ISAHP 2018

HONG KONG, HK

Library of Congress Publication Data

Proceedings of the International Symposium on the Analytic Hierarchy Process: the 15th ISAHP conference. Publication date: July 2018

Printed Schedule and Abstracts
ISBN 978-1-888603-59-0

Online Proceedings: ISSN 1556-8296

CONTACTS

Rozann Whitaker Saaty

Creative Decisions Foundation
4922 Ellsworth Avenue
Pittsburgh, PA 15213
Phone: 412-621-6546

E-mail: rozann@creativedecisions.net

TABLE OF CONTENTS

Thomas Saaty (1926 -2017)

Thomas Saaty in 1959 - Age 33 in London while working at the US Embassy for the Office of Naval Research

THOMAS SAATY IN MEMORIAM

Tom Saaty was born in Mosul, Iraq, on July 18, 1926. His parents were descendants from Assyrian Christians from northern Iraq. His father, David Saaty, lived in Rhode Island for many years, but returned to his home town of Mosul in the early 1900s. David was a well-known entrepreneur whose ambition was to modernize Iraq; he opened the country's first ice-making factory in 1923. David married Tom's mother, Dola, in 1925. Tom was their first child. They had three other children—John, Ben, and Grace.

Tom went to Brummana High School in Lebanon, a Quaker school, when he was 15, and after graduation attended the American University of Beirut for two years. When he was 19 he went to the U.S. to attend Columbia Union College in Takoma Park, Maryland. He then attended the Catholic University of America, receiving a M.S. degree in Physics. He received a Ph.D. in Mathematics from Yale University in 1953 under Professor Einer Hille, and he did postgraduate work for a year at La Sorbonne, Paris, under the direction of Henri Cartan.

After graduating from Yale, and, despite efforts by Einer Hille who wanted Tom to stay at Yale to do research, he joined Melpar, Inc. (1953-54)) as a scientific analyst studying submarine defense. In 1954, he joined the Operations Evaluation Group (OEG) in Washington D.C. OEG was formed in 1945 from the World War II Operations Research Group that evolved from the Antisubmarine Warfare Operations Research Group organized by Philip Morse in 1942. At OEG, Tom worked on classified submarine detection problems and the mathematics of radar reconnaissance, a topic of interest due to U.S. aircraft flights (RB48 and U-2) over the Soviet Union. In 1958, he was appointed scientific liaison officer to the U.S. Embassy in London. In 1959, he was named Director of Advanced Planning in the Office of Naval Research (ONR), a post he held until 1961 when he was appointed as Scientific Analyst in the Arms Control and Disarmament Agency (ACDA), Department of State, where he stayed

from 1963 till 1969. In 1969, Tom left ACDA and started his academic career as a professor at the University of Pennsylvania, and in 1979, moved to the University of Pittsburgh where he held a Distinguished University Professor Chair, with appointments to the Philosophy of Science department; the department of Operations, Decision Sciences and Artificial Intelligence at the Joseph M. Katz Graduate School of Business; the School of Engineering; the department of Mathematics; and the department of Sociology.

Tom has made many contributions in a variety of fields from queueing theory to mathematical models of arms control, but he is best known for his Analytic Hierarchy/Network Process theory.

Creativity in just about all fields, especially mathematics, has been a continuing area of Tom's research. His book *Creative Thinking, Problem Solving and Decision Making* ties together his main pursuits and interests in this area.

Tom was elected a fellow of the American Association for the Advancement of Science (AAAS) in 1959 and, in 1970, to the Real Academia de Ciencias Exactas, Fisicas y Naturales (Royal Academy of Mathematical, Physical and Natural Sciences) of Spain. In 1998, he was elected member of the International Academy of Management. In 2000, he received the Gold Medal of The International Society on Multiple Criteria Decision Making. In 2005, he was elected a member of the National Academy of Engineering. In 2007, he was awarded the International Quality Function Deployment Akao Prize from Japan, and in 2008, he was awarded INFORMS Impact Prize for the development of the Analytic Hierarchy Process theory.

Tom loved music and humor. He possessed CDs and records of all of Beethoven's works and, at one point in his life, could identify any Beethoven's piece. In a different vein, when he was younger, it was clear to him he was not good at telling jokes. As a way of his studying how to be a raconteur of jokes, he had, over the years, compiled hundreds of jokes into many booklets under a wide variety of pseudonyms. He shared and recounted this collection with colleagues and friends, and with his classes.

On a personal note. I worked with Tom for over 40 years but I consider him more a father than a coworker, for I knew him longer and spent more time with him than my own father. I met Tom in the Fall of 1975 when I came to study under him from Spain. From the beginning, I was considered part of his family. After 40 years spent with him I cannot find words to express the sadness I feel, but I am happy to think that perhaps now he has found the answers he was looking for to the innumerable questions he had about physics, mathematics, science and life in general.

By Luis Vargas first published in MCDM News, September 2, 2017

MESSAGE FROM THE PRESIDENT OF CREATIVE DECISIONS FOUNDATION

It is a pleasure to welcome you to this ISAHP2018 meeting in Hong Kong. My husband, Thomas Saaty, the creator of the AHP/ANP, passed away in 2017 at the age of 91 and this is the first ISAHP we will have without him and his driving spirit behind the meeting. The meeting this year is a memorial for him and I thank all his many friends and former students for gathering to celebrate his long and productive life. He left an amazing legacy of work, and besides being an outstanding scholar, as many of you have experienced, he was an extraordinarily kind person.

The first ISAHP was held in Tianjin, China, in 1988, and its title "The International Symposium on the AHP" was given to it by Shubo Xu of Tianjin University, its first chairman, who conceived the idea of having international meetings about AHP. There has been a long run of 15 International Meetings which we are proud to say were always very international in character, attracting scholars from more than 30 countries.

The legacy of AHP is far reaching beyond Tom's work. He always said that he felt like he was just the messenger for the concepts behind AHP and ANP, passing it through to the world to make it a better place. Each of you is working to carry on that legacy with your use and application of AHP in numerous disciplines, universities, companies, government agencies, and more. We hope to continue these types of events focused on the AHP and ANP so that the very important dialogue, learnings, and collegial relationships will continue to blossom and continue to move forward this very important theory and body of work.

Thanks to all of you, Tom's longtime colleagues and friends from around the world, for coming to this conference.

Rozann Saaty
President
Creative Decisions Foundation
Pittsburgh, Pennsylvania USA

MESSAGE FROM THE PROGRAM CHAIR

Welcome to ISAHP 2018 in Hong Kong. I was the chairman of ISAHP 1991 that took place in Pittsburgh, PA, USA. Twenty-seven years ago our largest expenditure was printing the papers in the symposium. It is befitting that this symposium emphasis is on technology, entrepreneurship and corporate social responsibility. We now focus more on people and how they communicate than in the media used to transmit the message.

AHP/ANP has now extended to many parts of the world as the keynote speakers can testify. Two years ago we met in Europe, specifically in London. However, we could not forget Asia, and in particular China where the first symposium took place, with the late Professor Shubo Xu as its chairman, under the auspices of Tianjin University. Since then we met in many countries. A list of the fourteen previous symposiums can be found in https://en.wikipedia.org/wiki/International_Symposium_on_the_Analytic_Hierarchy_Process.

Finally, let us not forget the location of the symposium, Hong Kong. An exciting city, always evolving, full of life and creativity. It is the world's seventh largest trading entity. It has one of the highest per capita income, the seventh highest life expectancy and the most skyscrapers, in the world, surrounding Victoria Harbor. Over 90 percent of its inhabitants use the well-developed public transportation system.

I wish all of you success in your presentations, interactions and networking with other AHP/ANP researchers. Four journals have offered to prepare guest editor issues helping to spread the word about the symposium. Enjoy!

Luis Vargas
ISAHP 2018 Chairman

MESSAGE FROM THE EXECUTIVE ORGANIZING COMMITTEE

Welcome to ISAHP 2018!

It is a pleasure to welcome all members of our AHP/ANP community worldwide. It has been a while since this symposium took place in Asia. Hong Kong was chosen as the host city due to its convenient location for Asian participants while still being easily accessible to travellers from the rest of the world. Unfortunately, this meeting is marked by the absence of Dr. Thomas Saaty, the creator of AHP/ANP methodology and founder -along with his wife Rozann- of the Creative Decisions Foundation, which organizes this symposium. Tom, as we most of us knew him, passed away on August 2017. For this reason, we dedicate this symposium to his memory and there will be several presentations and talks for this purpose. Let's not forget his lifelong mission and now legacy of making people's decisions more rational and effective.

Enrique Mu, PhD
President
Executive Committee, ISAHP

PROGRAM COMMITTEE

Thomas L. Saaty (1926-2017)
University of Pittsburgh
Honorary Founding Chairman
Luis Vargas
University of Pittsburgh
Co-Chair
Jennifer Shang
University of Pittsburgh
Co-Chair

EXECUTIVE COMMITTEE

Enrique Mu
Carlow University - University of Pittsburgh
President of the ISAHP Executive Council, and Editor-in-Chief of the International Journal of The Analytic Hierarchy Process (IJAHP)
Rozann Saaty
President
Creative Decisions Foundation
Elena Rokou
Chief Research Officer
Creative Decisions Foundation
Milagros Pereyra
President, Maestro Meetings
Executive Director, Latin American Studies Association (LASA)

ISAHP2018 INTERNATIONAL SCIENTIFIC ADVISORY COMMITTEE

Ririn Astanti
Indonesia
Majid Azizi
Faculty of Natural Resources, Karaj
Iran
Pablo Aragonés Beltrán
University of Valencia
Spain
Asma Bahurmoz
King Abdul Aziz University
Saudi Arabia
Ozden Bayazit
Central Washington University
United States
Nina Bejicevic
University of Zagreb
Croatia
Shashi Bhattarai
Knowledge Holding International
Nepal
Mario Castillo
Universidad de los Andes
Colombia
Orrin Cooper
University of Memphis
United States
Fabio De Felice
University of Cassino and Southern Lazio
Italy
Bolajoko Nkemdinim Dixon-Ogbechi
University of Lagos, Akoka -Yaba
Nigeria
James G. Dolan
University of Rochester
United States
Qingxing Dong
Central China Normal University
China
Miroslaw Dytczak
AGH Academy of Science and Technology, Poland
Emilio Esposito
University of Naples "Federico II"
Italy
Peter Fiala
University of Economics
Czech Republic
Giuseppe Fico
Universidad Politecnica Madrid
Spain
Anna Florek-Paszkowska
Jagiellonian University
Poland
Mónica García Melón
Universitat Politècnica de València Spain
Claudio Garuti
Fulcrum Ingeniería, Santiago
Chile
Grzegorz Ginda
University of Science and Technology
Poland
Didit Herawan
Indonesia
Alessio Ishizaka
University of Portsmouth
United Kingdom
Rafikul Islam
International Islamic University
Malaysia
Josef Jablonsky
University of Economics
Czech Republic
Blrsen Karpak
Youngstown State University
United States
Eizo Kinoshita
Meijo University
Japan
Konstantinos Kirytopoulos
University of Aegean
Greece
Saroj Koul
India
Stan Lipovetsky
GFK Custom Research North America

United States
Oliver Meixner
University of Natural Resources and Applied Life Sciences, Vienna
Austria
Ludmil Mikhailov
University of Manchester
United Kingdom
Karel Mls
University of Hradec Kralove
Czech Republic
Enrique Mu
Carlow University
United States
Anna Ostrega
Akademia Gorniczo-Hutni
Poland
Mujgan Sagir Ozdemir
Eskisehir Osmangazi University
Turkey
Elio Padoano
University of Trieste
Italy
Leandro Pecchia
University of Warwick
United Kingdom
Antonella Petrillo
University of Naples
Italy
Rocío Poveda-Bautista
Spain
Elena Rokou
Creative Decisions Foundation
United States
Valerio Salomon
UNESP-Universidade Estadual Paulista,
Brazil
Yuji Sato
Chukyo University
Japan
Jennifer Shang
University of Pittsburgh
United States
Hsu-Shih Shih
Tamkang University
Taiwan
Patrizia Simeoni
Università degli Studi di Udine
Italy
Isabel Spencer
Fulcrum Ingeniería, Santiago
Chile
Ilker Topçu
Istanbul Technical University
Turkey
Luis Vargas
University of Pittsburgh
United States
Sibs Von Solms
South Africa
Xiaojun Wang
University of Briston
United Kingdom
Min-Suk Yoon
Chonnam National University
Korea
Keyu Zhu (Andy)
China

TRACK CHAIRS

TRACK #1: MULTI-CRITERIA DECISION ANALYSIS METHODOLOGY AND THEORY

Elena Rokou
Creative Decisions Foundation, United States
erokou@creativedecisions.net

TRACK #2 - GOVERNMENT POLICY AND DECISION MAKING

Mónica García Melón
Universitat Politècnica de València, Spain
mgarciam@dpi.upv.es

TRACK #3 – HEALTHCARE DECISION MAKING

Antonella Petrillo
University of Naples "Parthenope", Italy
a.petrillo@unicas.it
Magda Gabriela Sava
Clemson University, United States
mgabrielasava@gmail.com

TRACK #4 - APPLICATIONS IN CIVIL ENGINEERING AND URBAN MANAGEMENT

Yuji Sato
Chukyo University, Japan
ysato@mecl.chukyo-u.ac.jp
Grzegorz Ginda
University of Science and Technology, Poland
gg.ginda@gmail.com

TRACK #5 - INDUSTRIAL AND MANUFACTURING ENGINEERING

Mujgan Sagir Ozdemir
Eskisehir Osmangazi University, Turkey
mujgan.sagir@gmail.com

Fabio De Felice
University of Cassino and Southern Lazio, Italy
defelice@unicas.it
Valerio Salomon
UNESP-Universidade Estadual Paulista, Brazil
salomon@feg.unesp.br

TRACK #6 – BUSINESS AND INNOVATION SYSTEM

Alessio Ishizaka
University of Portsmouth, United Kingdom
alessio.ishizaka@port.ac.uk
Josef Jablonsky
University of Economics Prague, Czech Republic
jablon@vse.cz

TRACK #7 – TECHNOLOGY

Jose Maria Moreno Jimenez
Universidad Zaragoza
Moreno@unizar.es
Claudio Garuti
FULCRUM Engineering Ltd, Chile
claudiogaruti@fulcrum.cl

TRACK #8 – ENTREPRENEURSHIP

Enrique Mu
Carlow University, Pittsburgh, United States
emu@carlow.edu
Rafikul Islam
International Islamic University Malaysia, Malaysia
rislam@iium.edu.my

TRACK #9 – CORPORATE SOCIAL RESPONSIBILITY

Orrin Cooper
University of Memphis, United States
olcooper@memphis.edu

ISAHP2018 SUMMARY SCHEDULE

THURSDAY JULY 12			
Time	**Room**	**Title**	**Presenter**
09:00 to 5:00pm	Outside Pool House	**Registration**	
09:00 to 12:00pm	The Pool House	SuperDecisions Seminar	Dr Elena Rokou, Creative Decisions Foundation, USA
10:00 to 10:30 am	The Pool House	**Coffee Break**	
12:00 to 1:00 pm	The Pool House	Lunch	
1:00 to 2:00 pm	The Pool House	How to conduct a negotiation using AHP	Dr Luis Vargas, University of Pittsburgh, USA
2:00 to 3:00 pm	The Pool House	How to improve your chance of getting your AHP/ANP paper published	Dr Enrique Mu, Carlow University, USA
3:00 to 3:30 pm	The Pool House	**Coffee Break**	
3:30 to 4:30 pm	The Pool House	The Art of Structuring AHP and ANP models	Rozann Saaty, Creative Decisions Foundation, USA
5:30 - 7:30	Waterfall bar	Welcome drink only reception	

