PERFORMANCE EVALUATION IN A LABORATORY MEDICINE UNIT

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ABSTRACT

The Healthcare Sector represents a particular system in which the rules of purchasing and resale do not follow the functional paradigms characterizing commercial systems. Therefore, the rules used to deal with the classic business management systems cannot be applied for managing purpose in the Healthcare sector without apposite modifications. For this reason, new management techniques have been and are currently investigated, such as the Discrete Event Simulation (DES) [1]. In this study, we applied the DES technique through the software Simul8 [2] to quantitatively analyze the workflow of the Division of Laboratory Medicine of the Hospital "San Paolo" in Naples, to define, in a clear and understandable way, the information about the costs that this structure supports to carry out its activities.

1   INTRODUCTION

The first step of the study aimed at designing the workflow model. To realize the model an iterative path has been used [3]. The data stored in the Laboratory Information System (L.I.S.) have been considered as working parameter to regulate the run of the system, since they allowed to obtain information about exams requested from each department, the departments identifications, and the exams executed. By observing the reality, the definition of equipment and resources involved in the system has been carried out through the direct observation of the real workflows. As far as economic data it concerns, we examined both the national taxes and the structure receipts. The model designed by using the information above, is shown in the following picture.
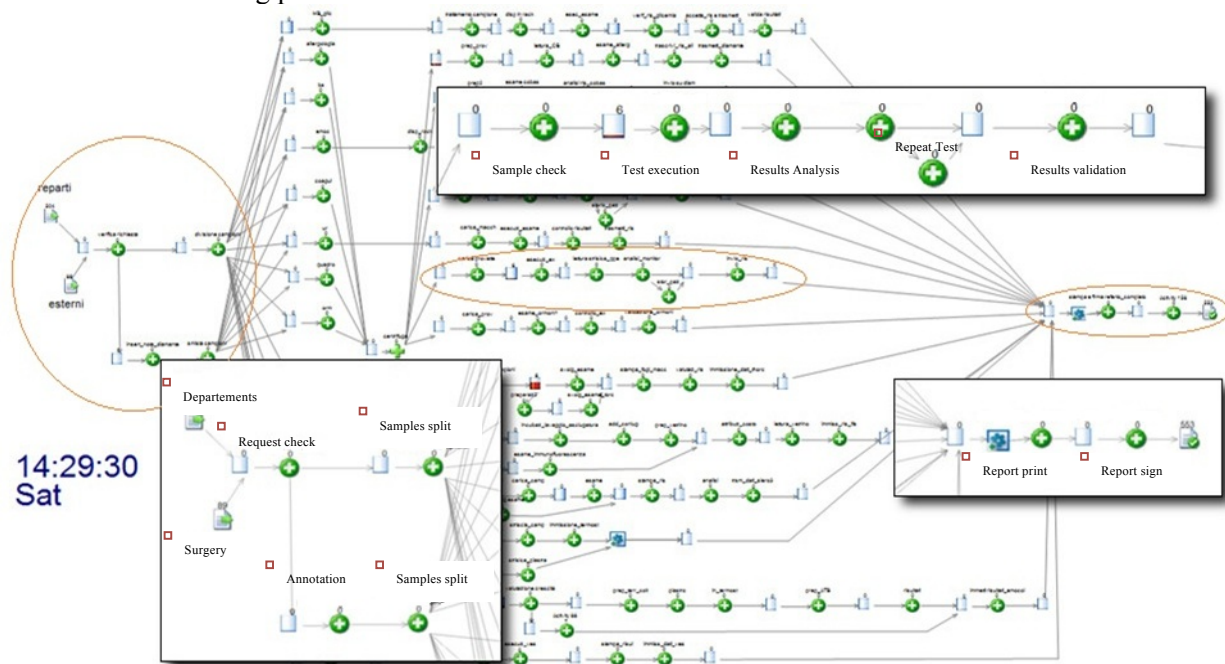
2   ANALYSIS OF THE MODEL

Once the model has been designed, the "As-is" analysis was applied to estimated the cost of each exam, as shown in the following table:

Exam Type	N° of Performed Exams	Unitary Costs per Exam in €
GHb	15	4,1
Allergology	10	5,33
Base	426	3,26
Hemochrome	358	2,84
Coagulation	190	3,97
Urine	179	3,24
Serum Electrophoresis	180	8,86
Hormones	132	1,59
THORC	10	20,4
IFA	10	25
Serum3	10	17,13
Urinoculture	39	12,95
Tampons	3	15,34
Blood cultures	2	28,58
VES	22	2,73

Tab1. Exams list and unitary costs

3   VALIDTION OF THE MODEL

The designed model has been validated based on two types of tests:
- Subjective tests: the model was shown to the operators and to the managers of the structure, who verified the behavior of the simulated model;
- Objective tests: the results obtained through the "As-Is" analysis were compared to a set of well-known data obtained from the actual system, to verify the compliance of the simulated model to the reality.

Both the approaches demonstrated that the designed workflow comply with the actual system.

4   CONCLUSIONS

The performed analysis allowed us to evaluate the actual costs sustained by the Laboratory Medicine Unit for the exams execution. The obtained results are currently considered as a starting point for further analysis in progress.

The aim of these tests is the definition of functional indexes, concerning time and costs, that can be used as reference parameters to quantitative estimate the efficiency of the laboratory tests execution.

REFERENCES

1.Norm Matloff, Introduction to Discrete-Event Simulation and the SimPy Language, 2008 pp. 3-6.
2. www.simul8.com/evalu8.htm
3. Law A.M.,Kelton W.D., Simulation Modeling and Analysis, 2000.