

COST REDUCTION AND CONTINUOUS IMPROVEMENT: A LONGITUDINAL CASE STUDY

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Abstract:

In today's environment one of the top priorities for organizations is to costs without affecting dramatically organization survival. Therefore, the aim of this paper is provide evidence on (1) the importance of Management Accounting information for cost reduction purposes and (2) the role of some Control System components in order to carry out this strategy. A longitudinal case study has been conducted to this purpose at a Spanish subsidiary of a multinational chemical group. This chemical plant introduced a cost reduction project in the mid 1990s. The most salient results were on the one hand, the implementation of quality circles and internal benchmarking practices and, on the other hand the importance of both formal and non-formal Control System components in order to successfully achieve the project's objectives.

Key Words: Continuous Improvement, Internal Benchmarking, Control Systems, Longitudinal Case Study.

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1. INTRODUCTION

The definition of the concept of Management Accounting (Saez et al., 1993; Sierra and Rodriguez, 1997; Mallo et al., 2000), from a broader perspective lets us to consider it as an information system capable of providing relevant information for business management, considered as an ongoing planning and control process aimed at achieving organizational goals, which takes place at a given social and organisational setting we must take into account.

In this context Fernandez (1994) identified four principles present in the new management techniques: Continuous improvement, Value addition, Strategic action and Non-financial measures. Likewise, he already noted that in order to achieve ongoing improvement a new approach to Management Accounting was needed, basically because the variables to be measured and control are substantially different from the traditional ones.

Moreover, the need expressed by Ripoll and Balada (1993) for management accountants to be able to design and implement new accounting information systems better suited to the new environment of business management remain fully valid. They made a special emphasis on the use of Management Accounting as a control device to improve organisational processes with the ultimate goal of increased performance.

In order to attain such goal and since benchmarking is an instrument used to achieve Continuous Improvement, which consists of *“emulating the best known practices in a given field in the route to excellence”* (Perez-Fernandez, 1996, p.301)⁴. Using it as a

⁴ Its rationale lies in learning from those that achieve the best results in something – practice, process, task – in which the business strives to improve. Thus, the best way of doing things is taken as a reference, and it is compared what the business is actually doing, in order to obtain a better performance (Perez-Fernandez, 1996, p.301).

management technique by means of an ongoing process of tracking and comparing the best business practices, leads us to different outcomes, among them the most relevant ones, according to Elnathan et al. (1996, p. 41), are improved quality, reduction of defects, better product distribution and from a financial perspective, increased revenues and reduced costs.

However, we must mention that in a global environment with the resulting increased competition, the above-mentioned cost reduction cannot be achieved to the expense of product quality, since this would endanger the company's survival. In this line, Broto (1996, p.659) says that this survival will necessarily require achieving excellence by the implementation of quality circles. According to Leal (1997), they must be promoted by the top management, which must try to involve the employees working in all business areas, but such involvement must be voluntary and without financial pay. Notwithstanding, it would seem convenient to devise some type of incentive, since staff motivation and active involvement is crucial (Ripoll and Balada 1993, p.30).

In this same line, this paper pursues two main objectives: One the one hand we intend to bring up evidences on the importance of Management Accounting in cost reduction processes by means of the implementation of quality circles and the introduction of benchmarking practices within a continuous improvement rationale. On the other hand we will try to analyse the role played by the different elements of the control system in facilitating or hindering the implementation of this strategic action.

In order to achieve these objectives, we have conducted a longitudinal case study⁵ following the process perspective⁶, in which we have analysed the development of the Horizon Project in Onuba, a Spanish subsidiary of a multinational group (Onuba Group) operating in the chemical industry. The purpose of this project was to control and reduce costs, especially manufacturing costs, in Onuba Group, and meant a significant change process for the company, characterised by continuous improvement and the implementation of internal benchmarking practices.

⁵ This method allows the observer to contact directly with the real situation of the organisation under study, study in depth all the relevant issues and use multiple sources of evidence over a long stay, understanding the social, political and historic context of the event under study (Yin, 1987; Scapens, 1990). On the other hand, it allows to triangulate the information collect through them for internal validation.

⁶ Following Pettigrew (1997), we have paid special attention to the individuals involved, to the groups they are part of – Management Committee, departments, etc. -, to the organisation – position within the group and in its

So, in the following chapter we will present the theoretical approach we have adopted for this study. The third chapter discusses the results obtained in the case study, with references to the techniques used to collect information. The third chapter addresses (1) the most relevant characteristics of the chemical industry, the Onuba Group and its subsidiary in Spain, needed to provide the appropriate context for our study; (2) the Horizon Project, with an analysis of the most relevant objectives, stages and factors in its implementation, which will allow us to achieve our first objective; and (3) Onuba’s control system, in which we consider the variables in its environment, both the ones the company can control and those it cannot control, its formal and informal elements, as well as its organisational performance tracking and evaluation system, in order to achieve our second objective. The fourth chapter analysis the outcomes based on a previously conducted literature review. The fifth chapter presents the final conclusions we have arrived at and finally, the sixth lists the literature references used.

2. THEORETICAL APPROACH

Total Quality management is an integrated management philosophy and a set of techniques that makes emphasis among others on continuous improvement, customer satisfaction, reduction of reprocessing, a long term approach, increased staff involvement and team work, process redesign, competitive benchmarking, problem solving in groups, constant measurement of outcomes and keeping close relationships with suppliers (Ross, 1993). Along the same line Jarrar and Aspinwall (1999) characterised Total Quality Management as follows:

Table 1: Characterisation of Total Quality Management

Started by	Common sense and conventional know-how
Starting point	Existing processes: Analysis, standardisation and improvement
Frequency of change	Continuous and incremental
Approach	System components: Processes, individuals, activities
Focus on client	Same emphasis on internal and external clients
Level of change	Incremental improvement for existing processes (Evolutionary)

market segment as compared to competitors, etc. – which has allowed us to detect the multiple interrelationships existing among the different levels of analysis.

Involvement	Total involvement of anyone is essential, all individuals, working groups and some teams
Participation	Bottom-up (built within the culture)
<i>Empowerment</i>	Very important
Disadvantages	Difficult to achieve excitement and commitment over time, since it involves many small improvements
Advantages	Appropriate if low level of resources. Provides consistent improvement over time
Typical outreach	Narrow, within tasks. Process improvement efforts are made by simple times or just a few tasks
Risk	Moderate
Primary facilitator	Statistical control process
Payback time	Slow small continuous improvement

Source: Jarrar and Aspinwall (1999).

As evidenced by Fuentes and Lopez (1999), we cannot but define Total Quality Management as a management philosophy integrated by a set of ideas, practices and principles, since they have been developed over more than three decades and ítem from different authors and cultures. As Leal (1997) says, the main consequence of this fact is that although some papers have tried to reach an agreement on its definition and contents, there are still important differences among the various specialists. Thus, for example Leal considers Continuous Improvement of processes as a Total Quality Management tool, whereas Krieter (1996) says that Brocka and Brocka (1992) stated that it is just a way of improving on an ongoing basis. The issue becomes more complex with the emergence of the concept of Process Reengineering.

