

GJCIE

ABSTRACT BOOK

Global Joint Conference on Industrial Engineering and Its Application Areas - 2019



September 02 - 03, 2019
Eastern Mediterranean University
Gazimagusa, TRNC

GAZIMAGUSA

TRNC

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Title

Abstract Book of Global Joint Conference on Industrial Engineering and Its Application Areas (GJCIE) 2019
“Industrial Engineering in the Digital Disruption Era”

Editors

Fethi Calisir, PhD., Orhan Korhan, PhD.

Technical Editor

Murat Durucu, PhD.

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WELCOME MESSAGE FROM THE CONFERENCE CHAIR

Fethi Calisir, PhD

Dean, Management Faculty

Istanbul Technical University, Turkey



On behalf of the Global Joint Conference on Industrial Engineering and Its Application Areas (GJCIE 2019) Organizing Committee, I welcome you to the GJCIE 2019 in Gazimagusa, Turkish Republic of Northern Cyprus (TRNC). The GJCIE 2019 is composed of three co-located conferences: the 4th Global Conference on Industrial Engineering (GCIE), the 5th Global Conference on Healthcare Systems Engineering and Management (GCHSEM), and the 6th Global Conference on Engineering and Technology Management (GCETM). The GGJCIE 2019 will be an internationally renowned forum for researchers, practitioners, and educators to present and discuss the most recent innovations, trends, experiences, and challenges in the field of industrial engineering. It will bring together experts from academia and industry to exchange the latest research results and trends, and their practical applications in the aforementioned areas of industrial engineering. This will be accomplished through the following two modes of communication: keynote presentation and parallel sessions.

Digital disruption is a transformation that is triggered by emerging digital technologies and business models. Digital disruption is expanding beyond the technology sector to engulf a diverse set of industries, including construction, energy, finance, healthcare, IT services, manufacturing, and transportation that represent a large portion of the global economy. The escalating digital disruption in these industries will put unprecedented pressure on managers to formulate effective strategies to change organizational structures and eliminate barriers that are keeping them from taking full advantage of contemporary digital technologies. For this to be achieved, companies will need to improve and re-engineer most of their processes before they are partially or fully automated. This means that Industrial Engineering skills will be the cornerstone for achieving maximum value from investments in automation. The Global Joint Conference on Industrial Engineering and Its Application Areas (GJCIE) 2019 will shed light on the role of Industrial Engineering in this endeavor. We have a great program and a fantastic keynote speaker this year.

Gazimagusa (Famagusta) is the second-largest city in the TRNC. It is a town rich in history and culture and bears the marks of civilizations such as the Assyrians, Greeks, Persians, Romans, Byzantines, Lusignans, Venetians, and Ottomans. Those interested in history will enjoy visiting the walled town of Famagusta and hearing about the Ottoman siege of the then Venetian city. The city offers a wide selection of shops, restaurants, pubs, and cafes visited by a large student population. Owing to these prominent features of the place, participants will enjoy their stay beside benefiting from the conference.

I want to welcome you to the GJCIE 2019 and wish you a pleasant time in Gazimagusa!

Best regards,

Fethi Calisir, Ph.D.

Conference Chair

KEYNOTE SESSION

KEYNOTE SESSION

KEYNOTE

M. YASAR OZDEN, PhD

- Director of Distance Education Institute, Eastern Mediterranean University, Famagusta-TRNC

Professor of Computer Education & Instructional Technology, Eastern Mediterranean University

September 02, 2019 – Room: Arsinoe



How to Survive in the Digital Disruption Era?

Abstract

It is stated in the World Bank 2019 report (The Changing Nature of Work, 2019) “..Machines are coming to take our jobs” has been a concern for hundreds of years—at least since the industrialization of weaving in the early 18th century, which raised productivity and fears that thousands of workers would be thrown out on the streets. Innovation and technological progress have caused disruption, but they have created more prosperity than they have destroyed. Today, we are riding a new wave of uncertainty as the pace of innovation continues to accelerate, and technology affects every part of our lives.

We know that robots are taking over thousands of routine tasks and will eliminate many low-skill jobs in advanced economies and developing countries. At the same time, technology is creating opportunities, paving the way for new and altered jobs, increasing productivity, and improving the delivery of public services. When we consider the scope of the challenge to prepare for the future of work, it is important to understand that many children currently in primary school will work in jobs as adults that do not even exist today. So, how do we resist this change or how to adapt new environmental settings for being alive. In this talk, I will try to discuss digital disruption and its possible effects. I will also share my ideas about analog disruption and its mechanism. And finally, I will say something about how to be ready for any kind of disruptions.

PARALLEL SESSIONS

PARALLEL SESSION 01 | PS01

PS01.21

September 02, 2019 | 11:00 – 12:15

Optimal Order Quantity for the Mean-Variance Newsvendor Problem with Stockout

Akram El-Tannir

Department of Industrial Engineering and Engineering Management, Faculty of Engineering, Beirut Arab University, Debbieh, Lebanon

Abstract: This paper extends the formula that derives the optimal order quantity for the risk-neutral newsvendor under stockout. Its objective is to maximize the mean-variance risk-averse profit utility function under the general demand probability distribution. The obtained formula is applied for the cases of the Uniform, Normal, and Exponential distributions. The obtained results confirmed earlier findings that the optimal order quantity for the risk-averse newsvendor problem using the mean-variance utility can either be less than or greater than the optimal quantity of the risk-neutral case.

PS01.43

September 02, 2019 | 11:00 – 12:15

Binary Satin Bowerbird Optimizer for the Set Covering Problem

Ilker Kucukoglu

Industrial Engineering Department, Faculty of Engineering, Bursa Uludag University, Gorukle, Bursa, Turkey

Abstract: The set covering problem (SCP) is one of the most studied NP-hard problems in the literature. To solve the SCP efficiently, this study considers a recently proposed bio-inspired meta-heuristic algorithm, called satin bowerbird optimizer (SBO). Since the SBO was first introduced for the global optimization problem, it works on a continuous solution space. To adapt the algorithm to the SCP, this study introduces a binary version of the SBO (BSBO). The BSBO simply converts real value coded solution vector of the SBO to binary coded solution vector by applying a binarization procedure. In addition to binarization procedures, a solution improving operator is employed in the BSBO to

transform infeasible solutions into feasible solutions and remove redundant columns to reduce solution cost. The performance of the proposed BSBO is tested on a well-known benchmark problem set consists of 65 instances. With regards to the best-known solutions of the instances, efficient results are obtained by the proposed BSBO by finding near-optimal solutions. Furthermore, standard deviations of the runs demonstrate the robustness of the algorithm. As a consequence, it should be noted that the proposed solution approach is capable of finding efficient results for the SCP.

