A Provocation for Quality Product

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Abstract
The new problems on global market bring a wind of changes in our lives, as well in technology, in environment protection, the future provoke us to find immediately solution and identify new sources for industry. The solution to this problem is the improvement of quality management of enterprises and also of products which must be designed taking into consideration the protection of environment. From this point of view we have to change the total quality management. Also the target of this research is to identify new solutions and recycle the possibilities of the materials. The intense search for solutions, the needs for a system of approach, the use of knowledge or models, can be used as a measure to reduce variations between different countries and develop a new system inside the universities which implemented a new eco age and which are preparing the new generation to redesign the mantra of this new eco-age and its green products. A solution to this challenge, and an explanation of applying a sustainable strategy under the principles of quality and continuous improvement in research work done in our universities will be presented in this article, as well as some solutions which guarantee the efficiency as a result to the new challenges in our market place and technological process.

1. Introduction

We are constantly amazed by the speed with which our attitudes absorb new ideas and new technologies. Novelty appears to have a rapid decay rate in the modern world, and thus a new concept of the future appeared: the eco and green industry.

As a result of the green sustainable industry and not only, the major changes that have affected our societies are usually described under the label industrialization or modernization.

This development has involved changes such as:
- The factory system of manufacturing;
- Large complex industrial and commercial organizations;
- Increase of life expectancy;
- Consumer society.

Change is taking place too slowly; the rate of technological innovation in our industry will need to increase its products and manufacturing processes under the new rules regarding the protection of environment and the new orientation of the recycling of products, components, materials.
We have no other option; we must concentrate our efforts on industries, change and adopt as fast as possible technical innovation from abroad, and implement it in economical activity, this being the solution which will ensure the improvement of total quality management. Rapid change in common places, the complexity of organizational activities, disorganization and frustration are all natural aspects of our daily lives and normal features of organizational life. Organizations are in a constant state of change and they are not able to adjust, to change, having difficulty in surviving, this is why the management of change has become such a serious managerial problem.

The problem is to create organizational forms that are stable enough to persist, but flexible enough to adapt to pressures for change. For that reason total quality management can be a solution, a philosophy and a system for the continuous improvement of services and products offered to customers.

Now that the technologies of transportation and communication have replaced national economic systems with a global economy, nations and businesses which will not practice total quality management can rapidly become globally non-competitive.

2. Solution for causes and effects in technological process

A major challenge facing the economy today is the integration of environmental issues in economic growth, and slowing down the environmental degradation process in the context of economic growth.

In essence, we need to find solutions to do more in this problem. Taking into consideration all these situations, we believe that our role is to motivate and encourage our students in research work and develop creativity and innovation. This objective in our activity was becoming ever more important because of the collaboration among higher education institutions.

We identified the following objectives: climate changes and their consequences, increasing the demand for energy and resources, finding new technological solutions in industrial processes, increasing quality and reliability of the products.

![Fish bone diagram for technological process](image)

These challenges require innovative approaches and call people to action. After we identified the common problems regarding new solutions for the manufacturing process using the fishbone diagram we provided an overall idea of the possible causes of our chosen problem and its new solutions for industry (Figure 1).
For any concern the four main causes through which the whole story was built are MAN, MACHINE, METHOD and MATERIAL, and because any cause of improvement involves the four M’s categorically we take into consideration all these factors. We have used this instrument as a tool which helps us find the relationship between all six causes. In this way the investigation was also conducted for the major categories utilized:

- **The 4 M’s:** METHODES, MACHINES, MATERIALS, MANPOWER;
- **The 4 P’s:** PLACE, PROCEDURE, PEOPLE, POLICIES;
- **The 4 S’s:** SURROUNDINGS, SUPPLIERS, SYSTEMS, SKILLS.

During our research we realized that training the people represents an important factor for this new trend in industry and economic marketplace. The important role of universities is to help people behave on the pattern of the fish bone, involving them in the development and implementation of department PLANNING for instructional and practical improvement, in discovering new solutions for this new challenge regarding the protection of environment, ecological procedures, green products, recycling procedures in industry.

Managing continuous movement toward progressively higher quality standards depends on defining those standards. We develop a simple scheme for organizing thinking and practice, with regards to organizational change, we can easy identify for our economical agents the variables who influence the organizations (Figure 2)

![Figure 2. The four variable who influence the organization](image)

The variables are
- the people of an organization who are its managers and its workforce, its members or its employees.
- the technology of the organization who is the tools and techniques that organization uses in the pursuits of its task,
- the task of the organization who is the reason for the organization’s existence.

