The Quality Policy in Value Based Management

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ABSTRACT

This study is based on the premise that, strictly speaking, capitalistic firms are business profit oriented organizations that are viewed as systems for the creation of economic and financial value for their shareholders (owners). This assumption has guided the new concept of a management whose aim is the production of value, or Value Based Management (VBM). VBM recognizes that financial performance – based on profit and the value of capital – depends in a causal way on the level of *quality* of products and processes, and that therefore quality is the condition for producing value for the client and financial value for shareholders.

Quality is an "elusive" concept, but for VBM I hold there are three notions of quality to consider in the value production process:

1. *functional quality*, according to which the product must be fit for a purpose, leaving to clients the task of identifying the needs and aspirations the product must satisfy;
2. *design-based quality*, according to which the product must, in any case, conform to a design, prototype, or standard in order to satisfy client needs:
3. *environmental quality*, according to which the product must not only satisfy the clients but be compatible with its introduction in the environment.

This paper has a twofold objective. It seeks above all to analyze the different ways VBM must use to consider *quality* as a *value driver* – identifying the relations between quality levels, on the one hand, and cost, revenue and profit levels, on the other; and, secondly, to indicate the guidelines based on which VBM can develop a strategy of Total Quality Management, or *Company-Wide Quality Control* that is integrated with the other "value creating strategies".

INTRODUCTION

The spread of Value Based Management (VBM) is relatively recent. Only since the 1990s have many large firms turned to this managerial technique, whose objective is to direct management toward the primary goal of creating shareholder (owner) value (Mella and Pellicelli, 2008).

For Arnold, VBM does not represent a new management technique, a specific method, or a new system of control; rather it is a mental attitude toward the systematic maximization of shareholder value: "*Value-based management is a managerial approach in which the primary purpose is long-term shareholder wealth maximization. The objective of a firm, its systems, strategy, processes, analytical techniques, performance measurements and culture have as their guiding objective shareholder wealth maximization*" (Arnold, 2000: p. 9).

The objective of monetary profit gives way to that of the maximum return on the shares, and thus to the maximization of *shareholder value*; as a result, the need *inevitably* arises for management to move toward a value based approach, continually changing the composition of the businesses in the portfolio, abandoning the low profit ones for new ones with higher returns, in order to maximize the *return on equity* (roe) and the *return on invested capital* (roi) (Copeland, Koller and Murrin, 2000: p. 87).

Morin and Jarrel consider VBM from an organizational point of view and argue that VBM "*is both a philosophy and a methodology for managing companies. As a philosophy, it focuses on the overriding objective of creating as much value as possible for the shareholders. ... As a methodology, VBM provides an integrated framework for making strategic and operating decisions*" (Morin and Jarrel, 2001: p. 28).

As a philosophy and a methodology for managing companies, VBM has three basic principles:

1. spread shared ethical values, thereby developing trust in the intrinsic value of each individual, whether the latter is a partner in the company, a client, a supplier, or an employee;
2. distribute the results obtained for the benefit of all internal members of the organization that have contributed, directly or indirectly, to the production of value, as part of a team, as a worker, or even as an owner or shareholder;

3. not to limit itself only to producing and distributing value internally, but also to achieving the maximum external value for the client, assuring him the maximum *value for money function* (Wellemin, 1990), understood as the maximum quality at the lowest price:

value perceived by the customer = product price / quality **[1]**

These principles represent the main elements that guide the formation of the "value creating strategies" of firms adopting VBM (Rappaport, 1998). *"Once the company develops strategies, a number of operational drivers that are key to implementing the strategy have to be identified. By focusing on these operational drivers, the company's strategy is successfully implemented, which in turn improves the value drivers, creating aggregate value*" (Morin, Jarrel, 2001: p. 343).

While the first two principles have been widely treated in the literature (Serven, 1998; Rappaport, 1998; www.cesj.org/vbm/vbmsummary.htm), the third deserves further treatment since the production of value for the client not only is an objective to pursue but also represents a fundamental driver for profitability, and thus shareholder value.

Therefore, this study seeks to analyze the ways according to which VBM must consider quality as the value driver and the guidelines for controlling this driver from the perspective of "value creating strategies".

After introducing three basic notions of quality and analyzing the relevant literature, the paper will deal with the strategic approaches VBM must adopt to control those economic aspects of quality which most impact profitability.

LITERATURE REVIEW. THE THREE FORMS OF QUALITY

The concept of quality is not easy to define (Plunkett and Dale,1987). It is "elusive", and understanding it is normally left to intuition. Several scholars have proposed giving up the attempt to precisely define the concept, viewing it as an intuitive, non-definable, almost primitive, philosophic, even metaphysical notion derived from the concepts of differentiation, excellence, perfection and consistency; "*Quality is a direct experience independent of and prior to intellectual abstractions*" (Pirsig, 1974).

From a managerial perspective, the quality of goods or services produced by firms is defined in the UNI EN ISO 9000 as: "*Whatever the customer perceives good quality to be*", referring not so much to the intrinsic features of the product as to consumer tastes and experiences.

In 1983 the American Society for Quality Control (ASQC) proposed a more specific definition: "*the totality of features and characteristics of a product or service that bear on its ability to satisfy given needs*". In addition to being general, these definitions are also generic.