PS01.46

September 02, 2019 | 11:00 – 12:15

Crew Constrained Home Health Care Routing Problem with Time Windows and Synchronized Visits

Nozir Shokirov¹, Bulent Catay^{1,2}, Tonguc Unluyurt¹

¹ *Faculty of Natural Sciences and Engineering, Sabanci University, Istanbul, Turkey*

² *Smart Mobility and Logistics Lab, Sabanci University, Istanbul, Turkey*

Abstract: Population aging, rise in the prevalence of chronic diseases worldwide, and growing health care costs have substantially increased the demand for home health care (HHC) in recent years. To gain a competitive advantage in the market and lower public expenditure, HHC service providers and governmental institutions mainly focus on increasing service quality while decreasing their costs. These objectives have resulted in various challenging optimization problems that have been widely studied in the past few years, including routing and scheduling problems. In this paper, we study an HHC routing and scheduling problem with time windows, where service is provided to patients requesting different types of care using a limited crew. We first provide the mixed integer programming formulation of the problem. Then, we perform a computational study to investigate the benefits of allowing synchronized visits to patients. Our results show that synchronized visits guarantee HCC service to all patients in some instances which are otherwise infeasible, and may reduce the total travel distance in other cases.

PARALLEL SESSION 02 | PS02

PS02.09

September 02, 2019 | 11:00 – 12:15

Research on the Interaction between Patient Satisfaction, Service Quality, Organizational Image and Trust in a Training and Research Hospital

Cemil Ceylan

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: Today, the satisfaction of people who benefit from health systems and health systems are gaining importance. In this context, analyzing the basic concepts affecting customer satisfaction and analyzing the interactions of these concepts became essential for an accurate health system management. It is inevitable that the priorities of the customers are determined, and action is taken in line with these priorities. The concepts of Perceived Service Quality, Trust, and Organizational Image are the subjects of this study. The number of studies analyzing these four concepts together is deficient. The study was carried out in the district of Bakırköy, Bakırköy. Sadi Konuk Research Hospital. Bakırköy. Sadi Konuk Hospital has 20 polyclinics, 359 beds and 800-1500 people in a day and it is the largest hospital in the region. The data of the study were collected from patients in these outpatient clinics. By using a convenience sampling method, polyclinic patients with at least two hospital visits responded to the questionnaire. Various demographic data were collected under the name of Age, Gender, Marital Status, Education Level, and Number of Arrival to Hospital. The questions were asked objectively, and the patients were asked to answer each question. According to the results obtained from the study, Perceived Service Quality is positively affected by Patient Satisfaction, Organizational Image, and Trust. Trust, Patient Satisfaction, and Organizational Image adversely affect Trust. Organizational Image also positively affects Patient Satisfaction.

PS02.48

September 02, 2019 | 11:00 – 12:15

Multi-Criteria Group Decision Making in the Selection of CNC Woodworking Machinery

Fatma Betül Yeni¹, Mehmet Mustafa Acipayamoglu², Emre Cevikcan³

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³ *Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey*

Abstract: The machine selection process has been an important issue for companies for many years. The wrong selection of the machine leaves a negative result on the efficiency, precision, flexibility, and sensitive production capacity of the company, and this leads to many problems. In this study, a real case application in a company that serves in the wood industry sector is carried out for the process of CNC woodworking machine selection. First, the main criteria and sub-criteria affecting machine selection are defined. For the decision-making process, 3 senior executives of the company are considered as decision-makers (DM). During the evaluation of alternatives under these criteria, the AHP method, one of the most popular Multi-Criteria Decision Making (MCDM) methods, is used. A sensitivity analysis is also conducted for a different scenario to see the change in the rankings of alternatives.

PS02.68

September 02, 2019 | 11:00 – 12:15

Selection of Optimum Maintenance Strategy using Multi-Criteria Decision Making Approaches

Tolga Gedikli, Beyzanur Cayir Ervural

Department of Industrial Engineering, Faculty of Engineering and Architecture, Konya Food and Agriculture University, Konya, Turkey

Abstract: An appropriate maintenance strategy can improve the availability and reliability levels of industries, while improper maintenance strategy can significantly reduce the effectiveness of companies. This paper aims to select the optimal maintenance

strategy utilizing four decision-making techniques in a food company in Turkey. In this study, four multi-criteria decision making (MCDM) methods (Analytic Hierarchy Process (AHP), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), Simple Additive Weighting (SAW) and Weighted Product (WP)) are used to determine the optimal maintenance strategy. In this context, four main criteria (safety, cost, reliability, and added-value), twelve criteria and five alternatives (corrective maintenance, time-based preventive maintenance, opportunistic maintenance, condition-based maintenance, and predictive maintenance) are defined according to focus group meetings in the company and the literature review. The obtained results are compared with each other, and the appropriate maintenance strategies are identified.

PARALLEL SESSION 03 | PS03

PS03.35

September 02, 2019 | 13:45 – 15:00

Ergonomic Review of University Library Furniture: A Case Study of Cyprus International University

Kevin Chika Alozie, Elif Binboga Yel, Banu Numan Uyal

Industrial Engineering Department Engineering Faculty, Cyprus International University, North Cyprus, Turkey

Abstract: As university students spend a considerable part of their daily life studying in the library reading area, ensuring that the furniture dimensions used are agreeable with the principles of anthropometrics has become critical. The compatibility between dimensions of furniture and user anthropometrics is therefore important. This study was carried out to understand the anthropometric dimensions of the library users and juxtapose it with the observed dimensions of the furniture in the library. Two approaches were employed for data collection. Namely, measuring the students' anthropometry and administration of questionnaires to the students using the university library. The questionnaire was focused on the musculoskeletal pain experienced by students. It was discovered that students feel more discomfort in the neck region. Also, shoulders and elbow regions are

experiencing a considerable amount of pain. Results of the correlation analysis pointed out that there is a relationship between experienced musculoskeletal pain and variables like gender, age, degree level, and furniture design features. Comparison of furniture dimensions and anthropometric profile of the students highlights that there are mismatches in the paired dimensions. These mismatches are the precursor of the pains felt by the students that affect their well-being.

PS03.47

September 02, 2019 | 13:45 – 15:00

Operator 4.0 and Cognitive Ergonomics

Mohamad Fallaha¹, Zeki Murat Cinar², Orhan Korhan¹, Qasim Zeeshan²

¹ *Industrial Engineering Departement, Eastern Mediterranean University (EMU), Famagusta, Northern Cyprus, via Mersin 10, Turkey*

² *Mechanical Engineering Departement, Eastern Mediterranean University (EMU), Famagusta, Northern Cyprus, via Mersin 10, Turkey*

Abstract: Industry 4.0 requires a paradigm shift from the traditional manufacturing practices and work environment to a dynamic workplace where humans and machines must work together as a human cyber-physical system for increased productivity and flexibility. It necessitates novel interactions between operators and machines, consequently leading to the transformation of a traditional operator to Operator 4.0 or Smart Operator. Improvement in operators and engineers' cognitive skills is imminent to adapt to Industry 4.0 working environment. Wearable technology, sensors, or virtual reality equipment enhances cognitive capabilities of the Operator 4.0. Thus cognitive skills of the smart operators are required more rather than the physical strength. This paper presents a review of the recent developments in cognitive ergonomics of Smart Operator or Operator 4.0 in the context of Industry 4.0.