FRIDAY JULY 13			
9:00 am to 3:00 pm	Ballroom area	**Registration**	
9:00 to 10:00 am	Grand Ballroom	Opening Ceremony	Welcome – Dr Luis Vargas, Chairman Memorial Address - John Saaty, CEO Decision Lens
10:00 to 10:30 am	Foyer in between the Grand Rooms	**Coffee Break**	
10:30 to 11:30 am	Grand Ballroom	Keynote Speaker	Dr Yong Shi, Key Lab of Big Data Mining and Knowledge Management, Chinese Academy of Sciences, Beijing, CN
11:30 to 1:00 pm	Grand Room I, II, III, IV	Break Out Sessions	
1:00 to 2:30 pm	Foyer in between the Grand Rooms	**Lunch & Poster Session 1**	
2:30 to 3:30 pm	Grand Ballroom	Keynote Session	Dr Shashi Bhattarai, Chairman, Knowledge Holding International Pvt. Ltd. Nepal , NP
3:30 to 4:00 pm	Foyer	**Coffee Break**	
4:00 to 5:00 pm	Grand Room I, II, III, IV	Break Out Sessions	
6:30 - 9:30 pm	The Pool House and Waterfall Bar	**Gala & Award Reception**	

SATURDAY JULY 14			
Time	**Room**	**Title**	**Presenter**
9:00 am - 3:00pm	Ballroom area	**Registration**	
9:00 to 10:00 am	Grand Ballroom	Keynote Speaker	Dr Gang Hao, Assistant Dean, Associate Professor, City University of Hong Kong, HK
10:00 to 10:30 am	Foyer in between the Grand Rooms	**Coffee Break**	
10:30 to 12:00 am	Grand Room I, II, III, IV	Break Out Sessions	
12:00 to 1:00 pm	Grand Ballroom	Publishing Your Work: Panel of Journal Editors	
1:00 to 2:30 pm	Foyer	**Lunch & Poster Session 2**	
2:30 to 3:30 pm	Grand Ballroom	Keynote Speaker	Dr Iwan Azis, Professor of Regional Science & Economics Cornell University, USA & University of Indonesia, ID
3:30 to 4:00 pm	Foyer in between the Grand Rooms	**Coffee Break**	
4:00 to 5:00 pm	Grand Room I, II, III, IV	Break Out Sessions	

SUNDAY JULY 15			
9:00 to 10:00 am	Grand Ballroom	Plennary Session	Dr Kirti Peniwati, Decision Making Facilitator, Jakarta, Indonesia
10:00 to 10:30 am	Foyer	**Coffee Break**	
10:30 to 12:00 am	Grand Room I, II, III, IV	Break Out Sessions	
12:00 to 1:00 pm	Grand Room I, II, III, IV	Break Out Sessions	
1:00 to 2:30 pm	Foyer in between the Grand Rooms	**Lunch & Poster Session 2**	

BREAK OUT SESSIONS SUMMARY SCHEDULE

FRIDAY JULY 13 - BREAK OUT SESSIONS		
FRIDAY 11:30 am to 1:00 pm		
Grand Room I	**1.1 Multi-criteria Decision Analysis Methodology and Theory**	
WEIGHT ADJUSTMENT USING MACHINE LEARNING APPLIED TO THE ANALYTICAL HIERARCHY PROCESS		Caelum Kamps, DRDC; Rahim Jassemi-Zargani, DRDC Ottawa, Canada
SIGMOID SUPPLEMENTED DECISION STRUCTURES FOR EVIDENCE SENSITIVITY LEARNING		Caelum Kamps, DRDC; Rahim Jassemi-Zargani, DRDC Ottawa, Canada
THE RELIABILITY OF DATA IN PAIRWISE COMPARISON MATRICES		Jacek Szybowski, AGH University of Science and Technology
ON PROPERTIES OF PARETO OPTIMAL WEIGHTS FROM PAIRWISE COMPARISON MATRICES BASED ON GRAPH THEORY		Kouichi Taji, Nagoya University; Takafumi Mizuno, Meijo University
Grand Room II	**2.1 Government Policy and Decision Making**	

A FRAMEWORK OF PROJECT EVALUATION BASED ON OUTCOME IN LOCAL GOVERNMENT	Yoichi Iida, Suwa University of Science
APPLICATION EXPERIENCE OF AHP FOR ANTARCTIC ISSUES	Oleksandr Kuzko, National Antarctic Scientific Center of Ukraine; Mykola Leonov, National Antarctic Scientific Center of Ukraine
ANALYSIS OF RELATION BETWEEN HUMAN DEVELOPMENT AND COMPETITIVENESS USING ANP AND DEA	Hakan Kılınç, Koc University; Ozgur Kabak, Istanbul Technical University, Turkey
MEASURING PERFORMANCE OF UNIVERSITIES IN FRAGILE COUNTRIES USING ANALYTIC HIERARCHY PROCESS	Rafikul Islam, International Islamic University Malaysia; Shafie Sharif Mohamed, International Islamic University Malaysia
Grand Room III	**6.1 Business and Innovation Systems**
ESTIMATING THE IMPORTANCE OF CONSUMER PURCHASING CRITERIA IN DIGITAL ECOSYSTEMS	Jose Ignacio Pelaez, University of Malaga; Francisco E. Cabrera, University of Malaga; Luis G Vargas, University of Pittsburgh, U.S.
RISK PERCEPTION OF UNCERTAINTIES IN SUPPLY CHAIN	Yuji Sato, Graduate School of Management, Chukyo University, Japan

A MULTICRITERIA FRAMEWORK FOR EVALUATING FOOD SUPPLIERS: AN AHP-DEMATEL-TOPSIS MODEL TO MANAGE BULLWHIP EFFECT	Antonella Petrillo, University of Naples "Parthenope", Italy; Fabio De Felice, University of Cassino and Southern Lazio, Italy; Miguel Angel Ortiz Barrios, Universidad de la Costa, Colombia; Carlos Miranda-De la Hoz, Department of Industrial and Agroindustrial Management and Operations, Universidad de la Costa CUC
Grand Room IV	**5.1 Industrial and Manufacturing Engineering**
INFRASTRUCTURES DEVELOPMENT: APPLICATION OF ANALYTIC HIERARCHY PROCESS TO CONTRACTORS' SELECTION	Emmanuel Olateju Oyatoye, University of Lagos, Nigeria; Adedotun A. Odulana, University of Lagos
USE OF ANALYTIC HIERARCHY PROCESS (AHP) TO IDENTIFY DECISION FACTORS IN THE DEPLOYMENT OF PUBLIC AND PRIVATE PORT TERMINALS IN THE NORTHERN BRAZIL	Felipe George Gomes Pereira, University of Sao Paulo; Rui Carlos Botter, University of Sao Paulo; Léo Tadeu Robles, Federal University of Maranhao
UNIQUE: THE SURVEY OF THE REMARKABLE BREADTH OF DR. THOMAS L. SAATY'S WORKS	Mujgan Sagir Ozdemir, ESOGU, Turkey
SPACE MISSION DEFFINITION BASED ON ANALYTICAL HIERARCHY PROCESS (AHP) METHOD	Hassan Naseh, Faculty Member; Mehran Mirshams, Faculty Member

FRIDAY 1:00 pm to 2:30 pm		
Foyer	**10.1 Poster Presentations 1**	
SPATIAL MODELING FOR SITE SELECTION OF LANDFILLS TO REDUCE DESTRUCTIVE ENVIRONMENTAL AND SOCIAL CONSEQUENCES		Qadir Ashournejad, Ph.D Student of RS & GIS Uni. of Tehran, Faculty of Geography, Dep. of RS & GIS; Sara Rahimi, Graduate M.S. of Regional Development Planning from Allameh Tabatabaei university, Tehran, Iran.; Seyed Javad Hosseini, Graduate M.S. of Geomorphology from University of Tehran, Tehran, Iran.
BAYESIAN IDENTIFICATION OF HOMOGENEOUS SUBGROUPS OF ACTORS IN A LOCAL AHP-MULTICRITERIA DECISION MAKING CONTEXT		José María Moreno-Jiménez, University of Zaragoza; Alfredo Altuzarra, Facultad De Economia Y Empresa Universidad De Zaragoza (Spain); Pilar Gargallo, Universidad de Zaragoza; Manuel Salvador, Universidad de Zaragoza
STATION LOCATION SUITABILITY ANALYSIS USING AHP AND GIS FOR ADDIS ABABA LIGHT RAIL		ABERA Gomeju Taye, Kotebe Metropolitan University
FRIDAY 4:00 pm to 5:00 pm		
Grand Room I	**1.2 Multi-criteria Decision Analysis Methodology and Theory**	

A FUZZY MULTI-CRITERIA METHODOLOGY FOR THE SELECTION OF WELLS FOR STIMULATION	Fanhui Zeng, SWPU in CHINA; Fan Peng, SWPU in CHINA; Jianchun Guo, SWPU IN CHINA; Jianhua Xiang, Engineering Technology Research Institute
BUSINESS INCUBATOR AS AN EXTENSION OF EDUCATIONAL SUPPLY CHAIN: A STUDY OF KEY SUCCESS FACTORS	Haidar Abbas, Al Buraimi University College; Zaheer Ahmed Khan, Mazoon College, Muscat
PRIORITIZING LARGE DATASET OF SOFTWARE REQUIREMENTS WITH ANP USING SUPERDECISION	Naila Jan, Research Assistant - National Univerisity of computer and emerging sciences
FUZZY ANALYTIC HIERARCHY PROCESS AND TOPSIS FOR BUSINESS SITE SELECTION	Jeremy Yap, Multimedia University Cyberjaya; Chiung Ching Ho, Multimedia University Cyberjaya; Choo-Yee Ting, Multimedia University Cyberjaya
Grand Room II	**9.1 Corporate Social Responsibility**
STRATEGIES TO DEVELOP INDICATORS OF PUBLIC ENGAGEMENT FOR RESPONSIBLE RESEARCH AND INNOVATION STRATEGIES IN SPAIN	Monica Garcia-Melon, Universitat Politecnica de Valencia, Spain; Irene Monsonís-Paya, Universitat Politecnica de Valencia; Félix Lozano-Aguilar, Universitat Politecnica de Valencia
INDICATORS FOR FOSTERING ENVIRONMENTAL SUSTAINABILITY IN THE CONTEXT OF RESPONSIBLE RESEARCH AND INNOVATION	Tomas Gomez-Navarro, Universitat Politècnica de València; Iván Ligardo-Herrera, Universitat Politècnica de València; Wilson Jácome-Enríquez, Universidad de las Fuerzas Armadas - ESPE

MEASURING CSR PERFORMANCE A COMPREHENSIVE AHP BASED INDEX	Asma M Bahurmoz, Bahurmoz Consult, Saudi Arabia
Grand Room III	**3.1 Healthcare Decision Making**
MEDICAL EQUIPMENT SUPPLIER EVALUATION APPROACH BASED ON ANP, FUZZY TOPSIS AND SUPER DECISION	Xi Chen, Xidian University; Yuan Luo, Xidian University
AN HYBRID MODEL FOR EVALUATING THE OVERALL PERFORMANCE OF GYNECOBSTETRICS DEPARTMENT: AN APPROACH BASED ON FAHP, DEMATEL AND TOPSIS	Miguel Angel Ortiz Barrios, Universidad de la Costa, Colombia; Edward Gutiérrez-Severiche, Universidad de la Costa CUC; Dayana Patricia Cómbita-Niño, Universidad de la Costa CUC; Zulmeira Herrera Fontalvo, Department of Industrial Engineering, Universidad de la Costa CUC; Antonella Petrillo, University of Naples "Parthenope", Italy; Fabio De Felice, University of Cassino and Southern Lazio, Italy
ETHICAL DECISION MAKING IN ACTION: EVALUATING HOSPITAL CARE ATTENDANCE APPROACHES	Julie E. Forbes, Carlow University - UPMC Presbyterian-Shadyside; Abigail M. Hebb, Carlow University - UPMC Presbyterian-Shadyside; Enrique Mu, Carlow University - College of Leadership and Social Change
Grand Room IV	**4.1 Applications in Civil Engineering and Urban Management**

SMART CITY PRINCIPLE-BASED ENERGY SOLUTION EVALUATION FRAMEWORK	Grzegorz Ginda, AGH University of Science and Technology, Poland; Dominika Dawiec, AGH University of Science and Technology
A QUANTITATIVE APPROACH FOR SUSTAINABLE URBAN WATER MANAGEMENT SUPPORT	Grzegorz Ginda, AGH University of Science and Technology, Poland; Dominika Dawiec, AGH University of Science and Technology
DECISION MAKING FOR THE VALUATION OF ITAIPU'S ENERGY IN THE BRAZILIAN MARKET: AN APPROACH BASED ON AHP	Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.; Arturo Ramón González Osorio, Universidad Nacional de Asunción - Facultad Politécnica.; Richard Ríos, Facultad Politécnica, Universidad Nacional de Asunción; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Victorio Oxilia, Facultad Politécnica, UNA

SATURDAY JULY 14 - BREAK OUT SESSIONS		
SATURDAY 10:00 am to 12:00 pm		
Grand Room I	**1.3 Multi-criteria Decision Analysis Methodology and Theory**	
ESTIMATION OF PRIORITY WEIGHTS BASED ON A RE-SAMPLING TECHNIQUE AND A RANKING MRTHOD IN ANALYTIC HIERARCHY PROCESS		Indrani Basak, Penn State Altoona
COHERENCY: AN INNOVATION TO TEST DATA QUALITY AND REDUCE COMPARISONS IN THE ANP		Orrin Cooper, University of Memphis,U.S.; Idil Yavuz, Dokuz Eylul University
JUDGMENT SCALES OF THE ANALYTICAL HIERARCHY PROCESS – THE BALANCED SCALE		Klaus D Goepel, BPMSG
COGNITIVE AHP-MULTIACTOR DECISION MAKING		Luis G Vargas, University of Pittsburgh, U.S.; José María Moreno-Jiménez, University of Zaragoza
Grand Room II	**2.2 Government Policy and Decision Making**	

DEVELOPING A POLICY FOR POST DISASTER RECONSTRUCTION PRIORITIZATION: A LESSON LEARNT FROM NEPAL'S EARTHQUAKE 2015	Madhav Prasad Pandey, Kathmandu University, Dhulikhel, Kavre, Nepal; Prabal Sapkota, Kathmandu University, Dhulikhel, Kavre, Nepal
INTEGRATED MULTI-CRITERIA PLANNING MODEL OF THE USE OF HYDROELECTRICITY SURPLUS OF PARAGUAY BASED ON ANALYTIC NETWORK PROCESS (ANP)	Raúl Emilio Amarilla, Polytechnic Faculty, National University of Asuncion; Arturo Ramón González Osorio, Universidad Nacional de Asunción - Facultad Politécnica.; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Cecilia Llamosas, Facultad Politécnica, Universidad Nacional de Asunción; Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.
APPLICATION OF AHP FRAMEWORK TO RANK RURAL ELECTRIFICATION BARRIERS OF NEPAL	Madhusudhan Adhikari, Institute of Engineering, Pulchwok; Bharat Raj Pahari, Institute of Engineering, Central Campus, Pulchowk.; Rajendra Shrestha, Institute of Engineering, Central Campus, Pulchowk.