Garvin (1984) highlighted eight basic dimensions of quality: l. Performance: A product's primary operating characteristics. 2. Features. The "bells and whistles" of the product. 3. Reliability: The probability that a product will operate properly over a specified period of time under stated conditions of use. 4. Conformance: The degree to which physical and performance characteristics of a product match pre-established standards. 5. Durability: The amount of use one gets from a product before it physicallydeteriorates or until replacement is preferable. 6. Serviceability: The speed, courtesy, and competence of repair. 7. Aesthetics. How a product looks, feels, sounds, tastes, or smells. 8. Perceived quality: Subjective assessment resulting from image, advertising, or brand name.

I propose identifying three distinct, though connected, notions that sum up the majority of definitions found in the literature and allow us to focus on quality from a threefold perspective: the customer, the product, and the environment: *functional*, *design*, and *environmental* quality.

Functional (or market) quality defines the set of characteristics which, from the customer's point of view, make the *product* appropriate for *use*; that is, capable of satisfying a specific *use or utility function* of the good or service (Band and Huot, 1990) – in other words, the relationship between the user's needs and aspirations and the merchandising characteristics of the product – taking into account a desired standard of *reliability* (the product must provide use that is not interrupted due to imperfections) and *safety* (the product must be capable of use without damage or risks), as specified in the ISO/IEC 9126:1991 (Ebeling, 1997, Krishnaiah and Rao, 1988).

The ISO 8402: 1994 (Quality Vocabulary) specifies the concept as "*the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs*". In the ISO 8402:1986, 3.1 version, the definition is "*The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs*", very similar to that proposed by ASQC

Functional quality is the basis for *customer satisfaction* (Wellemin, 1990) as defined in ISO 9001:2000 (8.2.1), known as "Vision", which in fact emphasizes functional quality: "… *if before Quality meant satisfying all the Customer's expectations, now the concept of "expectations" is broadened and enriched through adjectives such as "explicit*" and, above all, "implicit", with regard to both the external Customer – the recipient of the products – and the internal Customer – the department that receives the components and services of the other departments; in this sense quality refers to the concept of 'fitness for use' (Juran, 1999) and of "attractive quality", which defines what the customer desires even though he is not yet aware of this (Kano et al., 1984).

Design (or *intrinsic, productive*) *quality* is the set of characteristics that, from an internal point of view (in terms of production processes) make all the product units conform to a standard of reference (prototype, sample, model, design), as statet by Crosby (1979), who defined quality as "conformance to requirements".

These forms of quality refer not so much to the product as to the *production*; that is, to the flows of production units obtained during a process. This is the notion that is considered in the UNI EN ISO 9000:2000, which defines quality as the "*degree to which a set of inherent characteristics fulfills requirements*".

Environmental (or *context*) quality is the set of characteristics which, from the point of view of external impact, make the product compatible with the environment, both in terms of pollution, waste disposal, environmental risks, or suitability for introduction into the context in question. The perception of environmental quality as defined in the ISO 14000 standards – which obliges firms to identify in which ways the firm's activities, processes, and products can have an "impact" on the environment – gives rise to the idea of the adequacy of the products relative to the environmental context in which they are employed during their life cycle. Today, in our highly interconnected society, no product can avoid a *judgment of adequacy*; some cars are too polluting; some homes scar the landscape; some packages are too cumbersome; some scooters too noisy; some motorcycles too dangerous; some railway lines too invasive, and so on (Claret, 1981).

Moreover, these notions of quality consider the products as *fit for a purpose*: "*One of the possible criteria for establishing whether or not a unit meets quality, measured against what is seen to be the goal of the unit*" (Campbell and Rozsnyai, 2002: 132). "*Fitness for purpose sees quality as fulfilling a customer's requirements, needs or desires*" (Harvey and Green, 1993, Juran, 1999, Crosby, 1979).

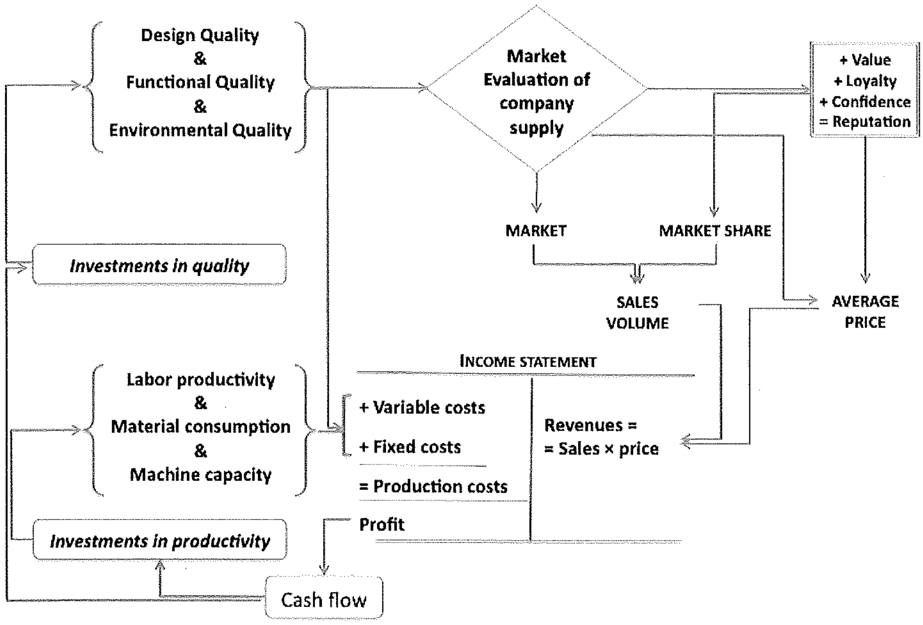
VBM MUST CONTROL THE QUALITY OF THE PRODUCT

