

## Management strategies and workers' perceptions: a case study in the white goods industry

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*Abstract: The restructuring of the white goods sector is associated with internationalization through cross border acquisition. This paper focuses on the technological and organisational changes in a cooker factory and their consequences for the workers. We will examine the restructuring impacts on the volume and composition of the labour force, on the conditions of employment and on the workers' perceptions of the changes, based on data collected from interviews of an ongoing project.*

*Keywords: white goods sector, work organization, workers perception.*

### 1. Introduction

This paper focuses on the technological and organisational changes in a cooker factory located in Campinas, São Paulo, and their consequences for the workers. We will examine the restructuring impacts on the volume and composition of the labour force, on the conditions of employment and on the workers' perceptions of the changes.

This study is based on data collected in the first semester of 2002, from an ongoing project entitled "Globalization, Managerial Strategies and Workers' Responses: A Comparative Study of the White Goods Industry"; supported by Fapesp and linked to an International Project. The firm chosen for the case study is the largest Brazilian cookers' producer. The restructuring of the white goods sector is associated with two main processes – internationalization through cross border acquisition and technological and organisational changes aimed at production efficiency and cost reduction.

Interviews have been accomplished with managers of commercial area, production, logistics, quality and human resources to obtain information about the restructuring process in the cooker factory. A survey has also been accomplished with administrative staff (50 persons, including directors, managers and supervisors) and with 53 production workers to evaluate their perceptions regarding these changes.

The next part of the paper shows the history of the Brazilian white goods industry and its restructuring in the 90's. The third part presents the company studied. In the third part, the technological and organisational changes and their consequences for the workers are analysed, comparing them with the Campinas metal sector data. In the last part, the workers' perceptions about changes in work processes and conditions are explored.

### 2. The Brazilian white goods industry

The white goods industry was introduced in Brazil at the end of the 1940s, as part of a policy of import substitution. In the 1980's this industry had a reduced number of large national family companies and two large national groups (GITAHY and CUNHA, 1999). The entry of foreign groups during the 1990's reshaped its structure, chiefly by the acquisition of leading national companies. The Brazilian white goods industry is now an oligopoly, dominated by large internationalised foreign groups, which are the four main conglomerates within the world's white goods market.

Technological maturity is an important feature of this industry. Technological opportunities are to be found in incremental developments. Product innovations have been related to changes in consumer

habits and tastes, which stimulate product obsolescence. Process innovations have been associated with the dissemination of microelectronic automation and new techniques for planning, organisation and management of production and quality. They are intended to reduce costs, reduce stock levels and increase flexibility. In the 1990's, the large companies in Brazil concentrated on the production of the entire spectrum of white goods and introduced market segmentation by income groups. They have also internationalised their production focus and this has sometimes involved agreements with or acquisitions by foreign companies. Yet the production of these companies is predominantly aimed at the internal market.

Sales had reached a peak of 12.9 million of white good appliance units in 1996, 4.4 million cookers and 4.0 million refrigerators. In the year 2000, internal sales were 9.6 million (3.6 million cookers, 3.2 million refrigerators) (ELETROS, 2001). The Brazilian economic recovery from 1994 to 1996, mainly after adoption of the 'Plano Real', brought about high levels of annual growth in the consumption of white goods, including lower incomes consumers and also high-income consumers seeking more sophisticated imported products. This rising trend changed abruptly after 1997 in the wake of deterioration in the economic situation. This period is characterised by increased unemployment, defaults and interest rates, besides the crisis in the retailing sector.

Exports and imports of final products have not played a significant role in the revenues of the Brazilian industry. They reached, respectively, an average annual stake of 7.5% and 1.1% of revenues in the 1990s (ABINEE, 2001; SECEX, 2001). The industry's trade has surplus, what highlights that it is more an export than an import sector. The percentage of national content (rate of nationalisation) is high.

The future expansion in sales of white goods in the Brazilian market will be based on the demand for appliances that have very low levels of saturation, which will depend particularly on the evolution of the population's buying power and on the replacement rate of appliances that have high levels of physical saturation. The level of diffusion of some traditional white goods appliances, such as cookers (97.6%), and refrigerators (85,1%) reveals a high level of saturation amongst Brazilian consumers. Saturation levels for other types of appliances, such as freezers (18,8%), washing machines (33,7%), clothes dryers, dishwashers, microwave ovens and air conditioners, are much lower (PNAD-IBGE, 2001).