When analysing this question a little more in depth, we find that the most widely shared view in the literature (Dean and Bowen, 1994; Leal, 1997; Fuentes and Lopez, 1999; Garcia, 2001; among others), perhaps because it is the most integrated, is the one that considers Total Quality Management as a management philosophy or approach that can be characterised by its principles, practices and techniques. Its three basic principles are: Client Focus, Continuous Improvement and Teamwork. In turn, each principle can be implemented by means of a set of instruments, among them benchmarking. With regards to Client Focus, their satisfaction is the most important requirement for long-term organisational success and such satisfaction requires the whole organisation to focus on clients' needs. Continuous Improvement means a commitment to continuously examine administrative and technical processes in a search for the best methods and practices. Teamwork must imply collaboration between managers and all other

employees, among the different business functions and even with clients and suppliers (Kelada, 1999). As we can observe, all three principles are closely related to each other.

Focusing on Continuous Improvement, we must indicate that it is essential for Total Quality Management, since organisations are nothing else but sets of interconnected processes and an improvement of such processes is needed to achieve an improved organisational performance. It is usually promoted by the Manufacturing and Quality Control functions (Davenport, 1993).

In principle, any task can be addressed by an improvement team, which is made up by few people working in the same workplace and carry out improvement tasks on their own initiative. Notwithstanding, in most cases the Top Management promotes improvement programmes (Fuentes and Lopez, 1999) structured according to Ruchala (1995) with a bottom up approach, since its is the workers most closely link to each specific task who identify and implement improvements in them and set up the scenario for a more global improvement of processes.

In most cases benchmarking is associated to comparing the company to its environment, Harrington (1991, p.222) proposed a classification based on the reference used, making a distinction between: (1) Internal, which implies looking into the organisation itself to determine whether there are other centres implementing similar activities in a better way and define the best practices observed; (2) Competitive, which requires an investigation of products, services and processes of competitors in order to identify the best practices; (3) World Operations, in which benchmarking goes beyond the industry in which the company operates, observing generic functions or processes that can provide us with significant knowledge, even if they are used in some other industry; and (4) of Type Activity, focusing on some specific activities within a given process, regardless of the industry in which the company operates.

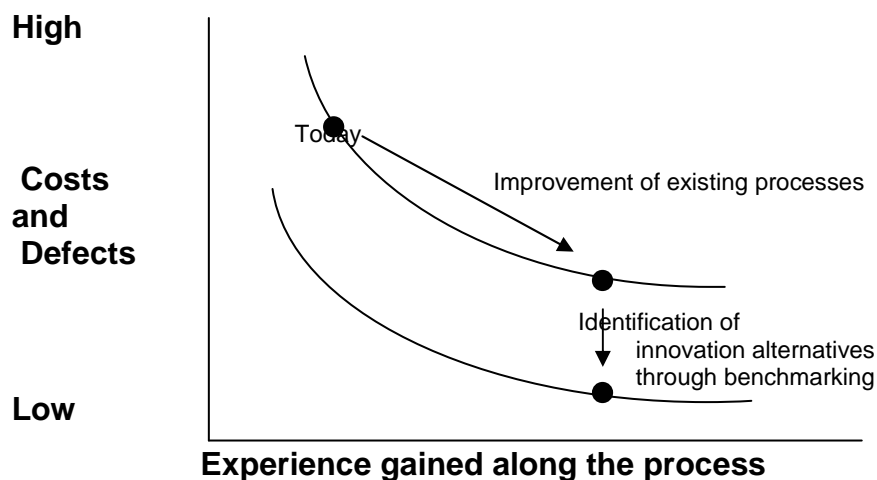
Depending upon the type of performance we intend to emulate, Perez-Fernandez (1996, p.302) makes a distinction between different types of benchmarking: (1) Strategic, related, to the market position of competitors; (2) Functional, for the most relevant processes within a function; and (3) Operational, connected to the specific aspects of an organizational unit.

Therefore, benchmarking can be considered as an analysis technique that allows companies to identify the different areas in which it can strive to improve, serving as

a reference to achieve the best known practices. So, according to Earl (1994), we must underline the ability of benchmarking to become a stimulus.

From a more practical viewpoint, Ruchala (1995) considers that benchmarking is most effective when the company has established previously incremental process improvements. The reason given by Furey (1993) is that such incremental improvements are already improving the existing process, as we move along the experience curve, with a reduction of costs and defects (Chart 1).

Chart 1: Experience Curve Before and After Benchmarking



Source: Furey (1993, p.22).

However, in order to implement benchmarking in an organisation and improve its results⁷, we need quantifiable data we can compare (Elnathan et al., 1996, p. 50), among other issues, on client needs, operational problems and success of improvement attempts; it has been even suggested that the organisations that collect and analyse information most efficiently are the ones that achieve the best results (Dean and Bowen, 1994). Likewise, according to Banker et al. (1998), within the benchmarking process it is essential to make the standard setting process more flexible, and therefore recommends the use of data envelopment analysis.

Thus, Management Accounting must set up a system capable of supplying the information needed – including quantitative non-financial and qualitative information – for decision-making in such an environment (Iglesias, 1992; Castello, 1996; Sierra

⁷ Carpinetti and Melo (2002, pp. 250-251) have proposed a five-stage model for the implementation of benchmarking projects in organisations: Product and market analysis, analysis of improvement areas, analysis of processes to be improved, measurement of performance and detection of priorities to be improved in the future.

and Escobar, 1996), which poses a true challenge for practitioners (Ripoll and Balada, 1993; Gimeno and Lopez, 1999).

In our case, it must provide the information needed to implement this strategic action, in the sense meant by Fernandez (1994, p.868) when he stated that it should allow for *“capturing, measuring, analysing and communicating information on each and everyone of the activities performed in the company in order to evaluate precisely the achievements made in implementing such improvement”*.

Finally, since motivation and an active participation of staff from all company areas is crucial in the success of such an initiative (Ripoll and Balada, 1993; Leal, 1997), we must take into account that Management Accounting, being part of the formal elements of the Organisation's Global Control System, it is subject to the influence of its informal elements (Flamholtz, 1983; Flamholtz et al., 1985; Amat, 1991), which can help to promote, or doom to failure, any action entailing a change in the organisation. Among the informal elements we can underline organisational culture, leadership style and interpersonal relationships (Jones, 1992; Granlund, 1998; Blanco and Aibar, 1999; Escobar and Lobo, 2000).

