ABSTRACTS

Provide an Econometric Model to Plan the Profits of Automaker Companies through Customer Satisfaction Management, After Sales Services (Case Study: Logan Pars Khodro)

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Companys' profits is planned through customers' satisfaction management and four main stages: 1. Recognizing the constitutive components of customer satisfaction and measuring them, 2. Integrating the components and measuring overall customer satisfaction, 3. Reviewing how the impact overall customer satisfaction on the level of performance and company activity, and 4. Identifying variables and the main parameters capable of maneuver on customers' satisfaction, and the company's profits planning. This paper has mainly focused on the third stages. The econometric approach is employed to study the case of Logan from Pars Khodro. It should be noted that in modeling the subject, in addition to customer satisfaction, three other variables, i.e. household income, Logan price, and the price of the rival automobile (Peugeot 206) have been considered. Results showed that the variables of customer satisfaction, household income and the price of Peugeot 206 have a direct relationship with sales and thus the company profit, while the Logan's price has an inverse relationship with the company's profit. The variable of customer satisfaction by after-sales services has the most effect on its profitability. This means that an increase by 1 unit in customer satisfaction, increases the sale by 26.5 units. So Pars Khodro can increase its profits by investment and paying more attention to these factors. The study has been carried out by using EViews and Spss.

Keywords: After-Sales Services, Customer Satisfaction, Econometrics, Logan, Profitability.

Presenting a Comprehensive Mathematical Programming Model for an Integrated Production–Distribution Planning in a Closed-Loop Supply Chain

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Planning for production, distribution, collection, and recovery of used products plays an important role in reducing environmental burdens of different industries. To this aim, many researchers have developed efficient mathematical models for planning forward and reverse supply chains. Most of the presented models have covered strategic planning in forward and reverse supply chains in this area, and have rarely addressed the mid- and short-run programming. In this paper, a comprehensive integrated mathematical programming model is developed for production and distribution planning in a closed-loop supply chain. In the proposed model, the customers are categorized into three groups including new product customers, recovered product customers, and raw material customers. Due to the economy of scale principal, hybrid production/recovery centers and hybrid distribution/redistribution centers are considered rather than separate facilities. The acquired results show the ability of the proposed model to production and distribution programming in a closed-loop supply chain.

Keywords: Closed-Loop Supply Chain, Forward and Reverse Logistics, Mathematical Programming Model, Mid-run Programming, Production and Distribution Programming.

A Mathematical Model for Project Portfolio Selection with Project Interdependency, Project Divisibility, Reinvestment and Resourcing in Different Ways

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Project portfolio management consists of repetitive cycles of project assess, selection, and execution. Project portfolio selection is the main part of project portfolio management, where the organization identifies and prioritizes projects that are mostly aligned with stated strategic goals, when considering real-world restrictions

and considerations that are related to scheduling and resource allocation. In this paper, a new comprehensive model for the project portfolio selection over a planning horizon with multiple periods by maximizing profit is developed, in which simultaneous selection, scheduling, and resource allocation of projects are addressed. The model incorporates project interdependency and strategies of project divisibility, reinvestment, external investment and resourcing in different ways at the same time in choosing the best execution schedule for the projects in real-life applications. In addition, resource and budget constraints, cardinality restriction, precedence relationship and scheduling, setup, and resource costs are included in the model. Numerical examples under eight scenarios are presented to highlight the characteristics of the proposed model.

Keywords: Project Divisibility, Project Interdependency, Project Portfolio Selection, Reinvestment, Resourcing in Different Ways.

Integrating Pre- and Post-Disaster Operations Considering the Restoration of Disrupted Routes and Warehouses

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The increasing trend in happening natural disasters mandates developing appropriate contingency plans to deal with them. In this paper, a goal programming based model is developed for an integrated pre- and post-disaster operations management, while considering the restoration of disrupted routed and warehouses. The model accounts for epistemic uncertainty in input data through a hybrid two-stage scenario-based possibilistic-stochastic programming model. In addition, to validate the proposed model and its practicality, an illustrative example is presented, and its numerical results are assessed.

Keywords: Goal Programming, Humanitarian Logistics, Multi-Objective Programming, Relief Chain, Two-Stage Possibilistic-Stochastic Programming.