The control of the three forms of quality is essential for every VBM system because quality *represents* the set of product characteristics – design, function and environmental impact – that *contributes in a relavent way to the purchase decisions, taking into account the selling price* (equation [1]) and the general and specific economic conditions. Since quality conditions the prices and the market, acting on economic efficiency mainly from the revenue side, it is a fundamental driver for value production (together with productivity, which conditions value from the cost side) since the level of quality perceived by the customer contributes in a relevant manner to purchasing decisions and the customer's propensity to pay the price (equation [1]).

It is vital for VBM to set up a reliable system of *quality management* as part of the general strategy for value production (Shetty, 1987); this system should set appropriate "quality" objectives for the product and adopt a system to control the achievement and progressive surpassing of these objectives, as called for in the application of the Deming Cycle (Deming, 1989). "*Practising quality control means developing, designing, producing and supplying quality products and services which are the most economical and most useful for the consumer, providing him continual satisfaction.*" (Ishikawa, 1992).

As figure 1 shows, the perception of consumers regarding the *value* of the overall supply of goods and services (eq. [1]) is directly dependent on the three forms of quality, which produce *loyalty,* increase *trust*, justify the *proposed selling price*, and sustain the level of demand by impacting *market share* (Eccles and Pyburn, 1992).

Fig. 1 – Quality and productivity as profit, and thus value, driver



Quality is also a fundamental driver of marketing efficiency, which is expressed by the following equation:

sales = market × market share **[2]**

and influences the *market* itself by creating goods to satisfy new needs and aspirations or by varying the capacity of goods to satisfy high-level needs or aspirations, in order to create, or increase the share in, an attainable market.

However, quality also impacts costs, since the improvement in quality levels causes a reduction in *non-quality costs*, which are linked to certifying, preventing or restoring quality (see below).

Profit creation generates cash flow that can favor new investments to improve quality and productivity.

Investments for the improvement of quality should thus represent a relevant factor in the overall strategy, by affecting marketing and production.

After these general considerations let us examine the methods VBM must follow to control the three forms of quality.

VBM MUST CONTROL FUNCTIONAL QUALITY AND QUALITY REVENUES

According to the concept of *functional quality*, every product has its own *use function*; that is, a mix of needs and aspirations – "expressed or implicit", according to ISO 8402:1986 – which it is able to satisfy contemporaneously.

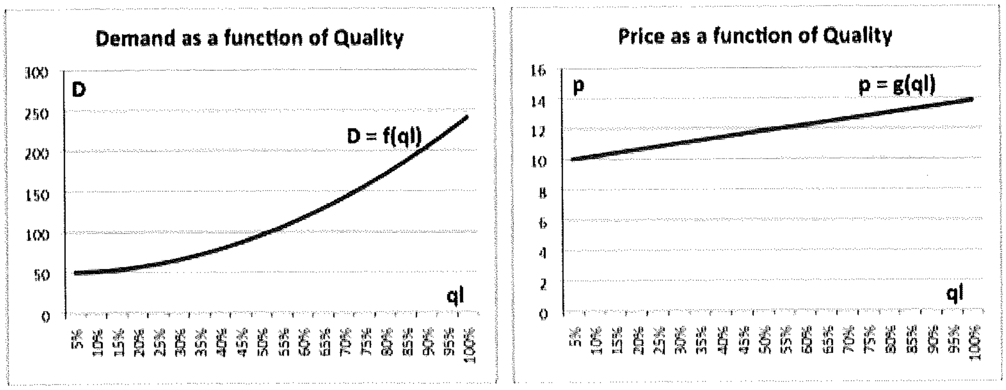
VBM must manage quality by controlling that the product maintains, and if possible increases over time, its overall use function, which is the condition for controlling prices in some manner and producing economic value.

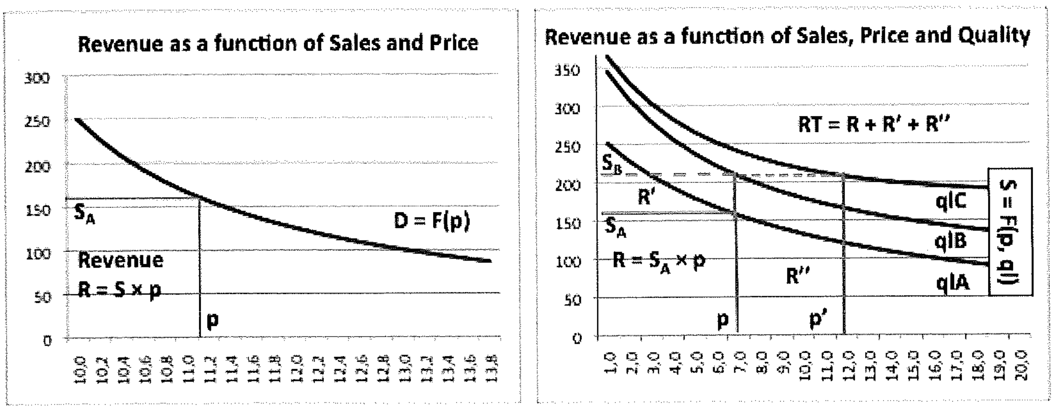
Keeping functional quality under control is important since the revenue curve of the firm depends on the form of activity. In fact, functional quality (ql) influences both the demand curve and prices (fig. 2-A).