PS03.53

September 02, 2019 | 13:45 – 15:00

Motivators for the Second-hand Shopping through Mobile Commerce

Cigdem Altin Gumussoy, Aycan Kaya, Sezin Bahar Unal

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: This study aims to reveal the factors affecting the use of second-hand shopping through a mobile application. An extended Technology Acceptance Model (TAM), including economic advantage, natural conservation, sustainable consumption, trust, convenience, and subjective norms is constructed. A total of 318 questionnaires are collected from the users of one of the second-hand shopping application-Letgo. Regression analysis is used to reveal the relationships defined in the model. First, the results of the study confirm the relations defined in TAM in the context of second-hand shopping. Furthermore, behavioral intention to use is affected by perceived usefulness, subjective norms, convenience, and perceived ease of use. Perceived usefulness and subjective norms have a higher impact than others. Another result is that perceived ease of use, economic advantage, sustainable consumption, natural conservation, and subjective norms impact the feeling about the usefulness of second-hand shopping system. Among the factors, perceived ease of use and economic advantage have higher importance on perceived usefulness.

PARALLEL SESSION 04 | PS04

PS04.04

September 02, 2019 | 13:45 – 15:00

Dimensions Optimization of EMU Library Furniture Using Ergonomics Evaluation

Tareq A. M. Babaqi, Adham Mackieh

Industrial Engineering, Eastern Mediterranean University, Famagusta, North Cyprus via Mersin 10, Turkey

Abstract: The point of this study is assessing furniture of EMU Library and its impact on the understudy

stance, execution, and consideration. One hundred and fifty-seven understudies were utilized as subjects, their ages between 16 to 45 years. Twelve anthropometric information of the subjects were measured including Stature, Shoulder Height, Shoulder Elbow Height, Buttock-to-Popliteal length, Popliteal Height, Knee Height, Forearm Length, Hip Width, Elbow Sitting Height, Sitting Height, Sitting Eye Height and Overhead Stretch Height. The mean, Standard deviation, percentiles, least and greatest estimation of anthropometric measurements were figured. The normality assumption and design of experiment principles were testes and applied. The combination of statistics and optimization method was used in this study to reduce the mismatch

PS04.16

September 02, 2019 | 13:45 – 15:00

An Integrated Employability Aptitude Survey-Cognitive Test Model for Assessing Students' Skills Retention Threshold

Faeza Saleh Dihin¹, Adham Ahmad Mackieh¹, Kehinde Adewale Adesina²

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² *Food Engineering Department, Near East University, Lefkosia, 99138 KKTC, Via Mersin 10 Turkey*

Abstract: An integrated employability aptitude survey-cognitive test is proposed to assess the retention threshold of students with the view of appraising the capabilities of engineering students in readiness for engineering positions. Numerical ability, space visualization, numerical reasoning, and symbolic reasoning responses are adapted into the model. One hundred six undergraduate students of the Department of Industrial Engineering at Eastern Mediterranean University selected across freshman, sophomore, junior and senior in the 2016-2017 academic years assessed their aptitudes through the proposed EAS cognitive tests. Analysis of variance is employed to analyze the model, and the results indicate a significant difference between students' abilities in terms of raw scores and respective academic levels. Academic years and CGPA groups are found to have significant effects on the student's percentile. Additionally, strong correlations between CGPA and the student's

percentile are found. However, space visualization ability is not affected by academic progression.

PS04.66

September 02, 2019 | 13:45 – 15:00

The Effect of Working from Home on Work and Private Life: Automotive Sector Application

Murat Durucu, Cahit Ali Bayraktar

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: Today, the increase in the sense of independence and developments in communication technology increase the importance of working from home. Working from home is not defined as bringing home the work that the employee cannot rise to the workplace, but rather working from home by the management at a certain frequency rather than going to work. Working from home has positive and negative effects on work-life. While some studies have positive findings that working from home will improve work performance, some studies have found that being away from the workplace will decrease team performance, create obstacles for progress and adversely affect business life. One hundred eighty employees, including 66 managers of the company to apply to work from home in the Turkish automotive sector, did take part in this study. As a result of the study, it has been concluded that the increase in transportation time and frequency of working from home reduces the level of communication between the manager and the employee and contributes positively to the establishment of work-family balance. It was obtained that working at home posed a barrier to progress at both the executive and employee levels and prevented teamwork. As a result, to increase the motivation of employees to work from home, it may be suggested that companies should place systems of teamwork in their enterprises, provide the necessary technological tools for remote teamwork and establish systems that closely monitor the results of the work of workers from home in their career plans.

PARALLEL SESSION 05 | PS05

PS05.49

September 02, 2019 | 15:30 – 16:45

A Study on the Adoption of Smart Home Devices: PLS Structural Equation Modelling

Umut Asan¹, Abdurrahman Can²

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² R&D Directorate, Technology Management and R&D Incentives Management Department, Arcelik, Istanbul, Turkey

Abstract: In this study, the adoption of smart home devices that offer comfort, security, and energy saving to users has been examined. The technology acceptance model (TAM) is extended by integrating Domain Specific Innovativeness, Perceived Compatibility, Perceived Data Reliability, Perceived System Reliability, Variety Seeking, and Laziness into the model. Different from the existing studies in the literature, the present study introduces the constructs Variety Seeking and Laziness the first time. Also, Personal Innovativeness is replaced by the construct Domain Specific Innovativeness. Partial least squares structural equation modeling (PLS-SEM) is used to test the proposed model. This statistical technique does not require the data to be normally distributed and is well suited for testing large and complex models, including moderating effects. According to the results, the relationship between Domain Specific Innovativeness and Perceived Usefulness is not supported. On the other hand, a weak positive relation is found between Domain Specific Innovativeness and Perceived Ease of Use. Although the analysis reveals also a positive weak relationship between Laziness and Attitude, the moderating effect of Laziness on the relationship between Attitude and Perceived Usefulness as well as Attitude and Perceived Ease of Use is not supported. Finally, a weak positive relationship between Variety Seeking and Attitude is found.

PS05.50

September 02, 2019 | 15:30 – 16:45

Segmentation of Social Media Users: A Means-End Chain Approach

Aslı Cetin, Umut Asan, Ayberk Soyer

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: The use of social media has risen dramatically over the past few years, and companies are spending more dollars than ever on social media. It has created great opportunities for users in terms of social interaction, knowledge sharing, entertainment, and online shopping. At the same time, social media has generated a new set of capabilities for marketers to collect data, test propositions, understand consumer reactions, and communicate more effectively. Therefore, a better understanding of the profiles and preferences of social media users becomes inevitable for developing effective marketing strategies. This requires a detailed analysis of meaningful differences among segments. Only a few studies have attempted to differentiate among users employing either a customer-based or product-based approach. To address this issue, this study applies the means-end approach along with the laddering technique and cluster analysis for data collection and analysis. The proposed approach can provide a deeper understanding of user perceptions and preferences. The constructed model presents the connections between preferred attributes of social media platforms, the benefits obtained from these attributes, and the personal values satisfied by those benefits. The study identified four distinct groups that vary according to their motivations of using social media platforms.

