

# Chapter 5

## The Use of Systems Dynamics in the Analysis of Facilities Management Affecting the Quality of Higher Education in Egypt

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### **ABSTRACT**

*In every nation, it is important that the higher education system fulfils the community expectation for perceived quality. One aspect of improving quality is to adopt a better funding strategy for the facilities that are provided by a university. This chapter focuses on the funding strategy for Egyptian universities. The chapter provides the background to the problem distinguishing between private and public universities thenceforward describes the process, employing the causal diagrams, to prioritise the six most important facility services. The budgeting for these services are individually modelled (using both the qualitative and quantitative system dynamics) and then incorporated into a combined stock and flow*

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*model. The models allow a facility service administrator to optimise spending in a particular area and also to rank the spending between the six facilities. The models for private and public universities have the same structure but differ with the data. Results of the analysis are discussed in detail.*

## **1 INTRODUCTION**

Decision making has always been viewed from a philosophical perspective as a definitely human activity replicating the capability of human beings to practise assessment and decide freely to proceed and take action in a specific selected approach (Pomerol, 2003). Though, that fact has not been consistently acknowledged in science, and other human behaviours, such as language, have long been included in the research of how the brain works; the discovery of Broca's areas in 1861 demonstrates the start of the research of the brain structure. Damasio et al. (1996) argued that decision making is similar to the definition of a human characteristic as a language, and this persuasive argumentation emerged from their decisional biology study.

Decision making and successive actions, predominantly the earlier phases of the process by which individuals focus on their goals and the desired outcomes of their actions, are usually human activities (Pomerol, 2003). For human beings, action is a direct explicit result of the stimuli perceived within the environment, because there occurs an additional layer of look-ahead reasoning between the data acquisition (the stimuli or inputs) and the resultant action. Nevertheless, there are also some instinctive and unconscious responses in human behaviour, but they are closely linked to other biological processes such as closing the windpipe while eating, breathing and certain reflex behaviour, as it takes one's hand out of the flames. Therefore, Action is guided by human thought and this analytical stage offers the freedom to discover what can happen in the big universe (Pomerol, 1997).

Operational research systems, management information systems MIS, and database management systems DMS were built for a long time without any connection to human behaviour as tools that are based on logical models. This led to systems that were more likely to crunch data rather than to relieve the uncertainty inherent in decision-making and decision-makers support. Hence, it rapidly seemed that managers were not going to use MIS systems and some authors were able to criticize the side effects of "MIS- management information systems" (Ackoff, 1967). Rather of addressing the issue of information overload these systems expelled to escalate and led managers to be swamped with data and starving for knowledge. In consequence, systems development is needed, which are capable of raw data translation, represented in facts and figures taken randomly in the heaps of management information reports or in the data warehouse of the organisation, in information given in an ordered collection of relevant data and delivered in a manner that improves its relevance to a specific problem (Pomerol, 2003).

In line with the specialists, DMSS is more technically advanced, offering broader and deeper support for decision-making, as well as more applications. New information and computer technologies are required, the roles of the decision-makers shift, and thus new organizational structures arise to accomplish the changes. Organisations will gain substantial significant benefits from successful DMSS deployments. Researchers and practitioners are stimulated to co-operate their efforts for further enhancements for the pragmatic and theoretical developments of DMSS. Despite technological progress, a key problem still remains how deficiencies in DMSS implementation in organizations can be minimized (Forgionne et al., 2003).

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