3. THE ONUBA CASE

The case study was started in June 1997, when the Horizon Project started, and lasted until March 2000. The following tasks were carried out throughout this period:

a.- Interviews to members of the management team, conducted to the Human Resources, Technical and Development, Accounting and Staff Administration, Distribution, Production, Data Processing Centre, Safety and Health and Maintenance Managers; to the two individuals in charge of reporting, to the Heads of Costs, Treasury, Client Control and Administration, Projects, Black and White Production Area⁸, Sales and Materials (Chart 2).

b.- Direct observation without participation at the Horizon Project, in which a new cost system was designed and implemented with the purpose of producing information in order to improve the company's management, by controlling and trying to reduce them. Likewise, at (1) meetings and daily work of the Departments of Accounting, Staff Administration and Information Systems, more specifically at discussions on Treasury and Client Management, maintenance issues, resolution of inconsistencies

in inventory management, adaptation of the system and finally, user information and education; (2) report drafting process for local and corporate management; (3) training sessions in different fields, such as Information Systems, Safety and Health and Staff Administration.

c.- Analysis of the following documents: 1989-200 Annual Reports, reports drafted for local and group management (Table 2), organisational charter (Chart 2) and scheme of productive process (Chart 3), documentation on the costing and budgeting system, internal information on the different departments, on the staff, on internal control procedures, as well as internal corporate journals and bulletins.

d.- Analysis of databases, both internal ones for local-level management, and external ones for corporate management. The latter include information on performance of all plants in real time, and so they are the main instrument in internal benchmarking.

e.- Circulation of a questionnaire on the role of Management Accounting in Onuba, the characteristics of the information used in management processes, management style, organisational structure, environment and business perspectives.

Chart 2: Abbreviated Functional Organisational Chart of Onuba (2000).

President of the Board of Directors	
	Operations Manager
	Black Area Manager
	Head of Production Plant Engineer Planning and Control Technician Production Technician Head of Materials Operation
	Plant Development Manager
	Head of Production Plant Engineer Planning and Control Technician Head of Pigment and Raw Material Storehouses
	Engineering and Maintenance Manager
	White Area Engineer Black Area Engineer Head of Projects Control Engineer Process Engineer
	Business Services Manger

⁸ The division of the production process into a Black Area and a White Area is a standard in the industry. In Onuba the former includes sulphuration and the latter the coverage with hydrated oxide, silicates and alumina.

	Head of the Plant Management Unit Head of Treasury Head of Accounting and Staff Management Head of Data Processing Head of Supplies Head of Pigment Distribution
	Technical and Development Manager
	Head of Labs Head of Process Engineering Head of Quality Head of New Technology Engineering
	Human Resources and SHEQ Manager
	Head of Environmental Prevention and Quality Head of Industrial Relations and Communication Human Resources Technician

Source: Own Drafting.

f.- Informal conversations with individuals belonging to different groups within the organisation. They were favoured by the actual location of the plant, which forces employees to have lunch at the canteen. All opinions were noted down on the field book, which turned out to be very useful in order to better understand the political, social, historical and organisational contexts, as well as to know the feelings of the workers.

g.- Discussion and analysis of the documents with the individuals in charge of producing them. We made a full list with all management reports, both at local and at group level, with data from the reporter, addressee, content, frequency, etc. Additionally we contacted the group's headquarters in London via telephone and they sent us the financial reports for the years covered in the study.

To conclude, we discussed our outcomes with the managers to whom we delivered a full report in order to analyse it in the closing interviews. This allowed us to make up for some errors in the interpretation on the information provided to us.

3.1. CONTEXT

Following Pettigrew's suggestion (1997), in order to put the case into context we started focusing on the main trends in the chemical industry and of the specific market segment, then we analysed Onuba Group and finally, its Spanish subsidiary Onuba.

Table 2: Main reports produced in Onuba.

Name:	Author:	Content:	Addressee:	Periodicity:	Observations:
T-FORMS	Group reporters	Basically quantitative-financial. Human resources and efficiency	Onuba Group	Monthly and annual summary	Focuses on <i>cash flow</i> . Used to draft detailed budgets
A-FORMS	Group reporters	Basically quantitative-financial. Human resources and efficiency	Onuba Group	Quarterly and annual summary.	Uses <i>T-Forms</i> information by 80%
Regional Office Costs	Head of Costs.	Office costs	Onuba and Group	Monthly	
Month Trading Profit Analysis	Head of Costs and Head of Accounting	Analytical result	President in Madrid.	Monthly	
Business Services	Secretary to the Management	Summary by areas: financial, staff, procurement, distribution, etc.	Management Committee	Monthly	Uses information of the reports of all areas
Materials Report	Heads of Production	Production, costs, inventories	Onuba and Group	Monthly	
Fixed Costs	Head of Costs.	Fixed costs per department	Onuba and Group	Monthly	
Variable Production Costs	Head of Costs.	Variable costs	Onuba and Group	Monthly	
Costs Forecast (3 months)	Head of Costs Plant Manager	Fixed and variable costs	Onuba.	Monthly or even less	
<i>Operating Cost</i>	Head of Costs.	Cost per ton and pigment	Onuba and Group	Half-yearly.	Used to manage inventories
<i>Site Operation Management Report</i>	Reporters	Quantitative-financial information of Onuba's different areas, Also some qualitative information	Management Committee. Onuba Group.	Monthly	This information is used for internal <i>benchmarking</i> among the different plants of Onuba Group
Horizon 2000 Report	Reporters and persons in charge of the Horizon Project in Onuba.	Information on improvements in cost management	Onuba and Group	Monthly	
Plant Maintenance	Maintenance Manager	Control of investments	Management Committee	Monthly	
Production Report	Plant Manager and Heads of Production	Information on production area	Management Committee	Monthly	
Safety and Health Report	Safety and Health Manager	Accident and other health indicators	Management Committee	Monthly	
ERO database	Onuba Group (London).	Production, markets, financial, forecasts, investments, costs, etc.	Local Top Management	Monthly (update)	Restricted access On-line information
BOP database	Onuba Group (London).	Best operational practices at group level	Local Top Management	Monthly (update)	Restricted access On-line information
TEMs database	Onuba Group (London).	Sales and distribution	Local Top Management	Monthly (update)	Restricted access On-line information

Source: Own Drafting

The chemical industry makes a substantial contribution to the GDP. Some of its main characteristics are as follows: (1) it uses few raw materials; therefore, input costs are usually not too high, especially if we consider that chemical plants are usually built close to the natural sources; (2) it is not labour intensive; however, labour costs are still very important; (3) it requires important investments in research and development, which has led to a high debt; and (4) it is considered as a mature industry, due to the stabilisation or decrease in the number of patents. Some of its main problems are overcapacity and the cyclical character of the business, resulting from the effects of crises in other industries, its location in an environment of traditionally unstable currencies, and the general failure to meet existing environmental controls, if any.

The evolution of the chemical industry in recent times has been determined by a substantial increase in: (1) number of mergers and/or acquisitions, inasmuch as companies have tried to benefit from scale economies, (2) joint ventures started in countries with a large potential as emergent markets, such as Brazil and China and (3) great public awareness and concern about environmental issues, which has led to a strong regulation enactment process in Europe, requiring companies to invest huge sums in researching and acquiring new technologies, to improve the treatment of their waste and emissions of pollutants.