PS05.62

September 02, 2019 | 15:30 – 16:45

Open Data Availability and Suitability for Financial Analyses

Peiman Alipour Sarvari¹, Gulcan Baskurt², Djamel Khadraoui¹, Sébastien-Augustin Martin¹

¹ *Trusted Security Services Unite, ITIS Department, Luxembourg Institute of Science and Technology, Belval, Luxembourg*

² *Management Department, Faculty of Management, Beykent University, Istanbul, Turkey*

Abstract: The purpose of this study is to explore the benefits of Open Data initiatives for the financial sector. The first approach is to take the financial activities, to consider their data needs (in terms of data kinds and characteristics) and consider if they are available, and in a suitable format for these goals. Even though it has been done for some cases and applied to the case of Luxembourg, we are the first and foremost group to suggest and explain a systematic method, based on an Open Data literature review, to assess the dimensions characterizing the availability (not only the data accessibility, but also the conditions around this accessibility) and the suitability of the data (not only their existence but other dimensions of their accessibility, like licenses). Although the accessibility of financial, economic and commercial information is highly dependent on contextual legal and political frameworks, this framework is adaptable enough to be used for different countries, and even beyond the case of financial data. The last part is showcasing the importance of the title of this study for financial data in Luxembourg. This contribution intends to be useful both for people in charge of the Open Data initiatives in the public and private sectors; for practitioners and researchers aiming at reusing these data; and for Open Data researchers.

PARALLEL SESSION 06 | PS06

PS06.06

September 02, 2019 | 15:30 – 16:45

3-D Printing a Non-Disrupting Technology for Sales, Distribution, and Logistics

Reinhard Koether

Faculty of Engineering and Management, University of Applied Sciences Munich, Germany

Abstract: Experts forecast that 3D printing was a disruptive technology for conventional supply chains based on mass production, economies of scale, global transportation, and local inventories. However, 3D printing has many limitations in customers supply: Long operational times cause a high manufacturing cost. 3D printing is not precise enough for functional surfaces and many parts, and products have to be coated,

assembled, or post-processed before they can be sold to customers. Spare parts could be ideal applications, but they must have the same abilities as original parts, and spare part business is too important to give away design data for 3D printing. So, 3D printing is and will be limited to in small volume production with new design options like the bionic design or lightweight design and for customer-configured products.

PS06.39

September 02, 2019 | 15:30 – 16:45

Failure Mode and Effect Analysis (FMEA) of Vertical Axis Wind Turbines

Mohamad Alhijazi, Qasim Zeeshan, Hamed Ghasemian

Mechanical Engineering Department, Eastern Mediterranean University (EMU), Famagusta, Northern Cyprus, via Mersin 10, Turkey

Abstract: Failure Mode and Effect Analysis (FMEA) is a widely used risk assessment approach for identification, quantification, and mitigation of potential failures in systems, products, processes, designs, and projects. Previous research efforts have focused on FMEA of Horizontal Axis Wind Turbines (HAWT)s, but there is a lack of application of FMEA for the failure analysis of Vertical Axis Wind Turbines (VAWT)s. This paper aims at the enhancement of reliability of VAWTs by applying system FMEA augmented with Fuzzy Logic (FL), and Dempster-Shafer (D-S) theory. A total of 12 probable failure modes have been identified, quantified and prioritized. The application of Fuzzy-FMEA and DS-FMEA approach based on three experts' opinions accommodates the diversity of opinions and accounts for the uncertainty in decision making, due to any lack of knowledge and experience of the FMEA team.

PS06.40

September 02, 2019 | 15:30 – 16:45

Research Areas and Suggestions for Sustainable Manufacturing Systems

Emine Bozoklar¹, Ebru Yilmaz²

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² *Department of Industrial Engineering, Faculty of Engineering, Cukurova University, 01330, Balcali, Saricam, Adana, Turkey*

Abstract: Nowadays, sustainable manufacturing systems gain further awareness and importance because of considering economic, environmental, and social factors. This study presents a comprehensive evaluation to gain knowledge about sustainable manufacturing systems and related basic concepts such as circular economy, industrial symbiosis, eco-industrial parks, and life cycle assessment. Moreover, some suggestions for future research areas are presented to help to fill gaps in this field after many studies from the related literature are evaluated in detail.

PARALLEL SESSION 07 | PS07

PS07.07

September 03, 2019 | 11:00 – 12:15

Strategy Proposals for the Preference of SMEs as Workplace

Seckin Polat, Umran Eris Ucurum, Umut Asan

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: Small and medium-sized enterprises (SMEs) are important drivers of national economies, especially because of their employment-generating characteristics. In spite of this fact, SMEs are facing significant problems related to attracting and retaining a quality workforce, which is critical for organizational performance. This study aims to develop strategies that will attract high-quality employees in choosing SMEs as their workplace. For this purpose, the workplace preferences of employees are examined using conjoint analysis. A sample group was asked how attractive they find the alternative combinations of incentives (benefits) that will be provided by the government. According to the answers given, the impact of each alternative strategy proposed as state incentives were estimated. The results highlight the benefits the government should provide to employees to motivate them to work in SMEs.

PS07.34

September 03, 2019 | 11:00 – 12:15

Sexual Harassment in Higher Education: Students' Perceptions and Attitudes

[Ahmet Tarik Timur](#), [Alheri Bawa Magaji](#), [Juliet Ikhide](#), [Seldjan Timur](#)

Business Administration Department, Eastern Mediterranean University, North Cyprus

Abstract: The study examines university students' attitudes toward sexual harassment and their perceptions of sexual harassment behaviors in a culturally diverse university in North Cyprus. Data is collected from 460 university students. The findings suggest that university students' perceptions about what constitutes sexual harassment behavior were similar, regardless of their gender. However, women were more likely than men to perceive a wider range of verbal and non-verbal behaviors as sexual harassment. Furthermore, different perceptions of sexual harassment behavior were identified based on culture and age. When attitudes toward sexual harassment were compared, it was found that female students had lower tolerance levels and that age had an effect on attitudes toward sexual harassment.

PS07.52

September 03, 2019 | 11:00 – 12:15

Predicting the Medical Tourism Demand of Turkey

[Erkan Isikli](#), [Seyda SerdarAsan](#), [Saliha Karadayi-Usta](#)

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: There is an emerging need in understanding the trends and determinants of the medical tourism industry, which have a significant impact on the host country's economy. Turkey's popularity as an international tourism destination combined with the expertise of Turkish medical professionals and advanced technology available in the leading medical facilities make Turkey one of the most popular travel destinations for medical tourism. While the expanding literature on medical tourism offers conceptual and

theoretical knowledge on this topic, the number of empirical studies is somewhat limited. Forecast of medical tourism demand is a critical input into decisions related to investments in healthcare, tourism, and transportation infrastructure. This study models Turkey's medical tourism demand incorporating several factors. Due to the relatively high number of indicators and a small number of observations, Partial Least Squares Regression (PLSR) was employed to predict the response, and the results were compared with those of the Ordinary Least Squares (OLS) estimation. The empirical findings are expected to help policy makers and practitioners to deepen their understanding of medical tourism demand for Turkey.

