ANALYTIC MANAGEMENT

Article Abstract

We will produce a model that explains present weaknesses of the Western Management as a result of inconsistent corporate planning and interprets the solution proposed by Deming's 14 management principles as an optimal strategic alternative. Never in human history has the environment changed at such a rate. Competitive businesses in today's market are those that have a rational basis for filtering emerging opportunities and matching them with corporate distinctive competence. We will introduce process management as an analytic decision support technology to bridge the gap between quality concepts and the practice of general management.

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We didn't inherit the land from our fathers; we are borrowing it from our children. –*Amish saying*

Abstract

Given the rate at which market forces are changing, the very same practices which made a business successful in the past may now be obstructing its path to progress. Analytic management is a framework which enables people to understand to what extent their past experiences can guide their future actions. Its purpose is to help managers update their business practices.

This paper will examine the application of information theory to deployment of strategic goals. The fundamental assumption behind the author's approach is that organizational hierarchy corresponds to clusters of information. In today's world, information is well mixed (for example, the profit figures of a company, once published only in the annual report of its parent corporation, will now reach its employees). Therefore, competitive companies are those whose leaders provide early "intentional" data to their employees in order to tap into their brainpower to predict, plan and build robust and flexible strategic processes.

Outline

The process of defining and deploying business goals and strategies–the strategic management process–is compared to that of sending out a message to initiate a significant action. For such a message to fulfill its purpose, the following steps must take place.

1. The signal sent must be received.
2. The signal must be understood.
3. The receiver must agree with the content of the message.
4. The desired action must take place.
5. The outcome of the action must be analyzed.
6. Feedback must be provided to sender about significant variations (receiver becomes sender and the cycle restarts).

The author will apply this model to the strategic management process and analyze its implications in terms of needs for:

- Building a consensus among top managers about the company's existing and planned products and markets (constancy of purpose)
- Relevance of the strategic intent to the employee's personal goals and objectives (dualization, the principle of the uniqueness of the driving force, recognition of employees as business constituencies)
- A climate of psychological safety where employee's self-esteem and security needs are not endangered (Deming principle #2, win/win attitude)
- Building of capability (technology, tools to do the job, and training in foreseeable job skills)
- Education in statistical thinking (differentiation of signal from noise, special and common causes of variation)
- Leadership (ability to maintain a win/win climate) and its role as innovator and educator (change agent).

Introduction

How does one manage to pick up a pencil every time one tries without failure? Five elements seem to be prominent in the execution of this plan:

1. Determination to pick up the pencil
2. The message sent by the nervous system to the muscles
3. The capability of muscles to execute the plan
4. The continuous feedback that sense organs provide to the brain
5. The brain's capability to adjust the order by the magnitude of the signal in the feedback.

To what extent is managing an organization different from picking up a pencil? There appear to be two main differences:

1. Business targets (customer needs) are more mobile than a pencil.
2. The receivers of the message are no longer elastic materials in the body capable of producing movement called muscles but are human beings with their own brainpower

If management is the process of allocating resources to maximize the return on investment, are managers making optimum usage of available resources? The way managers are managing today is similar to a pilot who would taxi his airplane and complain about the size of the wings.

In this paper, the author will consider an alternative approach. The first section will explain the competitive problem in terms of obsolete management knowledge. Section two will differentiate between knowledge and know-how and show that the increase in the rate of communications has increased the amount of available expertise and reduced the shelf-life of knowledge. The third section will describe the Analytic Management model which allows for an accelerated rate of learning. Finally, the fourth section will apply this model to the strategic management process with the aim to help businesses update their practices.

Section 1:

The Competitive Problem

In a democratic society, human beings are to be valued as individuals. However, organizations of ten manage according to an obsolete understanding of the scientific method of management whereby people are treated like machines. Everyone knows this is wrong.

Employees are typically responsible citizens and parents who are building society's future. Despite this knowledge, with some excuses relative to efficiency or risks involved, employees are constrained to perform tedious, repetitive tasks, always using the person with the "most experience" to perform a given job.

This leads to an internal conflict. Failing to resolve this conflict, employers try to hide it. They say one thing-illustrating what they would like to be, such as saying they consider their employees their most valuable asset-and then they do other things such as lay off employees in the name of efficiency.