Onuba Group was founded in 1930 and it is one of the world leaders in the production of titanium dioxide; it is the first European producer and third in the world, very close to the second, a position it held in recent years. It employs more than 3400 workers in its nine production plants located in four continents: America – USA and Canada, Asia – Malaysia, Africa – Republic of South Africa, Europe – France (Calais), Spain (Huelva), Italy (Scarlino) and two plants in the United Kingdom (Grimsby and Greatham).

In the 1990s Onuba Group carried out an important investment plan, which included the start of a new sulphate-process plant in Malaysia and the acquisition of 50% of the stock of a chlorine-process plant of Louisiana Pigment Company in the US. It also made substantial investments in different programmes with the double purpose of: (1) adapting plant operations to the new environmental regulations enacted in the different countries in which the group operates, and (2) trying to improve its competitive position in the titanium dioxide industry.

Onuba Group experienced a crisis in the early 1990s caused by poor financial results and not having paid out any dividends for several years. This led its main shareholder to put it on sale since he considered it as a non-core business, characterised by cyclical returns below the group's average (Alperowicz, 1999).

The most significant features of Onuba are as follows:

a.- It belongs to Onuba Group, which experienced a crisis since the early 1990s, which led to the development of an integrated cost reduction plan in each of its plants.

b.- The company started its operations in Spain in 1973, at a time protectionist regulations and economic deregulation seemed quite likely, and has been operating ever since.

c.- Its core activity is the production and sale of titanium dioxide, a very pure white pigment, with an excellent performance and versatility in the manufacturing of components to give a white and opaque colour to paint, but also paper, plastic and fibres. It can be obtained by two different processes: (1) sulphate-based, treating the raw material – ilmenite – with sulphuric acid or (2) chlorine-based, using it to alter the raw material. Onuba Group uses both production technologies and it is the largest world producer of pigments using the sulphate process (Chart 3), which is the method used in Onuba.

d.- It has got a high transaction volume, since it is the plant in Onuba Group with the lowest production costs and the largest installed capacity.

e.- Onuba's Management expected the losses period, which had lasted for almost 5 years, to end in 1997, but the losses accounted for 1454 million pesetas (8.75 million € approx.) in that year. This was mainly due to the human resource restructuring process and the technology improvement project, focusing primarily on manufacturing but also on information, the company had carried out. The ultimate goal of such organisation policies was cost reduction and productivity increase in order to improve its competitive position in and out of Spain.

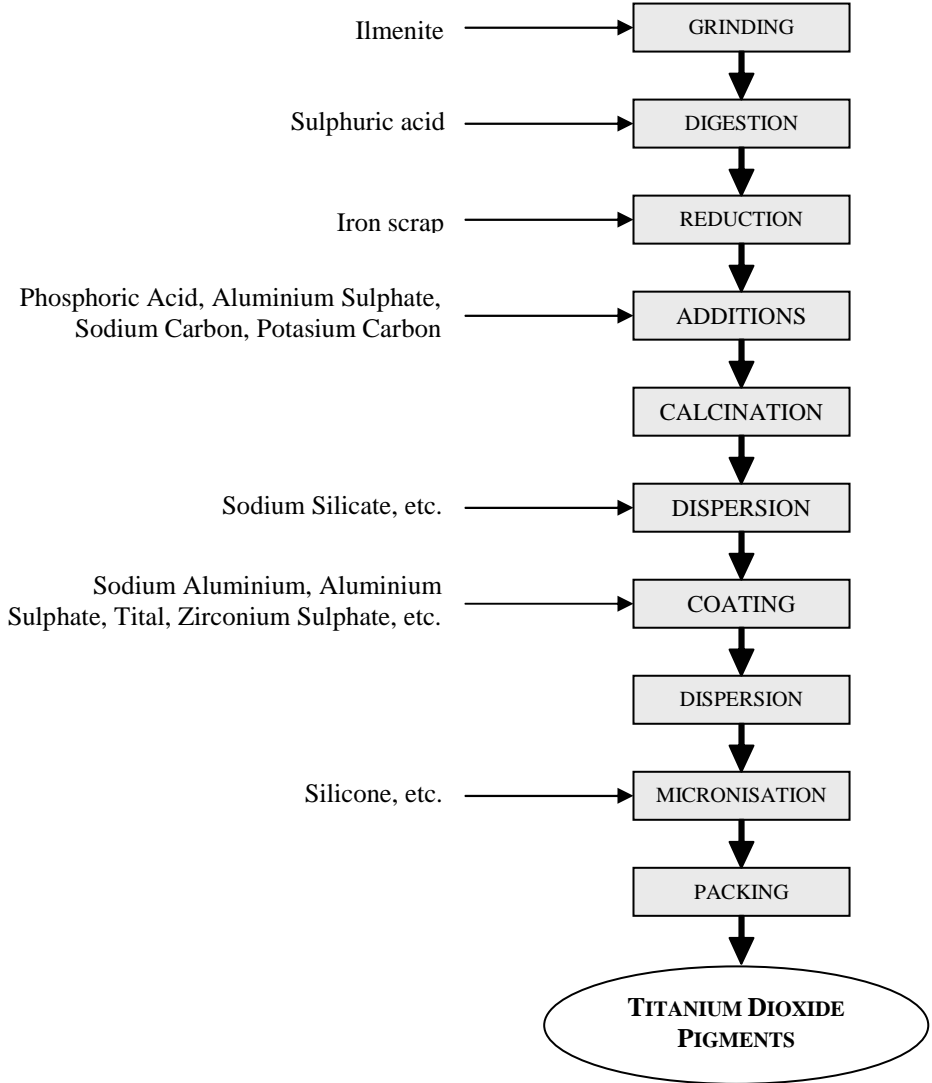
f.- It has currently got 397 employees, 103 less than 5 years ago.

g.- There has been a positive evolution in net sales over the last 5 years reaching 23280 million pesetas (139.9 million € approx.) in 1998 and 24996 million pesetas (150.2 million € approx.) in 1999.

h.- Onuba has been a pioneer within the Group in the development of environmental impact reduction technologies. It has set up a joint venture to treat the waste it

produces and market them as agricultural fertilizers. These initiatives have led the company to receive the Principe de Asturias Awards in Environmental Management Excellence in 1993 and 1994.

Chart 3: Summary of Onuba’s Production Process



Source: Own Drafting.

3.2. HORIZON PROJECT

This programme intended to change some key aspects in the overall management of Onuba, en especially in its cost management, started to be drafted three years before it was actually started, when a consultancy firm studied the management practices and business perspectives of Onuba Group. The outcome of this analysis was a set of recommendations that finally resulted in action focusing on management and control and on cost reduction, especially of manufacturing.