The change can affect any one of these variables, especially there is a tendency to blame technology as main source of change in both organization and society as a whole. The central issue is management choice of technical design and layout; work organization A new technology will only create change if people in an organization see its potential and if others are ready to accept it and make it work effectively. This is why technology it is regarded as a trigger, not a cause of organizational change.

Technical change is simply the results of competitive pressure, it is widely assumed that the organizations must employ new information and computing technologies to remain competitive in world markets.
It is also generally accepted that, because microprocessor technologies are widely applicable, faster, smaller, cheaper and more reliable, their application will be inevitable, rapid and beneficial. The revolution we’re talking about is that of information Technology, two words that until recently were unknown to all but a small number of people.

But they are two words with an impact so widespread that none of us can avoid being affected by them. Nor would we want to. It is no exaggeration to say that the impact of information Technology, or IT, will be greater than that of any other technological developments that have come before. A technical change it is a management decision which can improve the technological process and also give a possibility from the first stage of design product to find and create quality products with the standards needs.

Technical change can be achieved under the results of competitive pressure; the organization must employ new information and computing technologies to remain competitive in world markets following the strategy choice (Figure 3).

The reason to implement the new management change in industry it is present as an argument that the consequences of technical change in an organization depend on the capabilities of the technology used, why it is used and how work is organized around it.

![Diagram](image)

**Figure 3. Technical change - the management decision making process**

These standards should emphasize developing student abilities to solve real-life problems rather than just memorizing subject matter. The latter does not represent a quality for either students or employers.
It is also generally accepted that, because microprocessor technologies are widely applicable, faster, smaller, cheaper and more reliable, their application will be inevitable, rapid and beneficial.

A technical change is a management decision which can improve the technological process and also give the possibility to find and create quality products with the standards needs from the first stage of product design.

The reason to implement the new management change in industry is an argument that the consequences of technical change in an organization depend on the capabilities of the technology used, the reason why it is used and how work is organized around it. That kind of technology will give the opportunity to model and simulate the new green generation products and reduce the loss and failure of the products which means a lot of extra money for non-quality.

The principles are important for the strategy of quality management which will increase the creativity and also define new solutions for the a new generation = green products. It is expected that organization would seek to develop knowledge, skills and attitudes based on these six principles through their staff training, any formal education activity they undertake, their information and awareness raising activities, and through the way in which the organization operates [1]:

1-interdependence - understanding that what happens in one place can affect what happens somewhere else.

2-carrying capacity - understanding that there are limits to the world’s resources and the ways in which the world can develop and that the consequences of unmanaged and unsustainable growth are increased poverty and hardship, and the degradation of the environment, to the disadvantage of us all.

3-rights and responsibilities - understanding the need to manage our lives; we do not know what life might be like in the future.

4-uncertainty and precaution - understanding that our actions may have unforeseen consequences and recognizing that there are limits to human knowledge, and encouraging a cautious approach to the welfare of our planet.

Also a new collaboration in the right combination of all the tree factors will determine SUCCESS, such support gives access to resources, continuing professional development for the future managers and engineers form the labor market (Figure 4).

Figure 4. The factors involve the economical activities
3. Results of research work

We realize that universities have some common projects regarding the solutions to improve the quality in industrial processes. Because the priority was to find solutions to improve also the reliability of the products we took into consideration the new standards ISO 14000 and redesign the entire process and management from RRR point of view in each of the departments of the small enterprises. We must change our methods under the influence of the protection of environment and green products for that reason, we start to redesign the entire process from the creation of the product along the technological process to the final step of the product.

We can present some of our research work, where team spirit (engineers and economists) identify some solutions for green products. From the fish bone diagram in figure 1, we started and established a plan regarding the research work and identify new materials which are able to improve the characteristics of the products and increase the life-long cycle of the products.

The results obtained for machinery drilling insert shows the new chemical material composition, as a solution for our green products, solution which can improve the manufacturing quality of the tools in technological process, where the material it is an important cause from the Ishikawa diagram (figure 1).

It is important to encourage the spirit of creativity and innovation, because of the competition and the rapid solutions requested by our economical crises. Improving quality characteristics for cutting tools, and choosing another type of material will increases the parameters of working machinery, the results obtain are presented in table 1.

