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Performance measurement and performance management☆

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Abstract

Performance management creates the context for – and the measures of – performance. Performance is defined as the potential for future successful implementation of actions in order to reach the objectives and targets. The article takes the view that performance is constructed by the management system and by managers. Performance management precedes performance measurement and gives it meaning.

Keywords: Performance; Measurement; Management; Reengineering; Accounting

"Measurement is complex, frustrating, difficult, challenging, important, abused and misused" (Sink, [1], yet, as Lord Kelvin once said, "*if you cannot measure it, it does not exist*".

Managers are continually measuring or requesting that measures be provided, be they of market share, of lead time, or of profitability. In fact management could hardly exist without measurement. We know, however, that measuring means transforming a complex reality into a sequence of limited symbols that can be communicated and that can be, more or less, reproduced under similar circumstances. Managers often speak of performance measurement, thus raising the question what is performance?

The term performance is even more frustrating to define than measures are. Yet the term performance appears continuously in the management as well as engineering literature. Few people agree on what performance really means: it can mean anything from efficiency, to robustness or resistance or return on investment, or plenty of other definitions never fully specified. In this paper we will choose to say that performance, especially in the case of management, is not so much about past achievements, as generally accepted, but about the future, about the capability of the unit being evaluated. It is so because, in our mind, the purpose of management is about creating and shaping the future of the organization, as well as that of society. We will later see how performance defined on the future actually relates to performance as defined over the past achievements.

The first section of the paper will address the issue of why and what to measure, thus defining the term of performance while the second section will review how the accounting model, the dominant model of economic performance measurement, is evolving from a retrospective viewpoint to that of performance management.

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1. What is performance?

1.1. Why and what do we measure?

The key questions managers and performance evaluators must answer are:

(1) why do we want to measure? That is to say, what is the use that will be made of the measure? Implicitly this means that measures are not objective, they are not externally defined. They result from a choice and are carried out with some purpose in mind.

(2) what do we want to measure ? The purpose of the measure is not enough to define what is to be measured. The very concept of performance must be operationalized before it can be measured.

These two questions are difficult to separate, they are very much a chicken and egg problem. The answer is neither easy nor unique as the questions are heavily loaded ones in terms of culture and meaning: different cultures and different economic and socio-political contexts will lead to different answers.

1.2. Why do we want to measure?

In management, we identify, at least, five reasons why we may want to measure (each time we illustrate in brackets the types of measures that might help answer the need):

- Where have we been? (Score card about the past: how did we get to where we are. Such measures support the reward system – rewards are based, most of the time, on the past, not on the likelihood of future success – and serves to build the archives that will help forecast the parameter values used in decision analysis models.)
- Where are we now? (What is the status of the processes that define the organization and what is their potential for achievement in the future – for example: the car-engine oil-level and the ignition timing are coherent with the manufacturer's recommendations; the spark plugs are new; etc.)
- Where do we want to go? (We want the measures to provide support to the definition of objectives and targets, and support to the design of action plans.)
- How are we going to get there? (The measures must support the budgeting and planning activities, and support continuous improvement.)
- How will we know we got there? (Measures cannot be separated from the feed-back loop about whether or not objectives or targets have been achieved. They feed into the reward system, and serve to reinitialize the cycle again.)

For each of these five aims, measures must be created for different users and for different purposes:

- For the manager/measurer/measured: learning and self improving.
- For others in lateral partnerships: dynamic coordination of actions and continuous improvement.
- For supervisors:
  - integration of local measures to create aggregated or eventually corporate wide measures;
  - monitoring of actions delegated to others for continuous improvement and control;
  - feeding the reward system.
- For all actors in the organization:
  - creating a sense of belonging;
  - feeding discussions as a basis for continuous improvement.
- For some external stakeholders: customers, suppliers, and some financial institutions as well as some regulatory agencies may require that some measures about how well the organization is and will be doing be made available.
- Etc.

As we can see, the question "why do we measure?" cannot be separated from who the users are. It is therefore important to explore the second side of the question i.e. what is to be measured.

