). In conclusion, we discuss how this reformulation constitutes a reply to BSC as regards general issues of control.

2. The Balanced Scorecard

2.1 *Diagnostics*

According to KN, large firms experience changes that take them ever further away from a system of mass production, and which bring them ever closer to a system that is based on the production of a wide range of products and services. The combination of

management systems and financial and global systems, on the one hand, with physical and decentralised systems, on the other hand, produces a dichotomy that may have been suitable for a system of mass production, but which is a definite handicap given current trends. It used to be enough to monitor whether things were improving over time at a local level. Nowadays internal co-ordination mechanisms need to be anticipated and rapidly reconfigured. Financial indicators without any other backup constitute alarm signals that often sound too late. They should therefore be combined with other more strategic indicators in order to enable a timely analysis and interpretation of the firm's true situation.

KN suggest combining these other indicators, necessary as they are to a proper understanding of the current situation, into three categories: commercial; internal processes; and innovation and learning. These three categories are then associated with the financial category to constitute the unit's *tableau de bord* battery of performance indicators. The first thing that each of these categories has to do is identify a series of generic levers. This replicates ROI's breakdown into several well-known levers (price, product mix, working capital needs, etc.), but the approach does provide something new, specifically the linkages that its authors try to build between the four categories.

Whereas large firms are traditionally comprised of departments that have each developed their own expertise and performance evaluation systems, BSC's ambition is to provide an opportunity for rethinking internal co-ordination on the basis of collective challenges.

KN's explanation for the innovation and learning category stresses this ambition. In an increasingly international world where comparative advantages are more of a goal than a given, human capital is a key factor of success in the top performing firms. As such,

there needs to be a constant questioning of firms' ability to learn: the selection and retention of the best staff; the mastery of information technology; and at a wider level, the efficiency of the organisation's tools and procedures - these are all generic topics that need to be broken down according to the specific levers that have been identified in the three other categories.

2.2 KN's suggestion: a top-down approach⁴

The authors provide details of several other examples of implementation (1996b, pp. 78-79 and 2001). The principles contained therein are as follows:

1. BSC design (" Translating strategy into operational terms")

- clarifying the unit's strategy by interviewing its main senior managers
- formalising the anticipated outcomes of this strategy along the lines of the 4 main axes that are being followed by the BSC
- choosing 4 or 5 key indicators for each axis
- designing a synthetic model to interconnect the various potential strategies
- choosing a specific strategic orientation - and quantifying it thanks to the model

2. BSC implementation

- "mobilising change through executive leadership"
- turning strategy into a continuous process: integrating BSC into the planning procedures (plan and budget); breaking the orientation that has been chosen down throughout the organisation through an updating of the current information systems ("new executive information system")
- "making strategy everyone's everyday job": breaking the BSC down at the lower hierarchical levels: adapting the remuneration system

- "aligning the organisation to the strategy"

To facilitate the BSC's installation, the authors recommend capitalising upon a particular issue that is related to the firm's own specific circumstances. This can for example involve a decentralisation project within a given structure, or else the incorporation of inter-unit synergies. By integrating an issue of this nature into the overall BSC implementation approach, it should become possible to build the new practices into the regular procedures and encourage actors to adhere to them (rather than causing rejection at the intermediary level, which often associates BSC with a new managerial scheme that is costly in terms of time and information systems).

Two points deserve attention in the examples they give: the role of the model of cause and effect; how the BSC is broken down at the lower hierarchical levels and the remuneration system adapted.

On the role of the model, they provide some example on how the model can be used to learn about the relevance of the strategy. Sears for instance tested statistically the assumption of the causal link between the satisfaction of the employees, of the customer and of the investors on which the strategy was based. However, they do not explain how the employees at all levels will contribute to the learning. They only argue that the model improves the communication of the strategy, which leads to a better understanding by the employees. They thus understand better the link between their action on the one hand and the strategic objectives and the performance of the company on the otherⁱ and would be more induced to discuss the strategy or suggest improvements.

On the second point, examples are given of companies that broke the BSC down the hierarchical ladder. At the City of Charlotte's department of Transportation, for instance, all the priority programs are evaluated on their impact on the BSC measures of the City (KN, 2001, p.237-239). In the case of the Exploration group of a large oil company a personal scorecard has been created for each person in the organisation. This card contains three levels of information: corporate objectives and measures, translation of the corporate goals into business unit goals, and five personal objectives to which a target is associated (KN, 2001, p.244-245).

Other examples are given of compensation systems: in one Mobil's business unit, 250\$ have been given to each employee because the target on four among five BSC objectives at BU's level had been reached (KN, 2001, p.235-236). At CIGNA Property and Casualty, the bonus is determined by a number of "shares" multiplied by a price per share. The number of shares is based on individual performance, but we do not know how it is measured, and the price based on targets on the BSC of the BU (p.259-260).

Other examples show that at Business Unit level, the compensation of the executives is often linked to personal, BU and corporate objectives based on the BSC.

