

# Optimizing the Service Provision time in the Emergency Department Using Mathematical Modeling and Simulation

Case Study: Imam Reza Hospital

Mahdi Yousefi Nejad Atari<sup>1</sup>

Ensiyeh Neishabouri Jami<sup>2</sup>

Akbar Sattari Behnam<sup>3</sup>

## Abstract

Patient waiting time, the costs, and nurses' job satisfaction level are important criteria in providing services in hospital. One of the main causes of long patient waiting times is the lack of sufficient expert staff in the hospital. Increased costs and low job satisfaction of nursing staff in hospitals are the result of applying traditional and nonscientific methods in assigning nurses to shifts. The emergency department is one of the special units in the hospital, in which studying the patient flow is highly important. In this study, the current status of Imam Reza Hospital emergency department in Tabriz, Iran is simulated using ARENA 14 software, in order to assess the costs and size of the waiting line. Then, the current status of this department is compared with three scenarios with different number of nurses. In order to evaluate the costs and nurse job satisfaction in each scenario, a nonlinear integer programming mathematical model is proposed. In this model, nurses are properly assigned to shifts and weekdays in order to minimize the costs and to increase nurse job satisfaction. Finally, analyzing both nonlinear programming and simulation model, the results show that the number of nurses in this department is not sufficient and that six nurses should be added to the staff.

**Keywords:** Generalized Center Method, Mathematical Modeling, Multi-Objective Allocation Problem, Optimization of Service Provision Time, Simulation.

---

<sup>1</sup> Associate Prof., Faculty of Engineering, Azad University, Bonab Branch, Bonab, Iran (Corresponding Author)

mahdi\_108108@yahoo.com

<sup>2</sup> Associate Prof., Faculty of Engineering, Azad University, Bonab Branch, Bonab, Iran

<sup>3</sup> MSc, Faculty of Engineering, Azad University, Bonab Branch, Bonab, Iran

## Combining Fuzzy Dematel and Product Design Structure Matrix for Clustring Nozzle

Mahdi Karbasian<sup>1</sup>

Sayed Mohammad Kazemi<sup>2</sup>

Golara Iranpoor<sup>3</sup>

### Abstract

This article presents an integrated approach for designing bullet fuzes. Using systems engineering in this approach, first of all the needs of the customer, Air Force, are considered and translated into functional requirements. Then, by applying the house of quality (HOQ) matrix, these functional requirements are transformed into component parts whose classification is finally carried out by the design structure matrix and through examining the presence or absence of relationship between various parts. On the other hand, regarding the different types of dependencies and relationships among these parts, the value and strength of relationships are expressed using fuzzy DEMATEL analysis that leads to the classification of components in each module. The integrated approach outlined in this article can serve as a basis for a fully localized process of designing and developing new products in design offices, resulting generally in reducing the design/redesign time and improving the quality. Furthermore, our novel approach is employed for the first time in single-function products causing changes in considering the types of relationships in the design structure matrix.

**Key words:** design structure matrix, functional requirement, fuzzy DEMATEL, Mirage fuzes, systems engineering.

---

<sup>1</sup> Associate Prof., Industrial Engineering Department, Malek Ashtar University, Isfahan, Iran (Corresponding Author)

karbasian@mut.ac.ir

<sup>2</sup> Department of management, Dolat Abad Branch, Islamic Azad Univesity, Isfahan, Iran

<sup>3</sup> Industrial Engineering Department, Malek Ashtar University, Isfahan, Iran

## Offering Effective Approaches to Implementation of Electronic Customer Relationship Management by the University of Applied Science and Technology (Case Study: the University of Applied Science and Technology, Unit 20, Tehran)

Ehsan Babaei<sup>1</sup>

Ehram Safari<sup>2</sup>

Mohammad Kazem Sayadi<sup>3</sup>

### Abstract

Universities and institutions which plan to use electronic customer relation management system (e-CRM) first need to first measure the effective factors affecting the system's implementation so that they'll be able to provide a transparent system in order to satisfy the students and help them manage their daily activities. This article explores the effects of implementing electronic customer relationship management from the students' viewpoint in the under-researched university. This study is an applied research regarding its purpose, and a descriptive survey research in terms of methodology. The statistical population of the research includes students studying at the University of Applied Science and Technology, unit 20. The data has been collected through researcher-designed questionnaires. The structural equation modeling was used in order to perform data analysis and hypothesis testing. Results indicate that factors such as commitment to customers, privacy protection, customers' trust, convenience, quality electronic service, students' satisfaction and loyalty are influential in the implementation of electronic customer relationship management system. The proper implementation of e-CRM results in an increased loyalty and the satisfaction of students with the university services and programs.