The Horizon Project started as a pilot test in Grimsby – one of the Onuba Group plants in Britain. The final objectives of the plan were to achieve (1) a progressive reduction of the production costs until reaching a 40% cut in fixed costs and an 8% cut in variables costs⁹, (2) quality improvement by means of a continuous improvement policy aimed at achieving a 40% reduction in product not meeting the group's standards and (3) improvement of production efficiency by reducing losses caused by plant problems by 40%.

This project aimed at cost control and reduction in the company has meant a significant change in the working practices of Onuba's employees. The crucial elements used in this organisational change process are ideas linked to continuous improvement, internal benchmarking practices, and above all, the change in attitude of all those involved towards internal management in Onuba, because of despite the initiative being promoted by the top management, it was only the high involvement of the employees working in process implementation what made it possible to achieve its full implementation and the resulting improvements.

Here we must highlight the actions undertaken by Onuba to prevent potential individual and group resistances within the organisation. After the first news on the project, its development and implementation, the top management publicly stated its full support to the project and tried to involve the highest possible number of employees from different categories and departments, taking advantage of the good existing informal relations and the veiled threat of a potential sale of the subsidiary by Onuba Group.

Comprehensive and detailed information was delivered to the employees using different internal, vertical and horizontal, communication channels, such as the Intranet, periodical bulletins, presentation meetings both at company and at function level, as well as informal talks, in which the local top management played a very active role. A further important measure to prevent future conflicts was the agreement reached by the local top management and the workers' representatives specifically stating that there would be no layoffs resulting from the application of the ideas for improvement included in the Horizon Project, which reduced to a great extent internal resistance to change.

⁹ The main production costs in Onuba are: (1) fixed: materials used in maintenance, workforce, travel and external contacts; and (2) variable: raw materials, natural gas, electric power, water and other chemicals.

Continuous improvement teams were established to implement the project. They were made up by up to five workers from different areas of the plant whose purpose was to develop, analyse and implement ideas for improvement in each of the tasks related to the team's specific goals.

Team components were selected by the top management among the voluntaries, following both objective criteria, such as their previous experience in similar projects and their knowledge of the different tasks relevant to the specific process to be improved, and political ones, individuals with formal authority and reputation among the workers.

The first three teams were formed on April 4th 1997. All team members went through several training courses on different team-working and quality improvement techniques – brainstorming, SWOT analysis, etc. These courses were taught by a consultancy firm hired by Onuba Group to provide counselling especially during the initial project implementation stages. Likewise, a pocket guide was produced for each team, which included a summary of available techniques and tools, as well as a time plan with the main deadlines in terms of objectives to be achieved.

During this initial stage it was said that as incentive, at the end of each period throughout the implementation of the Horizon Project, the Management Committee would appraise the ideas presented by each group in order to give a prize to the best team, keeping in mind that implementing some of them would require setting up a new ad-hoc team for its implementation. Likewise, this Committee was responsible for evaluating the different proposals on the basis of the cost and time savings they would bring about, their originality and the effort their implementation would require. The prize promoted internal benchmarking practices in Onuba Group since it consisted on a trip to a different plant to observe how the best practices resulting from the Horizon Project in other countries, and also, to improve the relationships with employees from other plants, which would also help to disseminate a continuous improvement culture.

The Top Management of Onuba performed the first project implementation assessment in July 1997. From the 717 ideas generated by the three improvement teams in the different units in which the plant was divided and approved by the Management Committee, 85% have been implemented by the planned deadlines. Among them two groups stand out: (1) those regarding the reduction of intermediate components necessary to manufacture the final product, such as Idea 121 whose

purpose was the minimisation of reactives used in coatings; and (2) those focusing on the improvement of information production and communication for management purposes, such as Idea 158 setting up a new internal mail system.

According to the initial planning four new improvement teams were formed in 1998, allowing for new ideas to be used to achieve the Horizon Project's objectives (Table 3). By late 1998 85% of the approved ideas had been implemented in Onuba; 345 had been successfully implemented within the planned deadlines, accounting for more than 6% of the total that had to be put in place at the end of the Horizon Project by the end of 1999. In order to implement such practices investments accounting for 549 million pesetas (3.3 million € approx.) were required, from which 153 million pesetas (0.92 million € approx.) were already spent at the end of 1998.

Table 3: Situation of the Improvement Teams in January 1998.

Team	Members	Objective	Tools
1	5	New identification system for materials and waste	SWOT Analysis GANTT Diagram
2	4	Reduce number of work orders by 50%	SWOT Analysis GANTT Diagram
3	4	Prevent time losses caused by the issuing of work orders	SWOT Analysis GANTT Diagram
4	4	Improve the management of the telephone central	SWOT Analysis GANTT Diagram
5	5	Improve reliability conditions	Brainstorming GANTT Diagram
6	3	Improve work safety signs	Brainstorming GANTT Diagram
7	4	Improve conditions of subcontractors area	Decision pending

Source: Own Drafting.

The outcome in terms of costs was that the plant achieved savings accounting for 605 million pesetas (3.64 million € approx.) in 1998, 36% of the total savings forecasted for the end of 1999.

By the end of 1998 1500 ideas had been implemented in all of Onuba Group's plants. Total savings at group level accounted for 4750 million pesetas (28.5 million € approx.). Notwithstanding, in the words of the manager responsible for the Horizon Project *"the greatest satisfaction has been to verify that the changes we have introduced have not stayed at the surface, but have rather led to a substantial change in the company's and the workers' culture and philosophy."*

The Horizon Project was controlled at two levels. On the one hand there was an intensive use of informal control systems, such as continuous monitoring of team responsible employees by the Top Management at meetings not specific to the project and in informal talks. On the other hand, there was also a formal control of the outcomes achieved by the teams at the end of the year. Likewise, the information obtained at each of the plants was used to compare and evaluate project implementation at group level.

At the end of each year of the Horizon Project a study was conducted at Onuba to control the improvement teams' performance. All their members filled out a questionnaire and were interviewed by the Management Committee; this helped to identify a series of strengths and weaknesses during the first two years of the project. Later, this Committee discussed with those in charge of the improvement teams potential solutions to overcome some of the weaknesses – lack of time for meetings, incompatible schedules, less collaboration by some junior managers, lack of experience in self-management, etc. – as well as to promote strengths desirable to improve better team performance – short term results, enthusiasm, learning of new tools, improved communication between employees and between different corporate functions, etc.

The final result in December 1999 at the end of the Horizon Project was the implementation of 77% of the initially planned ideas, with a financial result of savings accounting for 1605 million pesetas (9.65 million € approx.), 931 (5.6 million €) in fixed costs and (4.05 million €) 674 in variable costs.