Grand Room III	**4.2 Applications in Civil Engineering and Urban Management**

USING THE AHP TO ESTABLISH INCLUSIVE HOUSING DEVELOPMENT PRIORITIES FOR INDUSTRY		Ali Lakhani, Griffith University; Heidi Zeeman, Griffith University; Rafikul Islam, International Islamic University Malaysia; David Watling, Griffith University; Courtney J. Wright, Griffith University; Dianne Smith, Curtin University
AN ANP MODEL TO IMPROVE PEDESTRIAN ACCESSIBILITY IN THE CITY CENTER OF CARTAGENA DE INDIAS (COLOMBIA)		Monica Garcia-Melon, Universitat Politecnica de Valencia, Spain; Hannia Karime González-Urango, Universitat Politecnica de Valencia; Michela Le Pira, University of Catania; Giuseppe Inturri, University of Catania
THE BENEFITS AND COSTS OF REGULATING PROPERTY MANAGEMENT SERVICES PROVIDERS THROUGH LEGISLATION		Yat Wong, The Hong Kong Polytechnic University
DESIGNING A FLEET OF COMMERCIAL VEHICLES FOR SMART SHARING: DECISION SUPPORT FOR LOGISTICS COMPANIES		Yat Wong, The Hong Kong Polytechnic University
Grand Room IV	**5.2 Industrial and Manufacturing Engineering**	
SELECTION OF PROJECT MANAGEMENT TOOL: AN EX-POST FACTO CASE STUDY		Valerio Salomon, Sao Paulo State University, Brazil; Daniele Mizuno, Sao Paulo State University

CONCURRENT MANUFACTURING PROCESS SELECTION FOR NATURAL FIBRE THERMOPLASTIC COMPOSITES	Mastura Mohammad Taha, Universiti Teknikal Malaysia Melaka; Sapuan Mohd Salit, universiti putra malaysia; Muhd Ridzuan Mansor, Universiti Teknikal Malaysia Melaka
IDENTIFYING DRIVERS OF SUSTAINABLE MANUFACTURING AT FIRM LEVEL USING A FUZZY-BOCR-AHP FRAMEWORK	Lanndon Ocampo, Cebu Technological University; Jessa Marie Vallecera, University of San Carlos; Donna Mae Nunez, University of San Carlos; Karyn Jean Galagar, University of San Carlos
PROGRAM ACCREDITATION: A NETWORK MODEL FOR CRITERIA DEPENDENCIES AND PRIORITIZATION	Mujgan Sagir Ozdemir, ESOGU, Turkey
SATURDAY 1:00 pm to 2:30 pm	
Foyer	**10.2 Poster Presentations 2**
HYBRID SWOT-ANP MODEL FOR POLICY PRIORITIES OF REGIONAL ECONOMIC DEVELOPMENT IN MALUKU PROVINCE	Bayu Kharisma, Faculty of Business and Economics Universitas Padjadjaran
QUALITATIVE AND QUANTITATIVE CRITERIA EVALUATION USING FUZZY AHP: APPLICATION TO THE PROBLEM OF SHIP BUNKERING	Danijela Tuljak-Suban, UNIVERSITY OF LJUBLJANA; Valter Suban, UNIVERSITY OF LJUBLJANA, Faculty of Maritime Studies and Transport

USING ANALYTICAL HIERARCHY PROCESS IN ARCGIS TO PREDICT LANDSLIDE HAZARD OF THUMBA BASIN, TAPLEJUNG.	Shilpa Koirala, Sanima Hydro; Sakunda Ojha, Sanima Hydro
STATISTICAL ANALYSIS OF APPLICATION OF AHP IN POSTGRADUATE THESIS OF TSINGHUA UNIVERSITY	Ming Yu, Department of Industrial Engineering, Tsinghua University; Erjiang E, Department of Industrial Engineering, Tsinghua University
SATURDAY 4:00 pm to 5:00 pm	
Grand Room I	**1.4 Multi-criteria Decision Analysis Methodology and Theory**
IMPLEMENTATION OF AN ONLINE SOFTWARE TOOL FOR THE ANALYTIC HIERARCHY PROCESS (AHP-OS)	Klaus D Goepel, BPMSG
IMPROVING ANALYTIC NETWORK PROCESS REPORTING	Enrique Mu, Carlow University - College of Leadership and Social Change; Orrin Cooper, University of Memphis,U.S.; Michael Peasley, Middle Tennessee State University
A GROUP CONSENSUS MODEL WITH AHP	Qingxing Dong, Central China Normal University; Qi Sheng, Central China Normal University; Keyu Zhu, Hefei University of Technology, China; Gaohui Cao, Central China Normal University
Grand Room II	**7.1 Technology**

MULTI-CRITERIA DECISION MAKING FOR SUSTAINABILITY OF RENEWABLE ENERGY SYSTEM OF NEPAL	Ram Prasad Dhital, Alternative Energy Promotion Centre
OBJECT ORIENTED MAINTAINABILITY AND TESTABILITY MEASUREMENT USING ANALYTIC HIERARCHY PROCESS	Petrus Mursanto, Universitas Indonesia, Indonesia
SYSTEM-OF-SYSTEMS SITUATIONAL AWARENESS EFFECTIVENESS USING AHP	Rahim Jassemi-Zargani, DRDC Ottawa, Canada; Fredrick Lichacz, Dr; Nathan Kashyap, Mr
Grand Room III	**8.1 Entrepreneurship**
ENHANCING THE WORK-LIFE BALANCE THROUGH AHP MODELLING OF EARLY CAREER DECISION-MAKING	Remigiusz Gawlik, Cracow University of Economics
THE PRIORITIZATION OF INTANGIBLE CAPITAL FOR SERVICE INNOVATION IN PHILIPPINE MICRO, SMALL, AND MEDIUM SIZED ENTERPRISES	John Mari Yupangco De Ocampo, Thesis on AHP; Dean Andre Dionisio, Thesis Presenter on AHP; Janine Simone Bocalan King, Thesis on AHP; Ricardo Antonio Villanueva, Thesis Presenter on AHP
DECISION MAKING WITHIN THE TOURISM INDUSTRY WITH AHP: DETERMINING KEY INFLUENTIAL	Marvin Antonio Ruano, PhD Student

FACTORS AFFECTING FOREIGN VISITORS' DECISION TO REVISIT BELIZE, CENTRAL AMERICA	
Grand Room IV	**6.2 Business and Innovation Systems**
DETERMINING STRATEGY FOR ADOPTION OF PREFABRICATED HOUSING BY DEVELOPERS IN LAGOS STATE: AN AHP APPROACH	Bolajoko Nkemdinim Dixon-Ogbechi, Department of Business Administration, University of Lagos, Nigeria; Anthony Kayode Adebayo, Department of Architecture, University of Lagos; Cephas Adeoye Adelore, Department of Architecture, University of Lagos
NIGERIAN CONSUMERS' ONLINE RETAILING EVALUATION AND BEHAVIOURAL INTENTIONS DECISION USING ANALYTIC HIERARCHY PROCESS (AHP)	Adebola Glorious Adekoya, University of Lagos, Nigeria; Emmanuel Olateju Oyatoye, University of Lagos, Nigeria
ANALYTIC NETWORK PROCESS FOR ESTIMATING THE DETERMINANTS OF KNOWLEDGE SHARING AMONG ACADEMICS IN NIGERIA	Olamilekan Gbenga Oyenuga, University of Lagos; Sulaimon Olanrewaju Adebiyi, Department of Business Administration, University of Lagos. Nigeria

SUNDAY JULY 15 - BREAK OUT SESSIONS		
SUNDAY 10:30 am to 12:00 pm		
Grand Room I	**1.5 Multi-criteria Decision Analysis Methodology and Theory**	
MEASURING EFFECTIVENESS IN A HIERARCHICAL SYSTEM		Bijaya Krushna Mangaraj, XLRI-Xavier School of Management, Jamshedpur-831001, INDIA
COMPARISION CHAIN METHOD FOR AHP		Junwen Feng, Nanjing university of Science and technology
CARDINAL AND ORDINAL INCONSISTENCY IN PAIRWISE COMPARISONS MATRIX		Konrad Kulakowski, AGH University Of Science and Technology
AN ANP-BASED SIMULATION OF VULNERABILITY OF TWO-WAY COUPLED SOCIO-ECOLOGICAL SYSTEMS		Luis Antonio Bojórquez-Tapia, LANCIS UNAM, Mexico; Hallie Eakin, School of Sustainability, Arizona State University; Marco A Janssen, School of Sustainability, Arizona State University; Andrés Baeza, School of Sustainability, Arizona State University
Grand Room II	**2.3 Government Policy and Decision Making**	
PROJECT EVALUATION IN LOCAL GOVERNMENTS TO REALIZE WOMEN ACTIVE PROMOTION SOCIETY IN JAPAN		Ryo Koizumi, suwa university of science; Yoichi Iida, Suwa University of Science

VARIABLE-SCALE CLUSTERING FOR DECISION MAKING	Xuedong Gao, Donglinks School of Economics and Management, University of Science and Technology Beijing; Ai Wang, Donlinks School of Economics and Management, University of Science and Technology Beijing
MULTICRITERIA ANALYSIS CONSIDERING UNCERTAINTY FOR THE SELECTION OF THE ELECTRIC POWER SUPPLY SYSTEM - POZO HONDO, PARAGUAYAN CHACO	Carlos Romero, Facultad Politécnica, Universidad Nacional de Asunción; Luis Morinigo, Facultad Politécnica, Universidad Nacional de Asunción; Richard Ríos, Facultad Politécnica, Universidad Nacional de Asunción; Arturo Ramón González Osorio, Universidad Nacional de Asunción - Facultad Politécnica.; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Eduardo Ortigoza, Facultad Politécnica, Universidad Nacional de Asunción; Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.
OPPORTUNITY COST ANALISYS OF THE SALE OF PARAGUAYAN ENERGY FROM ITAIPU TO THE BRAZILIAN MARKET BASED ON A AHP MODEL	Arturo Ramón González Osorio, Universidad Nacional de Asunción - Facultad Politécnica.; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Richard Ríos, Facultad Politécnica, Universidad Nacional de Asunción; Cecilia Llamosas, Facultad Politécnica, Universidad Nacional de Asunción; Victorio Oxilia, Facultad Politécnica, UNA; Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.

Grand Room III	3.2 Healthcare Decision Making
EVALUATION OF HEALTH-CARE WASTE TREATMENT TECHNOLOGIES BASED ON ANALYTIC NETWORK PROCESS	Xi Chen, Xidian University; Yaya Sun, Xidian University
ASSESSMENT OF HEALTH-RELATED QUALITY OF LIFE (HRQL) IN LOW-BACK PAIN PATIENTS BEFORE AND AFTER VAX-D DISC DECOMPRESSION TREATMENT. ANALYSIS USING THE COMPUTER- ASSISTED ANALYTIC HIERARCHY PROCESS (AHP)	Ivan Naumov, Cyberspace Solutions, Inc; Albert Mancini, Fisioterapia Center; Kenneth Vinton, Pain Relief & Wellness Strategies Center; James Kittelberger, Physical Therapy Center; Thomas L. Saaty, University of Pittsburgh, U.S.
Grand Room IV	**6.4 Business and Innovation Systems**
OPEN INNOVATION: AN ASSESSMENT OF CRITICAL SUCCESS FACTORS USING ANALYTIC HIERARCHY PROCESS	Christian Tabi Amponsah, Yorkville University
APPLICATION OF ANALYTIC HIERARCHY PROCESS FOR FACULTY SELECTION AT NEPALESE UNIVERSITIES	Prabal Sapkota, Kathmandu University, Dhulikhel, Kavre, Nepal; Madhav Prasad Pandey, Kathmandu University, Dhulikhel, Kavre, Nepal

UNDERSTANDING ORGANIZATIONAL CREATIVITY: INFLUENTIAL FACTORS FROM A MAINLAND CHINESE PERSPECTIVE	Ying Li, sichuan university; lei zhang, Beijing Jiaotong University; Hong Yan, the Hong Kong Polytechnic University; John Thomas Delaney, The American University
THE COMPARATIVE ANALYSIS ON PRIORITIES OF E-LEARNING FACTORS BETWEEN CHINA AND KOREA	Xuting Li, chonnam national university; Jiaxin Wang, Chonnam National University; Min-Suk Yoon, Chonnam National University, Republic of Korea
SUNDAY 12:00 pm to 1:00 pm	
Grand Room II	**7.2 Technology**
OPTIMIZATION OF QOS IN IP/MPLS/DIFFSERV NETWORKS	KHELLADI Abdelkader, USTHB, Algiers, ALGERIA; LOURIACHI Zineb, USTHB, Algiers, ALGERIA
ADDRESSING THE PROBLEM OF OUTDATED AND IRRELEVANT KNOWLEDGE IN IT-RELATED EDUCATION PROCESS	Mikhail Nikolaev, National Research University Higher School of Economics; Andrey Kulikov, National Research University Higher School of Economics; Konstantin Degtyarev, National Research University Higher School of Economics
A MULTI-CRITERIA MODEL FOR SELECTING THE MOST SUITABLE CLASSIFIER FOR SUPPORTING	Miguel Angel Ortiz Barrios, Universidad de la Costa, Colombia; Antanas Verikas, Halmstad University; Chris Nugent, Ulster University; Mark Donnelly, Ulster University; Leo Galway, Ulster

ASSISTIVE TECHNOLOGY ADOPTION IN PEOPLE WITH DEMENTIA		University; Macarena Espinilla, University of Jaen; Ian Cleland, Ulster University
Grand Room IV	**6.3 Business and Innovation Systems**	
ANALYSIS OF ROLE OF DESIGN IN FURNITURE PRODUCTION AND MARKET BY APPLYING ANP		Majid Azizi, University of Tehran; Gholamreza Mehdikhanloo, University of Tehran
AHP FOR COMPREHENSIVE APPROACH OF QFD		Catherine Y. P. Chan, Hong Kong Quality Function Deployment Association; Glenn Mazur, QFD Institute, International Council for QFD, University of Michigan; Kim Stansfield, Warwick University WMG
AHP STRATEGIC ANALYSIS FOR HEADQUARTERS RE-LOCATION		Enrique Mu, Carlow University - College of Leadership and Social Change; Milagros Pereyra, University of Pittsburgh, U.S.

PROGRAM SCHEDULE WITH ABSTRACTS

THURSDAY JULY 12

REGISTRATION

9:00 am to 5:00 pm
Room: Outside Pool House

SUPERDECISIONS SEMINAR

Workshop
9:00 am to 12:00 pm
Room: The Pool House

The SuperDecisions software can be used to create both hierarchical (AHP) and network (ANP) models as well as complex multi-level models of both types. In this workshop we will show the current version of SuperDecisions software (v3.0) and concentrate on:

- showing how to use the Ratings Model to rate alternatives one-by-one on standards for the criteria instead of pairwise comparing them, thus shortening the judgment process a good deal.
- discuss when it is appropriate to use comparisons and when to use ratings.
- show how to structure and work with multilevel BOCR (benefits, opportunities, costs and risks) models.
- show how to do optimization using AHP/ANP and Excel.

Presenter: Elena Rokou, Creative Decisions Foundation, U.S.

COFFEE BREAK

10:00 am to 10:30 am
Room: The Pool House

LUNCH

12:00 pm to 1:00 pm

Room: The Pool House

How to conduct a negotiation using AHP

Workshop

1:00 pm to 2:00 pm

Room: The Pool House

In this workshop we show how to conduct a negotiation using the Analytic Hierarchy Process. This approach is an extension of the "Getting to Yes" approach where parties do see each other as adversaries, but as teams, looking for a fair and equitable solution to the conflict. The workshop will address the following concepts:

1. What is a negotiation?
2. Dimensions of a negotiation
3. The concept of a tradeoff
4. How to evaluate a tradeoff
5. Gain/loss ratios of tradeoffs. When is a tradeoff fair and equitable?
6. An agreement as a conglomerate of fair and equitable tradeoffs
7. Implementation of a fair agreement.

The workshop will use some well-known negotiation situations, not necessarily conflict resolution negotiations, to illustrate the different steps of the process.

Presenter: Luis Vargas, University of Pittsburgh

How to improve your chance of getting your AHP/ANP paper published

Workshop
2:00 pm to 3:00 pm
Room: The Pool House

his workshop is aimed at scholars in the early or middle phase of their professional careers and who are interested in getting their AHP/ANP papers published. It focuses, in particular, on AHP/ANP applications. These applications, per se, are usually hard to publish. Based on the lecturer's experience as author, editor and reviewer of many of these application papers, some practical suggestions will be given to the participants.