A Hybrid Approach to Risk Prioritization Based on Failure Analysis and Fuzzy Cognitive Map: A Case Study of the Automotive Parts Industry

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The increase of competition, the extension of customer expectations and their frequent demand, and rapid technological changes have caused the rapid development of today's manufacturer's obligations. So that any deficiencies and deviations in the performance of the products lead to loss of manufacturer's market share. In order to solve the problems and improve the quality of products, failures should be identified. In this study, potential failures are identified by implementing failure modes and effects analysis, by using the cross functional team in the car spare parts industry. Then, to achieve results according to the facts and to remove problem in risk priority number computation, and the identified interrelationships between failures are taken into consideration. Because the occurrence and control of any failure can affect other failures. In other words, the prioritization of failures based on the fuzzy cognitive map is done with regard to the three criteria including severity, occurrence and detection as well as interrelation between failures. A case study on auto parts manufacturing industry is used to show the abilities of integrating "failure modes and effects analysis-fuzzy cognitive map" for prioritizing failures.

Keywords: Automotive Parts, Failure Modes and Effects Analysis, Fuzzy Cognitive Map, Risk Prioritization.

Customization of the Renault-Nissan Production System by Using a Combination of NGT, DANP and VIKOR (Case study: An Iranian Automaker)

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A necessary condition for achieving organizational success is using a new customized production system and fitting the new customized production system tools with old processes of the organization. This paper provides a model for customizing Renault production system (SPR) to an Iranian automaker company. After defining the framework of customization alternatives by using Nominal Group Technique, the key criteria which are necessary to evaluate and prioritize alternatives, have been established. The relationship map of alternatives and criteria were established by using DEMATEL techniques and MATLAB. Finally, weights of the criteria and alternatives were calculated by using ANP method. Results show that the alternatives representing minimal changes in SPR and mild changes in the organization's current processes are selected.

Keywords: Customization, DANP, Production System, SPR, VIKOR.

A Model Based on Neural Network and Data Envelopment Analysis to Optimize Multi-Response Taguchi under Uncertainty

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"Taguchi" is a conventional method for quality control in offline mode. It is used to design and select the best level of parameters for designing a better method to make high quality products. Taguchi method is one-response that is a disadvantage. In the real world, there are several problems with some indicators of quality. Therefore, Taguchi method is not appropriate for optimizing multi-response problems, and we need an engineering and optimizing method to establish the best combination of parameters. On the other hand, due to some uncontrollable factors or the impossibility of empirical conditions, only some of experiments are implemented and a large number of them are incomplete. In this paper, to simulate the remaining experiments the Back-Propagation neural network is used. To overcome one-response problem in Taguchi method, the data envelopment analysis (DEA) is used. Since the results obtained from the neural network are uncertain, DEA model with interval grey data is used. To implement this approach and to identify effective factors, the wear characteristics of composite material PBT, the combined approach based on Taguchi method, neural network and DEA are used.

Keywords: DEA, Design of Experiments, Grey Numbers, Neural Network, Taguchi Method.

An Assess of Operational Project Performance by Integrating Earned Value Management and Learning Curve Theory

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This study adopts an integrated performance measurement and prediction model based on a combination of earned value management approach and the learning curve theory under risk condition. The research has two main parts: the first part concerns the project performance measurement and the second part focuses on forecasting performance indicators in terms of time and cost of the project subject to the errors and risks. The contributions of the present study are threefold. First, this study extends to the traditional performance measurement model, which focuses only on forecasting time at completion, by extending the performance measurement domain to analyse both time and cost. Secondly, the learning curve models are explicitly used as a basis to assess the nonlinear effect of learning on the performance. Novel risk performance metrics are proposed and adopted for knowledge-based projects. Thirdly, compared with classic deterministic and static performance measurement models, the proposed performance analysis employs the Kalman-Filter approach to predict the final time and cost performance accurately by taking into account the probabilistic risk factors and the errors in the performance forecasting procedures. The validity of the integrated

performance measurement model is justified based on a case study. The computational results demonstrate that the developed performance measurement framework affords more accurate forecasts for the future performance than the traditional deterministic earned value methodology. The integrated performance measurement model developed in this study affords probabilistic prediction bounds and generates less errors than those achieved in classic EVM.

Keywords: Cost Forecasting, Earned Value Management, Learning Curve Theory, Project Performance Measurement.

Scenario-Based Model for Multi-Product Multi-Level Supply Chain Management with Stochastic Demand and Waiting Time

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In this paper, a model is presented for managing multi-product multi-level supply chain by using predictive control of scenario-based model, which can handle supply chain with stochastic programming of the uncertainty that is caused by demand and random waiting time. In addition, it guarantees a certain level of customer service in the form of horizon at 95% level of confidence. Probabilistic waiting time may lead to lash effect throughout the entire chain, and causes shortages at different levels. Therefore, cost of facing shortages is considered in the model. After modeling, the problem is solved in probabilistic state, and to solve larger problems imperialist competitive algorithm is used. Results indicate that SCMPC is computationally very efficient, and offers significant advantage over the robust and stochastic optimization.

