

VALUE ADDITION THROUGH PRODUCTIVITY INCREASE A SRI LANKAN EXPERIENCE

by

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Abstract

Low value addition of local industries is generally attributed as a reason for slow economic growth in Sri Lanka. Productivity improvement is often sighted as one way of enhancing the level of value addition. However, many industrial managers have faced severe problems in trying to introduce these concepts in Sri Lankan context. This failure has at times led to the value addition and productivity enhancements as being categorized as impractical. In this paper a real life experiment is introduced. The case study involves the transformer manufacturing plant of Lanka Transformers Limited. The paper deals with the issues and resistance faced at the beginning, identification of the root causes of low productivity and measures adopted in overcoming the resistance. The exercise is put in perspective with a theoretical discussion on motivating employees and the results of the exercise are compared with those of before.

1.0 Introduction

1.1 Lanka Transformers Ltd

Lanka Transformers Ltd (LTL) is a private business concern. The Ceylon Electricity Board and ABB Kraft of Norway own it at present. The company was set up in 1982 with the sole intention of supplying the distribution transformer need of Ceylon Electricity Board. Initial technical input was obtained from M/s Bonar Long of Scotland, which also contributed to the equity. This has then been transferred to ABB Kraft AS of Norway who holds 30% equity. Besides, LTL obtains the latest technological innovations of transformer technology through a technical service agreement with ABB Kraft.

The company has diversified to many areas since then and now operates two hot dip galvanizing plants, a steel fabrication plant, a construction division and a fully owned subsidiary called Lakdhanavi (Pvt.) Ltd which operates a 24 MW independent power plant

connected to the national grid. The group turnover now stands at approximately Rs. 1.6 billion. It has an asset base exceeding Rs. 400 million. The company employs approximately 200 people in various divisions.

1.2 The Transformer Plant

The initial aim of the transformer plant was to produce 750 units per year. Most of the machinery was second hand, which were bought from various transformer plants around the world. The plant consists of 3 major departments namely the electrical assembly, enclosure fabrication, finishing and testing.

The basic design technology is from ABB Kraft AS of Norway. LTL Engineers used this to design transformers that meet the customer requirements. The main line of production is distribution transformers in the capacity of up to 2500 kVA and a voltage of up to 33 kV. In addition to distribution transformers, LTL is capable of producing earthing transformers, auto transformers and repair of transformers up to 5 MVA.

2.0 Problem Identification

The production process at LTL was operated through a system, where each department had their daily production targets. The system allowed no room for improvement in productivity levels.

2.1 Target System

The practice of operation planning was such that each worker was given a set target to achieve per day. This target was not variable. The supervisor's job was to check whether the workers have achieved their daily targets for the day. There were even times when the worker did not meet the set target owing to various

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excuses. The management prepares the monthly production plan based on this restricted target system. Whenever a worker took leave his target was lost for the day.

2.2 Deficiencies of the target system

2.2.1 No motivation to achieve full efficiency

The output of a worker is restricted through this system, whether the worker likes it or not. This caused difficulties of measuring the actual efficiency of the workers. At a glance it seemed that every one was working at their full potential. But at the end of the day the productivity achieved was minimal.

2.2.2 Gains in efficiency with experience not rewarded

The efficiency of the workers was hidden. There was no possibility in the system to reward the improvement in efficiency of a worker with experience. The workers enjoyed similar benefits by just achieving the target allocated to each one of them.

2.2.3 Less efficient workers were protected

It was hard to identify the efficient workers from those who were not. The less efficient people were hidden within the system and were protected by the system. There was no system to lead them to a more efficient level.

2.2.4 Promotes a culture of negative work ethic

Except for annual bonus, which was linked to the absenteeism and late coming all other benefits were non-discriminated. The benefits hardly had link to the individual contribution of the worker. Therefore there was no reason for a worker to be motivated towards higher productivity.

2.2.5 Influence of workers with high over time content

Employees at LTL enjoy 35 days of authorized leave excluding Saturday and Sunday. When all these leave including mercantile holidays were considered the factory operated around 200 days per year, which was 55% availability. The cumulative effect of availability and target system caused a hardly achievable transformer requirement. It allowed no option, but to go for overtime. This let the workers to be much more comfortable with the prevailing system. These facts resulted in a high resistance to even a small change in the existing operational process.