PARALLEL SESSION 08 | PS08

PS08.05

September 03, 2019 | 11:00 – 12:15

Reconstruction of the Ranking of Sovereign Debts by Logical Analysis of Data

[Elnaz Gholipour](#), [Bela Vizvari](#)

Industrial Engineering Department, Eastern Mediterranean University, Famagusta, 99628, North Cyprus

Abstract: A sovereign credit rating is the credit rating of a country or sovereign entity, that gives investors insight into the level of risk associated with investing in a particular country, including its political risk. Importance of ranking information on investors' decisions, plays a crucial role to be explored the method of country ranking. We are going to explore the corresponded cases which are considered in country ranking, also, in which countries the rank is modified by political and other factors by application of Fitch rating. This study works on optimization field of Industrial engineering to explore and improve the financial model. The methodology of the research is the Logical Analysis of Data, which will be used creatively. Logical analysis of data, (LAD) is a methodology aimed at discovering hidden structural information in data sets. LAD was originally developed for analyzing binary data by using the theory of partially defined Boolean functions. The form of our final result is a decision tree or a sequence of decision trees such that everybody can determine the ranks of countries used by them without any mathematical knowledge. This study, not only, is being focused on discussing about the ranking of

sovereign debts to offer a model for Fitch rating system to give insights to investors, but also, ranking some main skipped countries by Fitch which has not published the ranking method that is important information for investors to improve the ranking system of that.

PS08.41

September 03, 2019 | 11:00 – 12:15

Existing and Non-existing Technologies of the Communication in the Post-disaster Period

Bela Vizvari

Industrial Engineering Department, Eastern Mediterranean University, Famagusta, 99628, North Cyprus

Abstract: There are several major densely populated cities all around the world which are threatened by natural disasters such as earthquakes, tsunamis, etc. The main concern of this paper is a metropolitan city which may be hit by a serious earthquake. A relief system may help a city to be prepared for disasters. The relief system serves several functions such as distributing relief items like water, medicine, blanket, etc. The relief system relies heavily on communications. Regular communication systems may not be available due to damages inflicted by a disaster. Enabling communication as soon as possible is a critical issue to make the relief system work properly. Several communication systems which are not used in the pre-disaster phase may be used in the post-disaster phase. Existing and new technologies in communication systems have been researched in this study.

PS08.58

September 03, 2019 | 11:00 – 12:15

Effects of the Awareness of University's CSR on Students' Word-of-Mouth Intentions

Oluwatobi A Ogunmokun, Seldjan Timur

Department of Business Administration, Eastern Mediterranean University, Famagusta, North Cyprus

Abstract: Under recent circumstances such as globalization, edu-tourism and the privatization of institutions of higher education, the resultant competition in the higher education industry has forced universities to adopt an approach that is more

business-oriented to compete in and overcome the challenges of the industry. One of the major challenges facing universities is student attraction and retention, as students face little or no barrier in transferring from one university to another. As a result, universities continue to seek effective ways to remain attractive to prospective students in addition to ensuring that their current students do not leave. While corporate social responsibility (CSR) is a means for firms to improve societal well-being, it likewise offers the opportunity to have a positive reputation and competitive advantage. Studies reporting the positive effect of CSR on stakeholders' behavior are gradually increasing; thus, universities can use CSR as a part of their competitive strategy and positively influence the behavior of their students. However, for this strategy to be effective, attention has to be given to the significant role played by students' understanding and awareness of the university's CSR activities.

This study investigates the association between students' awareness of their university's CSR initiatives and their intentions to recommend their university. This is particularly relevant primarily because studies that have explored the effect of CSR on stakeholders' behavior have hardly considered the higher education sector thus leaving a void in literature this study seeks to fill.

The primary data for this study are obtained from a structured questionnaire survey administered to students of Eastern Mediterranean University. Based on a conceptual model developed on the theory of planned behavior (TPB), this study investigates the causative relationships among awareness of CSR activities, perceived behavioral control, subjective norm, attitude and Word-of-Mouth intention using PROCESS macro.

Theoretically, the present study contributes to the existing body of knowledge in this field by recommending and empirically analyzing an extended TPB model to predict students' recommendation intentions as a result of being aware of their university's CSR activities. This study is also relevant to the managers of higher education institutions as the findings suggest they can leverage on their CSR activities to build a reputation and gain competitive advantage.

PARALLEL SESSION 09 | PS09

PS09.60

September 03, 2019 | 13:45 – 14:35

Profit Allocation in the Turkish Electricity Industry based on Cooperative Game Theory

Sinan Ertemel, Nurtac Karaca

Department of Economics, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: In this study, retail electricity supply to the high consuming customers is analyzed using cooperative game theory to find a way of sharing the extra profit generated via cooperation. Players have an only retail license, and sell only retail electricity directly to the end user, operates with low levels of a profit margin due to high cost and competition in the market. In the commodity product market, customers prefer the cheapest product. We suggest the cooperation of the players for the retail electricity market and combine their strength to reduce the cost. There are two parties for retail electricity sales to end user, power plants and retailers respectively. Power plants have a generation asset, and the retailers have sales and marketing know-how. If they operate separately, they get some amount of profit. When they cooperate and integrate the market vertically, they generate extra profitability. In this study, we investigate the analytical way of profit-sharing system and make a comparison among them. We pick Nash Bargaining, Kalai Smorodinsky Bargaining, and weighted Shapley among the several bargaining solutions.

PS09.67

September 03, 2019 | 13:45 – 14:35

Analysis of the Relationship between Strategic Management Application and Innovation Level

Cahit Ali Bayraktar, Murat Durucu

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: The purpose of this study is to question whether the level and dimensions of strategic management implementation affect the innovation level of the enterprise. Some situations created by

strategic management (such as abundance, institutionalism) provide a healthy development environment in terms of innovation. Environmental scanning has been shown to support service innovation positively and powerfully. In this study, the level of strategic management applications not only impact on the type of innovation but also impact on all types of innovation were investigated. For this purpose, data obtained from 88 managers from various sectors were analyzed and interpreted by using survey method. As a result, a positive relationship was found between the strategic management level and innovation. It was found that the most important strategic management application level indicator affecting all types of innovation is environmental scanning intensity, planning horizon, and strategic control. Other indicators of the level of strategic management implementation, the flexibility of the strategic plan, and the level of participation in the preparation of strategic plans and innovation level of the enterprise could not be determined.