But no example describes how compensation at lower hierarchical levels is linked to personal objectives based on a personal BSC. In the two cases where there are BSC at personal level and compensation system is described (namely Novia Scotia Power and Mobil NAM&Rs), the compensation of employees are based on corporate, division and BU's performance but not on personal performance. It is thus unclear what use is made of the personal targets in the evaluation of these managers.

The problem of narrow and functional thinking that KN (2001, p.233) associate with traditional systems of management by objective seems thus solved by collective

incentives. But as we mentioned in the introduction, though in some cases the pressure from one's peers or the emergency of company's situation can attenuate free rider problem, in many other cases this problem remains and one has to look for other more elaborated solutions to provide individual incentives.

3. Methodology

The general framework for the present study is a thought-action cycle. New management tools, based on existing theories and practices, are suggested and then implemented. This implementation should in return enable an enriching of the initial ideas and theories, that is, of the thinking upon which the tools had been based. Kaplan (1998) conceptualized this methodological process, calling it innovation action research. In the present paper, we will primarily be deriving meaning from the attempt to implement a new management control procedure throughout an industrial group's different SBU's. This approach expands upon other research that has been done on the role that models play in management control (Ponssard and Tanguy, 1993).

We shall therefore be deriving meaning from a specific experience. Yin (1984), Eisenhardt (1989), and more recently Langley (1999), working with the theory of processes have highlighted the suitability of developing theory on the basis of particular examples. To be precise, we will be delving into the organizational modifications that are the result of a management tool's implementation. As such, the present research project is an example of intervention research (Moisdon, 1984, Hatchuel and Molet, 1986).

Eisenhardt (1989) stressed that any research project that is based on specific case histories runs the risk of creating theories which are too elaborate, given that they

comprise an attempt to explain a highly detailed situation. To overcome this deficiency, it may be appropriate to avoid describing the case in great detail. We should be trying to highlight those ideas that are crucial for theoretical thinking, and will therefore not seek to specify with any great degree of precision the conditions in the given example in which the proposed reengineering can be successful. We will however try to specify the operational objectives of this reengineering, which the intervention proved to be relevant. Given that this involves tools which are primarily designed from a rational perspective, being interested only in the explanation of the implementation through testing in the organization, is not only a necessary step, but also a difficult one to take. From this point of view, we have been able to understand better the expected effects of such a system by following its implementation in a context in which we knew well what was at stake. Our analysis has been mainly inductive and even though it has been built on the basis of one experience, it contains an intuitive component that cannot be completely overlooked. (Weick, 1989). Moreover, Langley advocates this intuitive component as useful (1999).

In addition, the educational case studies that we are devising can help to create a new approach for the implementation of management tools. According to this approach, management tools are not to be implemented in the traditional OR fashion but used as rationality myths to structure a decentralized decision-making. Analysis of these cases based on authors' intervention will illustrate the approach and provide an interesting starting point for its transposition into another context. This specific use of management tools in organizations has been advocated in Ponsard (1994) as part of an organizational learning process.

The discussion of detailed case histories such as the one described in this paper is also an important ingredient to focus theoretical thinking on relevant issues such as the relationship between coordination and incentives in team management – a question that is identified in the microeconomic theory of the firm, but that has not received much attention (Milgrom and Roberts, 1992).

4. The example of a major cement company

The case with which we are concerned here relates to the cement-making units of a major international group. The project head's mission statement mentioned two objectives:

- " to have a shared information system for the more than 20 cement units that the group operates across the world;
- to design and implement a battery of performance indicators that will enable the managers of these units and the different hierarchical echelons of the organisation to dispose of key indicators which will allow them to measure their performance and to better pilot our activities."

Behind these two operational objectives, one detects an interest in internal benchmarking, a desire to reinforce the common culture (notably by facilitating the new units' integration), and more generally an attempt to capitalise upon existing know-how. Two operational units were selected to take part in the project's design phase (formulation of performance indicators, method of utilisation, etc.). The pilot committee included the two operational heads from these two activities, a group level function manager (in this case, the CFO is his role as head of information systems), and the

project manager, who was assisted by an outside consultant (the author of the present article).

The actual carrying out of the project basically involved a mobilisation of the cement units' internal resources. Between the project's conception and the beginning of its implementation, two years elapsed.

Although the project was not talked about as if it were an implementation of a BSC approach, this reference progressively became a useful way of conceptualising what was happening (specifically during internal presentations). The BSC link was particularly evident in light of the simultaneous integration into the indicators of elements that had been previously analysed in an independent manner, or which had simply been neglected (tracking of fiscal indicators, budget control, monitoring of safety and environmental issues, following up on investments, etc.).

We will now focus on those aspects of the project that are directly related to our discussion.

4.1 Aspects that are both top-down and bottom-up in nature

Such aspects can be illustrated through the way in which factory managers, on one hand, and sales managers, on the other, used the battery of performance indicators.