**Key word:** Commitment to Customers, E-CRM, Student Satisfaction.

---

<sup>1</sup>. MSc., Student , Department of Faculty of Engineering and Technology, Electronic Branch, Islamic Azad university, Tehran ,Iran

<sup>2</sup>. Assistant Prof., Iran Telecommunication Research Center, Tehran, Iran

<sup>3</sup>. Assistant Prof., Iran Telecommunication Research Center, Tehran, Iran

## The Management and Evaluation of Independent Project Portfolios under Uncertainty and Projects Incompatibility

Hadi Mokhtari<sup>1</sup>  
Zeinab Habibi<sup>2</sup>

### Abstract

This research focuses on evaluating and proposing some approaches in order to choose the most economic projects under risk and uncertainty. In this investigation, the considered projects are independent and naturally selecting multiple options, as a project portfolio, is possible. The restrictive criterion for the investor in selecting large-scale portfolios is the limited available budget and capital that determine which projects are economic and can be selected. However, variations and inconsistencies in the economic utility of projects, which is caused by external uncertainties, is an important factor that should be considered in such evaluations. In this research, two different approaches are proposed for the economic evaluation of project portfolio under risk and uncertainty. The first approach is designed based on a normal distribution curve and the minimum coefficient of variation (CV), while the second one acts based on a corrected available budget and the maximum expected value. Finally, the results of the proposed approaches are evaluated and analyzed considering the presented sample problems.

**Keywords:** Economic Crisis, Economic Evaluation, Project Portfolios, Risk and Uncertainty.

---

<sup>1</sup>. Assistant Professor, Department of Industrial Engineering, Faculty of Engineering, University of Kashan, Kashan, Iran  
(Corresponding Author) mokhtari\_ie@kashanu.ac.ir

<sup>2</sup>. BSc Student of Industrial Engineering, Department of Industrial Engineering, Faculty of Engineering, University of Kashan, Kashan, Iran zeinabhabibi@yahoo.com

# The Impact of Managers' Attitude Towards Internet Marketing on Internet Marketing Adoption in Organizations

Case Study: Book-Publishing and Distribution Companies in Iran

Hamidreza Rezvani<sup>1</sup>

Narges Aghakhani<sup>2</sup>

## Abstract

In today's turbulent and competitive market, organizations tend to use Internet marketing for achieving and maintaining optimal performance in order to gain competitive advantage. One of the most important success factors in Internet marketing is the support of top managers of the organization. Since there has been a limited number of researches investigating the relationship between "top managers' supportive attitude" and "the extent to which Internet marketing is used", this paper seeks to identify, categorize, and provide indicators for measuring these two variables in book publishing and distribution companies. This study is a descriptive survey research and the data has been collected by sending electronic questionnaires to the top managers and marketing managers of under-research companies. The results indicate that there is a weak positive correlation between these two variables. In other words, the use of Internet marketing in under-research companies doesn't seem to have a strong relationship with managers' attitudes, and there are other factors involved. However, knowing the top managers' attitude will lead to appropriate decisions on using resources for implementation of Internet marketing.

**Keywords:** book publishing and distribution companies, Internet marketing, managers' attitude towards Internet marketing.

---

<sup>1</sup>. Assistant Prof., Faculty of management, Mehralborz University, Tehran, Iran (Corresponding Author)

Rezvani@mehralborz.ac.i

<sup>2</sup>. Master of Science degree of IT management, Mehralborz University, Tehran, Iran.

## Speed-up Technique in Time-Varying Shortest Path Problems with Arbitrary Waiting Times

Gholamhassan Shirdel<sup>1</sup>

Hassan Rezapour<sup>2</sup>

### Abstract

Network flow problems are considered a vital branch of operations research. These problems are classified into static and time-varying classes. Network flow problems are time-varying in real application, because any flow must take a given amount of time to traverse an arc. Moreover, all the parameters in the network can be time-dependent. In this paper, the speed-up technique on time-varying shortest path problems is studied. First of all, the time-varying shortest path problem is explained. The problem is to find the shortest paths from a specific vertex (which is called a source) to other vertices, so that the total cost of the path is minimized and the total travel times and waiting times reach a maximum value of  $T$ , where  $T$  is a given positive integer. Then the speed-up technique is explained for a shortest path problem.

**Keyword:** speed-up techniques, time-varying shortest path

---

<sup>1</sup>. Associate Prof., Faculty of Basic Sciences, University of Qom, Qom, Iran (Corresponding Author)

shirdel81math@gmail.com

<sup>2</sup>. Ph.D. in Applied Mathematics, Faculty of Basic Sciences, University of Qom, Qom, Iran.

## Table of Contents

<b>Speed-up Technique in Time-Varying Shortest Path Problems with Arbitrary Waiting Times .....</b>	<b>1</b>
Gholamhassan Shirdel, Hassan Rezapour	
<b>The Impact of Managers' Attitude Towards Internet Marketing on Internet Marketing Adoption in Organizations .....</b>	<b>2</b>
Hamidreza Rezvani, Narges Aghakhani	
<b>The Management and Evaluation of Independent Project Portfolios under Uncertainty and Projects Incompatibility .....</b>	<b>3</b>
Hadi Mokhtari, Zeinab Habibi	
<b>Offering Effective Approaches to Implementation of Electronic Customer Relationship Management by the University of Applied Science and Technology.....</b>	<b>4</b>
Ehsan Babaei, Ebrahim Safari, Mohammad Kazem Sayadi	
<b>Combining Fuzzy Dematel and Product Design Structure Matrix for Clustering Nozzle .....</b>	<b>5</b>
Mahdi Karbasian, Sayed Mohammad Kazemi, Golara Iranpoor	
<b>Optimizing the Service Provision time in the Emergency Department Using Mathematical Modeling and Simulation.....</b>	<b>6</b>
Mahdi Yousefi Nejad Atari, Ensiyeh Neishabouri Jami, Akbar Sattari Behnam	