Keywords: Multi Period, Multiproduct, Predictive Control, Scenario-Based Optimization, Stochastic Programming.

Locating Service Centers to Maximize the Competitive Share in a Closed Supply Chain

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Competitive location deals with the problem of locating facilities to provide services to the customers, where other competing facilities offer the same services. Many competitive location models are presented in the literature. However, the literature on competitive location considering reverse logistic in closed-loop supply chain is rather scarce. Also, there are two main approaches in the related literature: increasing profit, and increasing market share of the service centers. Most of the studies in the literature consider one of these issues as the objective function. This study shows that these objectives may have conflict with each other. Therefore, addressing these issues simultaneously is important for a successful design of supply chain. This paper addresses a novel biobjective competitive facility location problem in a closed-loop supply chain, so that increasing profit and market share are considered simultaneously. On the other hand, in the real world, the customer may choose facilities that are not necessarily close to them, because of the greater attractiveness of other facilities. Hence, in this study, a new relationship is introduced to establish the attractiveness of each potential center for customers based on the distance and quality of service centers. In order to solve the proposed model and tackle the computational complexity of the proposed model, two approaches are employed: LP-metric and NSGAII. Furthermore, multiple numerical instances are established and solved by employing the exact approach of LP-metric through GAMS. Results are assessed in order to validate the accuracy of the proposed model. The best value of "P" in LP-metric approach is obtained via analyzing the results. Furthermore, the performance of the NSGAII is analyzed by comparing to the exact solution of LP-metric through GAMS. Results indicate that the proposed NSGAII is more appropriate than LP-metric, and thus, solving the large size problems through GAMS in a logical time is impossible.

Keywords: Closed-Loop Supply Chain, Competitive Location, NSGA II, LP-Metric, Reverse Logistic.

Forecasting the Electricity Price Emphasizing Prices Jumps by Using Combination of Neural and Fuzzy Network with Particle Swarm Optimization Algorithm

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After deregulation in electricity markets, lots of studies were conducted especially in designing new systems and energy pricing in order to improve efficiency of power systems and increase investors' profit. Investment's profit could be increased by better contracts and better price bidding for buying and selling energy in electricity market, as a consequence price forecasting is essential. The main objective of this paper is to predict the price of electricity in Iran's electricity market by using a combination of fuzzy-neural network and particle swarm optimization (PSO). In this paper, past prices, past loads, working and nonworking days, day hours and effect of seasons in 2015 have been taken into account as the effective factors in forecasting mechanism. The combined model is more precise than other methods like ARIMA, neural network, neural-fuzzy network, and a combination of fuzzy-neural and genetic algorithm. In the following, the process of price fluctuations has been discussed for increasing effectiveness of bidding. Results of simulation revealed that price forecasting is much more precise with price process mechanism.

Keywords: Forecasting Price of Electricity, Neural and Fuzzy Network, Particle Swarm Optimization.

Robust Optimization of Resource-constrained Multi-Project Scheduling Problem with Uncertain Activities Duration

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Multi-project scheduling problem is one of the most important problems in the project scheduling applications, which has attracted considerable attention in the past decades. Due to the importance of resources in the multi-project scheduling problem, the resource sharing policy is used in this research. In addition, in each project, the activities durations are subject to the considerable uncertainty. Due to the rapid changing of the environment and also the uniqueness of the projects, one cannot estimate the probability distribution for the activity uncertain durations with certainty. In addition, the problem in multi-project scale needs a more conservative approach when facing with uncertainty. Therefore, the robust optimization approach is employed in this paper. So that the maximum total weighted tardiness of the projects should become minimum. The robust resource-constrained multi-project scheduling problem (RRCMPSP) is investigated in this paper as a two-stage model. A scenario relaxation algorithm is applied resulting optimal solutions for the RRCMPSP, which is tested on the examples produced by the RanGen. So, in this paper, an overall optimal structure containing all of the projects for the multi-project problem is obtained in a way that the maximum differences between the finish time of projects and their due date would become minimum.

Keywords: Activity Duration Scenario, Minimization of Maximum Regret, Multi-project Scheduling Problem, Resource Constraint, Robust Optimization.