Providing high-quality service and safe environment is a major objective in the healthcare. Training is an essential component for achieving this objective. Simulation-based training is part of the human capital strategy, yet few have effectively succeeded in quantifying its real ROI. Therefore, it will be the first option to cut when the budget cut is needed.

The intangible benefits of healthcare simulation-based training are difficult to quantify. Additionally, there was not a unified way to count for the different cost and benefits to provide a justifiable ROI. Quantifying its qualitative and intangible benefits needed a framework that helps to identify and convert qualitative and intangible benefits into monetary value to consider it in the ROI.

This research developed a comprehensive framework that is capable to consider the wide range of benefits that simulation-based training can bring to the healthcare system, considering the characteristics of this investment. The major characteristics of investment in this field include the uncertainty, the qualitative nature of the major benefits, and the diversity and the wide range of applications.

This framework consists of three parts. The first part is the benefits and cost structure, which pays attention to the intangible benefits by considering the Value Measurement methodology (VMM) and other existing models. The second part deals with the uncertainty. Monte Carlo simulation is a tool that considers multiple scenarios of input sets instead of a single set of inputs. The third part considers an advanced value analysis of the investment. It goes beyond the discounted cash flow (DCF) methodologies like net present value (NPV) that consider a single scenario for the cash flow to Real Options Analysis that consider the flexibility over the lifetime of the investment when evaluating the value of the investment. This framework has been validated through case studies.

Major: Industrial Engineering

Educational Career:
Bachelor’s of Mechanical Engineering, BS, 2005, King AbdulAziz University, Saudi Arabia
Master’s of Engineering Management and Leadership, MS, 2010, Santa Clara University, United States
Master's of Industrial Engineering, MS, 2016, University of Central Florida, United States

Committee in Charge:
Luis Rabelo, Chair, Department of Industrial Engineering and Management Systems (IEMS)
Ahmad Elshennawy, Department of Industrial Engineering and Management Systems (IEMS)
Pamela Andreatta, Institute for Simulation and Training, The University of Central Florida
Brian Goldiez, Institute for Simulation and Training, The University of Central Florida

Approved for distribution by Luis Rabelo, Committee Chair, on October 13, 2017.

The public is welcome to attend.