Presenter: Enrique Mu, Carlow University

COFFEE BREAK

3:00 pmto 3:30 pm
Room: The Pool House

THE ART OF STRUCTURING AHP AND ANP MODELS

Workshop
3:30 pm to 4:30 pm
Room: The Pool House

In this workshop you will learn how to take an unstructured real-life situation and turn it into an AHP (Analytic Hierarchy Process) or ANP (Analytic Network Process) decision model to pick the best alternative or to prioritize the factors you include because you find them to be significant. You will see that human judgments can be used to make pairwise comparisons in two ways: based on direct observation, or by interpreting the significance of data from tangibles. You can also directly use data to construct the judgments for AHP and ANP models. The ultimate goal is to have a model that provides a comprehensive view of the problem so it can be quickly grasped so whoever you show it to can quickly grasp the problem, perhaps make suggestions for revision, know how to make judgments when asked to do so, and understand the results and how to perform sensitivity studies.

The starting point is often a brainstorming session to identify the factors that should go into the model. The alternatives may be obvious and well-understood, or you may need to creatively come up with them. You will be shown efficient ways to group the factors into criteria and sub-criteria, make the connections and keep the number of judgments required to a minimum. Learn the two useful ways of prioritizing alternatives: pairwise compare them with respect to the criteria or rate them one at a time on the criteria - the rating method is especially useful when prioritizing and ranking large numbers of alternatives can be used in both AHP and ANP models.

Learn how to change from AHP hierarchical models to ANP models comprised of clusters of elements with links among them that will allow you to model dependence and feedback. What is feedback? Come to this workshop and find out!

Presenter: Rozann W. Saaty, Creative Decisions Foundation, U.S.

WELCOME DRINK ONLY RECEPTION

5:30 pm to 7:30 pm

Room: Waterfall bar

FRIDAY JULY 13

REGISTRATION

9:00 am to 3:00 pm
Room: Ballroom area

OPENING CEREMONY

9:00 am to 10:00 am
Room: Grand Ballroom

Speaker:
Welcome – Dr Luis Vargas, Chairman
Memorial Address - John Saaty, CEO Decision Lens

COFFEE BREAK

10:00 am to 10:30 am
Room: Foyer in between the Grand Rooms

KEYNOTE SPEAKER

10:30 am to 11:30 am
Room: Grand Ballroom
Speaker: Yong Shi, Key Lab of Big Data Mining and Knowledge Management, Chinese Academy of Sciences, Beijing, China

1.1 MULTI-CRITERIA DECISION ANALYSIS METHODOLOGY AND THEORY

11:30 am to 1:00 pm
Room: Grand Room I

WEIGHT ADJUSTMENT USING MACHINE LEARNING APPLIED TO THE ANALYTICAL HIERARCHY PROCESS

Caelum Kamps, DRDC; Rahim Jassemi-Zargani, DRDC Ottawa, Canada

Abstract

Multi Criteria Decision Making (MCDM) for classification often occurs in dynamic environments. Medical diagnosis, economic markets, and various military applications are all situations in which classification needs to be predictive, adaptive, and rapid. Algorithms for use in dynamic environments require adaptability to evolving inputs known as cues. The Analytical Hierarchy Process (AHP) provides a method for comparative decision making but is challenged when handling accumulating and updating evidence. The weights derived through the AHP represent priority ratio scales that when used in combination with a hierarchal decision structure can automatically synthesize a decision. When only some of the cues are available, truncated comparison matrices can generate new weights for deficient decision structures. This method is consistent with the notion of relative importance that is the basis of the AHP, however, it does not consider key factors that can often improve the deficient decision structures ability to predict the result of the completed one. These factors are probability of outcome due to dependency and relationships between the cues. This paper proposes a method of weight adjustment for deficient decision structures to supplement the AHP and improve prediction capabilities using machine learning.

SIGMOID SUPPLEMENTED DECISION STRUCTURES FOR EVIDENCE SENSITIVITY LEARNING

Caelum Kamps, DRDC; Rahim Jassemi-Zargani, DRDC Ottawa, Canada

Abstract

During decision making for classification it is desirable to predict an outcome when not all of the evidence is available. Consider medical

diagnosis. If a doctor is trying to determine the cause of a patient's ailment, often they are presented with a subset of potential evidences for or against a particular diagnosis. As the doctor runs more tests and the patients symptoms evolve, the doctor becomes more confident in their evaluation. It is critical that the decision maker be as confident in their decision as possible with as few evidences are available. The goal of this paper is to improve the ability to predict the final decision given only a subset of the total information. By exploiting interdependencies and probabilistic relationships between evidences, the confidence of prediction of a decision making tool can be improved through machine learning. Given some set of evidences the Analytical Hierarchy Process (AHP) provides a method of weighting the nodes in a decision structure to synthesize a decision that reflects the opinion of a subject matter expert (SME). Using truncated comparison matrices, weights can be generated for decision structures that are lacking inputs, known as deficient decision structures. This paper proposes a method of sigma node supplementation to the standard decision structure. Using machine learning the parameters of these sigma nodes can be optimized so that the output of decision structures in deficient evidence states can be vastly improved for prediction of the complete information decision. This method preserves the original weights derived through the AHP and thus relative importance of evidences is maintained after learning is undergone. An example will illustrate the improved confidence in prediction that can be achieved by adjusting the sensitivity of each node using this sigma node supplementation method.

THE RELIABILITY OF DATA IN PAIRWISE COMPARISON MATRICES

Jacek Szybowski, AGH University of Science and Technology

Abstract

This article analyzes the problem of reliability of data collected in the pairwise comparison matrices used in the Analytic Hierarchy Process for prioritization of alternatives. The hierarchy obtained from the inappropriate input data may be faulty. Basing on the consistency index defined by Saaty in 1977 we introduce a method which allows to search for the least reliable entries of a pairwise comparison matrix and replace them with their estimations.

ON PROPERTIES OF PARETO OPTIMAL WEIGHTS FROM PAIRWISE COMPARISON MATRICES BASED ON GRAPH THEORY

Kouichi Taji, Nagoya University; Takafumi Mizuno, Meijo University

Abstract

Pairwise comparison is frequently used in multi-criteria decision making problems. In the analytic hierarchy process (AHP), the local weights inferred from pairwise comparison matrices by mainly the principal eigenvector method or the geometric mean method. Recently, Blanquero et al. have shown that the weights derived from geometric mean method are Pareto optimal (or efficient) while the eigenvector method is not from the multi-objective optimization view point. They have also shown that the equivalency between Pareto optimal weights and the strong connectivity of the associated directed graphs. In this paper, we first give another proof of the equivalence theorem based on elementary graph theory. Based on the proof, we propose a new method inferring Pareto optimal weights, which is useful to modify the eigenvector method. We also discuss some properties of Pareto optimal weights based on graph theories.

Session Chair: Rahim Jassemi-Zargani, DRDC Ottawa, Canada

2.1 GOVERNMENT POLICY AND DECISION MAKING

11:30 am to 1:00 pm

Room: Grand Room II

A FRAMEWORK OF PROJECT EVALUATION BASED ON OUTCOME IN LOCAL GOVERNMENT

Yoichi Iida, Suwa University of Science

Abstract

About twenty years ago evaluation was introduced in Japanese local governments. In the beginning this evaluation was considered as a key tool in decentralization reform and the financial crisis, but the aim became ambiguous later. As a result, expectation of evaluation has been fading in spite of call for more rational evaluation. Japanese researchers in policy evaluation pointed out that output indices of projects were not

linked to outcome of the program on the upper level in many cases. It is difficult to measure how much each project is effective to the program if it adheres to a quantitative evaluation. The purpose of this study is to show a framework of project evaluation based on outcome of the program and a way to calculate relative evaluation values of projects with respect to the program using the AHP. In this study outcome of the program is represented as a hierarchy of three levels with the program on the top, several viewpoints of the program and several functions of activities of projects to achieve outcome of the program. In this study I defined Contribution degrees of projects to evaluate projects relatively with respect to the program. Relative evaluation values of projects are calculated by this degree. I showed how to calculate relative evaluation values of projects for the program related to gender equality in a local government. The ANP can simultaneously calculate Contribution degrees and relative evaluation values of projects, I did not use it in this study.

APPLICATION EXPERIENCE OF AHP FOR ANTARCTIC ISSUES

Oleksandr Kuzko, National Antarctic Scientific Center of Ukraine; Mykola Leonov, National Antarctic Scientific Center of Ukraine

Abstract

Paper is devoted to the application of the Analytic Hierarchy Process (AHP) to obtain solutions for current challenges in such important areas of decision-making as the activity both in Antarctic and in Antarctic Treaty System.

In National Antarctic Scientific Center of Ukraine the AHP was used particularly for quantitative analysis of:

- both Antarctic values and threats;
- National interests of Ukraine in both Antarctica and in Antarctic Treaty System.

For the first time the obtained quantitative characteristics make it possible to systematize both the Antarctic values (environmental, societal, economic, scientific, aesthetic, and political) and threats (Global warming, Non-Party States, Tourism, Alien species, Energy crisis, Legal Status). Also for the first time quantitative evaluations of Ukraine's national interests in Antarctica and in the Antarctic Treaty System were obtained among the Antarctic values. These characteristics have enabled to:

- plan the financial, material and human resources in order

to better realization of the Ukrainian Antarctic Program;

- develop recommendations for the policy makers concern activities of Ukraine in Antarctica and in the Antarctic Treaty System;
- inform general public and mass media about the efforts and activities of Ukraine in Antarctica and in the Antarctic Treaty System.

Thus it was shown the AHP is useful for decision-making in managing human activities in Antarctica and in the Antarctic Treaty System in the both national and international issues.

ANALYSIS OF RELATION BETWEEN HUMAN DEVELOPMENT AND COMPETITIVENESS USING ANP AND DEA

Hakan Kılınç, Koc University; Ozgur Kabak, Istanbul Technical University, Turkey

Abstract

This study analyses the bilateral relations among the human development and competitiveness. Analytical Network Process (ANP) is used to find the relative weights of the drivers of human development and competitiveness and to develop a composite index. Data Envelopment Analysis (DEA) is employed to calculate efficiencies of countries on converting their human development to competitiveness and competitiveness to human development. 45 countries were evaluated using the proposed methods and the results were compared for revealing the relationship.

MEASURING PERFORMANCE OF UNIVERSITIES IN FRAGILE COUNTRIES USING ANALYTIC HIERARCHY PROCESS

Rafikul Islam, International Islamic University Malaysia; Shafie Sharif Mohamed, International Islamic University Malaysia

Abstract

Performance measurement is a process of comparing what transpired with what was planned. Performance measurement assists users to know where they are making progress, where they are slowing down and where they are moving. Due to increasing global competition, both public and private institutions regularly measure their performance levels based on organisational vision and mission. While there are established models

to measure performance of universities in developed and developing countries, no such model exist for the universities belonging to fragile countries. This article aims at developing a model based upon AHP to measure performance of universities in fragile countries.

Session Chair: Rafikul Islam, International Islamic University Malaysia

6.1 BUSINESS AND INNOVATION SYSTEMS

11:30 am to 1:00 pm
Room: Grand Room III

ESTIMATING THE IMPORTANCE OF CONSUMER PURCHASING CRITERIA IN DIGITAL ECOSYSTEMS

Jose Ignacio Pelaez, University of Malaga; Francisco E. Cabrera, University of Malaga; Luis G Vargas, University of Pittsburgh, U.S.

Abstract

The purchasing process is not an isolated or unique fact, but a process that contains distinct phases. One of these phases is the evaluation of alternatives, in which the consumer compares the benefits that will be obtained from each brand, product or service, depending on a set of characteristics or criteria. Knowing these criteria and their importance is essential to companies for the supply and development of their products. Commonly this process is developed through multiple criteria decision making methods, where experts, using surveys and their own experience, ascertain the consumers' purchasing criteria, as well as the importance of them. But this process to determine the importance of the criteria is not simple, as the thought, attitude and learning that direct purchases contain relations that consumers are not able to express explicitly; and secondly because the current information society in which we live causes consumers to receive large volumes of information at all times, causing perception changes regularly. This causes growing discrepancies between the rankings offered by experts and the actual purchase ranking of products and services. In this paper we propose a model to estimate the importance of the criteria and alternatives driving purchases making use of the information expressed by consumers in digital ecosystems. This model takes a set of comparable alternatives defined by the client and valuation criteria defined by experts, and by making use of the

assessments that consumers make in digital ecosystems, determines the synergies implicit between the criteria and calculates their weight. Lastly, making use of the Choquet integral, the model aggregates the information and determines a purchase ranking. The model has been tested in real examples, obtaining satisfactory results.

RISK PERCEPTION OF UNCERTAINTIES IN SUPPLY CHAIN

Yuji Sato, Graduate School of Management, Chukyo University, Japan

Abstract

The objective of this paper is to clarify the risk perception of uncertainties in supply chain under environmental turbulence. Rapid spread of globalization pushes firms to face the higher level of uncertainty, where firms must formulate necessary and sufficient strategy for supply chain management. Such a strategy, however, involves a broad range of factors, including some that are subjective. This paper addresses this issue by refining existing structural model of supply disruption. Interviews were conducted to demonstrates the applicability of the proposed structural model to the real markets in both developed and developing countries. The results clarify the difference in risk perception and provide managers with suggestion on how to formulate strategy for their supply chain management.

A MULTICRITERIA FRAMEWORK FOR EVALUATING FOOD SUPPLIERS: AN AHP-DEMATEL-TOPSIS MODEL TO MANAGE BULLWHIP EFFECT

Antonella Petrillo, University of Naples "Parthenope", Italy; Fabio De Felice, University of Cassino and Southern Lazio, Italy; Miguel Angel Ortiz Barrios, Universidad de la Costa, Colombia; Carlos Miranda-De la Hoz, Department of Industrial and Agroindustrial Management and Operations, Universidad de la Costa CUC

Abstract

The aim of this paper is to highlight and summarize the main factors found along the food supply chain, which affect the quality of products, taking into consideration the product attributes demanded by consumers. In detail, the paper highlights the complexity involved in the pork supply chain in relation to the Bullwhip Effect in order to obtain

quality products.

Session Chair: Yuji Sato, Graduate School of Management, Chukyo University, Japan

5.1 INDUSTRIAL AND MANUFACTURING ENGINEERING

11:30 am to 1:00 pm
Room: Grand Room IV

INFRASTRUCTURES DEVELOPMENT: APPLICATION OF ANALYTIC HIERARCHY PROCESS TO CONTRACTORS' SELECTION

Emmanuel Olateju Oyatoye, University of Lagos, Nigeria; Adedotun A. Odulana, University of Lagos

Abstract

Contractor selection process is generally believed to be marred with lots of bias in most developing nations which sometimes leads to incompetent contractor being selected because it is based mainly on human experience and feelings. In particular, in a culturally biased country like Nigeria where most contractors' selection process is not based on performance but rather on whom you know, not paying attention to important factor/criteria but rather on selfish personal gains which directly or indirectly affect the public in different forms, could have some negative effect on projects. The failure of managers to be objective in decision making in regards to contractor selection has great consequences for the government as well as corporate organizations in terms of cost incurred, delivery time and impact on the general welfare of the people. Hence, there is need for managers to be interested in the selection of contractors, suppliers of materials, equipment and services, as failure or inefficiency on the part of the contractor could affect the well-being of the people negatively and damage the performance rating of the government. Developing an appropriate model to address the problem of poor contractor evaluation would, no doubt, be a great relief in the selection of contractors.