If we express demand as a function of both price and functional quality we observe how the curve varies with variations in this type of quality (fig. 2-B).

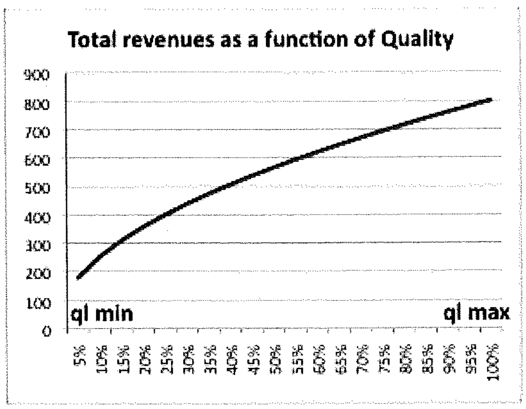
Fig. 2 – Functional quality, demand and price

2-A) demand (D) and price (p) as functions of functional quality (qlP)





2-B) variations in revenue (R) as a function of functional quality (plP)



2-C) quality revenues as a function of functional quality (plP)

Curve A in the graph on the left of fig. 2-B indicates the normal relation between demand (x-axis) and price (y-axis), assuming there is normal elasticity and that the curve depends on the pricing maneuvers of the firm.

The product of sales volume (indicated by S on the x-axis) and price level (indicated by p on the y-axis) expresses the revenue (R) attained for each (p, S) pair, which can be represented as the area of the rectangle whose vertex is at point (p, S) and whose opposite vertex is at the origin.

The graph on the right of fig. 2-B shows the theoretical effect of increasing the level of functional quality, which causes:

a. an upward shift of the demand curve, so that, at each price, the sales volumes are indicated on curve B, rising from S_A to S_B; total revenue (TR) thus becomes TR = R + R'.
b. an increase in prices as well at each level of demand; this means that the slope of the demand curve is reduced and can be represented as the curve C, which shows that for each price level the quantity demanded is greater than what it would have been without the increase in quality. Total revenue is now TR = R + R' + R''.

The trend in revenues as a function of the quality level can be shown by the curve in fig. 2-C, from which we can hypothesize that there is a minimum level of functional quality (ql min) below which revenues are not defined, as well as a maximum level (ql max) above which total revenues cannot increase as a result of further increases in quality (they can increase, of course, due to other causes that are not pertinent for a study on quality).

VBM carries out functional quality controls in the form of *Quality Function Deployment* (QFD), which proposes the development of new products or processes and the improvement of existing ones, as defined in the official site: *Quality Function Deployment (QFD) was developed to bring this personal interface to modern manufacturing and business alike. In today's industrial society, where the growing distance between producers and users is a concern, QFD links the needs of the customer (end user) with design, development, engineering, manufacturing, and service functions. It helps organizations seek out both spoken and unspoken needs, translate these into actions and designs, and focus various business functions toward achieving this common goal*" (at: http://www.qfdi.org).

Quality Function Deployment "*is a method for developing a design quality aimed at satisfying the consumer and then translating the consumer's demand into design targets and major quality assurance points to be used throughout the production phase. ... [QFD] is a way to assure the design quality while the product is still in the design stage*" (Akao, 1990; see also: Akao and Mizuno, 1978; Kano et al. 1984).

The phases of a QFD system can be summarized as follows (Bossert, 1991):

1. *evaluating* the strengths and weaknesses of the use functions of existing products, verifying consumer tastes in order to identify the consumer's real needs and aspirations, creating, if possible, new forms of aspirations;
2. searching in particular for the characteristics that can visibly distinguish the product from a quality perspective, identifying the priority decisions (deployment) for the product and the process that will maximize the customer's perception of value;
3. designing the product manufacturing process while trying to match the attributes desired by the customers with the design specifications and production methods, even adopting *target costing* (Clifton et al., 2005)

The successful firms today are those that have introduced a pro-active VBM system capable of anticipating variations in the use function of products, which thus allows them to achieve a timely *marketing strategy* that enables them to set higher prices due to the perception of a change in the products' use function.

Among the instruments used to control functional quality, *Value Analysis* deserves mention. This instrument starts from the principle that the value of a product will be interpreted in different ways by different customers, in terms of a high level of performance, capability, emotional appeal, style, etc., relative to its cost. This can also be expressed as maximizing the function:

Value = (Performance + Capability) / Cost = Function / Cost **[3]**

Value analysis consists of a series of techniques and studies aimed at finding the best product composition, in terms of the form and structure of the components and the necessary manufacturing processes, with the aim of minimizing the drawbacks resulting from the product's use (Crow, 2002). "Value analysis is a problem-solving system implemented by the use of a specific set of techniques, a body of knowledge, and a group of learned skills. It is an organized creative approach that has for its purpose the efficient identification of unnecessary cost, i.e., cost that provides neither quality nor use nor life nor appearance nor customer features. When applied to products, this approach assists in the orderly utilization of better approaches, alternative materials, newer processes, and abilities of specialized suppliers. It focuses engineering, manufacturing, and purchasing attention on one objective-equivalent performance for lower cost" (Miles, 1989).