(i) As regards the factory managers, from the very beginning the approach basically involved a bottom-up orientation. A subgroup comprising managers from two pilot units was constituted with the mission of devising a common battery of performance indicators. This task was largely facilitated by the existence of a function-level management unit that was placed in charge of tracking cement performances (at the factory level) - and thus by the existence of a battery of technical indicators for each of the process's various phases. This made it possible to verify the validity of KN's

diagnostics regarding the disconnection between the factories' technical piloting and financial cost control (variations in the reporting cycles, absence of shared itemisations, the operatives' relative lack of interest in "budget" control, the financiers' lack of knowledge as to operational issues, and more generally the gap between technical and managerial cultures).

This phase dealt with two types of issues: integrating technical and financial tracking procedures into a single and shared battery of performance indicators, it was also supposed to convey a "top-down" element that had not been incorporated into existing approaches and which related to the monitoring of the investments' profitability (factory managers tend to fight amongst themselves to obtain investments that help them to lower their direct costs without incorporating the cost of capital into their calculations). With respect to this latter point, the simultaneously top-down and bottom-up nature of the approach made it possible to come up with a formulation that was acceptable to everybody and which could actually translate into synthetic EVA-type indicators (such as return on invested capital).

(ii) As regards the sales management units, from the very beginning the approach basically involved a top-down orientation, due to the absence of any shared language between units that were operating in highly different contexts (mature vs. growing markets, various levels of vertical integration, differences in the relative importance of the distribution segments, etc.) and which were not very used to communicating internally on such topics. Here the piloting committee played a more direct role in formulating general management's objectives in this area (the need for segmentation, the need to know how the added costs' structure was broken down, the return for each client, market and factory, etc.). This made it possible to capitalise upon the unit that

had achieved the greatest progress with respect to these objectives - without neglecting the need to leave some room for local specificities in the performance indicators' final version.

4.2 The replacement of existing procedures

General management was convinced that this approach was a valid one, but it had to be sold out in the field to operatives who were not necessarily favourably disposed towards it ("*yet another programme the Group has dreamed up without thinking about our needs.*").

The project head's attitude consisted of demonstrating how the battery of indicators that were being proposed could be seen as an improvement on the existing system.

Although they were not a perfect reflection of existing organisational structures (which can vary from one unit to the next), the indicators broke activities down by the main stages in the value chain (production, logistics, sales, administration and overheads) and by hierarchical level (commercial zones, workshop-regional sales management level, factory-general sales management level, operational management level-general management level). They did this by ensuring the coherency of indicators, measuring them at each stage/level, and more or less aggregating them for a given period of time and by category (daily, monthly or annual rhythms, and interrelated itemisations).

These new performance indicators could therefore legitimately replace:

- operational piloting systems being used for industrial and commercial purposes;
- support documents for budget development and control;
- the function level technical reporting systems that senior management had organised to track production units' cement performances throughout the group.

In any event, the approach above all had to be useful for the units and not simply consist of a way of getting them to simply report upwards to the group level.

In an approach of this nature, the re-orientation of each unit's strategy results less from new thinking than from the ability to improve the unit's piloting because of the access to new indicators. Clearly, in certain cases, this simply involves little by little providing explanations for a strategy that already exists so as to enable its wider diffusion throughout the organisation (harking back to the approach's internal benchmark aspect).

4.3 The re-forecasting procedure

The fact that the same indicators could be found in different batteries does not mean that an organisational capacity for self-coordination was being implemented. Similarly, it is not because physical and financial indicators were included in one and the same battery that we had now generated the ability to anticipate the interdependencies that exist between these indicators, and the ability to make the correct decisions.

A traditional BSC approach consists of modelling interactions on the basis of a strategic-economic model.

With the approach being adopted here and specifically because it had a footing in each of the different operational levels, this goal was deemed unrealistic (we would have needed an integrated model for the entire business, containing several hundred indicators). In actual fact, we dealt with this issue by setting up shared re-forecasting procedures.

Usually this involves regularly mobilising all of the organisation's managers for year-end profitability re-forecasting exercises that touch upon both technical and financial indicators. Here is a detailed example.

4.3.1 Operational issues⁵

The cement workshops were organised around four main manufacturing phases: preparation of the feed, crushing, fuel preparation, firing. A workshop manager who reported to the factory manager ran each phase.

The person in charge of preparing fuels was supposed to be informed of any drop in the price of coke petroleum, one of the fuels used in the firing process. Based on the data that had been received on prices and on the various fuels' calorific content, s/he forecast a shift from 100 % coal to 35 % coal and 65 % coke petroleum, with the price of each thermal unit dropping from 15FF/GJ to 8FF/GJ (1£ = ca. 11FF)⁶. S/he therefore proposed a change to the factory manager who decided to follow up on this suggestion, anticipating an overall lowering of the cost of cement (from 100FF/tonne to 80FF/tonne).

The change was supposed to be implemented. In the month that followed, variances were noticed in the technical parameters of the factory's daily performance indicators.