USE OF ANALYTIC HIERARCHY PROCESS (AHP) TO IDENTIFY DECISION FACTORS IN THE DEPLOYMENT OF PUBLIC AND PRIVATE PORT TERMINALS IN THE NORTHERN BRAZIL

Felipe George Gomes Pereira, University of Sao Paulo; Rui Carlos Botter, University of Sao Paulo; Léo Tadeu Robles, Federal University of Maranhao

Abstract

Brazilian agribusiness plays an important role in world trade, especially soy. The Central-West and North regions have shown expansion of production and, thus, requiring new export alternatives. Decision factors for the investment of specialized port terminals in the area known as Arco Norte, that is, ports located in the Northeast and North of the country are addressed in this paper. The Analytic Hierarchy Process (AHP) decision tool was used as a methodology using a questionnaire applied to managers and specialists of the port scenario, to identify and qualify decision criteria for investments in the alternatives of public port terminal leasing and private terminal deployment, possibilities considered in Brazilian regulatory legislation. Priority was for the investment on Private Use Terminals, which has been effective in recent years.

UNIQUE: THE SURVEY OF THE REMARKABLE BREADTH OF DR. THOMAS L. SAATY'S WORKS

Mujgan Sagir Ozdemir, ESOGU, Turkey

Abstract

This paper presents a draft of a different kind of literature survey for Dr. Thomas L. Saaty's works. Its purpose is to show the already known fact that how "unique" Dr. Saaty was for not only his hundreds of academic works, papers, books, seminars, students but also for his extraordinary personality by pointing out some of his researches related to the social issues together with humanity and world peace. We hope that this review will be a guide and inspiration for other researchers. This survey is the first one but will not be the last one because his methods continuously will be using in the future.

SPACE MISSION DEFFINITION BASED ON ANALYTICAL HIERARCHY PROCESS (AHP) METHOD

Hassan Naseh, Faculty Member; Mehran Mirshams, Faculty Member

Abstract

Generally, missions of remote sensing satellites are divided three types: 1- Monitoring missions; 2- Recognition missions and 3- Surveillance missions. These missions need the Sun Synchronous Orbits (SSOs) for performing the operations. Also these orbits have requirements a lot. To this end, Analytical hierarchy Process (AHP) methodology is utilized to decide the orbit type in the mission. Therefore, the objective in the above methodology is to reach the orbit in the minimum time and cost (SSOs or on-SSOs), the criterion are remote sensing missions and alternatives in the AHP methodology are the sun synchronous orbit and non-sun synchronous orbits. In conclusion, the results of methodology are presented and evaluated.

Session Chair: Mujgan Sagir Ozdemir, Eskisehir Osmangazi University, Turkey

LUNCH & POSTER PRESENTATIONS 1

1:00 pm to 2:30 pm
Room: Foyer in between the Grand Rooms

SPATIAL MODELING FOR SITE SELECTION OF LANDFILLS TO REDUCE DESTRUCTIVE ENVIRONMENTAL AND SOCIAL CONSEQUENCES

Qadir Ashournejad, Ph.D Student of RS & GIS Uni. of Tehran, Faculty of Geography, Dep. of RS & GIS; Sara Rahimi, Graduate M.S. of Regional Development Planning from Allameh Tabatabaei university, Tehran, Iran.; Seyed Javad Hosseini, Graduate M.S. of Geomorphology from University of Tehran, Tehran, Iran

Abstract

Issue of waste management is one of the main ways of sustainable developments. Various strategies such as reduce production, recycling, burning and landfill. In many countries it's the most current way to bury the wastes due to having low prices and being applicable for wide range of wastes. To change a suitable place as a landfill, urban requirements, governmental affairs and environmental rules should be considered. In this research, first we mention the effective factors on landfills location such as (slope layer, fault, material of bedder, surface water and ground water, penetrability, evaporation and precipitation, distance from populated centers, distance from main paths, erodibility, protected areas, landuse). For identification the relations among the criteria, the DEMATEL (Decision Making Trial and Evaluation Laboratory) technique were used. After completing the Paired comparisons questionnaire, and obtained the results by the experts based on the ANP (Analyzing Network Process) model the weight of each pair was determined.

Fuzzy membership function for each of the criteria were calculated and combined with SAW (Simple Additive Weighting) or WLC (Weighted Linear Combination) method. In this research, MATLAB software was used to implement DEMATEL techniques. Super Decision software for calculation of Analysis Network Process model, and ArcGIS software was used for spatial modeling and zoning.

Results of this study shows that it is possible to prioritize and weigh the effective factor in decision making by ANP. Results also show that due to

geological features of in decision making mentioned area, factors of bedder material, slop, surface water in current sereach are more important than other factors.

BAYESIAN IDENTIFICATION OF HOMOGENEOUS SUBGROUPS OF ACTORS IN A LOCAL AHP-MULTICRITERIA DECISION MAKING CONTEXT

José María Moreno-Jiménez, University of Zaragoza; Alfredo Altuzarra, Facultad De Economia Y Empresa Universidad De Zaragoza (Spain); Pilar Gargallo, Universidad de Zaragoza; Manuel Salvador, Universidad de Zaragoza

Abstract

In our complex and interconnected society, many situations are characterised by the existence of a large number of individuals involved in the resolution of multicriteria problems. The two most commonly utilised methods in multi-actor decision making with AHP are the AIJ (Aggregation of Individual Judgments) and AIP (Aggregation of Individual Priorities). Both methods provide the collective priorities using a geometric mean of individual judgments (AIJ) and individual priorities (AIP). As is well known, when the group is not homogeneous, the geometric mean is not a representative indicator, it is therefore necessary to identify the existent heterogeneous patterns of behaviour. Following a Bayesian approach to the treatment of the log-linear model considered for the stochastic AHP, this work establishes in a local context a stochastic search procedure that allows the determination of the number and composition of the subgroups according to a maximum inconsistency threshold which is common to the decision makers. The proposed methodology is illustrated by a real-life example.

STATION LOCATION SUITABILITY ANALYSIS USING AHP AND GIS FOR ADDIS ABABA LIGHT RAIL

ABERA Gomeju Taye, Kotebe Metropolitan University

Abstract

Addis Ababa metropolitan constructed phase one light rail transit line and planning to continue with phase two routes. This Light Rail Transit is assumed to transport 80,000 passengers per hour per direction. For the system to hit the targeted objective on the proposed line, stations have to be positioned at a place where it can attract maximum users which enable the system to solve the problem and to be independent of subsidies. This is all about integrating Light rail system with other transport modes in Addis Ababa.

This paper examines the existing station sites accessibility to other transportation modes or access mode, and adopts Geographic Information Systems and Multi-Criteria Evaluation technique to carry out suitability mapping of station locations for phase two light rail transit route in Addis Ababa. For the station suitability analysis, eleven different criteria were identified and each criterion was weighted using Analytical Hierarchy Process AHP. The output of Analytical hierarchy process was used as an input for geographic information system GIS special analysis. Finally, based on these criteria requirements using overlaying, Euclidean distance calculation, Rasterisation, buffering reclassification and weighted overlay analysis, the station site suitability map was generated. The map revealed five classifications as: “less suitable”, “suitable”, “moderately suitable”, highly suitable and “extremely suitable”.

KEYNOTE SPEAKER: DR. SHASHI BHATTARAI

Plenary Session
2:30 pm to 3:30 pm
Room: Grand Ballroom

COFFEE BREAK

3:30 pm to 4:00 pm
Room: Foyer in between the Grand Rooms

1.2 MULTI-CRITERIA DECISION ANALYSIS METHODOLOGY AND THEORY

4:00 pm to 5:00 pm
Room: Grand Room I

A FUZZY MULTI-CRITERIA METHODOLOGY FOR THE SELECTION OF WELLS FOR STIMULATION

Fanhui Zeng, SWPU in CHINA; Fan Peng, SWPU in CHINA; Jianchun Guo, SWPU IN CHINA; Jianhua Xiang, Engineering Technology Research Institute

Abstract

Since choosing the correct wells for stimulation affects reservoir production and the economic development of a field significantly, it is very important to select the most appropriate candidate. Recently, a number of researchers have addressed the problem of determining which are the best wells for stimulation. The presence of uncertainty, incomplete or vague information and the large number of factors involved, has led to the application of multi-criteria and fuzzy approaches. In this paper, a new modified fuzzy multi-criteria decision-making methodology is developed for the selection among candidate well alternatives. To the best of our knowledge, this paper is the first application of the combination of the analytic hierarchy process (AHP) and grey theory under fuzziness for the selection of candidate wells in petroleum engineering. It allows expert opinions to be processed in the form of linguistic expressions, crisp or fuzzy numbers. Field application shows that in the application of the proposed methodology, the best candidate wells are determined for stimulation and achieve promising production.

BUSINESS INCUBATOR AS AN EXTENSION OF EDUCATIONAL SUPPLY CHAIN: A STUDY OF KEY SUCCESS FACTORS

Haidar Abbas, Al Buraimi University College; Zaheer Ahmed Khan, Mazoon College, Muscat

Abstract

Services being the key driver for economic growth around the world, the supply chain management for the service industry may be defined in

terms of a company's ability to reach out to its customers through its improved supply chain channels' performance in terms of responsiveness, effectiveness, efficiency, and control (Kathawala et. al., 2003). Alike air and water are important to the human body, knowledge, and skills, which are imparted among masses by the national and international network of educational supply chains, are considered as the backbone of an economy. Educational institutions provide the necessary knowledge domain to the human capital around the globe whereas incubation centers provide the much needed practical life exposure. In fact, the incubators become a link between theoretical knowledge and practical insights. And hence, the role of incubators in determining the success of the educational supply chains is increasing day by day.
Due to the ever increased focus on the idea of incubators, the researchers headed to study the incubators as an extended concept of the supply chain. More specifically, the study aims to prioritize the key success factors for the incubators based on the responses of academicians working in the Sultanate of Oman. These responses have to be analyzed using Fuzzy AHP technique. The results of this study are expected to enrich the body of related literature besides giving some insights to the practitioners.

PRIORITIZING LARGE DATASET OF SOFTWARE REQUIREMENTS WITH ANP USING SUPERDECISION

Naila Jan, Research Assistant - National Univerisity of computer and emerging sciences

Abstract

Decision making process is the most challenging and important task, which decides the success and failure of a software project, in software development life cycle. Deciding a good requirements prioritization technique can reduce our effort in terms of time and cost. In this research we have conducted an empirical study on requirements prioritization techniques to decide which technique in better in terms of scalability. We select AHP and ANP from the literature as AHP is the most cited technique and ANP is the generic form of AHP. We prioritize a large data-set of software requirement with ANP using SuperDecision tool to identify the scalability of ANP. This research shows the limit of the number of input requirements that ANP can prioritize efficiently using SuperDecision tool.

FUZZY ANALYTIC HIERARCHY PROCESS AND TOPSIS FOR BUSINESS SITE SELECTION

Jeremy Yap, Multimedia University Cyberjaya; Chiung Ching Ho, Multimedia University Cyberjaya; Choo-Yee Ting, Multimedia University Cyberjaya

Abstract

The location of a business site is one of the main factors that can determine the success of the business. Many criteria are taken into consideration when selecting the location of the business site, therefore decision makers will need to achieve an agreement when evaluating the criteria. The decision-making process involving multiple criteria is a complex task and over the years, many multi-criteria decision-making (MCDM) methods were researched upon and developed. In this paper, a model combining the Fuzzy Analytic Hierarchy Process (FAHP) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) for site selection is discussed. This model is used to rank six utility payment points in Selangor, Malaysia to determine the effect of the business site on the sales performance.

Session Chair: Luis G Vargas, University of Pittsburgh, U.S.

9.1 CORPORATE SOCIAL RESPONSIBILITY

4:00 pm to 5:00 pm

Room: Grand Room II

STRATEGIES TO DEVELOP INDICATORS OF PUBLIC ENGAGEMENT FOR RESPONSIBLE RESEARCH AND INNOVATION STRATEGIES IN SPAIN

Monica Garcia-Melon, Universitat Politecnica de Valencia, Spain; Irene Monsonís-Paya, Universitat Politecnica de Valencia; Félix Lozano-Aguilar, Universitat Politecnica de Valencia

Abstract

This study proposes a decision model based on Analytic Hierarchy Process to weight context-based indicators in the field of Public Engagement in science and technology in Spain. This study is framed in a series of analysis of the indicators proposed at European level to monitor

Responsible Research and Innovation (RRI) policies and initiatives. Those sets proposed so far are considered too large to be used at a cross-cutting level in certain R&D schemes due to the lack of analysis of the national context and bottom-up approaches. Therefore, in this paper we propose a methodology based on AHP and a group of stakeholders to select those more relevant in the national R&D context by assuring an appropriate coverage of the issue.

INDICATORS FOR FOSTERING ENVIRONMENTAL SUSTAINABILITY IN THE CONTEXT OF RESPONSIBLE RESEARCH AND INNOVATION

Tomas Gomez-Navarro, Universitat Politècnica de València; Iván Ligardo-Herrera, Universitat Politècnica de València; Wilson Jácome-Enríquez, Universidad de las Fuerzas Armadas - ESPE

Abstract

In this paper we suggest a methodology for identifying, selecting and prioritizing indicators for fostering the environmental sustainability of research projects. Our research is integrated in the framework of Responsible Research and Innovation. The methodology is based on the AHP method, the environmental indictor of the Global Reporting Initiative, and the interview to science management experts and environmental assessment experts. It has been applied to information and communication technology research projects.

The procedure has proven to be feasible and satisfactory. The starting list of 34 indicators was reduced to 19 in an AHP model of three levels: RRI dimensions, environmental aspects and environmental indicators. Applying the Pareto analysis, 4 environmental indicators add more than 80% of the total weight and we suggest to choose them, discarding the others. That way, research teams or policy makers can focus on the most important indicators for fostering the environmental sustainability of the selected research discipline.

MEASURING CSR PERFORMANCE A COMPREHENSIVE AHP BASED INDEX

Asma M Bahurmoz, Bahurmoz Consult, Saudi Arabia

Abstract

Although there is no agreed universal definition of CSR, organizations are often ranked in terms of their CSR performance. However, two glaring gaps are identified in the CSR literature. First, evaluation

methodologies are questionable and often lack a scientific basis and transparency, and second stakeholder representation is not made explicit or is missing altogether. This paper contributes to the CSR literature by constructing a CSR index based on the Analytic Hierarchy Process (AHP), as well as ensuring that stakeholder judgments are an integral part of the constructed index. An AHP-based CSR Index is developed for the Services Sector in Saudi Arabia to serve as a case study. The developed index is implemented to measure CSR performance in over 40 corporates from the private sector. The paper thus also adds value by providing an insight into how CSR and its dimensions are perceived and practiced by the Saudi corporations.

Session Chair: Orrin Cooper, University of Memphis, United States

3.1 HEALTHCARE DECISION MAKING

4:00 pm to 5:00 pm
Room: Grand Room III

MEDICAL EQUIPMENT SUPPLIER EVALUATION APPROACH BASED ON ANP, FUZZY TOPSIS AND SUPER DECISION

Xi Chen, Xidian University; Yuan Luo, Xidian University

Abstract
Increasing demand of medical equipment brings both opportunities and challenges for medical equipment manufactures. They need to evaluate suppliers with improving technology and severe standards for changing medical requirements. Besides, increasing awareness of environment protection can't be ignored. Therefore, this study takes environment factors and medical standards into consideration, and using ANP to analyze the inside relationship of evaluation criteria and fuzzy TOPSIS to evaluate suppliers. A case study is proposed for supplier evaluation in a medical manufacture.