While the analysis of value is a technique that encompasses the design and manufacturing phases, the *quality circles* (Ishikawa, 1980; Hutchins, 1985) are organizational instruments for the control and improvement of quality as part of the Quality Function Deployment. "*Quality Circles are (informal) groups of employees who voluntarily meet together on a regular basis to identify, define, analyze and solve work related problems*" (http://quality-circles.blogspot.com/).

Who better than the workers involved in the production process to identify the problems in assembling, stocking and distributing materials, component parts, subassemblies and other items at any stage in the manufacturing process? Who better than these workers to suggest solutions to eliminate such snags?

While the *quality circles* rely on the *opinions* of persons *inside* the firm, the *panel of consumers* technique directly seeks out the opinions of *customers*, forming a panel of consumers who are chosen based on statistical sampling techniques and then asked to try out the product – usually a new one – so that they can use it and express an opinion on its quality (and, in general, also on the price/quality relationship).

VBM MUST CONTROL DESIGN QUALITY

VBM must also verify that the *design quality* of the firm's production is at least equal to that of the competitors and remains constant or improves over time (Merrill, 1997).

Controlling design quality means (Kume, 1985):

a. maintaining a uniform technical standard in space and over time,
b. preventing or eliminating defects and maintaining or increasing reliability,
c. setting up a service to carry out: inspections, revisions, repairs or substitutions.

For firms that produce to order the standards are usually included in the contract in the form of detailed specification of the work to be carried out, accompanied by one or more technical designs or even a scaled model, in addition to Gantt and Pert Charts.

For firms with *mass production,* quality verification over time is essential to avoid future complaints and refunds, substitution or reparation costs, and, in the last analysis, to maintain the product's image and maintain market share; this verification is combined with the control of functional quality (which typically concerns itself with effectiveness), though it remains a distinct activity.

Design quality control covers three areas:

1. control of supplies, which aims at the *quality of materials and components*; it is necessary to undertake a process that, through defined control cycles, verifies that the input materials respect the product's required specifications; the outcome of the verifications determines the updating of the stock (unloading verification and wharehouse loading) and the continual evaluation of the supplier's reliability;

2. control of the manufacturing process undertaken to produce and move the product; this activity controls the manufacturing standards and decides whether or not to maintain the process or to modify the parameters which do not conform to the standards, and it involves the production function. We can further divide this control activity into:

   a. productive control: this focusses on the manufacturing processes and, in turn, includes two phases: *monitoring* in order to gather, file away, process and present data on productivity, the utilization of the means of production, and the progress of production: number of pieces produced, excess production, production times, losses, etc.; (ii) *diagnostics*, in order to verify the state of the production process and the data collection, which serves to identify and signal functional anomalies in the plants and their causes;
   b. logistical control: this aims at verifying the punctuality and accuracy of the deliveries and whether or not the selling procedures have been respected;

3. control and testing of the finished product; this verifies that the products respect the standard specifications; for this control as well, the director of production or the product manager (if called for) is usually in charge, and the process involves two phases:

   a. testing, a typical control of *efficiency*, when the functionality of the product is verified along with its suitability for providing the performances for which it has been designed; the outcome of the testing determines whether product quality is certified, whether the product is remanufactured, or whether it is discarded;

b. *revision*, when consumer observations, complaints and refunds are analyzed to identify the origin of the defects and prevent their future occurrence.

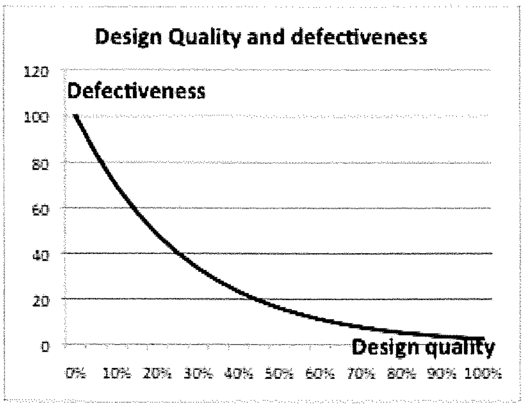
At times the entire production must be controlled; at other times a *sample control* is carried out based on sophisticated statistical instruments. This latter control is called the Statistical Quality Control, or Statistical Process Control (SQC or SPC). More detailed analysis of these controls can be found in the ample bibliography in *Industrial Statistics and Quality Control* (Duncan, 1986; Ryan, 2000).

VBM MUST CONTROL THE QUALITY COSTS

Design quality, as far as it represents the product unit's conformity to a prototype or sample of reference, is mainly expressed as "*absence of defects*" (Zemke, 1990).