1.3. The question "What do we measure?" translates into: what is performance?

As we said before, there is little agreement as to the answer to such an interrogation. Performance per se may not be definable in the absolute. It is, as we said above, contextual both in terms of users and in terms of purpose. We should, however, be

Table 1
USDoD[a] Maintenance depot's performance measures in 1992. (Italicized measures are the ones that were adopted in 1993 to be used across all services)

Performance measure	AR	NS	NA	MA	AF	Occurrence
Man hours/unit (plan vs. actual)	X				X	2
Net operating results	X		X		X	3
Cost/unit (planned vs. actual)	X	X		X	X	4
Customer complaints/returns	X				X	2
Customer satisfaction					X	1
Timeliness (conf to sched)	X	X	X	X	X	5
Direct/indirect costs ratio	X		X			2
Corporate plan conformance		X				1
DMR savings		X				1
Project review		X			X	2
Turnaround time			X		X	2
Cost/man hour (planned vs actual)			X		X	2
Quality			X			1
Defects (/area or/product)			X		X	2
Labor efficiency			X			1
Labor usage			X			1
Overtime			X	X		2
Materials usage			X			1
No need: we are close to the client				X		1
Capacity utilization					X	1
WIP and carry over					X	1
Overhead reduction					X	1
Output volume					X	1
Failure rate in service					X	1
Stockage effectiveness					X	1
Defense system availability					X	1
Productivity						0
COQ						0
Innovation						0

[a] The Services are identified as follows: AR = Army, NS = NavSea (i.e. the naval forces), NA = NavAir (i.e. the "air force" of the Navy), MA = Marine Corps, AF = Air Force.

able to get an approximation of what performance is in one well defined context. By looking at measures that have been selected by managers to serve as surrogates, we should be able to get one contextual definition. One might expect that, at least, in one relatively homogeneous business, similar concepts of performance might lead to similar measures, thus supporting the theory that performance could be defined if the context is clear. Facts unfortunately contradict that naive view. Table 1 shows an illustration of the lack of agreement about measures defining performance even in a narrowly defined context [2]. Table 1 reports the diversity of measures to evaluate performance for the maintenance depots of the US Department of Defense (US DoD)[1]. It is interesting to note that while everyone in the defense business is fully cognizant of the fact that "defense system availability"

[1] The US Department of Defense Maintenance Depots are "factories" that carry-out all maintenance activities on Defense Systems. It represented, in 1992, a business of $8 billion of operating expenses and $13 billion of total expenses. It employed about 125 000 personnel (of which 3,000 only were military) in about 20 sites. Each Service within the US armed forces had its own set of depots and used its own measures of performance until a single performance measurement system was introduced in 1993.

is the ultimate goal and therefore the ultimate definition of performance, with, admittedly, some economic constraints, the various Services of the US DoD have selected a great variety of surrogates to define and measure performance and only one such surrogate mentions availability. It can be argued that some of the measures listed in Table 1 could be seen as surrogates of availability, but all in all it seems that there is no agreement as to what performance is, even in as homogeneous a business as that of maintenance depots.

Not only is it quite clear from looking at the data that no clear definition of performance exists but, furthermore, one can infer that the choices of measures are muddled by "political" issues.[2] The vision one Service has of the mission of its maintenance depots transpires through the measures it selected. Yet it confirms the fact that measures are difficult to choose and that any measure implies some strategic orientation.

1.4. *A proposed first definition of what performance is*

A *performing* business is one that *will achieve* the objectives set by the managing coalition, not necessarily one that *has achieved* the objective.

Since performance cannot be defined objectively, even in a narrow context, we need to posit a conceptual definition and work from there. Performance, for us, as we stated before, is about capability; performance is about the future. However, we need not specify whether we are talking about performance defined in terms of any of the criteria listed in Table 2; it suffices to say that, whatever the definition of performance made by managers, we will define performance as the future value of the criteria retained. It is important to note that these criteria are not exclusive, they can be retained in any combination of criteria to be met simultaneously.

Table 2
A diversity of criteria defining performance

- Employment creation
- Societal good
- Security of employment for the firm's personnel
- Providing a satisfying return to corporate headquarters
- Innovativeness in processes and products
- "Customer" satisfaction
- Growth of market share
- Environmental "contribution(s)" (positive, as well as negative)
- Technological leading edge
- Etc.

However, measures can, by definition, only be about the past, even if we are talking of measures about capability. There is, therefore, a contradiction we will have to resolve in any managerial systems: data about the past are used to evaluate the future!

Data are accumulated about the past. They become information only when they are used in a decision making model or when they are transformed into some kind of predictive parameter value to be used in decision making. Information based on past data is only interesting in as much as it helps the user understand the potential for success in the future. The great difficulty with using past data is that it requires some form of extrapolation, i.e. it requires stability of the relations that created the data in the first place, i.e. stable causal models. These models are more or less aggregated: the financial model, especially, is quite aggregated, very far removed from the "original cause". An apparent stability of the financial model may hide a modification of the underlying "real" causal model that will transpire in the financial result only at a later date. It will be, therefore, especially important to provide measures that capture the elements of the causal model(s) as "soon as possible", as close as possible to the original cause so that any extrapolation be more responsive to changes in the causal relationships. Simultaneously, the managers will have to be very open to the idea that the causal