2.3 Reasons with evidence

The management started looking for indirect ways and means of identifying the actual potential of the work force. An energy audit was carried out covering the whole factory. The energy utilization was measured in individual departments and as a whole of the factory for several days. This was carried out in an energy management program, and no one was aware of the intention behind the project. The data were plotted at the end of the project. It clearly gave a picture of the true line of production in the factory. It spotted two major load durations after first tea break and just after lunch both lasting for very short period as shown in figure 2.1. This opened management's eyes to the realization of unused potential available within the factory.

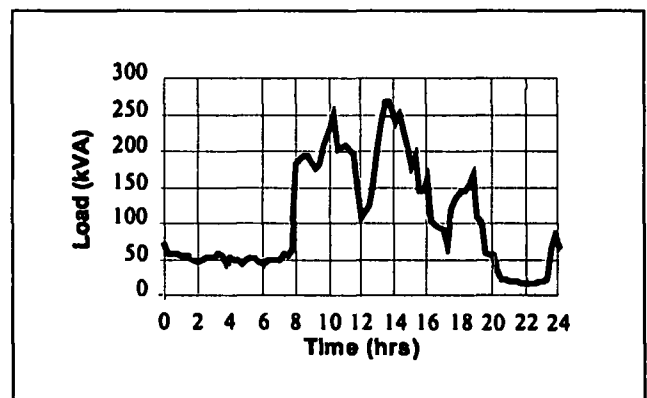


Figure 2.1 - Daily Load Profile at LTL

3.0 Productivity Drives As Motivators

"Motivation¹ is like the heat in a house during winter months in northern climates. Because heat gradually escapes, the furnace must cycle on frequently to maintain the warmth of the house. Motivation theory and motivational practices deal with processes that never really end, based on the assumption that motivation can escape over time."

3.1 Taylor's Theory

The theories on how to motivate people are as old as the discipline of management. The traditional model of motivation was incorporated in Fedrick Taylor's theory of scientific management¹ put forward in the nineteenth century. In those heady days of assembly line production, it was believed that the workers would do more of the repetitive task as long as they got a marginal increment of their remuneration. Thus, the piece rate incentive was born. The underlying concept being that the managers can design the job in the most efficient manner and the workers simply had to repeat the tasks.

Although this theory sounds logical, one can find that the human factor has completely been ignored in this theory. Any human being tends to get bored with the work if there is no creative input. Doing the same thing over and over again day after day is tiresome. It results in boredom and loss of interest. The temptation of financial gain on more number of pieces made has to then compete with ever increasing boredom.

One should also note the totally different social environment in which today's organizations operate with the society prevalent when the traditional model was introduced. The average factory worker was illiterate and socially backward. Today with the development of training, education and mass media resources, the average worker is far more knowledgeable. He will always demand much more than mere financial returns for a simple and boring task. This is one of the main reasons for the failure of piece rate systems as a motivator on the long term.

3.2 Elton Mayo Model

Another early view on motivation was the "human relationship model" of Elton Mayo. In 1930's the Hawthorne studies at Western Electric's Chicago plant proved the inefficiency of selecting pay as the only motivator. It also showed that social environment has a positive influence on productivity. Mayo argued that supplication of social needs, creation of on the job relationships and resorting to work-group culture (peer pressure) can be equally or more effective than just applying the traditional motivation theory.

If one carefully examines the developments that have taken place since Mayo's theory, the external environment has broadened the worker mentally even further. Thus it is no surprise that most successful productivity drives still depend on elements of this model.

3.3 Study at a Reputed Textile Factory

An important finding of a comprehensive study done by 90 shop floor employees at Asian Cotton Mills at Ratmalana is that individuals who attach a greater importance to work values such as participation, achievement, variety and prestige will not be motivated by financial rewards². Thus, they may not get involved just because an organization is prepared to give incentives or other monetary rewards.

"...employees attach greater importance to job security, environment and relationship with each other¹. Organizations could benefit from this observation by paying greater attention to the work environment of the shop floor employee, and promoting other relations with employees at all levels. Job security figured prominently. Hence organizations

should focus on giving the desired feeling of security to the employees. Shop floor employees value recognition and they seek recognition from their superiors for their efforts"

This demonstrates the inadequacy of mere financial rewards as a motivation tool in Sri Lankan conditions as well. How can the management create a social environment stimulus so that the workers can constantly be at their optimum productivity levels? Modern motivation theories provide directions to managers on this.