More specifically:

- the person in charge of preparing the feed noticed an increase in the consumption of electricity and a decrease in quality,
- the person in charge of fuel preparation noticed an increase in the consumption of electricity and in the sulphur rate,
- the person in charge of the kiln had to cope with reliability problems that lead to a significant drop in output.

The fuel change had therefore had an unanticipated snowball effect on production, specifically because of the need to adapt the feed, and the ensuing oven reliability problems.

The proposed procedure could contribute something here. This can be illustrated by emphasising its advantages over traditional approaches.

4.3.2 Traditional systems

Each factory had traditionally been piloted by means of a (technical) checklist for each workshop, a schedule that was updated every month during workshop manager meetings. The management controller carried out standard analysis of variances, basically so as to satisfy reporting requirements, but s/he did not participate in the technical piloting meeting. The system led to a pursuit of local technical objectives. There was no arbitrage between the various potential actions on the basis of their economic impact. The risk was that people would focus on whatever significant technical variances took place, even if these variances had little economic impact - and inversely that people would neglect minor technical variances, even if they had significant consequences for economic performance. More specifically, the two following scenarios had become distinct possibilities:

- Firing unit managers might have decided to restrict downtime via new investments⁷. This would have been a refusal to face current realities, one that could have destroyed the expected value of the fuel change decision. After all, such investments would have been made with reference to a situation characterised by lower levels of performances⁸.
- Or else it would have been impossible for these investments to perform as forecast in the budget. Here the firing unit manager's only room to manoeuvre would have been to convince other managers to abandon the entire project - even if this meant lower overall economic performance.

4.3.3 The proposed system

With the proposed system, the daily performance indicators still included technical indicators. As the month went by, local measures could be taken to keep technical variances down.

However, at the end of the month, the factory director could ask colleagues to carry out a re-forecasting exercise on those parameters that seemed to have been affected by the fuel change. These re-forecasts were consolidated by the factory's management controller and discussed at a meeting.

The re-forecasting was included in the monthly performance indicators and therefore covered operational elements as well as their financial impact. This scenario can be summarised as follows:

Table 1: Extracts from the battery of performance indicator

The meeting enabled discussions of how these forecasts could be collectively modified. It concluded with the choice of a scenario that was then translated into a battery of performance indicators for each of the various managers. This led to the replacement of the traditional budgetary analysis of variances (one that is undertaken by the management controller and which is not particularly useful) by a technical-economic piloting in which the various managers involved became aware of the way in which their respective commitments were interacting (speed of maintenance operations, the timing of kiln shutdowns, increasing volumes whenever another site temporarily closed, etc.).

In this example, the issue was whether it was desirable to reduce capacities so as to cut costs. It was certainly appropriate to present the planned scenario to the unit's general management in order to check whether the loss of capacity would not affect forecasted

sales, or else to determine whether there shouldn't be a different breakdown of output amongst the various factories. This would have been tantamount to a "re-coordination" of action plans at the unit level (involving both the commercial and production functions).

4.3.4 The articulation between co-ordination and incentives

The procedure we are proposing leads to a revision of local objectives. For example, if the fuel change had been maintained, we should have seen a drop in the price of cement but an increase in the per tonne price of the feed. If the corresponding objective had not been revised lower, it is easy to imagine that the manager of the workshop involved would not have adhered to the decision. And if s/he had pursued a local objective, this could have led to the overall failure of the fuel change decision. As such, co-ordination is encouraged by the fact that it is possible to render explicit those economic gains that can be associated with a technical decision (hence the reasons why the local objectives should be revised).

We can easily see how this procedure could limit incentivisation by increasing opportunities for re-negotiation, thus encouraging people to "keep something in store" for future bargaining. To avoid this undesired outcome, the bonus can be directly linked to the factory's capacity for coming up with accurate forecasts of its average annual costs. The idea is as follows: at the end of the year, a bonus is paid on the basis of an indicator P that is devised as follows:

$$X(n) = (\text{observed average annual cost} - \text{expected average annual cost in month } n)_-$$

The P indicator can be defined by:

$$P = n * X(n)$$

The higher P is, the less the factory was able to predict its costs and therefore "pilot" towards a controllable target. Thus the higher the P, the lower the bonus.

Our procedure encourages collective learning about the conditions in which a performance outcome can be achieved. We are not proposing an *a priori* model for the factory's performance. We are in fact replacing this sort of model with a re-forecasting procedure that revolves around technical and economic parameters - a procedure that encourages the emergence of a shared representation of the conditions in which the performance can be achieved. In the above example, the re-forecasting made it possible to highlight the need for modifying the feed following the fuel change (as well as the consequences for the kiln's reliability).

The fact that we are reasoning from a technical-economic perspective makes it possible to focus discussions on the interfaces that exists between the various departments, and the commitments that have to be met (maintaining levels of sales in our example) to reach the given target without having to develop a complete model of the factory's operations.

Having said that, it is clear that, in reality, the indicators will change as a result of these many actions – all of whose impacts are interrelated. This can impede the conditions in which learning can take place.