### **3. The case study: The Brazilian Cooker Company**

The case study focuses on a long established Brazilian cooker company (CookCo.), founded in 1935 and located in Campinas (SP). The company remained a family firm until 1992 when the family hired an outside director and President. This changed the way the company worked. In 1996, the company was acquired by a North American Multinational (AMN), aiming to re-enter the Brazilian market producing the whole line of white good appliances. In 2000, CookCo. had 2100 employees, total revenue of US\$ 171 million (GAZETA MERCANTIL, 2000) and it sold 1.4 million cookers, that represented 38.3% of the domestic sales in that year (ELETROS, 2001), making it the main Brazilian cooker manufacturer. CookCo. is also the world's largest producer of ranges from one single plant.

The company's sales were initially focused in small cities, outside the State of São Paulo. This strategy allowed its products to become very well known in the country. Nowadays, the company continues to target domestic production and sales to the internal market, but it also imports and distributes household appliances made by the group in other countries. Exports, to approximately 60 different countries, make up around 20% of total revenues. CookCo.'s brand name is used for simple models of cookers directed towards lower level income groups and the AMN brand name is used for cookers featuring characteristics directed more towards medium and higher level income groups. The priority granted to the AMN brand name can be explained by the fact that this company, despite having had installations for producing refrigerators in Brazil in the past, has been out of the market for many years and, therefore, its brand name has encountered low levels of consumer awareness.

## 4. Methodology

To obtain information about the restructuring process in the cooker factory and management methods and techniques adopted, the Project team had interviewed managers of commercial area, production, logistic quality and human resources.

How do production workers deal with the new organization and work conditions that come along with the introduction of new management methods and techniques? To answer this question the Project team interviewed 53 production workers, from different areas of the factory: stamping, enamelling, painting, assembly line, maintenance, tool shop, and stock. Of these, 11 were women, 10 of them from the assembly line and one from the stock department. Two questions of the questionnaire aimed to evaluate the workers knowledge about different managerial methods, how much they knew and what they thought about them.

To understand workers' perceptions about the impact of the firm's restructuring on their work conditions, we asked them questions to evaluate what they think about their wages, promotion opportunities, workmates and managers, work environment, their influence in work decisions, the way their work is organized and supervised and the way their skills are used.

The interviews were conducted within the factory, in a room where the researchers could stay alone with the interviewees. Nevertheless, the supervisors of each area chose the workers interviewed. To avoid the workers' resistance and fear that this could be a company sponsored research, we explained to each one of them the academic character of the research and assured the confidentiality of all the information we were collecting. As a warranty to the workers, they had the option to not give us their real names, but nicknames to identify each questionnaire and tape recorded. We are aware that, although this option can minimize distortions in the workers' answers due to the conditions of the interviews, it cannot eliminate them completely.

## 5. Management strategies and labour in CookCo.

CookCo initiated a process of modernization in the 1980s. The main changes were the investments in computerised presses, the automation of the printing and of the enamelling sectors, of the transport of pieces and the substitution of conventional tools for progressive tools to produce parts of the high volume models. Its restructuring intensified with the acquisition by AMN in the middle of the 1990's. Key changes included organisational changes such as reduced hierarchies and a new flatter organisational structure.

The assembly line is one of the stages most difficult to automate in the cooker production process, because various types of thin metal sheets have to be joined. Despite these difficulties, its automation is considered to be a priority in the company. AMN's introduction of new models and the necessity to reduce the incidence of RSI (repetitive strain injury) has given further justification to these investments in automation.

In the 1990's it has gradually formalized its quality system, what allowed it to obtain the ISO 9001 certification in 1997, particularly important to its export activity. Many of its suppliers now also have this certificate. In this year, it adopted a Six Sigma Program, following a clear orientation of its foreign head office. The Six Sigma involves various techniques and programs (such as Statistical Process Control, FMEA, 5S, Design of experiments) and aims to attain smaller number of errors per million of operations in all sections of the company, involving workers in continuous improvement and in the development of their initiative. CookCo does not intend to seek the ISO 14000 certificate, but a international environment health and security certificate held by the AMN parent body.

Workers participate in a programme of weekly meetings in which they are expected to discuss and propose solutions for production problems. This programme rewards individuals or groups if their suggestions are accepted and carried out, and if they generate costs reduction for the company. The reward paid for those who give a suggestion varies according to the savings generated, but in general it falls between US\$ 45 and US\$ 7700. If the suggestion is accepted the copyright is transferred to the company, allowing it to patent innovation.

Many activities have been outsourced by CookCo., although an interviewee considers it one of the most vertically integrated cooker factories. Outsourcing occurred for both direct and indirect production functions. Indirect activities outsourced included product design, final product movement in the factory, tool and mould construction. Direct activities outsourced included bobbins cut, the production of wire parts, the stamping of drawn steel parts - an activity intensive in labor - and part of the silkscreen and enameling processes.