3.4 Need Theory

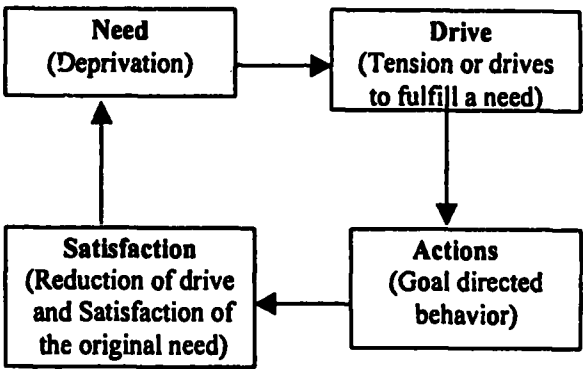


Figure 3.1 - Cycle of Need Theory
The need theory described in figure 3.1 has a special relevance to the present study. A person is motivated to do a certain action as long as there is a drive and a need behind. Most writings and theories describe types of needs as financial security, social acceptance, prestige etc. They then identify the action on a one to one relationship with the need. These create a drive to satisfy the needs. It is the drive, which lead to actions. The management obligation is to facilitate a suitable environment for such actions. This, will result in employee satisfaction and the organisations goals being realised.

3.5 Equity Theory

Another important theoretical input to a successful incentive scheme is the fairness by all concerned. Acceptance by a majority of the workforce is an essential pre-requisite for the successful implementation of any scheme. Next to the meeting of needs, equality of the rewards is a sine-quo-non for the productivity increase. That itself becomes a motivating factor for the employee.

Equity Theory³ assumes job motivation is related to the individual's evaluation of the fairness of the reward received. Equity here is defined as the ratio between individual job input and job rewards. An em-

employee will be motivated when he experiences satisfaction with what he receives from a reward in proportion to the effort he applies. Every management that ignores this in designing incentive schemes will in fact run into serious problems in the implementation of the scheme. Human beings by nature compare themselves with peers. Every person has a perception of the worth of every other person in the workforce.

Perception may differ from reality. But it is unlikely that everybody is wrong all the time on a particular person's abilities. Thus it is essential equity remains for all as far as possible. Otherwise the whole system is tainted with various allegations and becomes unpopular.

Most discussion and research on equity theories focus on money as the most significant reward in the workplace¹. People compare what they are being paid for their efforts with what others in similar situations receive for theirs. When they feel that inequity exists a state of tension develops within them, which they try to resolve by appropriately adjusting the behavior. A worker, who perceives that he or she is being underpaid, for example, may try to reduce the inequity by exerting less effort.

4.0 Approach Of LTL

The change of a highly unproductive system to a much more improved stage has to be done with a systematic and a step by step approach. This avoids unexpected problems. This was well realized by the management of LTL and an indirect approach was taken in the process towards higher productivity.

Productivity always has a major link with salary increases. The Sri Lankan culture is such that an increase in productivity could always come with increase in salaries only. The LTL management initially approached to improve the quality of the product. Quality always goes with rewards, but not with salary increases, which the management believed as a good way to start. People also do realize that the driving force behind quality systems is to achieve higher productivity.

4.1 Japanese 5S method

The LTL management initiated the quality strategy with Japanese '5S' system. This is a simple technique, which enable any enterprise to be well organized resulting in high productivity, quality, less stressful work and more pleasant environment. 5S is a five step process, the steps being 1. clearing up 2. organizing 3. cleaning with meaning 4. standardizing 5. training and discipline. All what it says is to keep the work place clean and organized and to remove all un-

wanted things. The participation of the work force on 5S activity was highly positive. They were rewarded with small gifts like shirts, caps, wristwatches etc for maintaining 5S activity. Several 5S competitions were also organized between different departments and the best were again rewarded. This exercise made them aware of the effectiveness of teamwork as well.

4.2 Worker Suggestion Scheme

The next step was the introduction of a suggestion scheme. Each department was allocated a date and a time of the week to meet with their supervisors. Here they discuss the possibilities of quality system improvements and they are submitted to the relevant management personnel in writing for execution. An encouraging response was received from the work force with the introduction of this scheme. Most of them were executable, some suggestions of which the management would have never thought of. The management also made sure that not a single suggestion is let down. Here again the workers, who came up with valuable suggestions, were rewarded.