[2] It is important to remember that in the period 1992–1993 the US DoD has been placed under tremendous pressure to cut down its budget and that many of the existing depots have been or will be closed, often creating great distress in the communities in which they were located and where they often represented the major source of employment. Each depot, and the Service to which it belongs, tries therefore to show that it looks better than the others and therefore should be the one to remain open if only one remains.

models do change and that mind sets do change: a systematic watch of the underlying phenomena will be an essential part of any performance measurement system. No one wants, explicitly, to be, for example, the most efficient, lowest cost producer of a digital watch chip of a generation of product that is currently obsolete. Part of the measurement system of performance will include a component that will continuously check the validity of possible extrapolations.

Having achieved the objective is no guarantee that it will be achieved again. We all know of "brilliant" organizations such as the ones selected by Peters and Waterman [3] that went bust a few years after the publication of the book; conversely, we all know of companies, such as, for example, Genentech, that have not produced much but are considered to be on the right track of genetic engineering and thus hold "a lot of potential".

1.5. *What are the purposes of the measures?*

We may not be able to define performance beyond saying it is about capability to meet certain objectives but we can derive, from what a performing business is, some of the components of performance. The objectives any performing firm achieves contain (1) *targets* to be reached, as well as, (2) elements of *time* at which the target or milestones to that aim are reached and (3) rules about a preference ordering about the *ways to get there.*

These three elements indicate that objectives and the definition of performance rest on the definition (choice) of a causal model linking inputs and outcomes through selected causal relationships. Performance is something each firm, each stakeholder, each organizational actor defines. Performance is never objective, it is only a way of defining where one wants to go.

Performance of a manufacturing facility can therefore be defined by different parameters by each firm, defining it to match its strategy and vision, subject to the external constraints of the market. The measures that describe the performance in terms of target, time, and path to the target can be regrouped around four categories of purposes, all contributing in one way or another to continuous improvement:[3]

(1) piloting the business (process management support) (where were we and where are we)

(2) anticipating the likelihood of achieving the target(s) (how are we getting there and how do we know if we got there);

(3) allowing updating the Performance Measurement System itself to maximize the likelihood of achieving the target(s) under acceptable conditions, (where do we want to go and how are we going to get there);

(4) contributing to the continuous redefinition of the target(s) or objective(s) (where do we want to go and how do we know we got there).

1.6. *The importance of the causal model(s) in the definition of performance*

If we hold on to the belief that performance is about the future, one must first, in order to create the conditions of management of performance, develop an understanding of what causes performance, however it is defined. The concepts of performance and the correlative causal model must be shared among all the participants so that every one can contribute to the success of the business.

The schema of Fig. 1 shows how complex a definition of performance can be. The general view, carried by the accounting tradition, limits the view of performance to that of net income, i.e. the difference between sales and costs, under the constraint of the accrual and the matching principles. However, we can see that sales are themselves the result of such elements of performance as customer satisfaction, quality, delivery, innovativeness, flexibility and costs. Costs are themselves the result of processes creating these parameters and these processes find their food in the "soil" represented by such elements as training and multiqualification of personnel, knowledge of markets, social relations,

[3] Capability may not be easily defined, but continuous improvement is the sure indication of the fact the capability existed. Simply because unless capability exists, continuous improvement is impossible.

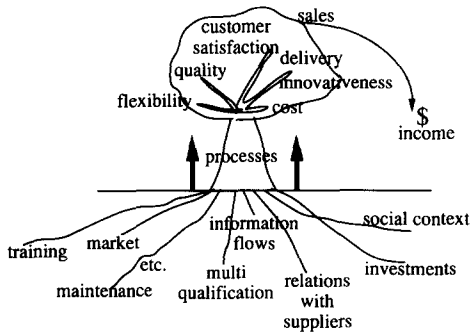

Fig. 1. The performance causal model. Adapted from an idea of Douglas McBeth, UK Management Accounting Research Group Annual Meeting, London School of Economics, London, April 1993 [4].

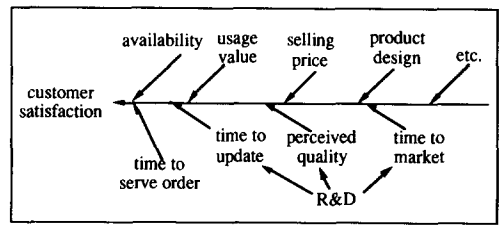

Fig. 2. An illustration of the components of customer satisfaction that need to be managed to guarantee performance of the organization (if customer satisfaction has been identified as one important component of performance).