The company uses an external *just-in-time (JIT)* system with its suppliers, who must deliver parts daily or, in some cases, several times per day, and it usually keeps stocks for two days production. Such a system (to some degree adapted, for it operates with minimal stocks) allows for more flexibility in the response to clients, which is fundamental to a sector plagued by constant changes in their clients demands, deriving from the lack of stability in the demand for domestic appliances.

These changes has affected the structure of employment in the supply chain, the division and content of work and the characteristics of the workforce in the company studied. Similarly as occurred in the metal sector as a whole, at CookCo., the restructuring process led to a significant reduction in the number of workers, mainly after the acquisition (ARAÚJO et al., 2000). In 1996, when the *joint venture* was established, there were 2,600 employees in the plant. This number was reduced to around 2,100 employees in 2000 and to 1,791 in December of 2001.

Data on the firm suggests that around 10% of the shop floor workforce is suffering in some way from the effects of repetitive strains. A major present preoccupation is to find a solution to this problem within the assembly lines because the union's and also because it represent extra costs. There is job rotation within the few existent cells in metal stamping sector and in the production line every 1 or 2 hours and workers daily have a ten-minute gymnastics class.

Workers receive incentives to finish middle or high school. The total provision for worker training is around 36 hours per year, an important part related to the introduction of Six Sigma. Yet we observed that only white-collars staff is trained to use its tools to solve problems and develop improvement projects. According to the Production Manager, he personally gives part of this training to shop floor workers and there is also *on-the-job* training.

The reorganisation of work inside metal sector plants has also resulted in significant changes in the composition of the labour force. In the Campinas region, the number of workers with 8 to 14 years of schooling grew from 34.2% in 1989 to 66.4% in 2000. The percentage of workers with a college degree also rose - from 5.4% to 10.7 % in the same period (RAIS/MTE). Table 2 shows the CookCo.'s data for 2001. The number of workers with 8 to 14 years of schooling is 80.56%, much higher than the average for this sector and region. The declared company's current policy is to hire production workers who have at least finished junior high school level.

The company has followed the general trend in the sector - to increase the length of service of its workers. Until the middle of the 1990s the company followed the trend of hiring young adults between 20 to 30 years of age. This has recently been changed as the company wants more responsible and committed workers and is now hiring more experienced workers. These people are generally in the age bracket ranging from 35 to 45.

Table 1 - Educational Level of CookCo. Employees (2001)

Level	Years of Studies	Percentage of Employees
College	15*	8.15
High school	11	19.82
Junior high school	8	52.59
Elementary	4	19.43

Source: Fieldwork, 2002.

\* Approximately, depending on course

A new characteristic of the labour market in the 1990's was a increased feminisation, in this male dominated segment of industry. Womens' participation in the metal sector rose from 12.8% in 1986 to 15.9% in 2000. Nevertheless, in CookCo. women represent only 8% of the workforce (5% are in the shop floor, mainly in the assembly line). One of the reasons mentioned by the managers interviewed was that "the probability of getting RSI is much greater for women", a traditional view of women and their capabilities.

Despite the intensification of labour use (due to task additions) and the rising level of education of the workforce, there appear to have been few improvements for workers – either in terms of salaries or benefits. Salary growth has fallen further behind productivity improvements and there have been few changes to benefits or reward structures.

## 6. Workers' knowledge and perceptions

Exploring the answers to the two questions that explore the workers knowledge about different managerial methods, it could be observed that CookCo's production workers didn't know well the new methods/ techniques that were introduced there. The methods with which they were more acquainted were the TPM (Total Preventive Maintenance), the TQM (Total Quality Management), the Six Sigma, the ISO 9000 certificate, and the environmental, health and security certificate held by the AMN.

Most of them were acquainted with TPM because they participated in it. As has been described in the interviews, their participation was to observe the machine's behavior and call the maintenance staff when some problem arose. As said by one of the interviewees, they are not supposed to do the maintenance. Nevertheless, few assembly line workers knew this method. Only five of them have some familiarity with TPM in a total of 22 interviewees. This is possibly because they do not operate machines and they have no responsibility on the operation of the assembly line.

All workers said they have familiarity with TQM. In CookCo., workers associate it mainly to behavioral aspects, related to their individual and collective effort to produce stoves without defect. They have the notion that this effort must be directed to customer satisfaction. According to the interviews, each one achieves the quality goals by checking his/her own work, but very few of them affirmed to know some specific quality control technique. Only two interviewees knew the SPC (Statistical Process Control). Two others said they had heard about the SPC, but didn't remember what it was.

