

Correlation Analysis of the Use of Computer Systems Relating the Internal Marketing and the Operative Yielding in a Biomedical of Mexicali, Mexico

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ABSTRACT

The use of computer systems in industrial operations as the biomedical industry located in the northwest of the Mexican Republic, is very relevant, because can control the specific parameters of the industrial products and industrial equipments, machinery and systems; used in the manufacturing process of this type of industries. And also, the use of methods to convince to workers to make his functions with the major quality, applying the internal marketing, is very interesting because is very important to obtain the major productivity and quality indices, and avoid errors and wrong process to not obtain defective products, which is necessary in sometimes the rework, generating economic losses in the biomedical industries, where is necessary strict values of the parameters in the industrial processes and in the manufactured products. In this investigation both actions originated an increase in the productivity and quality indices and with this economic gains, realizing this scientific study in 2022.

Keywords: Computer systems; Internal marketing; Biomedical industry; Industrial process.

Introduction

The computer systems utilized in the manufacturing areas are very important to special industrial operations, being relevant in the reach of goals of the productivity and quality indices, which are interesting to directive and managers to have its industrial activities controlled and to obtain economic gains (Bag et al, 2016). Other important aspect, is the internal marketing, which is used in some actions, and being necessary to convince to workers of the manufacturing areas of industrial plants, to obtain the best operative yielding and with this reach the goals proposed in any time of the production action (Wang, 2016).

The biomedical industry is an important type of industrial company in the worldwide, with a lot industrial operations that depends of the type of biomedical production manufactured, and having very strict regulations because its fabricated products are used in health actions to solve health complicated situations (Swat et al, 2014; Hagel et al, 2015). In Mexicali city are around 150 industrial companies, where the 20% are biomedical industries (IMAQ-Mexicali, 2022)

Biomedical industry

This is an important type of industry in the world, having investigation and fabrication activities, to manufacture biomedical products that are very required by the people that are seek and need some medicines or medical parts or equipments, which is most common in the medicine application as is mention now the different actions (Shaheen et al, 2016): oncology, dermatology, rheumatology, endocrinology, epidemiology, neurology, psychiatry, cardiology, pulmonology, ophthalmology, gastroenterology, urology, otorhinolaryngology, stomatology and gynecology. Also exists disciplines in the field of biology such as biochemistry, molecular biology, microbiology, bacteriology,

virology, parasitology, immunology, histology, genetics, cytology, embryology, anatomy, physiology, pathology, biomedical engineering, bioengineering, biotechnology, zoology, botany, and pharmacology (Campos, 2010). These actions of the medicine are very interesting to the biomedical industry. In this investigation was made an analysis in a biomedical industry located in the Mexicali city, which manufactures medical products as catheters and mark steps. The industrial process is very rigorous with very strict specifications (Oliveira et al, 2016).

Catheters and mark steps

These types of medical products are very important in some special actions in specialized situations, where can be used to supports to the health of persons. The function of each medical product is next (Lu, 2017):

(a) Catheters. Are used to extract blood, fluid drainage or to inject pharmakos to any health situation, which can be serious or not serious in the health or a person. In figure 1 is illustrated an example.



Figure 1. Illustration of catheters used to medical applications

SOURCE: <https://hemodialisisfuentesecatepec.com/puertos-para-cateteres-venosos-centrales/>

These medical products are composed from plastics tubes as around 30 cm to 50 cm, with a device to extract or inject a special liquid.:

(b) Mark steps. Are utilized to control the cardiac pulses in the heart, when some persons have a complicated situation with its heart. Are composed by small electronic devices to make the frequency of the cardiac pulses to support to the function of heart of persons. Next is represented in figure 2 a type of this medical product.



Figure 2. Illustration of mark steps used to medical applications

SOURCE: <https://www.cardiologosguadalajara.com.mx/marcapasos-cardiaco-guadalajara/>

Computer systems used in industries

This type of systems is very relevant in the industrial process because can be used to control some specific actions, where in this scientific study were utilized to control the weight of plastic recipients and large of plastic tubes of catheters, electrical functions of mark steps and weight of mark steps (Branger et al, 2015).

A computer system utilized in an industrial process is illustrated in figure 3, where is observed the control system in the left side at the top, then is located the simulator to determine if the industrial process will be working as an optimal action. Also were observed three actions in the down side as operations, maintenance and engineering staff using the computer systems to check and control these actions (Yan et al, 2015; Deloitte, 2015).