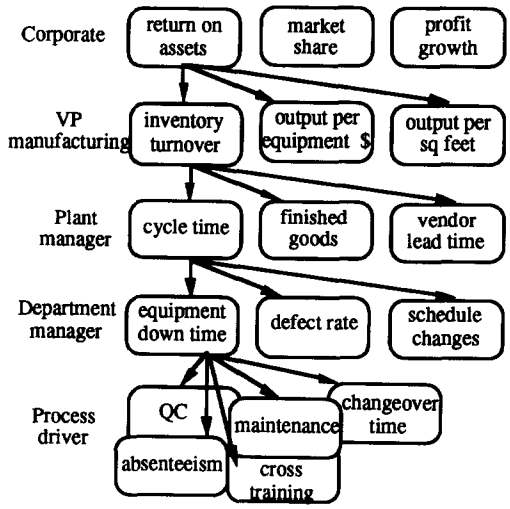

Fig. 3. The deployment of objectives, copy of the causal model. Adapted from Beischel and Smith [5].

management style, information flows, relations with suppliers, maintenance, investment, etc.

As we can see in the illustration of Fig. 1, performance can be defined at any or all of the four "levels" that appear in the process of creating income: the net income, the fruits and the foliage, the processes in the trunk of the performance tree, or the richness of the humus in the soil.

Understanding the processes underlying performance is the only way to define the measures that lead to actions. If we understand which of the steps in the process is defective, appropriate corrective action can be identified. If, however, only the final, most aggregated version of performance, namely the net income is looked at, no appropriate corrective action can be identified. For example, knowing whether customers are satisfied or not is already better than simply observing that sales or income go up or down, but it is not early enough to guide the manager in the choice of corrective actions; what must be done is to anticipate even further the causes of the performance (customer satisfaction as well as financial or any other definition) by placing measures upstream of the desired "outcome", in the processes that define the organization and in the components of the "humus" that represents the conditions that will generate performance.

Fig. 2 offers a more detailed illustration of a representation of a causal model that can be used by managers to define the elements that will be measured so that performance will be achieved. Customer satisfaction, in this illustration is only the result of several independent steps that singly and collectively influence on the achievement of customer satisfaction.

Understanding the process of performance generation not only facilitates the identification of measures and therefore of corrective actions, it allows for a clear deployment of strategy at all levels of responsibility. The schema of Fig. 3 shows how responsibility for certain variables in the achievement of performance can be assigned in a "nested" coherent way. In that schema, performance is assumed to be defined by three parameters, namely return on assets, market share and

profit growth. The illustration shows how each of these parameters can, in turn, be broken down into more detailed, more operational measures or targets at lower and lower levels of responsibility. Each time Beischel and Smith [5] indicate three or more targets or measures that need to be managed appropriately by the level of responsibility indicated on the left in order to guarantee that the target above is well managed.

1.7. What is performance?

We can therefore now attempt to define performance: performance is about deploying and managing well the components of the causal model(s) that lead to the timely attainment of stated objectives within constraints specific to the firm and to the situation. Performance is therefore case specific and decision-maker specific. Achieving congruence as to the definition of the parameters of performance and the causal model(s) that lead to it is one of the essential functions of management.

Accounting has been given the duty of defining performance since the early historical times. Wasn't the performance of a Venetian sailing expedition defined as the difference between the amount of money invested by the ship owner(s) and the amount of money obtained from selling all the goods brought back by the ship's captain. Today such a retrospective vision of performance would not be intuitively satisfactory, yet accounting still plays a major role in performance measurement. In the next section we will analyze the traditional accounting model and the implications for performance measurement of the current evolution introduced by the ABC[4] view of the organization which defines it as a network or processes or activities.

2. The role of accounting in performance measurement: the old and the new approaches

2.1. The traditional view of accounting

The traditional managerial accounting model of the firm is focused on product-costing and defines performance as income, that is, the difference between sales and costs. As described in Fig. 4, this representation, which we call the costing logic, assumes that costs are a given, an almost unavoidable "gift" of fate, and that the key issue is thus to allocate costs to cost objects "appropriately". The costing logic can be but is rarely based on a precise understanding of a causal model. Most accountants attach costs to objects on the basis of convenient[5] bases of allocation such as a % of direct labor cost in North America or on the basis of direct labor hours or machine hours in continental Europe.

Although Fig. 4 shows the possibility of multiple cost pools, often, especially in North America, there was only one cost pool for a whole plant. The French approach, on the contrary, always showed multiple cost pools under the *méthode des sections homogènes* (homogeneous cost pools method) recommended by the French Universal Chart of Accounts. Whether there is only one cost pool or several, one for each responsibility center, the traditional approach does not worry about why the costs exists, only where they are incurred.