4.3 Achievement of ISO 9001 Quality Certificate

The introduction of the 5S method and the suggestion scheme in the entire production process changed attitudes of the workers towards positive thinking. This change of thinking motivated the management to move towards the achievement of ISO 9001 quality certificate.

5.0 Incentive Scheme and its Expectations

The indirect approach management made gave the green light to a change in attitudes of the workers. Therefore, the management thought that it was the most suitable time to introduce an incentive scheme to boost productivity. There were several reasons why the management took this somewhat risky step.

5.1 The Proposal

The demand for the transformers was achieved in the existing target system with high over time content. The demand also started growing at a much faster rate from the middle of the year 1997. The unit price of a transformer would be well above the market price, if management were to achieve the increase in demand with overtime work.

These facts encouraged the management to come up with an incentive scheme to share the gains in profit to the increase in productivity with the workers.

The scheme was designed in such a way that the productivity measure selected was the total value addition. The monthly average value addition achieved for

the financial year 1996/97 was selected as the base. For the calculation of the value addition 'the addition method' was selected. In this method individual values added during the process of manufacturing a transformer were taken into consideration. These costs were categorized into labour cost, overheads (excluding non-monitory items such as depreciation) and financial inputs.

The total employee benefit due to the incentive scheme was determined on the basis of the percentage increase of the same value addition parameter over the base value. The share went to each department according to its contribution. The workers got theirs according to their contribution to the department.

The proposed incentive scheme was designed to achieve several objectives to enhance the competitiveness of the product. They are,

- * Creation of collective motivation in all departments of production so that the number of finished units could be maximized.
- * Optimizing the productive usage of normal working hours instead of resorting to expensive overtime to increase production. The workers were allowed long hours of work to maximize the final output under the new scheme, and they were paid incentive but not over time.
- * Release of funds tied up in raw material and work in progress due to faster turnaround of stocks.
- * Elimination of need for new recruitment and of initial training.

All these appeared to create a positive work ethic among the workers.

5.2 Problems faced

The management chose to implement the scheme with no hesitation. When introduced, the resulting feedback from the work force was unexpected.

5.2.1 Resistance from workers with high over time content

The first resistance came from workers with high level of overtime. They explicitly rejected the scheme, as it made everyone get his/her fair share. The employees with a high level of overtime were already well off within the system, and did not like to see others enjoying comparable benefits under the new scheme. They probably saw it as something that threatened to erode their income levels.

5.2.2 Resistance from less efficient workers

The less efficient workers never believed that they could achieve the productivity increase the management expected. These workers were mainly in their forties.

5.2.3 Fear of Management motives

The workers were not sure of the management's intentions, and were suspicious of making the improved production a target in the norm system after it was achieved.

5.2.4 Habitual resistance to change

There are always some people who resist any change, even if it is for their betterment.

5.3 Work stoppage

The management kept promoting the scheme, and the workers became more and more organized to resist the scheme. The New Year 1998 came. The management decided not to give salary increases, since there was no increase in productivity. Customers were pressing for more transformers. Worker unrest was building up. It ended up in workers being hooted every day after work, as protest against the scheme.

The management had no option but to call for representatives of the work force, and ask them to come up with better solutions. They insisted on a salary increase, which was not in proportion to the negligible increase in the existing targets.

5.4 How the management overcame the worker resistance

5.4.1 Retirement scheme

It was later identified that the resistance to the new scheme was not from all the workers, but from a few disgruntled workers. They were identified and the management negotiated to offer them an attractive retirement package as compensation. The factory was left with 67 workers compared to 97 earlier.

5.4.2 Simplification of the incentive scheme

The management understood that the incentive scheme introduced was too complicated for an ordinary worker. It added too much responsibility to the individual worker. The collective responsibility towards the maximum output of a worker was taken away from him. The final value addition was broken into each sub-sector of production. So for each additional input above the daily target by the worker, he was aware of the value addition to the total system as

well as to his monthly salary. The incentive payable to each unit of production was provided in a transparent tabular form. Since the tables were available with the worker, the worker himself could prepare his own budget for the month. The management's job was to synchronize the individual outputs to maximize the final output. The method encouraged the worker to maximize output during normal hours to earn more and save time.