PARALLEL SESSION 10 | PS10

PS10.37

September 03, 2019 | 13:45 – 15:00

Digital Twins for Industry 4.0: A Review

Zeki Murat Cinar¹, Abubakar Abdussalam Nuhu¹, Qasim Zeeshan¹, Orhan Korhan²

¹ *Mechanical Engineering Department, Eastern Mediterranean University, Famagusta, Northern Cyprus, via Mersin 10, Turkey*

² *Industrial Engineering Department, Eastern Mediterranean University, Famagusta, Northern Cyprus, via Mersin 10, Turkey*

Abstract: Digital twins (DT) are the key enablers for transformation to Industry 4.0 (I4.0), they are required and indispensable to the virtual design and optimization of smart manufacturing systems for I4.0. Recently many researchers have contributed to the development of Digital Twins for smart products processes and manufacturing systems. This paper presents a systematic literature review of recent developments in Digital Twins in I4.0 for Smart manufacturing, by examining the most researches related to DT, and classifying the existing publications according to the applications in various aspects of

manufacturing i.e. product design, process design, manufacturing process (such as machining, cutting), additive manufacturing, 3D printing, plant layout design, production planning, ergonomics, maintenance and product lifecycle. This paper classifies, identifies, and analyzes the research on Digital Twin application to smart manufacturing systems for I4.0.

PS10.38

September 03, 2019 | 13:45 – 15:00

Simulation of Factory 4.0: A Review

Zeki Murat Cinar¹, Qasim Zeeshan¹, Davut Solyali², Orhan Korhan³

¹ Mechanical Engineering Department, Eastern Mediterranean University, Famagusta, Northern Cyprus, via Mersin 10, Turkey

² Director, Electrical Vehicle Development Center (EV-DC), Eastern Mediterranean University, Famagusta, Northern Cyprus, via Mersin 10, Turkey

³ Industrial Engineering Department, Eastern Mediterranean University, Famagusta, Northern Cyprus, via Mersin 10, Turkey

Abstract: Computer-based models and simulations are critical to the design, development, and optimization of smart manufacturing systems required for Industry 4.0. Modeling and Simulation technologies are essential to address the challenges in the adoption of Industry 4.0 today, such as the creation of smart manufacturing systems. Recently many researchers have contributed to modeling and simulation of smart factories in Industry 4.0, also known as Factory 4.0. This paper presents a systematic literature review of recent developments in modeling, simulation, and optimization of Smart Factories. It indicates the most frequent contexts, problems, methods, tools, related to simulation and optimization of smart factories. This paper fills this gap by identifying and analyzing research on simulation of smart factories.

PS10.65

September 03, 2019 | 13:45 – 15:00

The Moderating Effect of Long-Term Orientation on the Relationship among Human Capital Research, Business Sophistication, and Knowledge & Technology Outputs

Basak Cetinguc¹, Eyup Calik¹, Fethi Calisir²

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² Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: National level innovation is one of the outstanding locomotive factors for both economic and business growth. Global Innovation Index (GII) is one of the most commonly used indices in this context. Furthermore, the innovation level of countries is affected by cultural dynamics. Hofstede's Cultural Dimensions (HCD) is one of the prominent guidelines on cultural dynamics. In this study, human capital & research (HCR), business sophistication (BS) and knowledge & technology outputs (KTO) are addressed to analyze the relationships among them. Moreover, long-term orientation (LTO) factor from HCD is considered as a moderator variable. This study aims at examining the relationships between HCR-BS and BS-KTO and exploring the moderating effect of LTO on these relationships. For this purpose, a conceptual model was proposed to explore these relationships. Structural Equation Modelling (SEM) was performed to conduct path analysis by employing 86 data from official web sites. The results show that hypotheses related to GI factors are supported, and a moderating effect of LTO is observed on the relationship between BS and KTO. These findings pointed out that short term-oriented countries are more successful in transforming knowledge into outputs. Furthermore, policymakers and innovation managers should consider time-oriented cultural values while planning to gain knowledge and technology outputs.

PARALLEL SESSION 11 | PS11

PS11.03

September 03, 2019 | 15:30 – 17:10

Transportation of Injured Persons to Hospitals in Case of a Large Scale Disaster

Tareq A. M. Babaqi, Bela Vizvari

Industrial Engineering, Eastern Mediterranean University, Famagusta, Cyprus

Abstract: Humanitarian logistics has many different branches. One of the most important ones is disaster management, which includes both preparedness and

response. One type of disaster which may occur on Cyprus with high probability is an earthquake. The locations of earthquakes are not completely random. Cyprus and other places, including metropolitan cities, face potential serious earthquakes in the future. Disaster response means early post-disaster activities. It includes the transportation of injured people to hospitals. This activity includes the control of the fleet of the emergency vehicles and the decisions (1) on the order of transportation, and (2) which person must be transported to which hospital. The objective of the research is to elaborate a fully algorithmic approach of the problem such that a Disaster Command Center can apply it. In the research, two main tasks are to be completed as follows:

- The elaboration of a method for the determination of the hospitals and the application of this method for a large existing city, and
- The elaboration of a method for the schedule of transportation such that the objective is to maximize the number of saved lives.

PS11.08

September 03, 2019 | 15:30 – 17:10

Exact Mathematical Models for the Open Field Layout Problem in Case of l_1 and l_2 Distances

Bela Vizvari¹, Gergely Kovacs²

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² *Educat University, Tatabánya, Hungary*

Abstract: In a large class of layout problem, rectangles are to be placed on the plane without overlap. The objective is to minimize the total transportation among the rectangles. The transportation quantity depends on the flow among the objects and their distances. A typical application is that the position of machines of a factory is modeled in this way. The total transportation of semi-finished products is to be minimized.

The rectangles must have vertical and horizontal edges and can be rotated by 90, 180, and 270 degrees. Each cell has a pick-up point, which is the middle point of a fixed edge. Transportation is carried out between the pick-up points. There are several types of layout problems. Open field layout does not have any further

restriction. To the best knowledge of the authors, no mathematical model is known in the case of open field layout using exact distances. In general, the distance of two pick-up points is approximated by their l_1 distance, although the vehicle may need to pass a longer distance. The main contributions of this paper are models with exact distances. It means that the distance of two points is exactly the length what the vehicle passes. If the distances are measured by Euclidean distance, then the distance of the points in the layout is their Euclidean distance if and only if there is no obstacle between the two points. If the distances are measured by l_1 distance then the distance of two points in the layout is their l_1 distance if and only if there is a sequence of adjacent vertical and horizontal intervals such that the vehicle may go from one point to the other one on these intervals such that both vertically and horizontally always goes into the same direction.

PS11.15

September 03, 2019 | 15:30 – 17:10

A Comparative Study of Multiple Objectives for Disaster Relief Logistics

Esra Agca Aktunc, Mahdi Samarah

Department of Industrial Engineering, Faculty of Engineering and Natural Sciences, Kadir Has University, Istanbul, Turkey

Abstract: Disaster relief logistics is a critical part of humanitarian emergency operations. In this study, we develop integer programming models with a focus on the pre-disaster location selection for depots in which relief items would be stored and the post-disaster distribution of relief items to demand locations. The goal is to determine the optimal depot locations and depot-demand node allocations by minimizing the total transportation cost of delivering relief items. We incorporate performance measures that represent the efficiency, efficacy, and equity of the decisions in our models in terms of total transportation cost, total waiting time, and percent of unmet demand, respectively. We consider the uncertainties that would affect the decisions made in terms of demand and transportation times in our case study by analyzing the results under various scenarios. We provide observations regarding the performance of different objectives under different scenarios for demand and transportation network conditions.