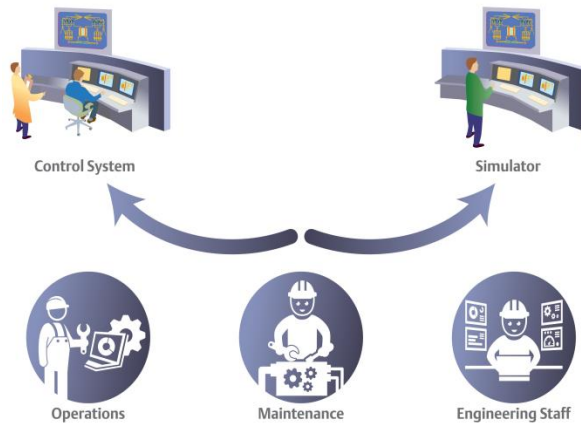


Figure 3. A computer system used in an industrial process

SOURCE:<https://www.turbomachinerymag.com/view/evolution-of-turbomachinery-controls-playing-catchup-with-h-tech-innovation>

The last figure presented some activities, which are utilize computer systems to have an efficient activity and can generate the optimal productivity and quality levels and with this the economic gains, without complicated situations and concerns of directive, managers, supervisors and specialized persons that supports the industrial activities in the manufacturing areas (Kusiak, 2017; Li et al, 2017).

Internal marketing in industries

This is a specialized action that can supports to convoke to workers to make his functions with high quality, being important in each step of the manufacturing process, because if all workers make his operations as optimal actions, will be an efficient industrial process, adequate flow process in the manufacturing areas and are reach the goals of production levels and productivity and quality indices. In figure 4 is showed an action as internal marketing in an industrial company (Figueroa, 2020; Alexopoulos et al, 2016).



Figure 4. Action of internal marketing in an industrial company

SOURCE: <https://everyonesocial.com/blog/internal-marketing/>

Methodology

This scientific study was relevant in the relation of the use of the computer systems and the industrial achievement, which generates the reach of the goals of the productive aspects. With this analysis, was determined the level of the correlation analysis, being important in the reach of the optimal productivity and quality indices in this biomedical industry, where was made this investigation. For realize the scientific study was necessary make two steps, as are described now:

- (a) Evaluation of productivity and quality levels, with a relation with the positive impact of the use of computer systems of the industrial company analyzed.
- (b) Correlation analysis of the use the internal marketing method with the productive yielding of workers of the manufacturing areas of the industrial company evaluated.

Results

The investigation made confirms the importance of the use of computer systems in a biomedical industry located in the Mexicali city, and the relevance of utilize the internal marketing method, illustrating interesting results, as is showed in the next sections.

Evaluation of productivity and quality levels

In this section of the investigation was made a correlation of the use of the computer systems and the impact as negative and positive of the productivity and quality levels, as is showed in figure 4.

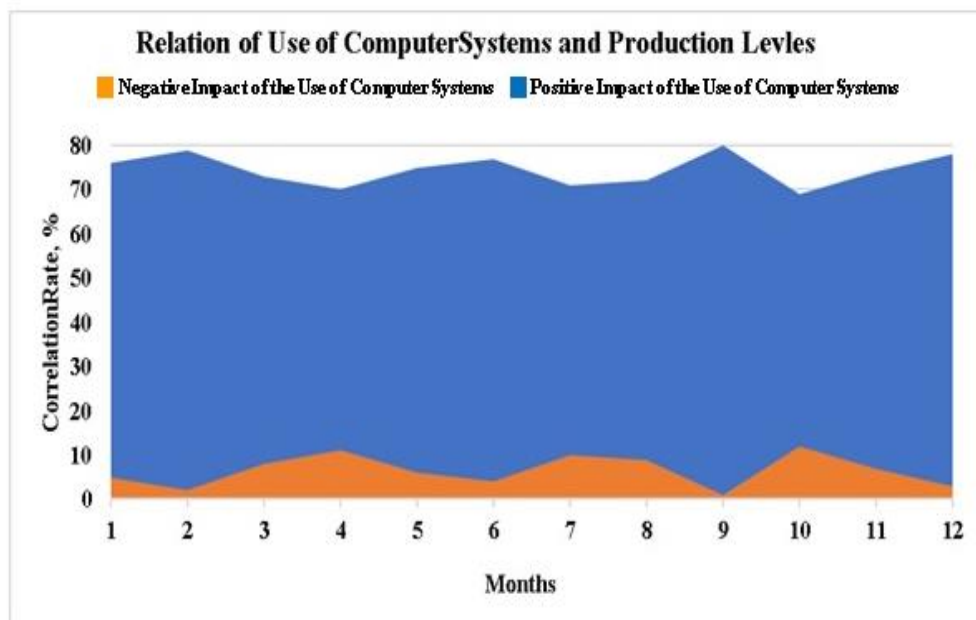


Figure 5. Correlation analysis of the use of computer systems in industrial operations of a biomedical industry of Mexicali (2022)