We can state that Onuba has achieved the best results within Onuba Group for two reasons: (1) It is the only plant that has completed the Horizon Project in the planned time-period; and (2) it has confirmed its positions as cost leader within the group, which was confirmed by the project manager at Onuba when he declared that *“we already had the lowest costs in the group before finishing the Horizon Project and the difference between the rest of the group and us have grown bigger.”*

Finally, as a consequence of the Horizon Project other qualitative improvements have been detected and acknowledged by the Top Management and team members themselves related to the development of skills and cultural values among participants, such as improved communication, implementation of a teamwork culture, promotion of initiatives, increased motivation, work in multi-task groups, etc.

3.3. CONTROL SYSTEM IN ONUBA

In order to achieve our second objective, analysing the role of the different components of Onuba's control system during the implementation of the Horizon Project, we will go on to consider the environmental variables, both the ones the organisation controls and those it does not, as well as its organisational performance monitoring and evaluation system.

Among the contingencies Onuba can control the following were analysed: (1) The strategy that is conditioned by the groups measuring organisational performance, by means of the bottom-line and the dividend per share. Therefore Onuba's objectives are expressed in terms of bottom-line, cash flow and cost reduction. On the other hand, such as markets of operation and investment policy fall beyond the policy-making powers of the local management; size, which in terms of revenues has experienced a sustained growth in recent years, 60% over 1994 in 1999. However, number of employees has gone down from more than 500 employees in 1989 to less than 390 in 1998; and (3) technology, which is partially controlled by Onuba. Production technology is determined by Onuba Group; however, each plant has some margin for action to invest in maintenance and improvement of production facilities. In other areas such as Research and Development there are differences among the plants. Thus, we can say that Onuba has developed new technologies for emission and waste treatment that are being exported to the group.

With regards to the variables the organisation cannot control, we can underline that: (1) The environment is moderately uncertain; however, there are some factors that significantly affect stability: changes in raw material prices on the one hand side, and the evolution of some industries, like automobile on the other; (2) from a technological perspective, "it is a mature industry and it is difficult to improve current levels". However, innovations in other support technologies, such as information ones and those used in polluting emission and waste treatments, are allowing for differentiation within its segment; (3) this industry is an oligopoly; the world leader accounts for one fourth of the total production and the first four producers accounted of 63% of the market in 1998. This situation is evidenced by some aspects of market operations, such as announcements of pigment price increase issued *almost simultaneously* by the main producers (Anonymous, 1999; Tullo, 1999). On the other

hand, (4) the evolution of the legal framework applied to chemical industry operations is tending towards stricter control of emissions and waste.

A further aspect to be considered is the evolution of currency exchange rates, even with the simplification brought about by the introduction of the euro. Other more global factors are interest rates, which may draw investments to a sector that traditionally has got external funding, or the overall evolution of the economy, since expansion cycles in the industries supplied by Onuba Group, such as automobile, paints, etc. increase their demand for pigment.

3.3.1. INFORMAL ELEMENTS OF THE CONTROL SYSTEM

They are highly coherent; the local organisational culture reflects the fact that the members of the Management Committee have been working together for more than 15 years, making up a closely knit-together group. This is why control processes operate under a participatory management style and fluent interpersonal relationships. In this culture the main values are commitment to and identification with the organisational goals, trust among workers which makes it possible to work in a friendly environment, and finally, a high awareness among employees allowing for self-management at the different responsibility areas.

These values are transmitted among employees, technicians and plant operators, by means of fluent interpersonal relationships that serve as a means for transfer and confirmation. This relationships result in multiple spontaneous meetings on any workday: coffee breaks, lunch at the canteen, etc.; they are very helpful in making the outcomes of many formal meetings more satisfactory for daily operations, as well as in preventing conflicts.

3.3.2. FORMAL ELEMENTS OF THE CONTROL SYSTEM

The organisational design is determined by Onuba Group; decisions on strategy, budgeting and investments are centralised. Notwithstanding Onuba's management has got a substantial autonomy, as long as the objectives established by the group are met, making effective centralisation much less.

Decision-making is highly formal and bureaucratic, some reports are even duplicated with the same information in different formats depending upon who they are submitted to. Likewise, we have identified the following mechanisms within Cybernetic Control Systems: Budgeting, Investment Delegation – Evaluation and

Control, Cost Control, Cash Flow and Working Capital Reporting, Quantitative Non-Financial and Qualitative Management Indicators¹⁰, and Organisational Performance Reporting. The reports produced by means of the above mechanisms are listed in Table 2.

In general terms, there is an overall dissatisfaction with the budget negotiation process, because the parent group asks for a proposal which it later adjusts downwards. Hereto, a manager stated the following: “We send to London the figures we consider necessary for Huelva every year, but the usually they cut them down by *10% to 15% and then they are all year long putting pressure on us because we do not meet their budget*”. Likewise, they declare that there is overlapping and reiteration in the reports to control budget deviations, indicating that: “*We spend here a lot of time drafting reports, some of the three or four times, which takes our attention away from work, in addition to overwhelming us with so much control of the same things*”. Logically, this situation generates conflicts between group and local management, because according to a member of the Management Committee “at the end all the Accounting and control of the different plants of the group work for London, and it should be the other way around, control systems specifically designed for the different plants.”

With regards to cost calculation, budget forecasts are drafted according to functional areas and based on them fixed and variable costs are estimated¹¹ and then the forecasted monthly analytical result is calculated. In order to control and reduce costs specific reports are produced, providing information of each department’s fixed and variable costs, with a special focus on production costs, both of the Black Area and the White Area. Moreover, we must underline that costs data are included in the monthly and quarterly reports drafted for the local and group management.

¹⁰ Pigment quality, energy use rates, production plant efficiency, absenteeism, safety in the workplace and control of environmental impact are included in the monthly report submitted to the general manager of the plant, the Operations Manager, called *Traffic Light*, whose content is crucial for Onuba’s management processes. Indeed, although it does not bear the name it is actually a Command Board for the Top Management, since it displays its main characteristics.

¹¹ The managers responsible for this areas insisted during the interviews on the difficulty caused in some cases by having to comply with such cost classification criterion, one of them even said that “all costs are semi-fixed or semi-variable”. With regard to this, Broto (1996:659) mentioned that the incorporation of new technologies had cracked the bases of the methods traditionally used in Cost Accounting, especially the indirect cost allocation criterion based on standardised global rates.