Actions being observable, employees abstract from employers' patterns of behavior the underlying assumptions which are in conflict with stated intentions. Credibility is thus lost.

The financial dependence of employees on organizations and a patriarchal society leads them to copy employer behavior which says: it is OK to say one thing and do something else. Communication channels are jammed and it is easy to go off target without any warning sign until it is too late and failure has occurred. Market share is lost despite all the resources spent in incentive and control systems.

Does it need to be like this? Should an understanding of the concept of efficiency in the 1990s be the same as it was in the beginning of this century when one can predict that the 1990s will be significantly different that the 1940s? Since the concept of efficiency depends on the concept of knowledge, the next section shall examine the present definition of knowledge.

Section 2:

Present Theory of Knowledge

Recent developments in artificial intelligence and expert systems seem to support the theory that the content of individual or collective memories that can be accessed (knowledge) may be organized into two categories:

(1) The category of objects, which includes the record of events, observations, ideas, and concepts abstracted from experience (frame of reference)

(2) The category of rules, which are the norms, paradigms, models, or theories that are used to form relationships between these objects.

For example, compensation, performance, and improvement belong to the first category of propositions known as *a posteriori,* synthetic, descriptive, or enumerative. The assumption that performance will improve if compensation is increased belongs to the second category of propositions, called *a priori,* analytic or anticipative. Prediction belongs exclusively to the second category of propositions, i.e., it is to the extent that one is able to build an analytic model of sensible experience that one is able to predict.

Thus, knowledge of the external world seems to have two limitations. The first one is due to the fit of the models to the external world; the second one is due to the limits of experience within the frame imposed by the models. This second limitation is well known to all managers; this is why they value people with experience. What is less known is that no matter how much experience one has, if the paradigm through which that person perceives the outside world remains unchanged while the world has changed, his/her capability of prediction will be reduced. For example, with the Newtonian frame of reference, the constancy of the speed of light would never have been predicted; within the classical frame of reference, the dependency of the outside world on one's mind would never have been acknowledged.

Likewise, the competitive problem will never be understood as long as there is failure to recognize the limitations that one's frame of reference imposes upon one's knowledge. This may be shown by example: A man, earning $50,000 per year, changes jobs. If one fails to recognize the change and estimates his annual income at $50,000, one might have a very poor prediction of this man's earnings over the next year. The point is that over the last 80 years the environment has changed so radically that one must modify one's frame of reference to understand it. This explains the competitive problem, which will not be resolved as long as one constrains oneself to think that efficiency means Ford's assembly line or Taylor and Gilbreth's ideas about job design and time study, i.e., as long as one is afraid to recognize one's ignorance. The solution will come from the commitment to understand why organizations are doing what they are doing rather than copying what has been done in the past or what the Japanese or others are doing elsewhere.

Profound knowledge is defined as the capability of explaining *why* things happen the way they happen for the purpose of predicting under what conditions they will, in the future, happen the same as in the past. This is the knowledge which will bring about a paradigm shift such as the shift from a geocentric theory of universe to a heliocentric theory, or like the shift from Newtonian physics to quantum theory.

Expert knowledge (surface knowledge or know-how) is defined as a set of mechanisms, decision trees, and procedures accumulated through experience about *how* things happen the way they happen. This is knowing how to drive a car, how to solve a differential equation, or how to run a business.

The reason one needs to differentiate between these two concepts is that if conditions remain stable, existing expert knowledge, supported by past experience, is likely to give, in most cases, the answer to existing problems. But what if conditions change? If conditions change, a process must be designed which updates management knowledge more frequently, in the same way a driver must check the road conditions more often in heavy traffic.

It is the author's thesis that competitive organizations are those committed to taking calculated risks to renew their vision of the market (knowledge base) before it becomes outdated. Part three of this paper describes a model which allows for updating of management information before it becomes obsolete. In summary, it says: First, one must access existing ideas within one's organization and then try out new ideas- even if the existing system is producing the expected results-to increase the ability to respond to a changing environment. This is because one never knows how market conditions may change.