2.2. The ABC view of accounting performance

In the ABC movement accountants rediscover what engineers have never lost: the logic of causality.

[4] ABC stands for Activity Based Costing. The term itself is misleading as it confuses the fact that a firm can be defined as a network of processes or activities – i.e. what people really do – and the focus on costing of traditional accounting. Even though, in the US, the term tends to be replaced by ABCM, for Activity Based Costing and Management, we feel the French translation of ABC by *A Base de Causes* or "based on causality" certainly captures better the revolution that is implicit in ABC, which implies not only a new representation of the firm but also turning one's attention away from costing and towards the management of costs.

[5] We use the term convenient because a basis of allocation is often chosen mainly because the information it requires already exists, not because it is relevant. Direct labor expense is already known and therefore a cost allocation on that basis does not require obtaining additional information. Simplicity is often favored by accountants over relevance for others than the accountants themselves.

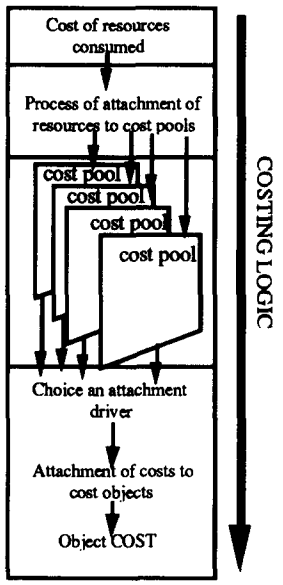

Fig. 4. The costing logic: traditional view of accounting valuation [6].

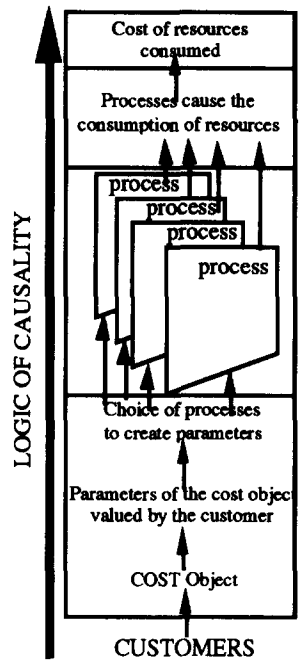

Fig. 5. The logic of causality: a completely reversed view of costs [6].

Instead of considering costs as the beginning of the calculation, the causality approach considers, as shown in Fig. 5, the customer as the root cause of the existence of costs. The cost object that the customer acquires is in turn the cause of the existence of processes aimed at creating the value parameters (for example: timeliness, quality, recyclability, variety, etc.) that the customer acquires in the bundle called the product or service. And it is the processes that are the cause of the existence of resource consumption, which is the cause of costs.

The observation of Fig. 5 may lead the reader to think that it looks very much like the schema of traditional costing shown in Fig. 4. The choice of presentation is deliberately similar. The ABC approach is a complete reversal of logic but the two approaches are quite compatible. It is simple to begin with Fig. 5 and develop an estimation of the costs required in order to serve the customer and once these costs are estimated, it is quite possible to consider the processes as cost pools and therefore calculate the cost of what is being sold to the customer. The result, however will be very different between the traditional cost and an ABC type cost that would have started the calculation process first from the customer needs and wants.

The ABC view modifies the definition of performance in the accounting sense: while the traditional costing approach was looking for cost minimization per cost-object and for "appropriate" cost allocations (based on such absurd ideas as "load the costs on the products that can bear it"), the ABC approach sees performance as the minimum amount of process costs that allow these processes to give the customer what he or she wants and values.

The causality approach rests on the identification of processes or activities, i.e. the description of "*what people do*" to achieve the objectives in general and customer satisfaction in particular. In many ways the process approach capitalizes on the total quality approach which, itself, benefited from the long standing total maintenance approach which focused on the search for the causes of the equipment failure. The ABC philosophy appropriates itself the idea that to solve problems one must act on the root cause: in order to minimize costs, one must work on the definition of the processes and on their coordination to avoid waste and duplication.