AN HYBRID MODEL FOR EVALUATING THE OVERALL PERFORMANCE OF GYNECOBSTETRICS DEPARTMENT: AN APPROACH BASED ON FAHP, DEMATEL AND TOPSIS

Miguel Angel Ortiz Barrios, Universidad de la Costa, Colombia; Edward

Gutiérrez-Severiche, Universidad de la Costa CUC; Dayana Patricia Cómbita-Niño, Universidad de la Costa CUC; Zulmeira Herrera Fontalvo, Department of Industrial Engineering, Universidad de la Costa CUC; Antonella Petrillo, University of Naples "Parthenope", Italy; Fabio De Felice, University of Cassino and Southern Lazio, Italy

Abstract

Hospitals typically lack effective service level strategic and operational planning. Some of them do not have a good "quality" organization. In most of the cases, they could use some optimization models to try to improve it. The point of seeking care at a hospital is to get well. That may seem obvious, but it is a fact that sometimes gets lost in discussions over the availability of "quality" health care. The aim of the present research is to investigate the relationship between the organization and performance of health service systems. In detail, the gynecobstetrics department. The study assesses several variables such as the quality of medical equipment, the quality of care, the patient safety etc. A multi criteria approach based on Fuzzy Analytic Hierarchy Process (FAHP), Decision Making Trial and Evaluation Laboratory (DEMATEL) and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) is proposed. The research concerns three hospitals from the public sector of Colombia. The results show the most critical variables and the correlation among all selected criteria of performance.

ETHICAL DECISION MAKING IN ACTION: EVALUATING HOSPITAL CARE ATTENDANCE APPROACHES

Julie E. Forbes, Carlow University - UPMC Presbyterian-Shadyside; Abigail M. Hebb, Carlow University - UPMC Presbyterian-Shadyside; Enrique Mu, Carlow University - College of Leadership and Social Change

Abstract

An average of 340,000 hospitalized patients get injured due to falls every year. Providing the best possible care attendance (CA) to prevent these incidents is very important. We posit and demonstrate here that beyond medical and financial considerations, CA proper selection and evaluation is an ethical decision which requires considering the needs as well as input from all the affected parties (hospitals, nurses and patients). Unfortunately, until now CA discussion has involved mainly isolated perspectives and rarely that of the patient. Using a stakeholder theoretical approach, taken from the ethical decision making literature,

and the Analytic Hierarchy Process -which allows the integration of multiple stakeholder perspectives and the inclusion of intangible variables (such as patient's sense of value)- we develop a CA evaluation framework to allow the prioritization and allocation of resources to the different CA approaches identified in the extant literature: care attendant (CA), continuous video monitoring (CVM), normal rounding (NR) and family visitor sitters (FVS).

Session Chair: Antonella Petrillo, University of Naples "Parthenope", Italy

4.1 APPLICATIONS IN CIVIL ENGINEERING AND URBAN MANAGEMENT

4:00 pm to 5:00 pm
Room: Grand Room IV

SMART CITY PRINCIPLE-BASED ENERGY SOLUTION EVALUATION FRAMEWORK

Grzegorz Ginda, AGH University of Science and Technology, Poland; Dominika Dawiec, AGH University of Science and Technology

Abstract
Smart city is a general concept for sustainable development of a contemporary city while taking advantage of population creativity and capability for innovations as well as existing institutions, procedures, and infrastructure. It provides foundations for fulfilling requirements of six basic implementation fields that deal with intelligent economy, mobility, environment, people, living, and governance, respectively. Therefore, the fields seem to provide apparent foundation for a comprehensive and sustainability-aware evaluation of actual solutions implementing smart city concept. This is why a general framework for such evaluation is discussed in the paper. Particular framework implementation is also presented. It is based on the use of two decision support techniques, namely DEMATEL and ANP. A sample application is also presented to illustrate merits of the framework.

A QUANTITATIVE APPROACH FOR SUSTAINABLE URBAN WATER MANAGEMENT SUPPORT

Grzegorz Ginda, AGH University of Science and Technology, Poland; Dominika Dawiec, AGH University of Science and Technology

Abstract

Water resources play multiple urban roles. Available literature shows that the roles are mainly perceived in economic and technological context of fresh water delivery, sewage management and treatment as well as rain water runoff management. Water may play, nevertheless, other roles that are important for sustainable urban development. This is especially true in the case of habitats where both surface water and rain water serve as important component of urban space that brings multi-dimensional merits. Management of water resources influences surrounding environment in a multi-dimensional manner and has a considerable effect on ultimate quality of urban environment. Some proposals for the systemic assessment of water resource management in urban sustainable development context are available in literature. The application of multi-dimensional intangibility-aware analysis is recommended in this regard. However, existing studies lack an indication of concrete tools for supporting such analysis. This is why an AHP/ANP-based implementation of a selected framework for water management influence on urban space quality is discussed in the paper.

DECISION MAKING FOR THE VALUATION OF ITAIPU'S ENERGY IN THE BRAZILIAN MARKET: AN APPROACH BASED ON AHP

Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.; Arturo Ramón González Osorio, Universidad Nacional de Asunción - Facultad Politécnica.; Richard Ríos, Facultad Politécnica, Universidad Nacional de Asunción; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Victorio Oxilia, Facultad Politécnica, UNA

Abstract

The production of clean electrical energy has acquired a preponderant role in energy security in recent decades. This is the case of the Itaipu Binational Hydroelectric Plant, which takes advantage of one of the resources that Paraguay has in condominium with Brazil. This power plant satisfies almost all of Paraguay's electric power demand, and there are even surpluses of energy that, under what is regulated in the binational Treaty, are ceded to the condominium country. In recent years, in Paraguay, an interesting debate has been generated about what

would be the best use of this surplus energy. One of the alternatives is the sale of said Paraguayan energy in the Brazilian electricity market. For this purpose, an important input in the analysis of this strategy would be the valuation of Itaipu's energy. However, at present, there is no mechanism for the valution of such energy. The only valuation available is the Itaipu energy tariff and the compensation for the energy transfer, based exclusively on the conditions defined in the Treaty. Therefore, the methodology of the Analytic Hierarchy Process (AHP) is used to develop this approach. This technique is applied in multicriteria decision-making process and can be used for asset valuation. In this case, the objective of this work is to estimate or appreciate the value of Itaipu's energy. The attributes for the development of the AHP, that is, technical, economic and environmental aspects, are prioritized according to their degree of importance. Finally, the alternatives are valued through a benchmarking with the Brazilian hydroelectric power plants. Subsequently, a sensitivity analysis is carried out among the alternatives analyzed, in order to observe the variation of the results obtained.

Session Chair: Grzegorz Ginda, AGH University of Science and Technology, Poland

GALA AND AWARD RECEPTION

6:30 pm to 9:30 pm

Room: The Pool House and Waterfall Bar

SATURDAY JULY 14

REGISTRATION

9:00 am to 3:00 pm
Room: Ballroom area

KEYNOTE SPEAKER

9:00 am to 10:00 am
Room: Grand Ballroom
Speaker: Gang Hao, Assistant Dean (Advancement), Associate Professor, City University of Hong Kong

COFFEE BREAK

10:00 am to 10:30 am
Room: Foyer in between the Grand Rooms

1.3 MULTI-CRITERIA DECISION ANALYSIS METHODOLOGY AND THEORY

10:30 am to 12:00 pm
Room: Grand Room I

ESTIMATION OF PRIORITY WEIGHTS BASED ON A RE-SAMPLING TECHNIQUE AND A RANKING MRTHOD IN ANALYTIC HIERARCHY PROCESS

Indrani Basak, Penn State Altoona

Abstract

Individual judgments are sought in order to elicit values of the entries of pairwise comparison matrices in Analytic Hierarchy Process (AHP). Some of these matrices are more consistent than others. But throwing out inconsistent matrices reduces the number of matrices. In this article, we propose a re-sampling technique to generate sets of pairwise comparison matrices which pass the consistency check. The advantage of the re-sampling technique is that one can generate as many sets of pairwise comparison matrices as needed to select the ones which satisfy the consistency requirement. Based on these selected matrices, the priority weights of the alternatives are then estimated. We propose rank-based statistical procedures to check the significance in the difference between estimated priorities of the alternatives to establish their most significant rank order.

COHERENCY: AN INNOVATION TO TEST DATA QUALITY AND REDUCE COMPARISONS IN THE ANP

Orrin Cooper, University of Memphis,U.S.; Idil Yavuz, Dokuz Eylul University

Abstract

Saaty recognized the value of research that would improve the quality of decision data. The Linking Coherency Index (LCI) is an innovative method to test for coherency in ANP Supermatrices. Coherent data can be defined as self-consistent and non-contradictory with respect to a particular system. Coherency can also be thought of as a “super consistency test” or a test for consistency at the level of the entire

Supermatrix. Linking Estimates (LE) are an important component used to calculate the LCI and can also be used to reduce the number of comparisons that are required in ANP decisions. The value of testing the coherency of the Supermatrix and reducing comparisons will be demonstrated through a neat example.

JUDGMENT SCALES OF THE ANALYTICAL HIERARCHY PROCESS – THE BALANCED SCALE

Klaus D Goepel, BPMSG

Abstract

One topic under discussion of the analytic hierarchy process is the use of different scales in order to translate judgments into ratios. The author shows that the so-called balanced scale has a uniform weight distribution for two decision criteria only. If it is applied to decision problems with more than two criteria, weights are no longer balanced, and priorities are underweighted. A generalization of the balanced scale is proposed, which takes into account the number of decision criteria. It is shown that the generalized balanced scale yields equally dispersed local weights for any number of decision criteria.

COGNITIVE AHP-MULTIACTOR DECISION MAKING

Luis G Vargas, University of Pittsburgh, U.S.; José María Moreno-Jiménez, University of Zaragoza

Abstract

This paper presents a methodology, based on the cognitive orientation proposed by the authors in the framework of multiple criteria decision making (Moreno-Jiménez & Vargas, 2018), but specialized to one of the strong dimensions of the Analytic Hierarchy Process (AHP), multiactor/group decision making. The methodology has two phases. Phase 1 in which decision making takes places with the individual decision makers' judgments, and Phase 2 in which the arguments supporting the individual judgments and positions are identified. The objective is the dissemination of the knowledge derived from the scientific resolution of the problem in order to reach a social learning.

Session Chair: Luis G Vargas, University of Pittsburgh, U.S.

2.2 GOVERNMENT POLICY AND DECISION MAKING

10:30 am to 12:00 pm
Room: Grand Room II

DEVELOPING A POLICY FOR POST DISASTER RECONSTRUCTION PRIORITIZATION: A LESSON LEARNT FROM NEPAL'S EARTHQUAKE 2015

Madhav Prasad Pandey, Kathmandu University, Dhulikhel, Kavre, Nepal; Prabal Sapkota, Kathmandu University, Dhulikhel, Kavre, Nepal

Abstract

In 2015, Central Nepal was shaken by a massive earthquake causing large number of loss of life and damage to private and public property. The disaster received an immediate global attention. Nepalese government received significant support from international agencies in the form of rescue and relief operations as well as commitments of funds for reconstruction. However significant progress has not been achieved in reconstruction of damaged structures even after three years of the devastation. There may be several reasons behind this. One of the reasons is the lack of proper reconstruction framework. The entire damaged infrastructure cannot be reconstructed at the same time because of low economy and lack of enough funds. The Nepalese government failed to prioritize the sectors so that the reconstruction can be completed in a stepwise manner based on the priority. The prioritization process is complex as one has to consider multiple factors, sub- factors and the alternatives to be prioritized. Further, it becomes very important to take care of all the stakeholders' interest in the matter. The process requires multi-criteria decision analysis. This research develops a decision making model based on Analytic Hierarchy Process which can assist government in prioritizing post disaster reconstruction process. The decision making model can be applicable to various kinds of disasters in developing countries.

INTEGRATED MULTI-CRITERIA PLANNING MODEL OF THE USE OF HYDROELECTRICITY SURPLUS OF PARAGUAY BASED ON ANALYTIC NETWORK PROCESS (ANP)

Raúl Emilio Amarilla, Polytechnic Faculty, National University of Asuncion;

Arturo Ramón González Osorio, Universidad Nacional de Asunción - Facultad Politécnica.; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Cecilia Llamosas, Facultad Politécnica, Universidad Nacional de Asunción; Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.

Abstract

The abundance of electric energy, generated mainly by the binational hydroelectric dams of Itaipú and Yacyretá, constitutes a strategic asset for the development of Paraguay. This has a great impact on the economic growth and social progress of the country, through the planned infrastructure growth and the development of the productive sector, mainly industry, based on a greater share of electricity in the energy matrix. In fact, it can be said that Paraguay, from different perspectives, urgently needs to take advantage of the large levels of clean energy available, encouraging the penetration of hydropower into the energy demand matrix, replacing biomass and oil.

In this context, a wide public debate on the use of hydropower surplus has been around in the country for many years. The different alternatives for its implementation are often characterized by the conflict between different objectives, such as political, social, economic, technical and environmental points of view. With this proposal, it is planned to generalize the analysis hierarchical process, the Analytic Network Process (ANP) to develop a decision-making tool for the best use of Paraguay's hydroelectric surpluses within the framework of a sustainable policy, considering quantitative and qualitative aspects, difficult to identify through usual evaluation approaches. This tool has a high scientific and avant-garde component to make essential decisions that would produce the greatest benefits for the integral development of the country.

APPLICATION OF AHP FRAMEWORK TO RANK RURAL ELECTRIFICATION BARRIERS OF NEPAL

Madhusudhan Adhikari, Institute of Engineering, Pulchwok; Bharat Raj Pahari, Institute of Engineering, Central Campus, Pulchowk.; Rajendra Shrestha, Institute of Engineering, Central Campus, Pulchowk.

Abstract

Nepal has good potential of energy generating resources. However, till 2017 only less than 1% of total potential is converted in to electricity and only around 65% of the total population is connected to grid electricity.

Different literature and stakeholders forums discuss numbers of hurdles/ barriers of rural electrification in Nepal. This study identifies the main rural electrification barriers and will be ranking them using analytical hierarchy process surveying three different actors - policy makers, policy implementer and beneficiaries of the policies as cost, time and impact of removal of these barriers as factors.The paper discusses the process of developing a model framework in AHP for such analysis.

Session Chair: Madhav Prasad Pandey, Kathmandu University, Dhulikhel, Kavre, Nepal

4.2 APPLICATIONS IN CIVIL ENGINEERING AND URBAN MANAGEMENT

11:30 am to 1:00 pm
Room: Grand Room III

USING THE AHP TO ESTABLISH INCLUSIVE HOUSING DEVELOPMENT PRIORITIES FOR INDUSTRY

Ali Lakhani, Griffith University; Heidi Zeeman, Griffith University; Rafikul Islam, International Islamic University Malaysia; David Watling, Griffith University; Courtney J. Wright, Griffith University; Dianne Smith, Curtin University

Abstract
The lack of inclusive housing options across the developed world means that many people with disability reside in housing which does not meet their physical and cognitive accessibility requirements, as well as their social and health care needs. This situation is partly due to a) a lack of understanding by designers and developers about what consumers want from their housing beyond the necessary physical access features and b) lack of multidisciplinary understanding of the various decisions or motivating drivers that might result in a development opportunity. In order to provide some decision clarity for the complex area of inclusive housing development, an AHP was used to determine the key priorities across a multidisciplinary group of stakeholders, including architects and designers, builders, disability service organisation professionals, and occupational therapists and access consultants. Despite some discipline variability, AHP results indicated three key drivers common to all

stakeholder groups, namely, 'connectedness of end users', 'feasibility' and 'building specifications'. The findings assert the importance of considering the needs of end users for inclusive housing development, a consideration that is often overlooked. The findings of this study will assist development of a resource manual to assist industry throughout inclusive housing development decision-making.

AN ANP MODEL TO IMPROVE PEDESTRIAN ACCESSIBILITY IN THE CITY CENTER OF CARTAGENA DE INDIAS (COLOMBIA)

Monica Garcia-Melon, Universitat Politecnica de Valencia, Spain; Hannia Karime González-Urango, Universitat Politecnica de Valencia; Michela Le Pira, University of Catania; Giuseppe Inturri, University of Catania

Abstract

To improve pedestrian accessibility is a multifaceted problem. The design of the best routes involves consideration of different stakeholders and factors. In this paper, a multicriteria decision analysis approach is presented based on Analytic Network Process (ANP) for location planning of pedestrian routes. A group of different stakeholders composed of representatives of local administration, city transportation officials, commercials, associations, NGO's and city residents or users has been formed to select the criteria for designing pedestrian routes in the city center of Cartagena de Indias (Colombia). Some key stakeholders will be selected as experts to evaluate criteria through the ANP process. An index which measures the importance of each criterion in designing pedestrian routes will be obtained. Finally, according to the results obtained some principal streets will be selected and evaluated. So far, criteria related to connectivity, urban function, route attributes, convenience, and coexistence have been selected as the more relevant ones.