Having already been set up in a number of units and engendered a manifest improvement in the predictability and control of costs, the transposition of this procedure can be construed as a transfer of "best practices" and not as the imposition of a cumbersome and costly procedure. In some of the units that recently adopted this idea, it was felt that the re-forecasting aid tools could in fact serve as a means of reassuring

operatives, both when they carry out their automatic re-forecasting of "easy" items, and also when they try to model some of the "technical" interactions that are played out between the various parameters. The need for modelling thus appeared ex post.

This re-forecasting procedure has been generalised to become one of the key elements in the approach being implemented. If it follows the appropriate rhythms, the procedure can be used for the inter-site co-ordination of production management-related issues. It should also apply to co-ordination between Technical Departments and factories (as regards their investment plans), etc.

4.4 Other points

This implementation experience also raised issues that the literature rarely deals with:

- Straightforward information system issues (system interconnections) are very important, since one is always navigating between two extremes. The approach can be presented as if all it requires is a "paper and a pencil" (i.e., an application such as Excel is enough to support it) - but in this case, it cannot be hooked up with existing information systems, hence a great deal of disillusionment from operatives after a few months of initial enthusiasm. Or else, the information system aspects can become the "be all and end all" - but this would require a great deal more time than that which had been initially planned, and would cause people to lose sight of the project's managerial aspects (since different people would then be put in charge of it).
- Training is another element that must not be neglected if the project is to succeed. Management controllers would be the main recipients of this training as they are destined to become the guardians of the new procedure and must therefore share in

the new management system philosophy. However, there is also the risk that they could one day become the principal proponents of reverting to the previous system.

- The cumbersome nature of this type of project (one that lasts several years and whose outcome is relatively "soft") means that if it is to succeed it must receive constant encouragement from senior management. In our example, this stemmed from a desire to introduce all of the ingredients of "value creation". The BSC was a natural element for breaking this approach down at operational levels.

5. The wider picture

5.1 Reformulating the BSC approach

The proposed approach was therefore presented in the experiment we have described above as a re-modelling of the performance indicator approach (involving an integration of updated BSC principles) rather than as a complete overhaul of the Company's strategy. This desire to re-model the current system clearly had to be based on an in-depth diagnosis of existing piloting systems - a diagnosis that makes it possible to verify and to contextualise KN's general diagnostics system.

Once this latter system has been proven to be reliable, the first thing that needs to be done is to merge the physical performance indicator systems with the accounting and financial indicator-centred reporting systems. The next step is to implement a re-forecasting procedure that can account for all of the indicators that have been selected. This re-forecasting procedure thus replaces the idea of an *a priori* modelling of the links, which exist between the technical and financial indicators. It must also enable a more efficient achievement of the goal of improved co-ordination within the firm.

As such, the prime motivation is the desire for higher organisational responsiveness, rather than the innovative aspect of the BSc's four vectors.

Above and beyond these main principles, let us now take a more detailed look at the differences between BSC and our approach.

5.2 Three differences with the BSC

The first two differences relate to our integration of elements that are a characteristic feature of performance indicators. The third, which is dealt with in greater length, incorporates advances that have taken place in the field of management control.

(i) Instead of adopting a top-down approach, our approach is both top-down and bottom-up

KN's diagnostics rely specifically on an operational dissociation between piloting and financial systems. They propose a complete rebuilding of these systems following a top-down approach. Our hypothesis is that significant technical know-how is already needed to run the existing operating systems. To benefit from this know-how, the new performance indicator batteries will be established in a decentralised fashion, one that is based on a diagnosis of these systems such as they already exists.

The unit's management will on the other hand have to be mobilised to deal with the weaknesses that have already been more or less integrated into the information systems (commercial aspects, new products, innovation, increased organisational capacities, etc.) without any radical overhaul of the unit's strategy as such⁹.

This approach is supposed to avoid two types of risks. The risks of a top-down approach relate primarily to the non-integration of operational constraints at such a time as the strategy is first being developed¹⁰. Inversely, a purely bottom-up approach can mask

several significant aspects because of the cognitive dissonance that exists at an operational level.

(ii) It replaces existing reporting systems

The simultaneous incorporation of non-financial and financial indicators is not achieved by simply adding a new system and new tracking procedure on top of existing systems (the new strategic performance indicator battery used by the unit's senior management and its breakdown throughout the organisation¹¹). Quite the contrary, from the outset we are seeking to combine financial and non-financial indicators in performance indicator batteries that can be used in the budget procedure and for operational piloting.

This leads to the construction of an entire battery of performance indicators that are associated with the existing organisational structure. From the very beginning and at every level, the approach fits in with an operational piloting perspective whose purpose is to use its inclusion of physical indicators to renew the traditional dichotomy between financial management control/industrial operational management.

In fact, the risk with the BSC approach is that it will add one more performance indicator system without replacing existing systems - and that it will have problems helping the BSC to survive and prosper in the presence of so many competitor information systems (Epstein and Manzoni, 1998).