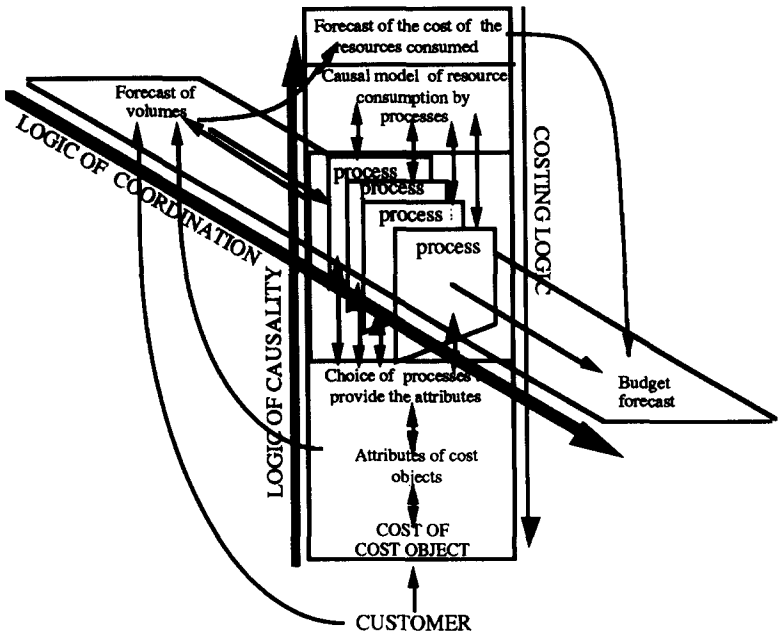

Fig. 6. The logic of coordination introduces process-based budgets in performance creation.

2.3. *The role of budgets in the ABC approach*

Each process or activity co-exists with other processes. Performance thus requires that all activities or processes be integrated in a logic of coordination which is similar in its purpose to budgeting but differs in the way it is set up because the causality logic has completely reversed the order in which questions will be addressed. As can be seen in Fig. 6, first, as always in ABC, is the customer and its satisfaction, then comes the identification of the processes followed by the forecasting of the volumes of activity of each process and the coordination of these processes.

Performance as we have stated above is about the future. The budget process is about evaluating and selecting possible action plans that will help the firm achieve customer satisfaction in the future. In order to increase the probability of such an intended result, it is crucial to make sure all managers, be they functional managers or process owners, must cooperate in order to minimize the quantity of resources consumed in total and also in order to give the customers the total quality they are expecting.[6]

2.4. *The final contribution of ABC: the logic of organizational engineering and the logic of piloting*

Once the concept of causality of performance is accepted and the firm is thus redefined as a network of processes aimed at satisfying the customer, it becomes clear, as the three subsections above have shown that performance is completely redefined. However, why should the manager accept that the choice of processes is outside the domain of performance. Certain processes are better than others at increasing the probability that the objectives will be achieved in the future, either because they are more effective or because they consume less resources, thus leaving more available resources for other

[6] For further details a good reference can be found in [7].

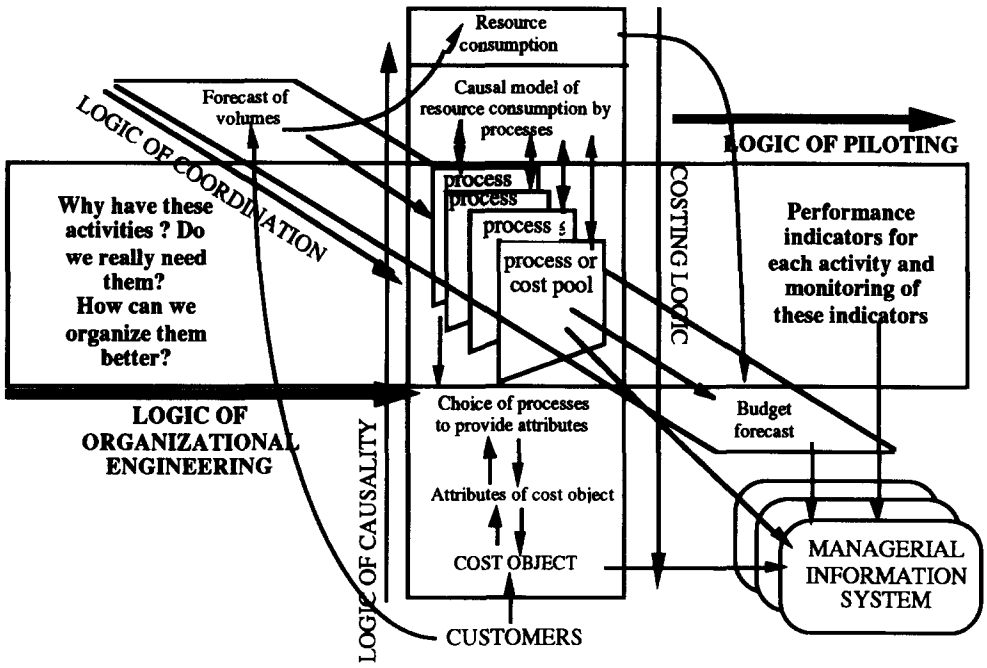

Fig. 7. The logic of organizational engineering and of piloting complete the ABC view of performance [6].

processes that might have been maligned otherwise. Fig. 7 shows that the previous three diagrams must be completed by the introduction of two more logic: (1) that of organizational engineering (reengineering is one version of organizational engineering), i.e., the logic of choosing and designing processes, and (2) that of piloting, i.e. that of "driving" efficiently and effectively the selected processes.