THE BENEFITS AND COSTS OF REGULATING PROPERTY MANAGEMENT SERVICES PROVIDERS THROUGH LEGISLATION

Yat Wong, The Hong Kong Polytechnic University

Abstract

In view of the numerous accidents related to the incompetent property management in Hong Kong, the government legislated to form a statutory body for regulating property management. This paper aims to determine the importance of the costs and benefits attributed to the regulating and investigate the application of AHP model to make

recommendations on the issue. The legislation is examined. Then, AHP is applied to assess the benefits/ costs of regulating property management services.

DESIGNING A FLEET OF COMMERCIAL VEHICLES FOR SMART SHARING: DECISION SUPPORT FOR LOGISTICS COMPANIES

Yat Wong, The Hong Kong Polytechnic University

Abstract

Sharing of commercial vehicles is less popular than private vehicles despite their high volume of traffic on road. This paper addresses the difficulties of applying AHP framework of considering sharing commercial vehicles as part of a logistic fleet. An in-depth interview with an experienced logistic consultant was carried out. Due to the diversity and complexity of commercial vehicle sharing, the decision maker should know the technical issues of vehicle sharing. This paper raises an important point for AHP application: Information overload of developing technology and difficulty of pairwise comparison when alternatives are very different in scales and investment involved.

Session Chair: Monica Garcia-Melon, Universitat Politecnica de Valencia, Spain

5.2 INDUSTRIAL AND MANUFACTURING ENGINEERING

10:30 am to 12:00 pm

Room: Grand Room IV

SELECTION OF PROJECT MANAGEMENT TOOL: AN EX-POST FACTO CASE STUDY

Valerio Salomon, Sao Paulo State University, Brazil; Daniele Mizuno, Sao Paulo State University

Abstract

Brazilian federal law imposes to state organizations the supplier selection on price. Private organizations also adopt this rule, mainly by costs optimization or simplicity. However, lower-cost inputs do not guarantee lower-cost outputs. That is, lower-cost supplies may imply in higher-cost production, for instance, due to rework. Besides of that, producers may

look for higher benefits instead of lower costs. For these reasons, even the federal law allows supplier selection on benefits, in justified cases. This paper presents a real case on supplier selection in a Brazilian company of fuel distribution. Since it was in a private company, a senior project manager could select a project management tool considering only benefits. An ex-post facto analytic hierarchy process application considered detailed benefits and costs. The results are compared in the end.

CONCURRENT MANUFACTURING PROCESS SELECTION FOR NATURAL FIBRE THERMOPLASTIC COMPOSITES

Mastura Mohammad Taha, Universiti Teknikal Malaysia Melaka; Sapuan Mohd Salit, universiti putra malaysia; Muhd Ridzuan Mansor, Universiti Teknikal Malaysia Melaka

Abstract

In this study, the manufacturing process for the natural fibre composite is selected with consideration of all elements of design composition in concurrent engineering practice. This includes materials, function, failure mode, and geometry, which interact simultaneously when the correct decisions have been made. All the elements have been determined in the previous study and the manufacturing process is the only element omitted, which needs to be determined. In this study, after preliminary selection, injection moulding, reaction injection moulding, resin transfer moulding, bulk moulding compound moulding and polymer casting are the potential manufacturing processes for the natural fibre composite automotive anti-roll bar with respect to the design composition. The obtained final selection results revealed that the injection moulding process was ranked top compared to other candidate processes; it satisfied most of the general manufacturing requirements by scoring 28.7% from the overall score. Next, sensitivity analysis was performed to confirm the stability of the judgement, and injection moulding maintained its position in three different cases. The results implied that all the elements in the design composition should interact for better quality and performance of the natural fibre composite products, and concurrent engineering practice is the most appropriate design strategy for the product design development.

IDENTIFYING DRIVERS OF SUSTAINABLE MANUFACTURING AT FIRM LEVEL USING A FUZZY-BOCR-AHP FRAMEWORK

Lanndon Ocampo, Cebu Technological University; Jessa Marie Vallecera, University of San Carlos; Donna Mae Nunez, University of San Carlos; Karyn Jean Galagar, University of San Carlos

Abstract

Sustainable manufacturing (SM) has currently become one of the very important issues for governments and industries globally due to the challenges associated with materials, energy, and wastes. With this, SM has certainly become one of the critical issues for the food manufacturing industry. Despite its significance, there has been little attention on the identification of drivers for sustainable food manufacturing (SFM). Thus, this study attempts to establish drivers that motivate food manufacturing SMEs in adopting sustainability. First, drivers are established by targeting the triple bottom line (TBL) perspectives. With this approach, the identified drivers become more relevant and straightforward in enhancing the sustainability of food manufacturing firms. Second, sustainability practices serve as links in translating drivers to TBL. In this manner, the framework identifies sustainability practices that are highly significant. Third, the identification of drivers is performed by individually taking into context the benefits, opportunities, costs, and risks (BOCR) associated with these drivers. Due to the hierarchical structure of the proposed framework and the complexity of the decisions that are in place, a fuzzy-BOCR-AHP approach is adopted in order to address the uncertainty in judgment elicitation in AHP. The results show that market demand is the most significant driver, while the most significant sustainable practice is lean practice. The prioritization of drivers based on the fuzzy-BOCR-AHP decision-making framework and their prioritization targeting the TBL perspectives suggest useful and interesting results.

PROGRAM ACCREDITATION: A NETWORK MODEL FOR CRITERIA DEPENDENCIES AND PRIORITIZATION

Mujgan Sagir Ozdemir, ESOGU, Turkey

Abstract

An accreditation provides assurance that a college or university program meets the quality standards of the profession for which that program prepares graduates. The accreditation agencies, in this context, pursue the following objectives in performing the function of "program

evaluation and accreditation" set out in its charter, regulations, and directives: Identifying programs that meet minimal evaluation criteria in order to inform society, students, future students, student counselors, parents and legal guardians of students, educational institutions, professional societies, prospective employers, and public organizations; fostering the advancement and continuous improvement of existing programs in engineering as well as the development of new programs; encouraging the development of education in relevant area. This papers presents a revised ANP model in order to modify the previous criteria and redefine the dependencies among them. Finally the criteria are prioritized.

Session Chair: Valerio Salomon, UNESP-Sao Paulo State University, Brazil

PLENARY : PUBLISHING YOUR WORK -PANEL OF JOURNAL EDITORS

12:00 pm to 1:00 pm
Room: Grand Ballroom

Journal editors will discuss what are the important factors that make an AHP/ANP paper publishable and will share their experiences with the audience. This is an opportunity for participants to ask questions pertinent to their own interests and concerns when publishing their work.

Participants:
Rafikul Islam, International Journal of Business and Systems **Research**, Annals of Management Science
Enrique Mu, International Journal of AHP
Valerio Salomon, Annals of Management Science
Luis Vargas, Journal of Multi-Criteria Decision Analysis

LUNCH & POSTER PRESENTATIONS 2

1:00 pm to 2:30 pm
Room: Foyer

HYBRID SWOT-ANP MODEL FOR POLICY PRIORITIES OF REGIONAL ECONOMIC DEVELOPMENT IN MALUKU PROVINCE

Bayu Kharisma, Faculty of Business and Economics Universitas Padjadjaran

Abstract

This research aims to analyze the potentials of the leading sector and to formulate policy priorities for regional economic development in Maluku Province. The research methodology used in this research is Location Quotient (LQ), Growth Ratio Model (MRP), Overlay analysis and Analytic Network Process (ANP). The result of the research shows that in Maluku Province there are 8 economic categories that have base sector namely agriculture, forestry and fishery category; categories of water supply, waste management and recycling; major trade and retail and auto-motorcycle repair categories; categories of transportation and warehousing; government administration, defense and compulsory social security schemes; categories of education services; categories of health services and social activities; and other service categories. The result of growth ratio (MRP) shows that the sector with the highest average regional growth rate (RPs) in Maluku province is mining and quarrying sector. Furthermore, overlay analysis shows that the sectors of government administration, defense, compulsory social security schemes and major trade and retail; car and motorcycle repairs. The result of SWOT-ANP analysis shows that policy priority in regional development is the acceleration of infrastructure development. The policy through the acceleration of infrastructure is essential for connectivity and fisheries and marine development as well as tourism which is the main sector in Maluku Province.

QUALITATIVE AND QUANTITATIVE CRITERIA EVALUATION USING FUZZY AHP: APPLICATION TO THE PROBLEM OF SHIP BUNKERING

Danijela Tuljak-Suban, UNIVERSITY OF LJUBLJANA; Valter Suban,

UNIVERSITY OF LJUBLJANA, Faculty of Maritime Studies and Transport

Abstract

Criteria used to make a decision could be numeric values or could have a verbal form used to express proprieties that are opinions or descriptive evaluations. By using the fuzzy AHP it is possible to compare all this criteria while still maintaining the proper consistency of the AHP method.

Defining an optimal ship bunkering policy is based on a multitude of quantitative and qualitative criteria connected to tank capacity, quantity of cargo on board, fuel price, port facilities, weather conditions, etc. The proper ranking of criteria is vital in order to allow the crew on board to make a decision that adequately weighs the various aspects. This is especially important, to optimize cargo dead weight of the ship and consequently optimum size of the ship engaged in the voyages.

The aim of the paper (which is based on a literature review) is to detect the proper criteria to make an optimal bunkering and make a proper AHP criteria evaluation. For this purpose, experts from the sector will be involved in the analysis and fuzzy logic computation properties to be used to obtain highly reliable assessments with a high membership degree that could be combined in a multicriteria goal function.

USING ANALYTICAL HIERARCHY PROCESS IN ARCGIS TO PREDICT LANDSLIDE HAZARD OF THUMBA BASIN, TAPLEJUNG

Shilpa Koirala, Sanima Hydro; Sakunda Ojha, Sanima Hydro

Abstract

Landslides have catastrophic impacts mainly on the rough terrain of hilly/ mountainous regions in Nepal. In this study, Landslide hazard of Thumba River basin located in Taplejung district of Eastern Nepal is predicted using Analytical Hierarchy Process (AHP) and Geographic Information System (GIS) tool. The major physical and ecological factors that are considered in landslide hazard mapping are; topographical heights to generate slope and aspect, landuse pattern, drainage density, distance from streams and existing landslides. The weightage values to the factors are set using pairwise comparison matrix and standard matrix. Several landslide susceptible zones are delineated as High, Medium and Low by unequal interval classification method in ArcGIS. The final susceptibility map shows that about 60% of south facing cultivated land within the

elevation range of 1700-2200 m amsl comprise70% vulnerable hazard coverage on Thumba basin. The map was verified with existing landslide locations which yielded close proximity. Hence, any planners, decision-makers, concerned authorities can cogitate combined AHP and GIS application in landslide hazard mapping as required for various developmental projects.

STATISTICAL ANALYSIS OF APPLICATION OF AHP IN POSTGRADUATE THESIS OF TSINGHUA UNIVERSITY

Ming Yu, Department of Industrial Engineering, Tsinghua University; Erjiang E, Department of Industrial Engineering, Tsinghua University

Abstract

Analytic hierarchical process (AHP) is an efficient tool used multiple criteria decision making. This paper gives an overview of applications of analytical hierarchical process (AHP) in various areas. We collect 176 doctoral and master these using AHP from 1986 to 2017 in Tsinghua University. This paper analyzes the application of AHP approach in various disciplines, industries, and fields.

KEYNOTE SPEAKER: DR. IWAN J AZIS

Plenary Session
2:30 pm to 3:30 pm
Room: Grand Ballroom

COFFEE BREAK

3:30 pm to 4:00 pm
Room: Foyer in between the Grand Rooms

1.4 MULTI-CRITERIA DECISION ANALYSIS METHODOLOGY AND THEORY

4:00 pm to 5:00 pm
Room: Grand Room I

IMPLEMENTATION OF AN ONLINE SOFTWARE TOOL FOR THE ANALYTIC HIERARCHY PROCESS (AHP-OS)

Klaus D Goepel, BPMSG

Abstract

The analytic hierarchy process (AHP) remains a popular multi-criteria decision method. The author has implemented a free, web-based AHP online system with noteworthy features, allowing for the detailed analysis of decision problems. Beside standard functions like flexible decision hierarchies, support to improve inconsistent judgments, alternative evaluation and sensitivity analysis, the software can handle group inputs, calculate group consensus based on Shannon α and β-entropy, and estimate weight uncertainties based on randomized small variations of input judgments. In addition, different AHP judgment scales can be applied a posteriori, and alternative evaluation can be done using the weighted sum (WSM) or weighted product model (WPM). This flexibility opens up opportunities to study the classical AHP and decision projects under various parameters. The author's intention was to provide a complete and free software tool for educational and research purposes, where calculations and algorithms are well documented and all input data and results can be exported in an open format for further processing or presentation. The article describes the basic structure of the software and highlights key features of its implementation. The full description of all underlying methods and algorithms is available from the author's website.

IMPROVING ANALYTIC NETWORK PROCESS REPORTING

Enrique Mu, Carlow University - College of Leadership and Social Change; Orrin Cooper, University of Memphis,U.S.; Michael Peasley, Middle Tennessee State University

Abstract

A review of more than 100 ANP studies published in 2015 shows that the report of these studies is either deficient or incomplete, to the point that it casts a shadow on the validity of their conclusions. In this study we identify key elements that must be present to ensure the validity, replicability and overall quality of the reported ANP study.

A GROUP CONSENSUS MODEL WITH AHP

Qingxing Dong, Central China Normal University; Qi Sheng, Central China Normal University; Keyu Zhu, Hefei University of Technology, China; Gaohui Cao, Central China Normal University

Abstract

Consensus reaching models aiming at helping a group to reach a certain level of consensus are crucial in group decision making process. The Analytic Hierarchy Process(AHP) is an effective tool and has been widely used in group decision making. In this paper a new consensus reaching model based on the AHP is proposed, which considers both individual and aggregated opinions. The compatibility index can be used to determine both the individual consensus level(ICI) and the central consensus level(CCI). Then this model provides feedback suggestions to the most incompatible decision makers so they can adjust their opinions adaptively depending on their ICI and CCI in each round. The integrated adaptive consensus reaching model is constructed. Finally, a numerical example is given to verify the feasibility and effectiveness of the model.

Session Chair: Enrique Mu, Carlow University - College of Leadership and Social Change

7.1 TECHNOLOGY

4:00 to 5:00 pm
Room: Grand Room II

MULTI-CRITERIA DECISION MAKING FOR SUSTAINABILITY OF RENEWABLE ENERGY SYSTEM OF NEPAL

Ram Prasad Dhital, Alternative Energy Promotion Centre

Abstract

This paper presents an application of Analytic Hierarchy Process for evaluation of the sustainability of renewable energy sources and technology in context of Nepal. Solar energy, biogas, micro hydropower and grid technology have been evaluated based on selected criteria like technical (energy production capacity, efficiency, reliability, primary energy ratio and technological maturity), economic (initial investment, operation and maintenance cost and payback period), environmental (carbondioxide emission, land requirement, impact on ecosystem) and social (social acceptability, job creation, social benefits). The importance weights of the criteria and sub-criteria as well as preferential ranking of options have been determined by eliciting expert judgment through pairwise comparisons. The findings show that within the technological constraints, grid technology is the most preferred option followed by micro hydropower. Biomass is the least preferred sustainable system of Nepal. The proposed evaluation will help to select the most suitable alternative assisting policy makers to form opinion on sustainability of considered energy systems. However, as time progresses and technology improves, the preferential ranking might change.