3.3.3. ORGANISATIONAL PERFORMANCE MONITORING AND EVALUATION SYSTEMS

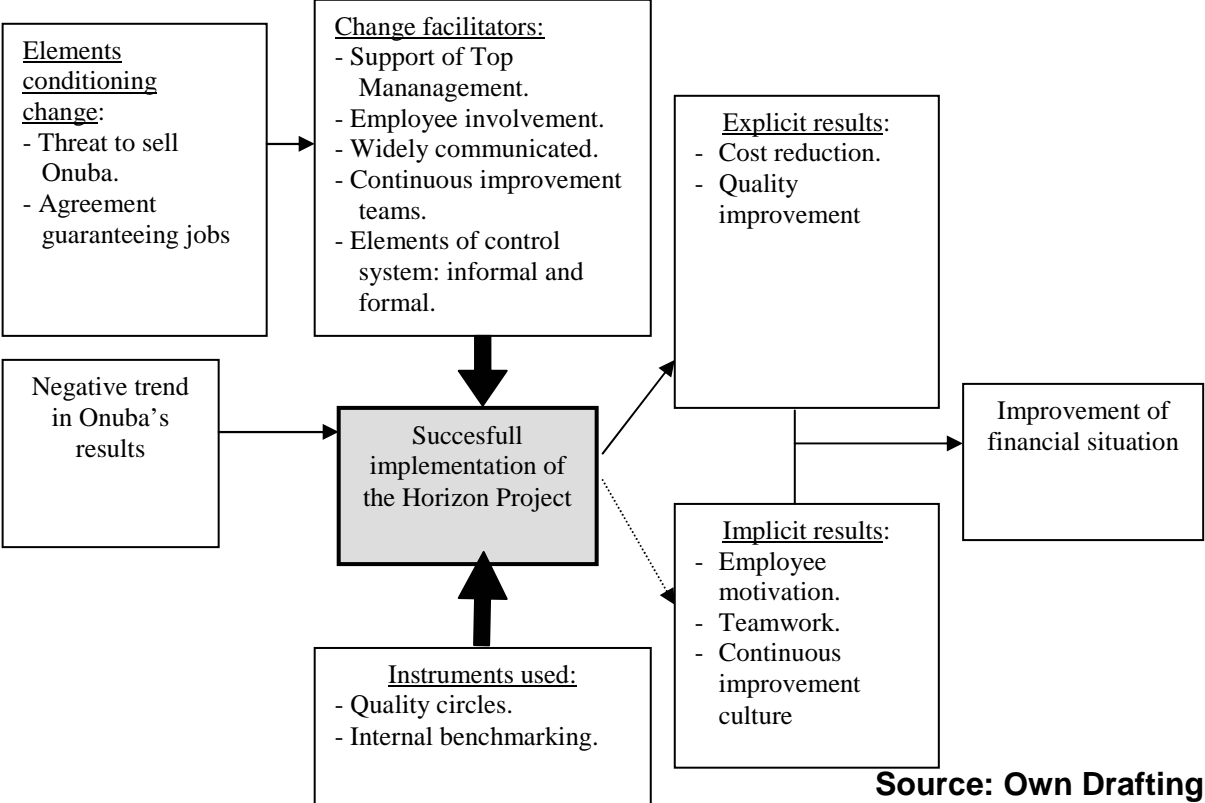
The variables used to monitor and assess organisational performance are consistent with the organisation's objectives and focus mainly on four magnitudes: Profits, Costs, Quality, and finally Safety and Environment. As we can see, both quantitative – mostly financial – and qualitative measures are used, with a clear predominance of the former. This trend becomes even clearer if we analyse more aggregate reports and the data bases of Onuba Group, for example, the so-called: *European Regional Office (ERO)* which includes the value of the main financial indicators in each subsidiary, as well as any deviations from them;; *Best Operating Practices (BOP)*, which includes the quantitative data of the Operations Area; and *Team European Measurement (TEMs)*, for indicators on sales and distribution. Based on the information provided by these databases internal benchmarking practices are developed, resulting from the systematic comparison of the figures achieved by each of the subsidiaries for the above-mentioned indicators, the study of any detected deviation and the analysis of the practices that allow the leading subsidiaries to achieve the best outcomes, in order to apply them across the group. In order to assess the performance of the technical staff, some 60 junior managers, the Management Committee produces a personal report called *Performance Appraisal*, which is basically an assessment of the work performed based on the degree of achievement of a set of objectives that according a Management Committee member are “*realistic, measurable and subject to evaluation, etc.*”. The report lists for each period the objectives, the results achieved by the employee as compared to such objectives, a classification of performance according to a six-level scale – from exceptional to unacceptable -, a global appraisal, the opinion of the individual under evaluation, objectives for the following term, training received and expected, analysis of the skills evidenced at the job, and finally future development chances of the individual under evaluation in his current job. Its most important aspect is that it is possible to achieve and monitor the objectives set for each job and the fact that it is a participatory evaluation reached in consensus with the employee.

4. ANALYSIS OF RESULTS

We will now proceed to analyse the results obtained in the longitudinal case study on the Horizon Project implemented in Onuba on the basis on the literature review we

have performed and following the structure presented in Chart 4. It includes the main factors that have influenced the development of the project, the instruments used by Onuba to achieve the proposed objectives, as well as the results obtained, both explicit and implicit.

Chart 4: Global Perspective of the Horizon Project.



Source: Own Drafting.

First of all, Onuba Group operates in a mature industry with a moderate degree of uncertainty and a strong price competition. During the 1990s it accumulated negative financial results, which led its former main shareholder to put it for sale, evidencing the relevance of business concentration processes in this industry at world scale, as a strategic response.

These conditioning factors led the management to consider an incremental and evolutionary programme, such as continuous improvement (Jarrar and Aspinwall, 1999), developed within the wider framework provided by Total Quality Management, as Leal (1997) proposed. Therefore, it is an intentional change process as proposed by Dean and Bowen (1994), which can be inferred from its planned character. A sign of that is the previous study carried out by a consultancy firm on business management and perspective, three years before the Horizon Project started, as well as the implementation of a pilot test at the Grimsby plant (United Kingdom).

The Horizon Project is part of the strategic response of the Top Management of Onuba Group to tackle the fierce price competition existing in the titanium dioxide business at world scale. Its implementation aimed mainly at reducing costs (one of the main indicators of organisational performance in Onuba Group) using benchmarking techniques, in accordance with the findings obtained by Chenhall and Langfield-Smith (1998, p.257). Likewise, the Project was communicated to the Local management of each of the subsidiaries, which were made responsible for its implementation, since a further intention was to make a compared cost control for each of them. This strategic aspect, together with those connected to continuous improvement, abides to the principles that according to Fernandez (1994) shall guide the new management techniques.

If we analyse its outcomes, the Horizon Project has been a success since its explicit objectives of reducing costs and improving quality have been achieved, but in the opposite order, as proposed by Elnathan et al. (1996, p. 49) first there is a quality improvement – *non-financial measure of organisational performance* – and then a cost reduction – *financial measure of organisational performance*. Furthermore, other implicit objectives have been achieved, among them the introduction of a continuous improvement and teamwork culture, both in Onuba Group and, especially, in its Spanish subsidiary.

We can mention several factors that have contributed to the success of the Horizon Project in Onuba, in terms both of implementation and results. Thus, the uncertainty created by the negotiation process aimed at the sale of Onuba Group resulting from its performance over the previous years led both Onuba's Local Management and workers envisage the project as an opportunity to turn around the financial situation and ultimately, to keep their jobs. This worked as a motivating and convincing instrument.