It must be noted that the three axes and five logic that were described all feed into the managerial information system which the French call their *tableau de bord* or literally their managerial dashboard or instrument panel. Just like the dashboard of the car, the managerial information system evoked here is forward looking, all the measures that appear on its "meters" are relevant for the operation of the vehicle or of the machine in the future. The logic of piloting refers to the ability for the organization to obtain the most out of the processes it has chosen during the phase of organizational engineering. Piloting is reactive and is creative; it assumes a thorough knowledge of the causal relationships under which the firm operates but at the same time, it requires the ability to take initiatives as soon as the causal model one had assumed seems to not be operating any more. The piloting aspect of management is therefore as reactive as possible both at the level of an assumed system but also about the relevance of the system itself.

2.5. *More about the logic of organizational engineering*

The logic of organizational engineering is really a constructivist view of the organization: it consists in designing the "industrial" organization that will best meet the needs of the firm in order to satisfy the customer.

The process described in Fig. 8 starts from the representation of the firm as a network of processes. It is not fundamentally important that the description be perfect the first time itself since the concept of organizational design implies that we

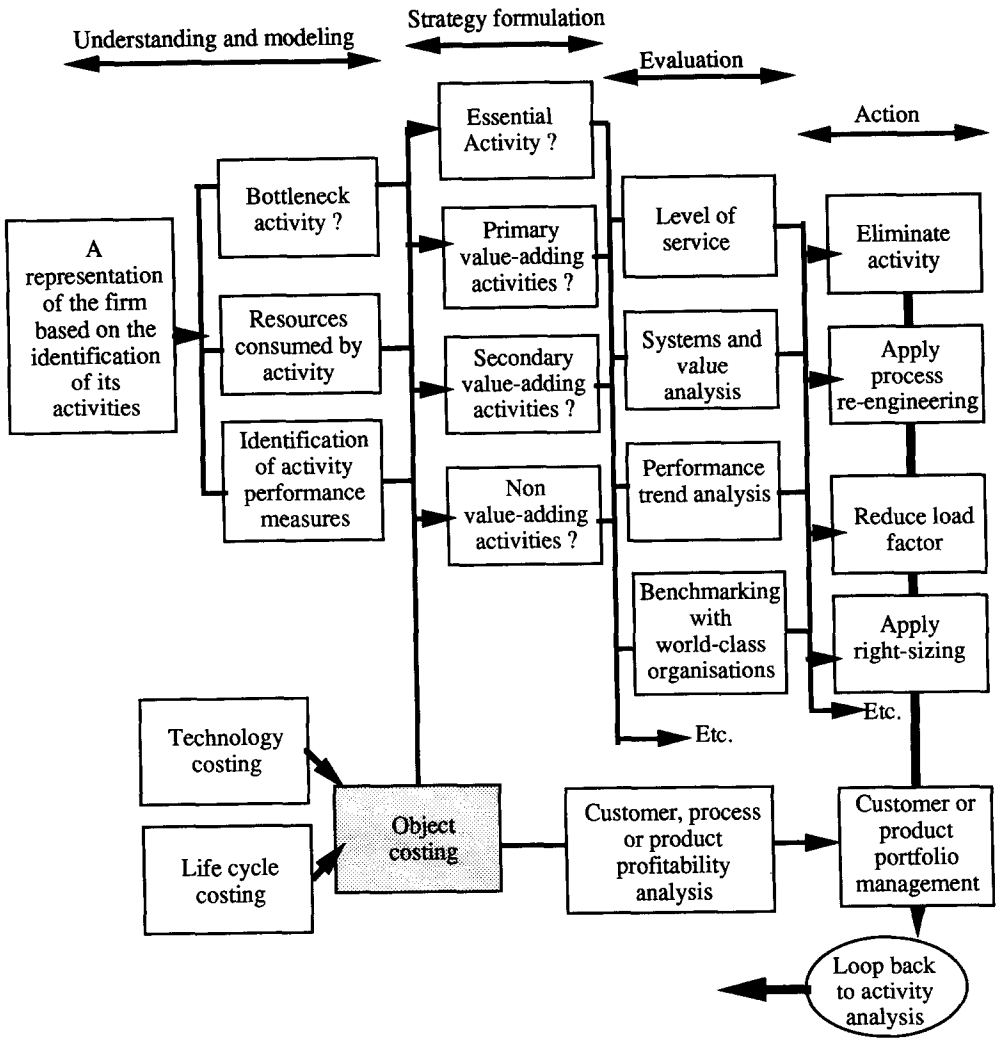

Fig. 8. The process of organizational engineering [6].