In their latest work, KN emphasise the importance of integrating BSC into planning and tracking procedures. They suggest ways of working towards this goal (notably through the separation of "operational budgeting" and "strategic budgeting") without providing any details for this integration.

The reformulation we are suggesting offers other routes that will make it possible to avoid difficulty in trying to implement a high-performance system to help out with

strategy decisions – even where management procedures (notably the budget procedure, which is the cornerstone of most management control systems) are not capable of supporting this strategy.

Integration into existing systems also makes it possible to tackle from the very start some of the technical issues that are involved in these information systems. The implementation approach that KN suggest does not deal with the problems of connecting a managerial information system to transactional systems, or else to the systems being used to carry out industrial operations. Yet only a successful connection between such systems can render the approach operational. In fact, the changes that are being proposed here will only be accepted or incorporated by operatives over the long run if itemisations are coherent, the performance indicators ergonomic and the management system user-friendly.

(iii.) Replacing the development of an *a priori* model with a forecasting procedure

Instead of seeking from the very beginning to build a causal model of value creation, we try to create procedures that allow for the progressive emergence of a shared representation of the conditions in which a certain performance can be achieved¹². Towards this end, we propose establishing a regular re-forecasting procedure that contains annual objectives.

As opposed to a mechanistic model, our model revolves around its co-ordination procedures. In its implementation, the procedure will of course often rely on a given model - however the hypotheses underlying such a model will have to be shared and its role will be restricted to the guiding of collective thinking within the confines of an approach that is based on interactive rationality. The model becomes a support for

collective decision-making. Its development is greatly affected by this fact (Ponssard and Tanguy, 1993; Ponssard, 1994).

The idea of re-forecasting is not a new one (Doblin, 1986; Chassang, 1987). It is an attempt to respond to one recurring criticism of traditional management control systems, which is their inclination to analyse past events (Johnson and Kaplan, 1987) in such a way as to re-direct decisions towards the future

Having said this, by associating operational and financial indicators it becomes possible to reason in terms of the decisions' operational dimensions whilst assessing their impact at an economic level. By so doing, we move away from performance indicator type of tools that basically involve operational indicator-based piloting¹³ to tools that are much more forward looking like a flight simulator¹⁴. The financial indicators are no longer a simple reflection of past performance (lag indicators), rather they are the economic translation of actions that are being envisaged for the future (and thus involve lead indicators)¹⁵.

In addition, the association between re-forecasting and this combination of operational and financial elements allows us to make progress on some other management control issues, to wit: co-ordination; incentivisation; and learning¹⁶.

Co-ordination:

Re-forecasting must provide a discussion forum for all of the operatives who are involved in this exercise, hence an opportunity for co-ordination at the operational and economic levels. This makes it possible, for example, to avoid local optimisation behaviours, since the overall impact of local decisions can be demonstrated (cf., 4.3.).

Learning:

The re-forecasting procedure, which simultaneously covers operational and financial elements, indirectly causes operatives to demand decisional aid tools that can help them to formalise the technical-economic relationships and interfaces which exist between the firm's main departments. It therefore creates a basis for collective learning about the conditions in which performance can be achieved¹⁷. This learning revolves around the existence of a widespread type of know-how that cannot be formalised outside of the boundaries of an action process that can be capitalised to enable greater organisational responsiveness. Partial models are then utilised whenever the operatives themselves request this.

The reformulation we are proposing thus offers the following advantages:

- Knowledge is progressively accumulated through a standardised procedure without any specific project (possibly requiring the intervention of an outside consultant) having to be set up. This makes it possible to overcome operatives' reticence (as emphasised by Epstein and Manzoni, 1998) in providing the information that is necessary for the development of the model¹⁸.
- The technical and operational constraints (essentially related to the various interfaces) will naturally be part of operatives' discussions with one another whenever an exercise in re-forecasting takes place (i.e., production management constraints when commercial policies change) - whereas in a "trickle-down" performance model (such as the one found in KN's approach), it will be difficult to integrate this type of constraint.

Nevertheless, attention should be paid to the following problems:

- The risk of falling back into a sort of "accountant's" management of the re-forecasting exercise, that is, one that focuses excessively on financial indicators, and

which therefore does not explain the links between the operational and the economic spheres.

- The risk of developing a re-forecasting aid model that allows the management controller to complete the exercise all on his/her own. In this case, there would not be any discussion between operatives, and this would rob the procedure of its real purpose.

The piloting of the management procedure remodelling project should therefore emphasise the quality of the re-forecasting exercises in order to ensure that they do indeed deal with the various co-ordination issues that exist between the various centres of responsibility - and that they do provide an opportunity for a dialogue between these centres.