The behavioral aspect appears in an outstanding way in the answers about the work group. All of them affirm they work in group however it is important to point out that the work stations in CookCo. are not individualized. This confusion is frequent. In different companies managers use the term "working group" referring to traditional assembly lines because there are daily meetings among their members. The interviewees say they work in group because they are supposed to help each other. The 'in house customer' concept which prescribes that the quality of each worker's job interferes in the next work station, was mentioned some times. Besides the mutual help and good relationship, some said they work in group because the

rotate between work stations to avoid RSI. Only one of them associated the working group with autonomy. According to him, the boss stays away from the painting area, where he works, for long periods, thus "We are in all six workers, and each one knows what to do".

Most workers know that CookCo is introducing the Six Sigma program, but they don't have much information about it. Some have known about it because "there are some posters in the company". One of them said "we don't have free access to it." Among those who have some information, some relate it to TQM or its objectives.

The workers have more familiarity with the ISO 9000 certificate and with the environmental, health and security certificate held by the AMN. This can be explained because, in order to obtain and keep the certification, the companies must invest in training and, during the audits, any employee can be questioned about the certificate's procedures. Many mention its importance to compete in the market, mainly to export.

There are some workers who know other methods, but most of them got the information out of CookCo. One of them worked in the automobile industry and knows the Quality Circles and the reengineering. In the interviews accomplished with managers, it was easy to find those who knew about reengineering among those who had already worked in the automobile industry. It is possible that these had been fired during a reengineering process.

The few workers who are familiarized with the term "lean production" relate it to the reduction in the number of workers. One of them made contact with this method in an automobile company where he worked before. Some of them also know the term "flexible production" and understand it as a way to "produce according to demand". It is interesting to observe that for others this term means a flexible work time as one of the women interviewed explained: "If today there is work to be done, then we work. If in the next week, there is not, we don't work". Actually, CookCo tried to introduce a 'flexible working week', but did not succeed due to the Union's opposition.

Although the changes recently introduced in CookCo had perverse impacts for the workers, when asked about the degree of satisfaction with some aspects of their work conditions the majority of the interviewees affirmed they were satisfied or very much satisfied. Their perception with regard to wages, labour conditions, relations with colleagues and supervisors and their decision making capabilities is positive. But when they compare current wages with those they received five years ago, the level of satisfaction lessens, for almost 50% consider their current wages as worse, or at least equivalent to the earlier ones.

## 7. Concluding remarks

The process of diffusion of technological and organisational techniques at white goods industry is strongly determined by the growing level of concentration in this industry internationally. As noted by previous studies, these trends have served to bring about two types of change. They have modified the division and content of work within the firm (through changed education levels and rising productivity) and they have altered the division of work between firms and thus along the supply chain. Within the firm, this is characterised by new selection criteria and thus changes in the structure of the workforce and new levels of education. Also, as documented by studies in other sectors, rising production levels have occurred alongside reduced employment levels within the firm and without improvements for workers. This situation has been facilitated by the existence of high unemployment levels and the fragility of unions. The capacity of workers and unions to "negotiate change" is very low.

In the case of CookCo, the acquisition by AMN brought about a wide restructuring process that is still evolving. This is mainly true in the last three years, when the process of worker layoffs has intensified and the Six Sigma programme was being introduced. A comparison of conditions at this plant and those

applying for other metal workers in the region has helped us to confirm and understand how these forces for change have been reflected at the micro level.

The impacts of restructuring on workers have been significant. There has been a great change in workers' characteristics and a speeding-up of work pace which has had serious consequences on worker health. The ever growing (productivity driven) demand for workers to take on further responsibilities and be involved with quality, production or sales goals resulted in an increase of occupational diseases over the last decade, particularly RSI (Repetitive Strain Injury), or Work Related Musculoskeletal Disorders (WRMDs), as it has been calling recently. There is an effort of CookCo to minimize it. For management, the next step in this process of organizational and technological changes is the modernization of the production line. The objective is to change the layout and automate wherever possible in order to eliminate the most repetitive jobs and those considered most risky for the worker health.

The results of the questionnaire applied to production workers show that they, and specially the women workers, are not well acquainted with the management methods, some of which are used in the plant. It happens because the investments in training are directed with managers, supervisors and administrative personnel, who got intensive training to use Six Sigma. That method is seen as crucial to attain quality and productivity standards required to improve competitiveness. Shopfloor workers were acquainted with this new method through a primer with general information and through posters in the factory.

Workers are more familiar with the methods directly related to their jobs, like preventive maintenance, quality programs and certifications, which they use routinely and in for which they were trained. These training programs, however, had a strong behavioural aspect as the changes adopted required not only the addition of new tasks to each job but also greater workers' involvement with and allegiance to the new goals of cost reduction and product quality improvement.

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