The implementation of the project followed a top-down approach, starting from the Top Management and then down to the lower levels. In turn, participation, proposal of ideas and their approval and implementation started at the lower levels, those directly involved in performing the tasks, and then up to the Top Management (bottom-up approach). These processes are in the line with the findings of Jarrar and Aspinwall (1999). More specifically, we can say that:

a. - The Top Management of Onuba Group and Onuba showed at all times their full support and commitment to the Horizon Project, making it visible for the employees

by means of their direct involvement, which included from a strong communication campaign through different communication channels, such as talks and meetings they held with the employees, appraisal of the proposals, the establishment of new teams to implement some of them or their control along the three years of the project.

b.- The commitment of the Management enhanced employee participation, which was crucial for project success, as Kelada (1999) proposed. An indication of such participation was the fact that the members of the improvement teams were selected among a group of employees who volunteered even without any kind of financial reward, just recognition by the others. The selection criteria were successful in bringing the rest of the employees to follow them; since they were people with formal authority and a reputation in the company the support of their colleagues was soon evident. Likewise, in the case of Onuba there are some informal elements in the Control System that helped to reinforce the impact of management and staff involvement, as proposed by Jones (1992) and Granlund (1998). By this we mean the different aspects making up the local culture of Onuba, such as the strong links between individuals resulting from having worked together for a long time, participatory management style, fluent interpersonal relationships, commitment to organisational goals, trust among workers, and in conclusion the pleasant working atmosphere. All of this helped people to feel part of the project and be willing to become involved. Good evidence of it is that just three months after the Horizon Project started, more than 700 proposals had been made, mostly aimed at the reduction of intermediate components and at improving information used in management.

The different factors we have already mentioned, mainly the possibility of selling, the visible support of the Top Management, the high involvement of employees and taking advantage of the good informal relationships existing in Onuba resulted in very little internal resistance against the project and the resulting changes. To this effect the agreement signed by the Workers' Representatives and the Top Management made clear to all employees that the group's objective was to reduce costs but not by cutting down jobs.

Likewise, during the implementation of the Horizon Project we must underline the use of two instruments that were crucial for the development of ideas for improvement and their implementation, such as teamwork (Broto, 1996) and internal benchmarking (Perez-Fernandez, 1996). The former was used in the formation of the improvement

teams and the ulterior establishment of further groups to develop some ideas. They were small teams, leading to better collaboration among members, and multi-functional, incorporating knowledge and skills from the different areas, in addition to the training provided to their members, in terms of teamworking and quality improvement techniques.

With regards to internal benchmarking practices, they have evidenced their validity in a crisis situation. In the case of Onuba, in line with Elnathan et al. (1996, p. 50) these practices relied on the information supplied by Management Accounting, which stored in the databases of Onuba Group, provides real time data of the best practices detected in the different plants. These databases are part of the Organisational Performance Monitoring and Evaluation System of Onuba Group, and so internal benchmarking practices had also an impact, as mentioned by Banker et al. (1998, p. 149), on employee motivation to perform better their tasks in all subsidiaries, best practices not being directly copied but serving as a reference, as suggested by Earl (1994) and Perez-Fernandez (1996), among other reasons, because despite belonging to the same group, each subsidiary has its own cultural peculiarities, some of them just because they operate in different countries.

Likewise, we must highlight the intelligent use by the management of the incentive awarded to the best teams, because in addition to be a goal for them, it was also an instrument to promote among the Group's subsidiaries internal benchmarking practices. In our case the individual participation was on a voluntary basis and without a financial reward, in line with the opinion of Leal (1997), with no need to resort to other incentives as proposed by Ripoll and Balada (1993).

When the Horizon Project finished we found that Onuba was the only plant to meet the deadlines, in addition to confirm its leading position in terms of costs within the group. This cannot be attributed to any of the individual factors we have mentioned but rather to the combination of all them, which made the project successful. Indeed, there are external factors such as the urgent need to undertake the project to overcome a period of negative results, starting with the lowest costs within the group, having previously undergone a human resource restructuring process or enjoying a good working atmosphere; and factors inherent to the implementation of the Horizon Project, such as commitment of Top Management, employee involvement, lack of internal resistance or adequate adaptation of best practices in the Group.

Finally, we must underline that the end of the Horizon Project in Onuba Group, and more specifically in Onuba has not meant the end of a time without future perspectives; right on the contrary, it has been the culmination of an intended change process that has changed the way of thinking of Onuba's people, who have integrated the search for continuous improvement in their daily work.

5. FINAL CONSIDERATIONS.

In this study we have intended to bring up evidence on the importance of Management Accounting in cost reduction processes by setting up quality circles and introducing internal benchmarking practices under a continuous improvement rationale, and to analyse the role played by the system's elements facilitating or hindering the implementation of this strategic action.

To this purpose we have conducted a longitudinal case study following the process perspective, in which we studied the Horizon Project in the Spanish subsidiary of a multinational company operating in the chemical industry. The objective of the project was to control and reduce costs, especially manufacturing costs, and it meant an important change process in Onuba, based on continuous improvement and the development of internal benchmarking practices.

In the case of Onuba, it is clear that it implemented the Horizon Project, designed at group level, basically in order to tackle a crisis caused by the negative results obtained over a long time period. Project implementation was facilitated by the support of the top management, a comprehensive information campaign addressed at all employees on the different aspects to the projects, their active participation and teamworking. This together with the contribution to such change made by the elements of Onuba's control system, especially informal ones, such as a participatory management style, fluent interpersonal relationships among organisation members, their commitment to and identification with company objectives and a good working environment, leading to little if any resistance to change. To this respect, we must highlight that that change facilitators we have just mentioned were enhanced to a great extent by the threat of selling Onuba, the agreement signed by Worker Representatives and Local Top Management guaranteeing that the Horizon Project would not lead to loss of jobs.

The instruments used by Onuba to achieve its objectives were basically two, setting up quality circles and internal task benchmarking practices rewarded with non-

financial incentives. This work confirms that in a continuous improvement rationale, and therefore subject to product and business processes quality, Management Accounting plays a crucial role in the implementation of such practices because it is the main information support in management, as we have been able to see when considering the formal elements and the organisational performance monitoring and evaluation system integrated into Onuba's control system.

The presence of the above mentioned changes factoring change, together with the application of benchmarking practices and the establishment of quality circles led to success in achieving the objectives of the Horizon Project, both explicit, such as reduction of production costs and increased quality, and implicit, such as increased employee motivation, improved corporate communication, and the intended organisational culture change, whose main symptoms were appreciation of teamwork and collaborative attitude of team members. These objectives ultimately led Onuba to turn its adverse financial situation around.

As a final remark, we understand that it would be convenient to conduct further research studies focusing on the analysis of continuous improvement processes, their conditioning factors and the role played by Management Accounting in them in order to improve our understanding on the subject. To this purpose we believe the case study is an appropriate method due to the multidisciplinary character of what is being studied, the advantages resulting from its holistic character and the used of techniques to search for evidence.

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