Section 3: Analytic Management Model

Management is defined as a process through which identified resources are allocated to recognized opportunities in order to maximize the return on stakeholders' investments. The analytic management process comprises three major components:

(1) A Visioning Process for defining assumptions which allow recognition and valuation of resources and opportunities

(2) A Scanning Process for defining alternative resource allocation strategies

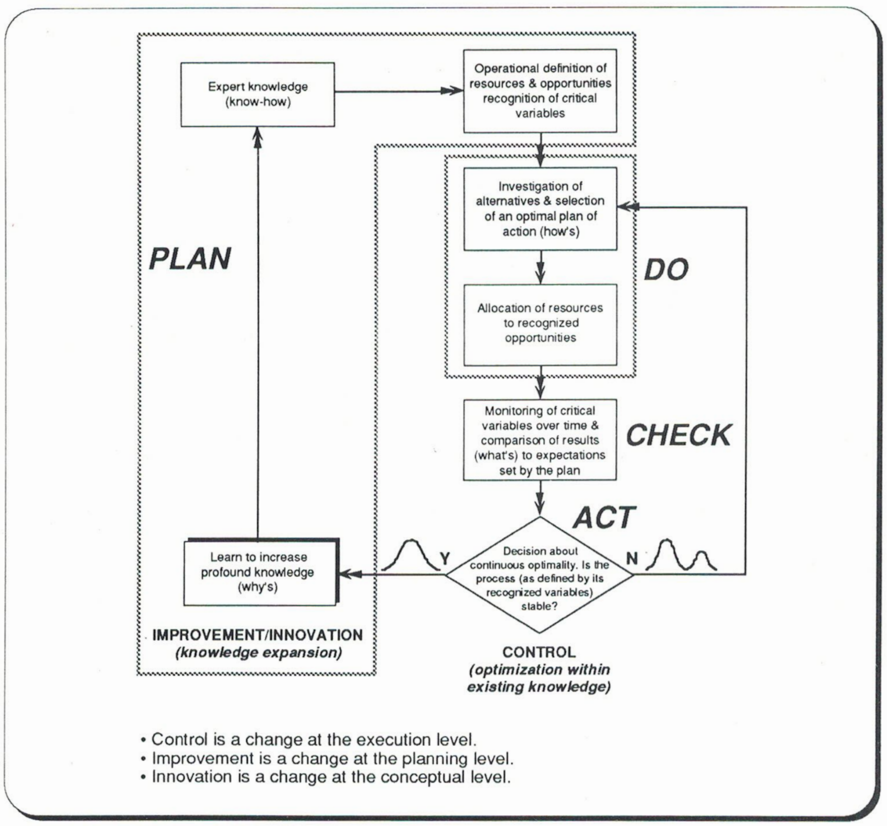
(3) An Evaluation Process for selecting an optimal alternative within the existing knowledge of the system (this is called control) or for changing some assumptions defining the system (this is called learning, improvement, or innovation).

Analytic management differs from traditional management by the fact that it is founded on a set of assumptions about the world and the human condition, with those assumptions being continuously updated under stable conditions, thus increasing flexibility and the ability to handle changes before they occur.

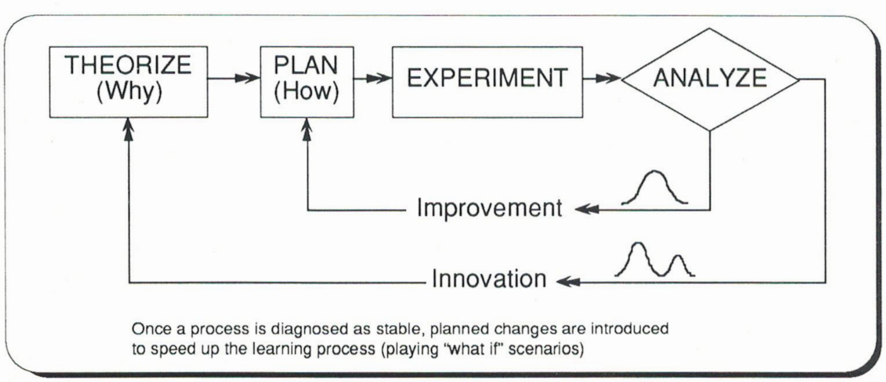
The necessity of explicit assumptions is fundamental within this frame: No matter how much experience one may have on a given subject, this experience can only be used as a basis for prediction if an assumption of stability is made, i.e., that in some sense the future will be similar to the past. What this model emphasizes is the necessity for building a feedback loop which allows for the testing of assumptions (stability of parameters over the span of the experiment).