Incentivisation:

Having said this, if the re-forecasting procedure is to become functional and allow for an integration of the re-coordination efforts, it must be understood that the local objectives will have to be revised¹⁹. As such, there is a possibility that the existing incentives will be weakened²⁰. This creates a twofold challenge:

- The shared knowledge that is generated by the re-forecasting exercises will allow a hierarchical superior to better assess the relevancy of the new objectives that are being calculated, thereby limiting the re-negotiation possibilities that informational asymmetry causes²¹.
- The lesser incentivisation will have to be offset by the positive effects of the co-ordination.

The proposed approach thus combines easily with an approach that is also supposed to renovate the remuneration system. In actual fact, because of its decentralised and

interactive character, the approach makes it possible to highlight the key indicators around which the incentives can be defined (and monitored!) at a later juncture – and this at every level of the organisation²². In a French context, with its lesser monetary incentives, our system fits in with a re-orientation towards more forceful incentives systems. The re-negotiation possibilities will progressively get managers who aren't used to taking risks to do so.

The aforementioned objectives of this re-forecasting exercise again show how important it is to integrate these new tools into any budget procedure during which action plans are being discussed and co-ordinated. They also demonstrate the usefulness of a bottom-up approach.

Finally, and to include long-term issues in this study²³, it would certainly be a good idea to extend these performance indicator and re-forecasting principles into the planning process, since this would make it possible to shift from a one-year time frame to a strategic horizon. This would not only involve an extension of the forecasts' horizon - it would allow for the design of performance indicators that represent real issues²⁴.

Above and beyond these three differences, note that the reformulation being proposed here seems to be well adapted to multidivisional companies that are trying to set up relatively uniform systems across all divisions that basically have the same core business (and which therefore lend themselves to natural inter-unit benchmarking). In this situation, it is difficult to focus on one pilot unit and then generalise on this basis - it is preferable to benefit from different units' experiences and then to synthesise them. Here the approach can be decentralised from the beginning and the focus oriented towards shared operational aspects instead of towards the specific aspects of a given unit's strategy. In addition, the benchmarking argument helps convey the idea (which

operatives may dislike at first) that the performance indicators may be initially standardised, to a certain extent at least.

Moreover, this reformulation is well adapted to a context in which no strategic novelties are expected in the short run²⁵.

All in all, the reformulation being proposed here seems particularly well adapted to the situation in which a number of firms who are currently thinking about BSC find themselves. This is because it involves an improvement of operational management rather than a radical redefinition of the entire piloting system.

Lastly, the reformulation can be a complete one insofar as it can draw inspiration from the BSC, given that it systematically takes into account the four dimensions which KN (or anyone else, c.f., Epstein and Manzoni, 1998) apply to all performance indicators.

6. Conclusion

BSC's contribution is probably that through its combination of financial and non-financial indicators, it has introduced, in a current environment that is largely dominated by incentivisation, a number of long-term, co-ordination-related elements and learning elements, though limited to top management. Having said that, this has been accompanied by the abandonment of individual incentives the further we go down the hierarchical ladder, meaning that BSC does not address the issue of simultaneously resolving both co-ordination, collective learning and individual incentives. To better understand and resolve the issues that are associated with this question, we have tried to add to current thinking on BSC by presenting new ways of implementing the models of cause and effects which are at the heart of BSC. These paths are based on three principles:

- Models must be thought of as tools of dialogue (Ponssard and Tanguy, 1993). This means that information exchanges during re-forecasting phases are more important than a simple corroboration of the forecasts - and that outcome-tracking procedures must emphasise the lateral and vertical exchanges that are involved in operational information.
- Information exchanges go with reduced incentivisation. This has to be offset.
- The tools must encourage the emergence of a model that links operational issues and financial performance so as to render decisions more observable and subsequently limits the weakening of incentivisation.

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Tables and Figures

Table 1: Extracts from the battery of performance indicator

		Initial situation	Forecast made during initial decision	Re-forecast
Fuel preparation				
Consumption of electricity	KWh/t	10	10	15
Cost of fuel/GJ	F/GJ	15	8	9
Preparation of feed				
KFUI*	%	10	10	15
Output	t feed/month	50 000	50 000	47 000
Cost of feed	FF/t	14	14	15
Firing unit (kiln)				
Efficiency of equipment	%	70	70	50
Output	T clinker/mo.	32 000	32 000	28 000
Cost of firing	F/t clinker	60	40	50
Factory				
Output	T cement/mo.	40 000	40 000	35 000
Cost of cement	F/t cement	100	80	90

*Kiln Feed Uniformity Index

¹ Kaplan and Norton (1992) - the first in a series of three articles (KN, 1993; KN 1996a)

² The usual French translation is a “prospective *tableau de bord* [battery of performance indicators]”.

³ See Aoki (1986) in particular.

⁴ cf. KN (1996b, p.8): “objectives and measures for the Balanced Scorecard [...] are derived from a top-down process driven by the mission and strategy of the business unit” and the title of Chapter 9 “Achieving Strategic Alignment: From Top to Bottom”.

ⁱ See for instance the examples of City of Charlotte or UPS (KN, 2001).