are operating in a loop and that, therefore, we will be iterating through the network of steps indicated on the diagram. It is important to note that the process is carried out in four general steps: understanding and modeling the business, strategy formulation, evaluation of the current form of organization of processes, and last, the action(s) step. The key concept is once more that of customer satisfaction: the notion of value-adding process is only defined in terms of adding value from the point of view of the customer. It is clear that the ultimate goal is to eliminate all non-value-adding processes as soon as feasible. The distinction between primary and secondary value-adding processes refers to the strategic choice of the firm. Some processes are clearly adding value such as accounting, billing, managerial information system management, quality control, personnel administration, security, etc., but are not processes that are central to the identity of the firm or central to its competitive strategy. What we call here secondary value-adding processes are processes that could be

subcontracted without any loss of competitive strength. The other components of the organizational engineering process are self explanatory and we shall not explore further the details of their meaning[7]. It should also be noted that the accounting process is not central to the organizational engineering process. As we showed earlier, the costing logic is now the result of all the other steps to a good management of performance, not the beginning of the analysis.

3. Concluding remarks: performance measurement or performance management?

The first section showed that performance can only be defined over the future and that its specific definition is case specific. Section two showed how the accounting profession through its adoption of the ABC philosophy, inherited from the total quality approach(es), can now move from retrospective measurement to a constructivist view of performance: contributing to designing a performing organization.

The first answer to the question posed in the title of these concluding remarks is that measurement and management are not separable. As can be seen on the schema of Fig. 9, there is a loop: measurement and management follow one another in an iterative process. May be the question might have been: which is the most important? measures of performance? or, processes aimed at creating performance?

There comes a second answer to the question raised in the heading of this section and to the last question: performance management is a philosophy which is supported by performance measurement. Fig. 9 gives a schematic view of their relationship.

Performance management precedes and follows performance measurement, in a virtuous spiral and performance management creates the context for measurement. Thus any attempt at separating the two processes is bound to be vain. Table 3 shows the differing types of preoccupations when one is addressing the question of measurement or the question of management of performance.

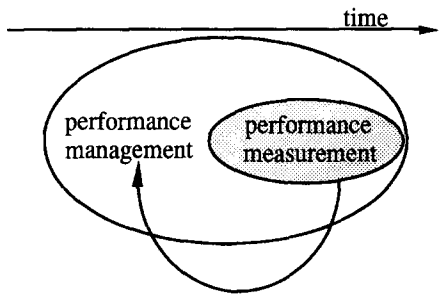

Fig. 9. Performance management and performance measurement are closely intertwined.

Table 3
The same processes and the same preoccupations do not apply to measurement and to management

Performance measures	Performance management
• Measures based on key success factors	• Training
• Measures for detection of deviations	• Team work
• Measures to track past achievements	• Dialogue
• Measures to describe the status potential	• Management style
• Measures of output	• Attitudes
• Measures of input	• Shared vision
• Etc.	• SPC
	• Employee involvement
	• Multicompetence
	• TQC
	• Incentives, rewards
	• Etc.

As can be seen in Table 3, the processes involved in performance measurement and in performance management are not the same but they feed and comfort one another. In fact, in a field study of performance management practices in 15 world-class plants, Euske et al. [9] have shown that in these unique sites, measurement was very secondary to management. Measures were used mainly to identify deviations from the expected result of the causal model but the actions that were implemented on the basis of these measures were always systemic and belonged to what we have called organizational engineering. First and foremost was the extent of educational programs of general

[7] For further details on the process of organizational engineering see [6, 8].

nature (based, as one of the managers they cite declares, "on the idea that educated personnel are more able to take appropriate initiatives"), followed by training programs for problem identification and problem solving, for statistical process control and for total quality management, including in many cases courses in group-discussion management.

Our final conclusion is that a powerful performance management system is one that is built on – and supports – measures that:

- give autonomy to individuals within their span of control;
- reflect cause and effect relationships;
- empower and involve individuals;
- create a basis for discussion, and thus support continuous improvement;
- support decision making.

Finally, we will reaffirm the fact that performance measurement and performance management cannot be separated. All those who have focussed exclusively on measurement, without understanding that measures are only telling what the consequences are of the decisions that created the context for performance, missed the opportunity to gain control over – to gain mastery of – the process of creating performance and success for the firm or for the organizational unit under scrutiny.

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