For example, one may believe that an agenda with a clear set of objectives will make company meetings more productive. If this does not turn out to be the case, one may think that it is due to lack of cooperation of certain members of the management team. Assume that, in a position of authority, one managed to change the "misbehaving" members. What if one still does not get the expected results? Would it not be wise to think that one might be missing something in one's frame of reference? For example, that in one's passion for efficiency one has missed the chance to allow the team any opportunity for forming, storming or norming? In the next section this model is applied to the strategic management process.

Analytic Management Model



Learning Process Model



Section 4:

Strategic Quality Management

It is the author's experience-a small brainstorming session will point out if such is the case in the reader's company-that top executives of organizations do not have consistent operational definitions of fundamental concepts like resources, opportunities, stakeholders, and ROI. When communicated downward, these differences are multiplied and result in conflicting signals received by the work force. The purpose of the following is to provide a model to help reduce this variance. In two previous articles the author described strategic quality management and how it can be implemented [1]. The focus of the following is to explain the logic behind that position.

The proposed model-which is strongly inspired by Dr. Deming's 14 Management Principles-is articulated through four critical parameters:

(1) A vision synthesized around the concept of added value

(2) A climate fostering participation, improvement, and innovation

(3) A focus on enhancement of technical and managerial capability

(4) A leadership consistent in its statements and its actions.

The plan is to help people explain their products (added value), their market (customers), their personal needs and the needs of their constituencies, and to create a constancy of purpose toward producing a product which has a market and will help people live a better life. The idea of helping people live a better life has more than pure philanthropic motivations: The community (class) has, by definition, boundaries as far as the communication process can reach.

Theory of Information and Long-term Market Strategy

In the remainder of the paper, the theory of information[2] is applied to explain why the previously mentioned four parameters are believed to constitute the imperatives of a competitive business (a necessary and sufficient condition for long-term market stability).

First, strategic management is the process through which the vision of the Board of Directors is formalized in terms of a statement of purpose and operationalized in terms of the company's executive behavior which is to scan and evaluate alternative resource allocation opportunities to achieve the stated purpose.

The size of this task requires division and integration of the work to be done. The division of the work has traditionally led to what is known as the Agency Problem (why should an executive manager try to maximize the wealth of shareholders if this does not maximize his/her interests?) and its integration with built-in sub-optimizations (building of turfs and clustering of information). The traditional manager could cope a *posteriori* with these two problems through a system of incentives and controls. This is because a slow rate of change provides the lead time for each case to be treated separately (as a special case). Increases in our rate of communication have reduced this lead time and thus revealed the inertia of the traditional system. In contrast, quality management focuses on designing a process which integrates this knowledge.

The Organizational Message

The behavior of an organization's management sends out a message to its constituency-shareholders, employees, and the society at large. This message carries two basic sets of information. The first relates to the intent of the organization: its purpose, its products, and its markets-what it can do and what it might do. The second message relates to the *raison dieter* of the business: its rea- son for being in existence, its norms, and values-what it wants to do and what it should do. The first element is content related and states *what* the business is all about; the second element is process related and states *how* the business is managed (strategies, policies and procedures) and reveals the vision of its Board of Directors *(why* the company is in business).

If the leadership of an organization is not clear as to what it intends to do, and why its intentions are important, its members will have no other choice than to make their own interpretations. This, of course, will generate a variability downstream which will only increase as the message is carried along.

Many organizations ref use to publish a statement of purpose thinking this will reduce their freedom. They are right. But the definition of commitment is a voluntary reduction of choices. And with- out commitment there is no focus, and opportunism will consume the scarce resources of the business. Dr. Deming asks in his first point, "Has your organization published a statement of commitment?" In tomorrow's world, opportunities are not going to be lacking. Differentiation will come from the capability to predict them long in advance and thus have the lead time to transform them into a competitive advantage.

The Organizational Climate

Management's refusal to publish a statement of purpose is often generated, as mentioned earlier, by the conflict between its democratic values and its understanding of the concept of efficiency.