PS11.51

September 03, 2019 | 15:30 – 17:10

A Mathematical Model and an Artificial Bee Colony Algorithm for In-Plant Milk-Run Design

Sule Itir Satoglu¹, Kadir Buyukozkan²

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² Industrial Engineering Department, Faculty of Engineering, Karadeniz Technical University, Trabzon, Turkey

Abstract: As a result of the product diversification, many types of components are used in the products' bill-of-materials. Consequently, smaller quantities of many different types of components are needed to be distributed. All these factors complicated the part-feeding to the assembly lines. In this study, a mathematical model is developed for an in-plant milk-run material supply system that periodically distributes multiple parts by using multiple vehicles to the stations of the assembly lines. This model is called the Multi-Vehicle Milk-Run Model. As the proposed mathematical model is NP-hard, an Artificial Bee Colony Algorithm is developed to solve the large instances. The proposed ABC Algorithm is tested based on the optimum solutions (where available) and the best-known feasible solutions of different sized instances of a real washing machine assembly plant. Hence, the performance of the ABC Algorithm is validated.

PARALLEL SESSION 12 | PS12

PS12.55

September 03, 2019 | 15:30 – 17:10

Gamification of Upper Limb Tangible-Wearable Rehabilitation Devices

Dilek Olcay, Serap Ulusam Seckiner

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Abstract: The researchers have focused on device-aided rehabilitation systems for many years. Wearable, tangible devices, and virtual reality technologies have been used to rehabilitate impaired patients in rehabilitation centers since repetitive exercises induce neuroplasticity. Neuroplasticity is the capability of a

neural network system to new situations or environmental and behavioral changes. During this adaptation stage, the brain forms new neural connections that cut off old injured ones, and it reorganizes itself. This lifelong process continues throughout a person's life. The brain reshapes and rewires itself by synaptic pruning, deleting the neural connections that are no longer necessary and make the useful connections stronger. Some research studies have proved that intensive therapy sessions at hospital and rehabilitation centers improve the motor skills of patients. However, device-aided therapies applied in centers have expensive, time, and labor consuming issues. Additionally, some patients find repetitive exercises hard and boring. For this reason, home-based and gamified rehabilitation tools, devices, and robots have been becoming more attractive. Starting to use upper limb partially or completely is one of the most important issues makes the daily and business life of patients more comfortable. Games integrated to home-based, tangible-wearable rehabilitation devices designed for upper limb impairments, especially after stroke have been started to be used for motivating the patients to continue rehabilitation exercises. The design and manufacturing of wearable and tangible, game-based equipment is a subject of a multidisciplinary study and requires mainly engineering, medical, and education sciences. The purpose of this study is conducting a literature review to provide foundation knowledge on the topic and a picture about the research problem being studied clarifying what has been done until now and what is needed to be done.

PS12.57

September 03, 2019 | 15:30 – 17:10

Prioritization of Factors of Breast Cancer Treatment Using Fuzzy AHP

Hatice Camgoz-Akdag, Kemal Konyalioglu, Tugce Beldek

Management Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: Breast cancer is a widespread disease that can both be seen at males or females. According to so many different factors such as age, sex, genetics, the shape and size of the tumor, environmental situations,

and so on, that affects cancer type directly. With so many alternative cancer types and thus, treatment preference changes, it is vital to make the diagnosis as soon as possible to decide and start the treatment process. Diagnosis time is dependent on both technological equipment and also medical personnel. This study aims to support medical personnel, radiologists, doctors, surgeons, via proposing a multi-criteria decision model to find out which factor is more effective on the breast cancer type. Fuzzy Analytic Hierarchy process is used to prioritize factors of breast cancer treatment alternatives and results are compared to another study which already used Analytic Hierarchy Process but in certain conditions.

PS12.64

September 03, 2019 | 15:30 – 17:10

Mathematical Models of HIV: Methodologies and Applications

Emine Yaylali, Zikriye Melisa Erdogan

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: HIV is one of the significant public health threats globally, with approximately 36.9 million people living with HIV and 1.8 million people becoming newly infected in 2017 (WHO fact sheet). To prevent HIV, to decrease its impact and to eventually eliminate this infectious disease; clinical, medical, epidemiological, economic, and modeling studies have been conducted in the last 30 years. In this study, we explore the mathematical modeling studies where HIV has been examined to understand the dynamics and spread of the disease as well as to improve HIV prevention. We surveyed HIV modeling literature, summarized primary modeling methodologies, and briefly discussed relevant studies. For each study included in this paper, we presented their modeling method, interventions included, target populations, implementation process, key results, and insights. Two most widely used modeling methodologies for HIV are Bernoulli process models and dynamic compartmental models similar to other infectious diseases. These methodologies have been discussed in detail in this paper. Other modeling methodologies included Markov models, agent-based simulation models, and discrete-event simulation models. Many studies focused on risk populations such as heterosexual (HET),

men who have sex with men (MSM), people who inject drugs (PWID) and jail inmates. We included the cost-effectiveness studies where HIV prevention and treatment interventions and strategies are compared concerning their costs and benefits. In this survey, we provided a summary of existing modeling literature as well as suggestions for future studies. We concluded that application of modeling tools for HIV presents excellent opportunities for both decision-makers and public health policymakers while predicting the future of this disease, establishing the most cost-effective prevention strategies and evaluating possibilities for the elimination of HIV.

PS12.69

September 03, 2019 | 15:30 – 17:10

Modelling Hepatitis C Infections among People who Inject Drugs in Turkey: Is HCV Elimination Possible?

Emine Yaylali, Busra Ozdemir, Neslihan Lacin, Sumeyye Ceyil

Industrial Engineering Department, Management Faculty, Istanbul Technical University, Istanbul, Turkey

Abstract: Hepatitis C (HCV) is one of the major infectious diseases in the world. Injection drug users (PWID) is a population who is at higher risk of acquisition of HCV due to risky behaviors such as needle sharing, and they are considered as an important factor in the spread of the disease. World Health Organization (WHO) aims to eliminate hepatitis C disease by 2030 with the help of approval and dissemination of newly developed direct-acting antiviral treatment regimes. In this study, we evaluated the cost-effectiveness of hepatitis C treatment among injected drug users in Turkey to observe whether it is possible to reach WHO targets. Purpose of our model is to determine the infected population in the future, and we simulated the injected drug user population with a time horizon of 20 years. We developed five scenarios to represent different levels of treatment coverage. We included treatment regimens that are available in Turkey and that are reimbursed by the government health care insurance policies, which roughly covers over 90% of the Turkish population. Our model objective is (i) to predict the spread of HCV in the next 20 years, (ii) to determine the cost of new treatment regimens

available to Turkish PWID population and (iii) to estimate the cost-effectiveness of these regimes. Our results indicate that HCV infected PWIDs could significantly decrease with treatment while the lowest total cost of treatment could be achieved with Viekirax Exviera and Mavyret. Also, it is possible to reach WHO targets by 2030 in Turkey if the treatment coverage increases.