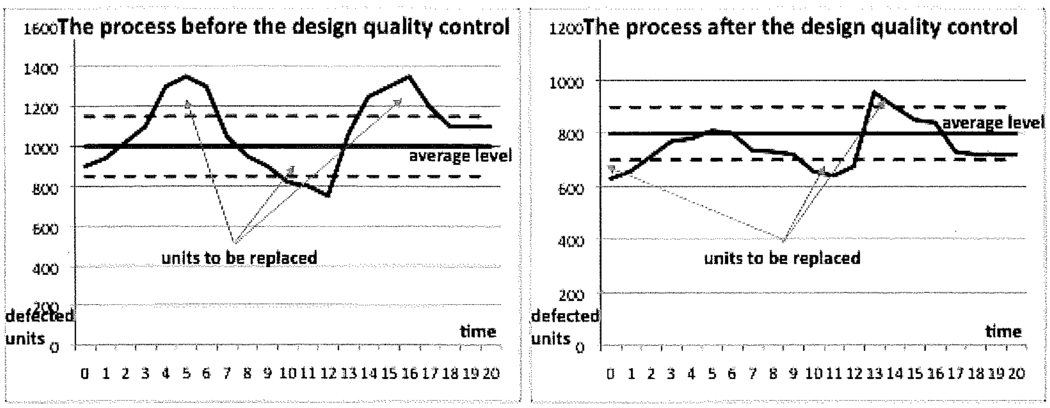
While functional quality control mainly impacts revenues, the control of design quality is of economic importance mainly from the *cost side* (Albright and Roth, 1992), since there is a clear inverse relation between the control of design quality and *defectiveness* (fig.3).

Fig. 3 – Design quality and defectiveness



If we assume we are controlling a given *parameter* that refers to finished products for all output units of the production process over a given interval, then we can become aware of the "design quality" of this same process in terms of *defectiveness*, as shown in fig. 4 at the left (Albright and Roth, 1994). The graph on the right shows the same process after the design quality control, which leads to an improvement which, on the one hand, reduces the standard average level of defectiveness, and on the other reduces the number and duration of "out of control points".

Fig. 4 – Effects of design quality control



The costs of design quality concern both the products and the managerial system, and they can be divided into (Morse, 1983; Campanella, 1999):

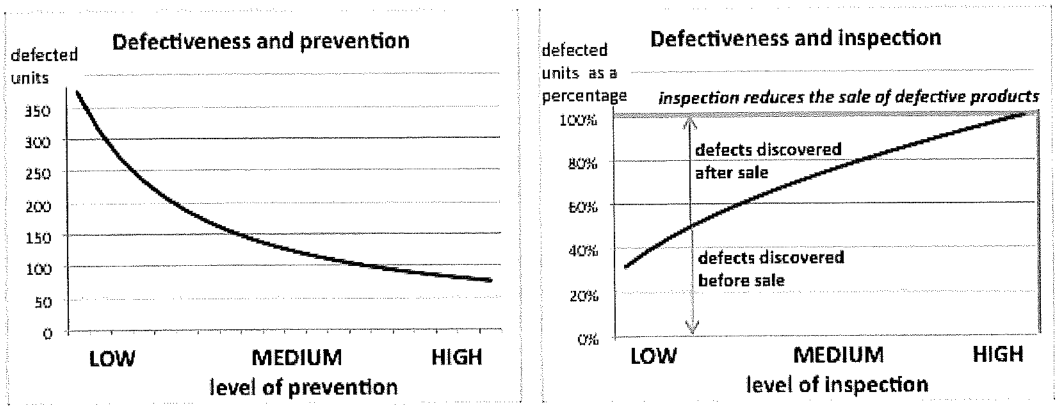
A – costs of internal and external non-conformities (or full non-quality costs) linked to the *absence of control* (Schneiderman, 1986; Harrington, 1987);

A.1 – *internal failure costs*: these derive from the need to eliminate anomalies and defects that occur in the production units *during* the manufacturing process;
A.2 – *lack-of-rationality costs*: these are connected to the lack of rationality in production, in the product, and in the marketing and post-sales organization due to the presence of defects;
A.3 - *external failure costs*: these arise from the repair or substitution of the product *after* sale;
B – investment quality costs, linked to the *procedures for implementing controls*;
B.1 – *prevention costs*: these arise from the attempt itself to *prevent* defects;
B.2 – *appraisal and assessment costs*: these arise from procedures to *verify* product defects;
C - *opportunity quality costs* (*Customer-incurred cost*, Loss of productivity, *Customer-dissatisfaction cost*, Dissatisfaction shared by word of mouth, *Loss-of-reputation cost*, Customer perception of firm (Harrington, 1987); these result in lower revenue due to the reduction in functional quality; in effect, design quality has a notable impact on the product's use function since, on the one hand, design quality damages and discourages the consumer (reduction in sales), and on the other forces the firm to lower prices; in general, the intangible costs are thus identified with the failed earnings caused by low levels of quality (Morse, 1993; Zemke, 1990).

Indirect costs and opportunity quality costs obviously derive from the lack of *verification* and *prevention* of defects (Kume, 1985, Taguchi, 1986).