This conflict should be overcome through the realization that communities of the 1990s have wider and less geographic boundaries than those of the 1910s. Eighty years ago, a man could rob a bank in a state and live with another name in another town of the same state. Today, one's history follows wherever one goes. Tomorrow-because of the large number of choices available anywhere at any point in time-optimal decisions can no longer be made based only on the present information. Decision s must involve the his- tory of the persons or the organizations involved. People will be buying less from businesses with reputations for poor quality and mismanaging their human resources. In such a context, the concept of added value-which is a leading indicator-is a much more reliable measure of return on investment than the concept of short- term profit.

The fact that there is a message sent does not necessarily imply that it is received. One sees only what one looks for. Why should anyone who is not planning to buy a car pay any attention to a TV commercial on car sales? Why should an employee be interested in realization of the organizational goals when he/she does not perceive any correlation between their realization and his/ her objectives in life? Do all CEOs see the correlation between the trade deficit and the future of their businesses?

The focus on added value creates a climate of trust in which employees are not only aware of the business intent but share in it. An increased focus on the logic behind the objectives can provide a more anticipative (analytic) feedback than a simple enumerative report of failure or success. This is the foundation of corporate competence.

The Focus of the Organization

Eighty years ago-given the scope of the markets companies were serving-it might have been acceptable to think that employees, after some exposure to a given job, would know everything they needed to know to do their job well. Though the same assumption would be clearly absurd today, in many companies, workers are assigned to tasks they started with. Performance is poor, and the lack of an adequate workforce is seen as the principal cause.

To become competitive again-once one has made a statement of commitment and accepted to support the appropriate climate-it is necessary to reassess resource allocation strategies. A good amount of knowledge is available within one's organization that has not been shared. A structure must be established which allows one to tap into this knowledge for the purpose of simplifying the existing procedures. One must establish a process which teaches people to unlearn some historical patterns of behavior and to learn new patterns in line with the changing market forces. The need for integrating more than the presently available expert knowledge into the decision-making processes will inevitably lead to the search for profound knowledge.

Organizational Leadership

For a company competing in a stable environment, the primary focus is for leadership to relay its intent to its membership. This explains pyramidal structures of traditional organizations, their standards of measurement, and their incentive and control systems (management by objectives). Rules are different if a company is to compete in an unstable environment where market needs are changing. A complex centralized control is likely to become obsolete by the time it is designed. *Post facto* "adjustments"- this is actually most of the time tampering-of the critical processes by top executives to cope with these changes increases the complexity, the cycle time, and the inertia of the system which soon falls under its own weight.

Examples are outdated bills of materials, and engineering prints which do not provide the guidance they are supposed to, along with safety manuals, quality, EEO, hiring, and other business procedures that no one reads, no one understands- that some blindly copy-and that the system "updates" at high costs on a periodic basis. These examples can be found in all organizations.

What should the approach be? It should be maintenance of a climate suitable to the propagation of information in all directions. In cases where management has profound knowledge, the approach should be delegation of authority. Where management does not have profound knowledge, the approach should be learning

and leading by example. In such an environment, management by objectives is replaced by a more flexible management with vision or leadership. Given the limited life of the management knowledge due to the changing market forces, the main task of leadership is to provide a climate which allows a continuous testing of the assumptions from which the business objectives are driven.
This means, in short, objectives are not deployed but tested "downward." The commitment is to purpose: not to procedures.

When the logic of a point is explained, understood, and agreed upon without supervision, any exercised human being can differentiate signal from noise and make corrections as needed. If, for example, a manager can explain what opportunities are in line with the main stream of the business and why, he/she no longer needs to decide what the business objectives should be.

Once the team spirit is established, and trained team members have been given the tools to perform their tasks, the leader could work with team members and available information to identify what the critical success factors of the business *seem* to be and then spend his / her time learning about the more complex interactions of the system with its environment.

In summary, the change that is needed-when adjusting to changes in the environment-is more than a change in the way resources are allocated; it is also more than a change in the way one plans. It is a fundamental change at the conceptual level affecting how one perceives the word. When dinosaurs, sticking to their old patterns, disappeared, human beings survived. Learning capability must be used.

Notes

1. See articles by Mark Shal in references listed on the following page.

2. Homeostasis is measured by the ergodicity of the flow of information within the organization, and one looks for a structure which ensures and supports this ergodicity. Due to the ergodicity of the information outside the organization, clusters of information within an organization will be pressured to collapse and will break any structure which will try to oppose it.

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