Figure 5 illustrates the correlation between use the computer systems in the manufacturing areas of the biomedical industry where was made this scientific study, showing the negative impact in the productivity and quality indices of the use of the computer systems represented with the orange color, being around 5%, because existed a bit

resistance to learn about the computer knowledge. Also, was presented the positive impact in the productivity and quality levels, using the computer systems in blue color with the 95%, being relevant and necessary the use of this important tool in the biomedical industry evaluated.

Correlation analysis of internal marketing and operative yielding

This part of the scientific study was made to evaluate the relation of the application of the internal marketing program as method to improve the way to think of the workers to make his operative functions as an optimal action, and related with the productivity and quality levels, being illustrated in figure 6.

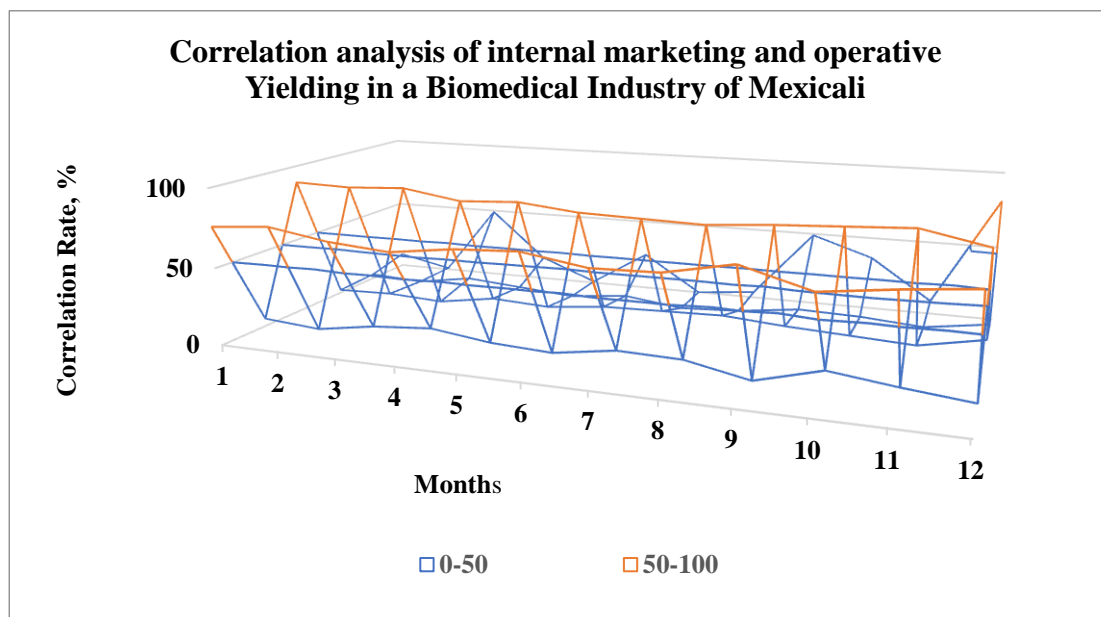


Figure 6. Correlation analysis of the internal marketing program and the productivity and quality indices in a biomedical industry of Mexicali (2022)

Figure 6 presents the relation of the application of the internal marketing with the each of the productivity and quality levels, observing that in five segments the correlation analysis from 0% to 100%, and illustrated that the major correlation analysis was from 60% o 80%, indicating that is necessary apply at least a program of the internal marketing actions.

Conclusions

This scientific study presented the relevant information about the necessity of use the computer systems in the industrial process, especially in the biomedical industry located in the Mexicali city, where was made this investigation. The graphs show the correlation level of the parameters evaluated, being very important in the taking of decisions to solve complicated situations and to apply the continuous improvement that originated the objective to reach the goals of the productivity and quality indices. Also, the application of the internal marketing method in workers of the manufacturing areas, improved the situation in the way to think and with this to make its operational functions with an efficient way and reach the productive yielding. This is very important and can be applied in other type of industries of this region of the Mexican Republic, and other regions of our country and other type of applications as government, commercial and educative activities.

Declarations

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Competing Interests Statement

The authors declare no competing financial, professional, or personal interests.

Consent for publication

The authors declare that they consented to the publication of this research work.

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