⁵ The present case expands upon a real experience, one which took place within the framework of an aid mission involving an implementation of new batteries of performance indicators. It is part of a teaching module that is intended to illustrate the system’s anticipated effects on the heads of technical departments and on factory managers.

⁶ For reasons of confidentiality, the data is fictitious. The basic trends have been shown here.

⁷ Although a return to the level of performance forecast in the budget is impossible in the absence of any investment (c.f., re-forecasting within the framework of the new system).

⁸ This explains why it is impossible to use the (ex post) ROI to find the average (ex ante) IRR of the unit’s successive investment programmes.

⁹ Many of the methods envisaged for implementing a *tableau de bord* battery of performance indicators also try to combine top-down approaches (i.e., as regards the definition of objectives) with bottom-up ones (since the key indicators that make it possible to reach the defined targets are defined by the managers).

¹⁰ This risk is particularly great in the highly industrialised firms where KN’s diagnostics can be applied – in which case it is difficult to devise the type of performance model that can support a BSC. Inversely, this model may well be easier to develop wherever operational constraints are less stringent (i.e., in an insurance company). But KN’s diagnostic is less relevant in this case.

¹¹ The BSC approach’s limited usability for General Management is also highlighted by Chiapello and Lebas (1996) and Mendoza (1998, p.57). The same breakdown methodology is also mentioned (KN, 1996b, p.8) – but it is never described.

¹² Several authors (Epstein and Manzoni, 1998; Chiapello and Lebas, 1996) focus on the fact that the model’s development phase is just as important as its utilisation phase. This analysis can be extended by highlighting the conditions in which the model was actually devised, or more specifically, the existence of shared knowledge.

¹³ Yet even if financial indicators are nothing more than the translation of past actions, physical indicators are not indicators of economic performance per se. Hence the need to try to control operational indicators by coming up with hypotheses regarding the operational objectives' impact on financial performance.

¹⁴ Thus remaining in line with the principles that KN listed (1996b, p.30).

¹⁵ It is not always easy to measure the economic impact of a given decision. More specifically, it is no easy thing to measure the economic impact on a product's development cycle or customer satisfaction rates. It remains that we find it wrong that decisions be made on these topics without any attention being paid to their economic impact. The procedure we are suggesting here attempts to explain the hypotheses underlying such decisions without making any judgements as to the feasibility of quantifying their financial impact with any degree of precision.

¹⁶ These issues are explicit in Anthony's definition of management control (1989) as a "process by which managers influence other members of the organisation so that they will implement its strategy".

¹⁷ Here we concur with recent studies that have simultaneously stressed the importance of technico-economic modelling as well as the way in which the learning which occurs during the management systems' design (Argyris and Schön, 1978; Hatchuel and Weil, 1990) leads to a rejuvenation of prospective management systems (Midler, 1994; Ponssard and Tanguy, 1993; Soler and Tanguy, 1998; Saulpic and Tanguy, 2001).

¹⁸ This information was a source of power for them (Crozier and Friedberg, 1977).

¹⁹ This point will be illustrated in Chapter 4.3.4.

²⁰ The loss of incentives may stem from what the theory of contracts calls the "ratchet effect" (Dewatripont, 1989), the result of a hierarchical superior's temptation to revise a target upwards when s/he realises that the initial objective was too easy. It is also the result of a "hold-up", corresponding to situations where the possibility of renegotiating objectives induces actors to work less hard on a task that will only provide results if the actors continue to operate within the framework of their current function or firm.

²¹ Another direction consists of agreeing to incorporate co-ordination tasks into performance evaluation. Work on the theory of contracts studying the effects on the incentive system of having agents accomplish a multiplicity of tasks (Holmström and Milgrom, 1991) suggests that an audit procedure be used towards this end. Sinclair Desgagné (1999) demonstrates how it is possible to achieve a high degree of simultaneous incentivisation from a task whose outcome can be measured (i.e., output) and from a task whose outcome is difficult to measure (i.e., quality). This requires establishing monetary incentives for quantities; initiating a quality audit if the quantities exceed a certain threshold; reinforcing the incentive system if the audit is positive; and cancelling bonuses if the audit is negative. If we hypothesise that the difficulties in giving people an incentive to co-ordinate stem from the problems that are involved in

measuring the results of this action, the target here is to turn co-ordination into something that can be audited. A model that links operational issues and financial performance helps us to advance in this direction.

²² As we have stressed, KN only deal with the issue of incentives in an indirect manner. Our reformulation is in tune with their thinking as regards the need to define incentives only after having highlighted the problems of co-ordination.

²³ This being one of the objectives of the BSC.

²⁴ For an illustration see Tanguy (1989).

²⁵ Having said that, even where such a break can be envisaged, the existence of a shared representation of the conditions in which a given level of performance can be achieved “from bottom up” might make it possible to validate the feasibility of a strategic reorientation that is based on “top down” strategic thinking. This can be done by introducing technical and operational constraints into this reorientation (Tanguy, 1989).