5.5 Agreement Implementation

The new simplified version was well understood by the workers. They readily agreed to the scheme. It was implemented on 15th June 1998. The results were dramatic. The management did not anticipated such an increase in productivity, and factory even suffered a shortage of material during the first two months owing to the unexpected increase in productivity.

6.0 Outcome

6.1 Benefits to the Company

6.1.1 Productivity Increase

The most obvious and beneficial outcome of the scheme was the increase of productivity. The plant which was built to produce 750 units per year was now producing above 2000 units per year on single shift operation. In this study the productivity measures selected are the total value addition per employee and the number of kVA (physical production measure) per employee. This scheme was introduced in June 1998. Thus the first two quarters of 1998 were under the earlier scheme and the last two under the new scheme. The indices of figure 6.1. show 70% and 130% increases in value addition and kVA produced per employee, respectively.

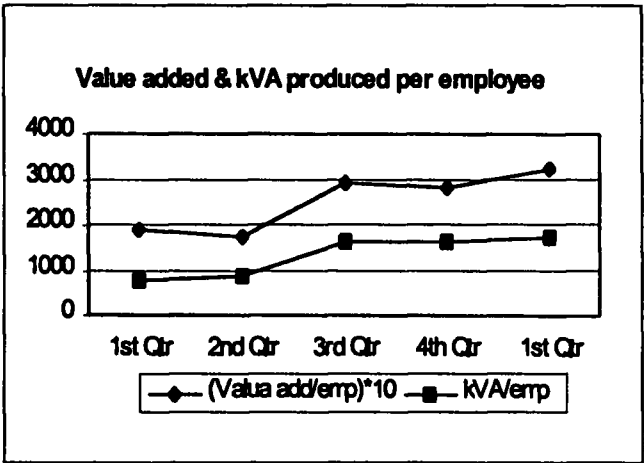


Figure 6.1 - Increase in Productivity

6.1.2 Positive Work Ethic

Overall, the more important achievements were in human relations. The management is of the opinion that the working environment became quite conducive to effect changes in the production system after the implementation of the scheme.

This was evident in less disputes and improved attendance with less lea^r taken and better punctuality. One of these, the trend in attendance during 1997/98/99 was selected as an index. Figure 6.2 shows a drop in absenteeism by about 65%. Employees even refused to take leave even in the case of important personal needs. Reporting to work became the top priority of their dairy routine.

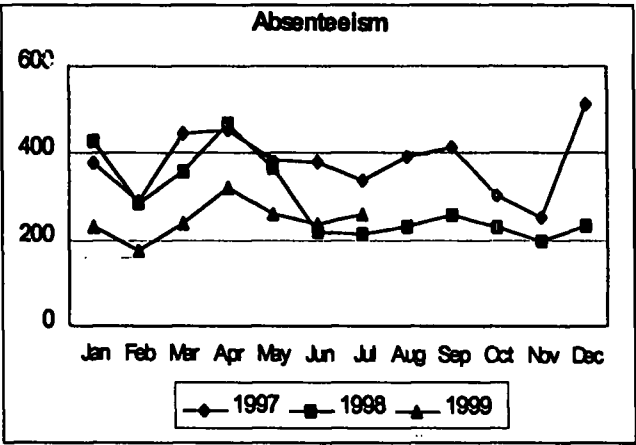


Figure 6.2 - Trend in Absenteeism

6.1.3 Elimination of the need for new recruitment

Another factor that makes incentive schemes more attractive in Sri Lanka is the elimination of the need for new recruitment. The labour rules of Sri Lanka make it almost impossible to discontinue inefficient labour. When the demand for a product rises, the management is not free to recruit more people to increase production since they cannot retrench any of them when the demand falls. It is unlikely that these negative features would change soon. Thus, it is always safe for the management to resort to an incentive scheme to cope with a short term rise in demand, since it allows them with flexibility, i.e. incentives should be linked to final production, which is driven by the market demand. As such, when the demand returns to the normal level, the incentive scheme could be suspended without straining the overall bottom lines.