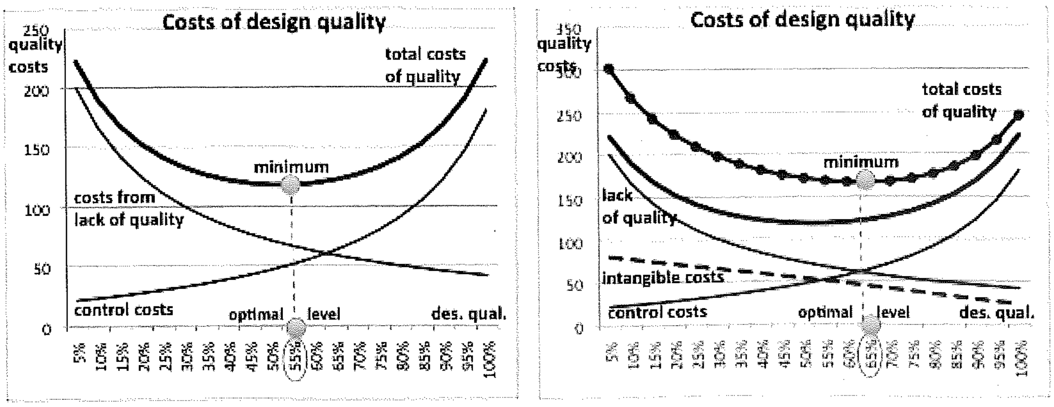
The two graphs in fig. 5 clearly show the importance of *prevention* and *inspection* activities and their effect on defectiveness.

Fig. 5– Control of quality through prevention or inspection



We can assume there is an optimal level of design quality that minimizes total quality costs, which is the sum of the direct and indirect costs, as shown in fig. 6 (left).

Fig. 6 – Costs of design quality

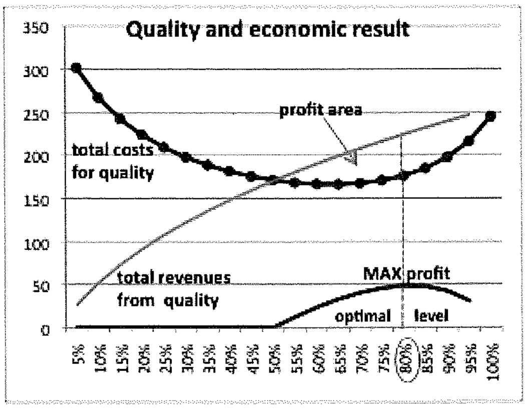


We can now modify the graph in fig. 6 (left) by also adding "intangible costs" arising from the *lack of quality*; such costs cause a shifting to the right of the minimum point of the total cost curve, which indicates that the optimal level of quality is higher in the presence of intangible costs, as shown in fig. 6 (right).

VBM must develop a highly efficient system of quality control, since both *functional* and *design* quality jointly impact economic efficiency.

Fig. 7 shows, in the same graph, the total revenue curve as a function of the level of *functional* quality and the total quality cost curve as a function of the level of *design* quality, where the quality levels are expressed on a uniform scale. This graph shows that the optimal level of overall quality – functional as well as design – can be determined as the level of overall quality that corresponds to the maximum profit, equal to the difference between only those revenues and costs connected to quality, which we assume in principle can be determined.

Fig. 7 – Profit as a function of quality



VBM MUST CONTROL THE ENVIRONMENTAL QUALITY

The environmental compatibility of products must be continually monitored, taking account of the possibility that the search for functional and design quality is often in contrast with the objective of safeguarding the environment. The lack of environmental quality impacts revenues in the form of reduced demand and the costs needed to safeguard the environment.

Nevertheless, the control of environmental quality is not easy to achieve, since the standards of environmental compatibility are not absolute but depend on several variables: first of all, the state of *scientific and technical knowledge* (the history of the use of asbestos is instructive here); secondly, the *prevalent social culture*, since sensitivity toward environmental problems is not the same in all countries (the refusal to abandon the use of polluting products in several countries is indicative here).

Despite these difficulties, VBM can control the environmental quality of its processes and products thanks to the use of increasingly sophisticated techniques in Environmental Impact Assessment and Sustainability Appraisal, whose application is obligatory for many production processes.

FROM QUALITY ASSURANCE TO COMPANY-WIDE QUALITY CONTROL

Being both a philosophy and a methodology for managing companies, VBM cannot limit itself to controlling economic efficiency but must integrate such methodologies and instruments into a single system to achieve the gradual involvement of all corporate functions in the control of quality, transforming the quality control *function* into a Quality Assurance *policy* with the aim of guaranteeing the total satisfaction of the final user (Tempus, 2001).

> "*Quality Assurance (QA) is a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process. Reviews, preferably by independent third parties, are performed upon a completed inventory following the implementation of QC procedures. Reviews verify that measurable objectives (data quality objectives, see Section 6.5, QA/QC Plan.) were met, ensure that the inventory represents the*

best possible estimates of emissions and removals given the current state of scientific knowledge and data availability, and support the effectiveness of the QC programme" (Winiwarter , 2006).

This definition highlights the fact that VBM must achieve the involvement of the entire organization in the Quality Assurance policy (Taguchi, 1986).

Quality Assurance cannot only be a production, marketing or economic need but must become the objective of a true Total Quality Management (TQM) strategy (Deming, 1982) or one of *Company-Wide Quality Control (CWQC)* (Ishikawa, 1985; 1989) – considered the Japanese version of TQM – which represent the operational interfaces of VBM with regard to quality.

