



# Performance Evaluation on Science and Innovation Management Process in A Cuban Medical University

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## Abstract

Quality represents a form of management focused and concerned on user satisfaction, as well as processes and results improvement. In an institution like the university, quality must involve all academic and administrative activities. Many higher education institutions use generic quality management models as a way to improve the performance of their processes and to introduce control mechanisms for efficiency seeking. In this regard, universities have developed performance evaluation indicator systems based on academic's scientific productivity. The main reason behind evaluation through performance criteria is that these measures drive improvement on the quality of service delivery. A critical analysis shows that difficulties persist in facing quality assessment processes and discrete values are observed in the indicators from a quantitative point of view. The purpose of this study is to evaluate the performance of the Science and Innovation Management process at the University of Medical Sciences of Matanzas as a contribution to institutional accreditation achievement.

**Methodology & Theoretical Orientation:** it was carried out a non-experimental, descriptive and quantitative cross-sectional research around performance evaluation. A diagnosis and subsequent analysis of Science and Technological Innovation processes based on relevant indicators was performed.

**Findings:** The budget spending for research activities is, in general, not satisfactory; only 14.3% of academic departments execute more than 50%. However, there is an increase in evaluation costs, with values range from 28% to 36%.

**Conclusion & Significance:** The application of generic quality tool to evaluate the performance of the Science and Innovation process at the Medical University, proved to be relevant to boost quality and efficiency based improvement in academic processes.

**Keywords:** Health Sciences; Technology and Innovation Management; Quality Management; Academic Performance

## Introduction

Quality represents a form of management focused and concerned on user satisfaction, as well as processes and results improvement. In an institution like the university, quality must involve all academic and administrative activities [1].

Many higher education institutions as a strategy use generic quality management models, based on the ISO 9001 standard and excellence awards as a way to improve the performance of their processes and to introduce control mechanisms for efficiency seeking [2].

The evaluation instruments proposed in these models are acknowledged to focus on improving management and results of health educational organizations. The satisfaction evaluation, quality costs and audits are notorious instruments of quality management systems; they lead these organizations into reviewing their processes, procedures and measures, and therefore provide redesign alternatives in accordance to new demands of the Higher Education agencies around performance improvement. based on academic's scientific productivity [3,4].

The main reason behind evaluation through performance criteria is that these measures drive improvement on the quality of service delivery. A critical analysis shows persistent flaws in quality evaluation processes and from a quantitative point of view discrete values are observed in the quality indicators.

The purpose of this study is to evaluate the performance of the Science and Innovation Management process at the University of Medical Sciences of Matanzas as a contribution to institutional accreditation achievement.

## Methods

It was carried out a non-experimental, descriptive and quantitative cross-sectional research around performance evaluation. A diagnosis and subsequent analysis of Science and Technological Innovation processes based on relevant indicators was performed; it consisted of: The development of academic audits according to the methodology described in ISO 19011.2018. Evaluation of quality costs. Application of customer satisfaction surveys related to scientific activities. The study was supported by statistical analysis, based on SPSS program.

## Results

The results from table 1 show that only in less than half of analyzed departments more than 80% of the professors are linked to research projects. The Budget spending is in general not satisfactory; only 14.3% execute more than 50%. The rest report execution values below 50%. Regarding the publication index, 57.1% do not publish or concentrate the publications in a very small group of teachers, so it does not satisfy the quality standard.

Variable	Frequency	Percent	Variable	Frequency	Percent
<b>Professors linked to Research Projects</b>			<b>Budget expending</b>		
None	1	14.3	Ninguno	2	28.6
Less than 50%	1	14.3	Up to 25%	2	28.6
50% to 59%	1	14.3	between 26%-49%	2	28.6
60% to 79%	1	42.9	between 76%-100%	1	14.3
80% or more	3	42.9			
Total	7	100	Total	7	100
<b>Index of publications per professor</b>			<b>Publications in not own journals</b>		
Not publishing	4	57.1	Less than 25%	2	28.6
1 Publication	2	28.6	between 26% - 50%	3	42.9
3 o more publications	1	14.3	None	2	28.6
Total	7	100	Total	7	100

Source: self-made.

**Table 1:** Projects, publications and Budget spending.

The results in table 2 show an increase in evaluation costs. Its result is associated with the increase in inspections and audits (academic and quality), as well as the application of surveys that allow the evaluation of the level of satisfaction perceived by professors, which is focused on the performance

of science management process. According to Harrington they should be 35%, for Garbey, 10-50% and Juran, 40% [5]. The results of the research offer increasing values of 28% up to 36% during 2019-2020 periods.

Quality Costs	Dec. 2019	Jan. 2020	Feb. 2020
Prevention Costs	5130.67	2936.84	2856.22
Evaluation Costs	3364.44	1851.6	2741.18
Internal Failure Costs	2666.67	907.43	1856.09
External Failure Costs	850	200	250
Total Cost of Quality	12011.78	5895.88	7703.49
Cost of Prevention / Total Cost of Quality	0.427	0.498	0.37
Evaluation Cost / Total Quality Cost	0.28	0.314	0.36
Cost of Failures / Total Cost of Quality	0.293	0.188	0.27

Source: self-made.

**Table 2:** Quality Costs.

The results in table 3 showed a higher percentage in the satisfaction levels of the professionals in the performance of the science management process. However, some of the

indicators associated with the Budget expending reflect persistence of fails affecting the development of research projects.

ITEM	Valid	Frequency	Percent
Quality and relevance of the recommendations and suggestions of experts and specialists	Deficient	2	6.7
	Regular	4	13.3
	Adequate	24	80
	Total	30	100
How important is the project budget?	0	1	3.3
	None	1	3.3
	Some	4	13.3
	Much	24	80
	Total	30	100
What level of knowledge have you received to plan your research activities?	0	4	13.3
	None	4	13.3
	Some	12	40
	Much	10	33.3
	Total	30	100
Have you used the planned budget for the development of your scientific activities and results?	0	5	16.7
	None	5	16.7
	Some	14	46.7
	Much	6	20
	Total	30	100

Source: self-made.

**Table 3:** The client's satisfaction.

## Discussion

The literature review revealed the need to incorporate principles, models and indicators that are related to the expectations, strategic projections and potential of the

institutions [6].

Although the most frequent criterion to measure the performance of universities is teaching and learning; research, seen as the capacity of universities to generate new

knowledge, constitutes a basic indicator to evaluate their performance through rankings that classify universities based on their scientific production [7].

Indicators reflected in table 1 such as: research projects, publications by professor, publications in other journals and professors with a doctorate in science are of utmost importance to evaluate the performance of an educational organization.

Efficiency represents one of the performance indicators and is described within the eight measures to evaluate the performance of processes [8]. The budget executed in scientific-research activities, the percentage of professors linked to research projects, the publication rate per professor are some of the efficiency indicators selected to evaluate the performance of the research process.

## Conclusions

The application of generic quality tools to evaluate the performance of the Science and Innovation process at the Medical University, proved to be relevant to boost quality and efficiency based improvement in academic processes.

The data provided by the research allowed evaluating the behavior of the performance indicators of the Science and Innovation process at the Medical University.

The study revealed the opportunity and scientific value of approaching the evaluation of the scientific-research performance of the medical university, based on tools such as quality, academic and quality cost audits.

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