6.1.4 Improvement of Liquidity

In the Sri Lankan context, the most important secondary result is the improvement of financial situation. As opposed to a profitability improvement in the increase in production, productivity improvement definitely

eases the cash flow of the company. Thus in the credit driven Sri Lankan market, productive organizations fast outstrip the others.

Since the abolition of the norm (target) system, everybody utilized every minute of the factory floor time to turn out more parts. The incentive was based on how much the unit as a whole could produce, which effectively placed a check on wasteful build up of work in progress. The overall number of completed units increased month by month clearly demonstrating the improvement in productivity.

6.2 Benefits to the Employees

6.2.1 Financial Benefits

The employees have obviously benefited in several ways. However, the most direct (and most appreciated) benefit was the financial gains. A random sample (based on employee number) of five employees were selected and their percentage increase in financial benefits are compared to the percentage increase in production output in table 6.1. The table provides proof of the equity theory, where the gains are in proportion to output. This shows that on an average each employee income has increased by about 60%. The percentage increase ranged from 45% to 110% depending on individual employee performance.

Table 6.1 - Movement of employee financial benefits with value addition

Emp. No:	31	35	41	45	64
% increase in Value addition	70	48	65	65	93
% increase in employee benefits	73	42	60	62	87

6.2.2 Release of Stress to Employees

Another important benefit was the higher morale of the employees. With the reduction of overtime they spent less time in the factory and more time with their families. This aspect is also likely to contribute to the overall mental happiness.

6.2.3 Improved Employee welfare

Increasing liquidity and profitability have enabled LTL to invest more on employee welfare. In this case, the company has improved employee rest rooms, common facilities and constructed outdoor facilities such as badminton courts for their benefit. These contributed to greater comfort of the workforce.

6.3 Benefits to the National Economy

The business of LTL has a direct impact on the national economy. As the only transformer manufacturer in the country it has the responsibility of supplying reliable products at a competitive price to ensure the quality of a basic human need in modern society. Without a reliable electricity supply, many industries will suffer. Thus LTL's ability to respond fast to market variations is important from the national point of view.

CEB is the main customer of LTL. In a successful incentive scheme, customer is also a beneficiary. This is through an improvement in the cost structure of transformers. All major cost heads have improved on a per unit basis, the end result being a reduction on transformer cost to the CEB.

It was mentioned earlier that in 1998, that the CEB faced a steep rise in transformer requirement. If not for the timely action taken by the LTL management to increase its productivity levels, transformers would have to be imported to Sri Lanka at the expense of scarce foreign exchange.

7.0 Conclusions

7.1 Risk Taking by Management

Overhauling a well-entrenched compensation package and a work norm is a risky management manoeuvre. However forgoing account demonstrates that the management of LTL has faced the reality of having to respond to the needs of the market place by taking that risk. Any management that wishes to experiment will also have to take such bold steps.

7.2 Monetary Benefits

As described in the previous chapters, a well-planned out incentive scheme brings out benefits to all parties concerned. It is nothing but sharing of profits justly among all stakeholders. It improves productivity. It gives a better service and quality product to the customer. It also helps the economy to create more wealth for the people. Thus it turns out to be a win-win situation of all concerned.

7.3 Important Requisites

Several pre-requisites are necessary to achieve this goal. In brief, following points could be named as salient features of such a value addition sharing incentive scheme.

- 01. Well planned out strategy
- 02. Building confidence among workers.

- 03. Frank and open discussions.
- 04. Courage to face difficulties.
- 05. Ensure effectiveness of resources.
- 06. Total commitment of management.

7.3 Being Innovative

It is very evident this scheme has not confined itself to a mere production enhancement effort. The management has taken care to link it with Total Quality Management, where both productivity and quality levels has been raised. Despite almost 100% increase in production levels quality has constantly been improved. Finally this incentive scheme is unique in achieving such production level increases despite a sharp drop in employee levels. It may even create a paradigm shift in operations management in this country in the future.

7.4 Can We Change Attitudes?

LTL management in this instance has tested the ability of the workers to change their attitudes severely. On the positive side it has been able to change the total outlook of very inward looking and traditional workforce to an out going and cooperative outfit ever willing to face challenges. This proves that with the right environment one can still force people to change attitudes. On the other hand they failed to convince a section of the workforce which ultimately had to leave the organization. That proves that even on very conducive environments certain people refuse to change attitudes.

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