Table 1. Technical specifications of changeable cemented carbide cutting tools

<table>
<thead>
<tr>
<th>Coating materials</th>
<th>Coating method</th>
<th>Materials quality ISO (Grade)</th>
<th>Stiffness (Hv)</th>
<th>Friction coefficient</th>
<th>Heat transfer Coefficient W/m*K</th>
</tr>
</thead>
<tbody>
<tr>
<td>TiN (TiN, Al2O3, TiC)</td>
<td>CVD</td>
<td>P10</td>
<td>2500</td>
<td>0,35</td>
<td>27</td>
</tr>
<tr>
<td>TiAlN</td>
<td>PVD</td>
<td>P20</td>
<td>3100</td>
<td>0,4</td>
<td>28</td>
</tr>
<tr>
<td>AlTiN</td>
<td>PVD</td>
<td>P20</td>
<td>3200</td>
<td>0,47</td>
<td>29</td>
</tr>
<tr>
<td>Wc-Co</td>
<td>Uncoated</td>
<td>P20</td>
<td>1800</td>
<td>0,6</td>
<td>38</td>
</tr>
</tbody>
</table>

Figure 5. Partitioned element view of models a) Tool-holder, b) Cutting tool
The program designed in Turkey at Karabuk University takes into consideration only one factor regarding the material used for the industrial tools; the research work was finalized according to the data presented in figure 5 (Gokkaya H. [4]).

In the statistical results present below from research work, regarding the modification of the composition of the material after the interpretation of the results we can observe that the quality was improve the result: a stamp of good work done.

The conclusion after the interpretation of the statistical results: the material composition can be improved; in this way the torques and the reliability of the tools in technological process and manufacturing process can be improved.

Another factor which can affect the quality aspects of technological processes was analyzed this time by the representative of the department quality management of the product from the North University of Baia Mare (BOCA G.[3]).

The research was done taking into consideration the technological process of the product the innovation it is that we can design the product to a high quality and reliability from the first stage of manufacturing design in this way we reduce the cost with non quality.

The solutions proposed for the future green products are
- design the products to a low design frequency;
- using new methods of design for products by virtual simulation, {Figure 6};
- optimizing the product from the first stages of the design;

This way the producer will be able to optimize and study the product from the beginning reducing the production costs and investing in new technology. Thus phonic pollution, the protection of the environment, the recycling of some parts of machinery and the special materials used can be achieved under the 3R rules.

Designing the products to low frequencies, because the sounds and vibrations still remain an unsolved problem for the majority of the machinery and manufacturing, represents a priority for this eco-age. The virtual simulation and creating the model with the help of the new programs based on finite element method give the solution to the new trend for our industry.

Figure 6. Preparing a piece for a study version adapted to virtual simulation using ANSYS program
The battle between the old methodology and the new trend in industrial life was an important victory. This way it is not necessary to create the product and it is possible to increase the quality and reliability from the design stage using the methods as finite element method, new generation programs as a source of increasing quality and decreasing the non-quality costs.

From the examples given in this paper we share these examples from our cooperation program when we identified and discovered solutions for the same problems. Again we can understand that economy has the same problem in different countries; our cooperation feedback is the mutual programs established for the implementation of courses ANSYS 11 and introducing the new courses TOSCA program for the optimization of the products.

4. Conclusion

Success mantra need total commitment at the job or the learning arena. It is very important to incorporate the capsules of total quality, right from the doorman to the top management. The most important factor which can influence quality in TQM is the people, the young generation who learn and study now in our universities.

We teach theme everything except how to think, what to do after they finish to study, how to find a solution in a difficult situation. It is easy to learn Quality Tools but to practice them at large is a difficult thin. In creating and delivering new solutions for industrial process technology it is necessary to define:

- the involvement in research work and stimulate creativity and innovation in finding solution for new products;
- encourage the implementation of new technologies regarding the simulation and virtual modulation of the products;
- identify ways to obtain from the first stage of manufacturing design – quality’;
- identify and discover for all causes: people, machinery, tools, materials, solutions;
- new solutions for recycling and re-using some parts, materials from the damaged products;
- new solutions to protect the environment.

In conclusion we have the tools and methods to implement the research work and find new solutions for industry. Preparing the next eco-products will be successful and resolve the quality problems of each part of the technological process and also of the people involved in the manufacturing activity.

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