The TQM strategy must involve the entire production, personnel and marketing structure (Oakland, 1989; Samson and Terziovski, 1999) in the control and improvement of product quality and production, involving top management, directors, supervisors and workers from all activity areas of the organizational group, such as market research, research and development, planning, purchases, sales management, production, inspections, selling, and personnel services (Japanese Industrial Standard Z8101-1981).

Also of importance is the relationship with customers and suppliers, who are viewed as the engines for quality improvement; the customers make suggestions for the improvement of functional quality, and the suppliers must be the guarantors of design quality; the culture of quality spreads from the suppliers to their own suppliers, so as to permeate the entire production line and entire business sectors.

Feigenbaum (1991) has developed a ten-point framework to implement Total Quality Management, which is parallel to the 14 points proposed by Deming (1982). A constant underlies the vision of these authors: the firm must create a system to manage quality which is aimed at customer service. It must reach every sector of the organization and be understood by all personnel, who then must truly believe in it and enthusiastically participate in its implementation by proposing the creation and spread of the *quality circles* (Hutchins, 1985; Ishikawa, 1980).

In Feigeinbaum, Deming and Ishikawa's conceptual framework, quality is not achieved through a discrete process, through innovations, often temporary, in products and processes, but through a continual process of "small steps", the *kaizen* (Tanaka, 1994), which produces a considerable evolution even in the way of conceiving of the relationships among the various operational departments or centers within the firm. Each center must guarantee the maximum quality to the center downstream – its "customer" – and must demand the maximum quality from the center upstream – its "supplier".

CONCLUSION. VBM MUST TRANSFER QUALITY TO THE ENTIRE ORGANIZATION AND GENERATE TRUST AND REPUTATION

VBM must develop a policy of 'transformative' quality in order to segment the three forms of quality within an organization (Harvey and Green, 1993) and produce an improvement in the internal processes and products for the customer's benefit, thereby creating an holistic model of quality management (Srikanthan and Dalrymple, 2005).

Whatever the nature of the products offered, their *utility*, *value* and *suitability* are the drivers of consumer *loyalty*, which, together with *trust*, build up the *reputation* of the firm, on which market share depends, which in turn impacts revenues, taking into account the role of design and functional quality on prices (fig. 1).

The first and most general action VBM must undertake is to transfer the three notions of quality from the products to the organization, which, in turn, is viewed as the object of judgment by the market.

VBM must develop:

1. the *functional quality of the firm*, by adjusting the characteristics of the firm so that it is *judged* by the market as suitable for producing value for all the external stakeholders and assigned a value as a single entity; that is, the firm is characterized by the same "fit for purpose" concept that we have examined for products: *"fitness for purpose" is a definition of quality that allows institutions to define their purpose in their mission and objectives, so "quality" is demonstrated by achieving these"* (Woodhouse, 1999: 29–30);

2. the *design quality of the firm*, by adjusting the characteristics of the organization to carry out production processes which conform to standards considered suitable (with respect to sanitary and safety norms at the

workplace; secure and useful products); a high quality in carrying out the company processes (seriousness, consistency in the procedures, manufacturing uniformity, etc.) generates *reliability* for consumers (Robertson, 1971; Pupius and Steed, 2005);

3. the *environmental quality of the firm*, by conforming the qualitative features of products to create the vision of a firm capable of playing a positive role in the environment, both from the social point of view (employment, housing improvement, consumer utility, etc.) and the environmental one (non-polluting, respect of safety regulations, etc.). The perception of environmental quality leads to *appreciation* of the firm by both economic and social (political community, unions, territorial agencies, etc.) stakeholders.

Fig. 8 shows the joint effect of VBM on product and company quality:

a. the three forms of *product* quality, expressed in terms of *utility, value* and *suitability,* are the drivers of customer loyalty (Dick and Kunal Basu, 1994) and brand store loyalty (Chaudhuri and Holbrook, 2001);
b. the three forms of *company* quality, in terms of *evaluation, reliability* and *appreciation,* produce *consumer confidence* (Acemoglu and Scott, 1994) and positive *customer sentiment* toward the firm as an operating entity in the environment (Bennett and Harrell, 1975; Rust et al., 1999; Bearden et al., 2001);
c. *loyalty,* together with *confidence*, enhance the firm's *reputation*, which represents the fundamental value driver on which market share, price level and, as a consequence, revenues and added value depend (fig. 1)

Product and company quality thus represent the two components of the firm's total quality as well as the fundamental element in the *value equation* of the product and the firm (Sweeney and Soutar, 2001). This clearly shows that the VBM and Total Quality Management approaches can be viewed as complementary, since there can be no production of value for the firm and its shareholders without the production of value for the customer (Mc Taggart et Al., 1994). Value is the object of both approaches, but financial shareholder value represents the most important driver through the value it provides the customer

Fig. 8 – The effects of product and corporate quality

TYPE OF QUALITY	PRODUCT	FIRM	PRODUCT & FIRM
FUNCTIONAL	Value, Satisfaction	Evaluation	
DESIGN	Utility, Image	Reliability	
ENVIRONMENTAL	Suitability	Appreciation	
Effects	LOYALTY	CONFIDENCE	REPUTATION & EXCELLENCE

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(Note: all the sites mentioned have been visited in February 2011).

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