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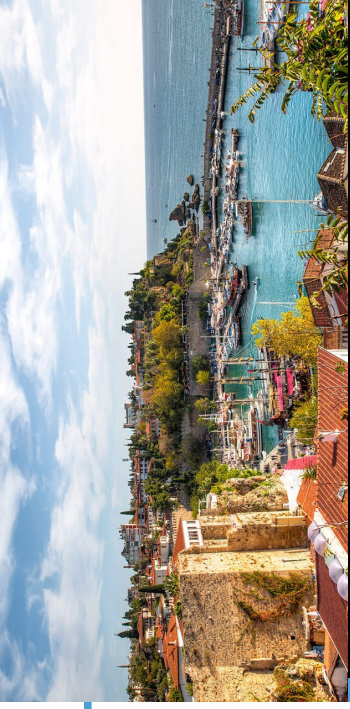
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Author / Participant	€ 330	€ 380
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Important Dates

Submission (Full-paper / Abstract) Due for Review	February 28, 2020
Notification of Full Paper Acceptance (with any requested changes)	April 17, 2020
Final Version (Full-paper / Abstract) Submission Due (with changes)	May 15, 2020
Early Registration Deadline	May 15, 2020
Registration Deadline	May 29, 2020



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Publication

- » All submissions will be subjected to a double-blind peer review and carefully evaluated based on originality, significance and clarity of exposition.
- » Based on the reviewers' comments, accepted and presented full-papers may appear in the Lecture Notes in Management and Industrial Engineering by Springer (*Pending approval*).
- » The abstracts of all accepted submissions will appear in the abstract book of the conference which will be available online at the conference website.
- » All submissions must be in English. However, oral presentations may be given in English or Turkish (*no simultaneous translation will be available*).



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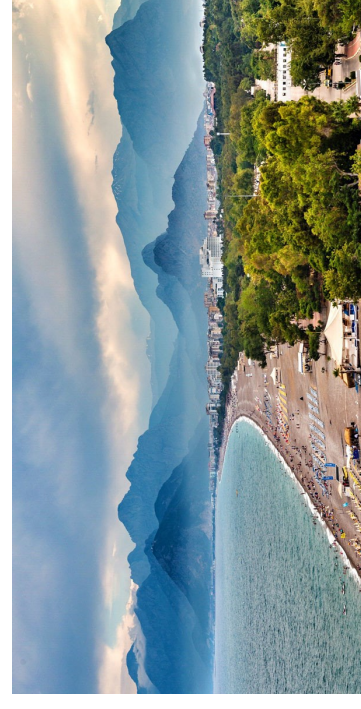
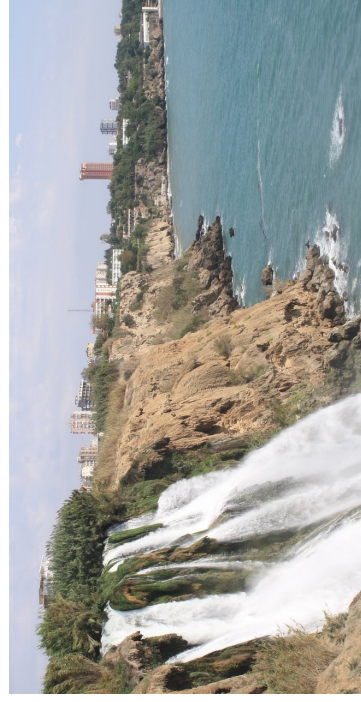
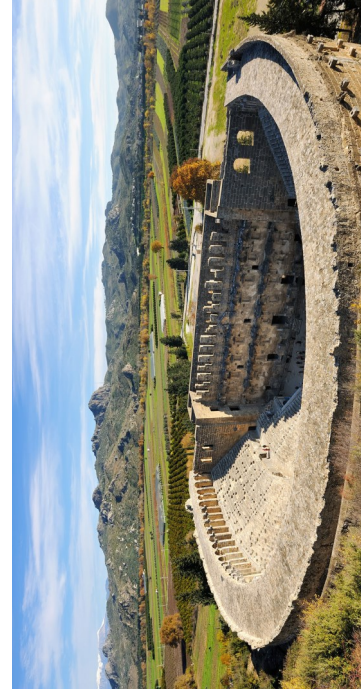
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INDUSTRIAL ENGINEERING IN THE WORLD OF IOT

The Internet of Things (IoT) is a paradigm where objects can be equipped with identifying, sensing, networking and processing capabilities that will let them connect, communicate, and exchange data with one another and with other devices and services over the Internet. IoT has been developed vastly due to developments of a wide variety of technologies, such as wireless communications, sensors, and computing. There are a lot of applications of IoT, which range from simple home and personal appliances to large-scale systems. IoT is one of the critical technologies that will have an enormous impact on all organizations. For example, IoT may play an enabling role in the design of systems and products by making them more effective, better connected, and more intelligent and transparent. This challenges the way we educate industrial engineers and the way we manage organizations. But IoT research is still in its early stages, and related studies are not well integrated. The Global Joint Conference on Industrial Engineering and Its Application Areas (GJCIE) 2020 will shed light on the role of industrial engineering in this endeavor.

The GJCIE 2020 is composed of three co-located conferences: the 5th Global Conference on Industrial Engineering (GCIE), the 6th Global Conference on Healthcare Systems Engineering and Management (GCHSEM), and the 7th Global Conference on Engineering and Technology Management (GCTM). The GJCIE 2019 will be an internationally renowned forum for researchers, practitioners, and educators to present and discuss the most recent innovations, trends, experiences, and challenges in the field of industrial engineering. It will bring together experts from academia and industry to exchange the latest research results and trends, and their practical applications in the aforementioned areas of industrial engineering. This will be accomplished through the following three modes of communication: keynote presentations, parallel sessions, and poster sessions.

Antalya, also known as the Turkish Riviera, where the pine-clad Toros (Taurus) Mountains sweep down to the sparkling clear sea, is the tourism capital of Turkey. The region, bathed in sunshine for 300 days of the year, is a paradise for sunbathing, swimming and water sports, yachting, trekking, mountaineering, and golf. If you

come to Antalya in March or April, you can even ski at Saklıkent in the mornings and swim in the warm waters of the Mediterranean in the afternoons. The over 600 km long coast features about 1,000 classified hotels with a capacity of 500,000 beds. The people are friendly, and the food is delicious. There are excellent shopping opportunities, rich culture, and a fascinating history. All are waiting to be explored. Owing to these prominent features of the place, participants will enjoy their stay besides benefiting from the conference.

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- » Concurrent Engineering
- » Data Mining and Analytics
- » Decision Analysis and Methods
- » e-Health and m-Health
- » Energy Management
- » Engineering and Technology Management Education and Training
- » Engineering and Technology Management
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