OBJECT ORIENTED MAINTAINABILITY AND TESTABILITY MEASUREMENT USING ANALYTIC HIERARCHY PROCESS

Petrus Mursanto, Universitas Indonesia, Indonesia

Abstract

Applying AHP to measure object-oriented design quality has been verified. The AHP is utilized in two stages of measurement process. First, in defining relative quality based on metric values that has been converted to AHP's pairwise comparison scheme; second, in expert judgment verification by answering pairwise preference questionnaire.

First stage measurement is conducted based on two sets of object-oriented metrics, i.e. MOOD and MOOSE. The results of quality rank over a number of OO design samples are proven consistent by applying MOOD and MOOSE as the criteria. Moreover, experts' judgment on relative quality of selected samples supports the robustness of AHP in measuring maintainability and testability of OO programs.

SYSTEM-OF-SYSTEMS SITUATIONAL AWARENESS EFFECTIVENESS USING AHP

Rahim Jassemi-Zargani, DRDC Ottawa, Canada; Fredrick Lichacz, Dr; Nathan Kashyap, Mr

Abstract

The integration of system-of-systems (SoS) data into shared situational awareness (SA) involves a complex interplay between a collection of sensors, network architectures and exploitation capability. To achieve the desired level of SA (i.e., information superiority) and improve the sense-to-act cycle requires an environment that is agile, interoperable, robust and efficient. To that end, this paper presents an integration concept evaluation methodology based on an Analytical Hierarchy Process (AHP) that uses technical and cognitive elements to assess the degree to which a system-of-systems concept can facilitate shared SA.

Session Chair: José María Moreno-Jiménez, Universidad Zaragoza

8.1 ENTREPRENEURSHIP

4:00 to 5:00 pm

Room: Grand Room III

ENHANCING THE WORK-LIFE BALANCE THROUGH AHP MODELLING OF EARLY CAREER DECISION-MAKING

Remigiusz Gawlik, Cracow University of Economics

Abstract

Objective: the paper presents the results of ranking of the significance of quality of life determinants by University students that are starting professional activities. Research methodology: literature review; elaboration of an AHP decision-making model; two-stage expert

selection; significance rankings by experts and a graphical and descriptive presentation of obtained results. Research sample: 14 experts out of almost 200 University students. Research outcome: a decision-making model that aims at maximizing the life satisfaction of future employees as a function of their individual assessments of significance of particular determinants of quality of life. Research implications: a more accurate adaptation to trends on the labor market and creation of new business models. Research limitation: narrowing the group of experts to University students. Value added of the research: better-motivated employees with a satisfactory level of work-life balance will contribute to an increase of societal satisfaction level.

THE PRIORITIZATION OF INTANGIBLE CAPITAL FOR SERVICE INNOVATION IN PHILIPPINE MICRO, SMALL, AND MEDIUM SIZED ENTERPRISES

John Mari Yupangco De Ocampo, Thesis on AHP; Dean Andre Dionisio, Thesis Presenter on AHP; Janine Simone Bocalan King, Thesis on AHP; Ricardo Antonio Villanueva, Thesis Presenter on AHP

Abstract

Prioritizing intangible capital is a critical investment in gearing firms up towards service innovation. Previous researches have shown that there is positive link between intangible capital and new service success, but only a few have addressed what makes a firm specifically Micro-Small-Medium Enterprises (MSMEs) effective for service innovation. Building from the multi-criteria decision model, contingency theory and service-dominant logic framework, this research proposes that four types of intangible capital mainly market, service delivery, interaction, and learning are essential to achieve service innovation success. The researchers approach this claim through the integration of a questionnaire investigation and an Analytical Hierarchy Process (AHP) to be sampled by 20 experts/CEOs from their respective MSMEs. The research is able to quantify subjective results obtained through the data gathering tool, and illustrate which form of intangible capital is most prioritized to achieve service innovation. This study acts as a guiding tool to provide recommendations for MSMEs' CEOs and high level managers who are seeking to create the most beneficial and effective service innovation for their firm through the prioritization and implementation of intangible capital.

DECISION MAKING WITHIN THE TOURISM INDUSTRY WITH AHP: DETERMINING KEY INFLUENTIAL FACTORS AFFECTING FOREIGN VISITORS' DECISION TO REVISIT BELIZE, CENTRAL AMERICA

Marvin Antonio Ruano, PhD Student

Abstract

Determining which factors influence a visitor's decision-making is a complex task that requires an analytical approach. The country of Belize, Central America, is highly dependent on tourism as source of foreign revenue; thus, sustaining the inflow of new and repeat visitors is invaluable to the economy. This paper assesses the key influential factors affecting foreign visitors' decision to revisit Belize, through an application of the Analytic Hierarchy Process (simply referred to as AHP), and identifies which specific factors influence visitors the most. Expected results should coincide with similar findings, which state that a visitor's highest motivation for travel is exploring nature, culture and history, and local food. However, final results reflect that although the most influential factors affecting foreign visitors' decision to revisit Belize include attractions and activities (specifically natural attractions), these are not the only key influential factors. Affordability, safety and security, and people, rank equally as high; therefore, these results only partially support the hypothesis. Nevertheless, the objective of this study is not only to identify the most influential factors affecting visitors' decisions, but also to create awareness through the findings and draw closer attention to these factors or areas within the tourism industry. Using a survey approach, the study collects qualitative and quantitative data from experts, foreign visitors, designated organizations, etc., analyses the data using "Super Decisions Software", and substantiates it with other information collected through secondary research, group feedback and additional methods. The research serves as an AHP application guide and provides important insights into the tourism industry.

Session Chair: Rafikul Islam, International Islamic University Malaysia, Malaysia

6.2 BUSINESS AND INNOVATION SYSTEMS

4:00 pm to 5:00 pm
Room: Grand Room IV

DETERMINING STRATEGY FOR ADOPTION OF PREFABRICATED HOUSING BY DEVELOPERS IN LAGOS STATE: AN AHP APPROACH

Bolajoko Nkemdinim Dixon-Ogbechi, Department of Business Administration, University of Lagos, Nigeria; Anthony Kayode Adebayo, Department of Architecture, University of Lagos; Cephas Adeoye Adelore, Department of Architecture, University of Lagos

Abstract

Research has shown that there is presently a housing deficit of about 17 million in Nigeria yet it appears the concerted efforts that have been put in place to address this issue by government has not yielded the expected results. Though the Nigerian government, in the Vision 2020 policy document recognized that one of the ways of resolving the issue of provision of adequate housing in Nigeria is to move from the traditional brick and mortar system to modern construction methodology like the prefab housing system, not much may have been done to promote the adoption of this new methodology by relevant built environment stakeholders among whom are developers. This study employed the survey research approach using the AHP model to investigate the relative importance of factors that can promote the adoption of the prefab Housing Technology by developers in Lagos State with a view to formulating appropriate strategies.

NIGERIAN CONSUMERS' ONLINE RETAILING EVALUATION AND BEHAVIOURAL INTENTIONS DECISION USING ANALYTIC HIERARCHY PROCESS (AHP)

Adebola Glorious Adekoya, University of Lagos, Nigeria; Emmanuel Olateju Oyatoye, University of Lagos, Nigeria

Abstract

Recently, online retailing has maintained an attractive unique selling point in Nigeria. However, amidst the acclaimed growth, there are still some fundamental problems such as lack of trust, poor customer service,

and inadequate infrastructures needed to enable online retailing. All these are a source of main concerns for the prevention of consumers from conducting more online shopping and hampering the continuous online repurchase intention. In view of the gaps identified and suggestions for further studies by various scholars, this paper conducted an investigation into the identification, analysing, and prioritizing of post-adoption factors used by online retailing consumers to evaluate the Nigerian online retailing industry that would lead to repurchase behaviour. Respondent are asked to identify the different post adoption factors used in evaluating online retailing service providers. Respondents are requested to indicate and compare the various post adoption factors used in evaluating online retailing service providers, according to their judgment, on how important they are when compared with one another. The sample size for the study is 380 participants. Responses is generated from MBA part time programme university students in Lagos state, Nigeria using a multi-stage sampling design technique by means of a structured questionnaire containing dichotomous questions based on Saaty's scale of preference. Consistency ratios are to be computed to confirm how consistent the judgments of the respondents were. Composite priorities of the critical importance of the factors are to be computed, while the pooled average composite priorities are also computed. The results from the study would revealed most important factor(s) used by consumers to evaluate online retailing service providers that leads to repurchase behavioural intentions decision. The knowledge gained from this study would go a long way in ensuring effective marketing policies towards the interest of customers which would eventually facilitates positive customers attitude towards the organizations.

ANALYTIC NETWORK PROCESS FOR ESTIMATING THE DETERMINANTS OF KNOWLEDGE SHARING AMONG ACADEMICS IN NIGERIA

Olamilekan Gbenga Oyenuga, University of Lagos; Sulaimon Olanrewaju Adebiyi, Department of Business Administration, University of Lagos. Nigeria

Abstract

Knowledge and its management are the crucial elements necessary for the growth of both an individual and organisations as a whole in order to

gain competitive edge and sustain core competencies. Similarly, knowledge sharing (KS) is a core process to knowledge management which aids innovation and regeneration of knowledge among individuals within institutions which cannot be overemphasized owing to its importance in sustainable competitive advantage. Therefore, as a citadel of knowledge, academic institutions needs to measure the factors that influence knowledge sharing among its scholars using analytic network process in order to formulate and implement research-driven strategies for sharing knowledge to enhance competiveness. The research design is quantitative and analytical in nature through a survey of experts (scholars) with usage questionnaire for pairwise comparison of nodesand clusters. Sample was drawn through multi-stage sampling procedure and total of 310 copies of questionnaires were administered to scholars of University of Lagos across 11 faculties on the basis of their career designation in order to ensure representation. Data collected were model into clusters in line with Analytical Network Process (ANP) technique. ANP was employed because of the complexity in knowledge sharing decision-making as it helps in modelling the dependencies and feedback between KS factors in the network. The KS factors were prioritized in order to strengthen the depth of information and the importance of the factors. The results estimated KS determinants (motivators, enablers, and barriers) based on the depth of importance. It expected academic institutions will improve the knowledge base of factors contributing to academia willingness to share knowledge among each other and within the academic institution. Similarly, the fact that attitude to knowledge sharing varies across culture settings make this study stimulating and worthwhile as it enlighten practitioners on the importance of sharing knowledge for their growth and development of the environment.

Session Chair: Bolajoko Nkemdinim Dixon-Ogbechi, Department of Business Administration, University of Lagos, Nigeria

SUNDAY JULY 15

KEYNOTE SPEAKER: KIRTI PENIWATTI

Plenary Session
9:00 am to 10:00 am
Room: Grand Ballroom
Speaker: Dr Kirti Peniwati, Decision Making Facilitator, Jakarta, Indonesia

COFFEE BREAK

10:00 to 10:30 am
Room: Foyer in between the Grand Rooms

1.5 MULTI-CRITERIA DECISION ANALYSIS METHODOLOGY AND THEORY

10:30 am to 12:00 pm
Room: Grand Room I

MEASURING EFFECTIVENESS IN A HIERARCHICAL SYSTEM

Bijaya Krushna Mangaraj, XLRI-Xavier School of Management, Jamshedpur-831001, INDIA

Abstract

Effectiveness is a major criterion of performance measurement that explains the degree to which goals are attained. This paper deals with developing a measure of effectiveness of alternatives with respect to multiple number of criteria, which are organized in a hierarchical structure. A multi-criteria decision-making framework is used to assess this value numerically. The methodology is a three-step process that involves an analytic hierarchy process followed by a multi-objective decision-making model and a multi-attribute decision-making model. In the first step, the procedure generates the weights of the criteria by a pairwise comparison method using Saaty's ordinal scale. The weights of the alternatives are also obtained by the same method with respect to the criteria individually. The second step solves a multi-objective linear programming model for maximizing the effectiveness criteria taking into

consideration the weights of the alternatives for the formulation of these criteria. The solution of this model involves "Min" followed by "Average" aggregation operators for combining the criteria that results in the highest common attainment level of the criteria, which acts as a benchmark for the alternatives. The third step evaluates effectiveness of each alternative as its relative closeness to the benchmark. For this, it becomes necessary to re-standardize the weights of the alternatives with respect to the benchmark in order to find out the average values and average distances of the alternatives from the benchmark. This helps in getting the relative closeness of each alternative from the benchmark that lies in the range of 0 to 1. To illustrate the applicability of the model, the proposed methodology is then applied to measure the effectiveness of a human resource information system along four major human resource functions for six factors obtained in a factor analysis of responses from employees of an organization in a questionnaire survey.

COMPARISION CHAIN METHOD FOR AHP

Junwen Feng, Nanjing university of Science and technology

Abstract

Based on the principle of the Analytic Hierarchy Process, under the condition giving the pairwise comparison judgment matrix of the decision maker, a new method to determinate the decision maker's priority vector for the comparison objects called Comparison Chain Method is proposed with a numerical example illustrating its applicability. Finally, the possible strong, weakness and extension of the chain comparison method are discussed, the comparisons with the other methods are made leading to the rationality of CCM, and the possible future research directions for AHP are foreseen.

CARDINAL AND ORDINAL INCONSISTENCY IN PAIRWISE COMPARISONS MATRIX

Konrad Kulakowski, AGH University Of Science and Technology

Abstract

Inconsistency is one of the concepts inseparably associated with AHP. It indicates as to the credibility of the ranking as well as the reliability of decision makers. AHP uses its quantitative idea of inconsistency measure. It is a CI – consistency index proposed along the AHP. Inconsistency,

however, can also be defined qualitatively. One of such qualitative measures is Kendall's inconsistency index. The primary purpose of this work is to compare the values of both CI and KBS for randomly disturbed pairwise comparisons (PC) matrices and check how the increase in the cardinal consistency translates into the rise in the ordinal inconsistency.

AN ANP-BASED SIMULATION OF VULNERABILITY OF TWO-WAY COUPLED SOCIO-ECOLOGICAL SYSTEMS

Luis Antonio Bojórquez-Tapia, LANCIS UNAM, Mexico; Hallie Eakin, School of Sustainability, Arizona State University; Marco A Janssen, School of Sustainability, Arizona State University; Andrés Baeza, School of Sustainability, Arizona State University

Abstract

A spatially explicit, integrated modeling approach in presented here that simulates the two-way coupling of complex socio-ecological systems. A key component of our method is the use of the Analytic Network Process (ANP), a MCDA technique based on the super-matrix approach, to operationalize the dynamic feedback between mental models and the situation at the geographic automata; the ANP generates the priority weights that determine the decisions dynamically. The approach is illustrated as it is being implemented in MEGADAPT (MEGAcity-ADAPTation) — a model that addresses the challenging task of eliciting the vulnerability of Mexico City to underlying socio-hydrological and climatic risks.

Session Chair: Luis Antonio Bojórquez-Tapia, LANCIS UNAM, Mexico

2.3 GOVERNMENT POLICY AND DECISION MAKING

10:30 am to 12:00 pm

Room: Grand Room II

PROJECT EVALUATION IN LOCAL GOVERNMENTS TO REALIZE WOMEN ACTIVE PROMOTION SOCIETY IN JAPAN

Ryo Koizumi, suwa university of science; Yoichi Iida, Suwa University of Science

Abstract

These days, in Japan, it is required for women to participate and advance

in the workplace because of labor population decline. However, it is very difficult for them to do that because of the Japanese history such as the patriarchal system. The Basic Act on gender-equal society established in 1999 and various projects for women to participate in the society began in local governments. On the other hand, in 1990s project evaluation was introduced to local government administration to boost the efficiency of projects. By the way, because any project belongs to a program, project evaluation has to be related to outcome of the program. However, project evaluation often is independent on the program. The purpose of this study is to propose a framework of project evaluation to realize a society promoting women's participation and advance in the workplace in Japan. This method calculates Contribution degree of projects with respect to the program with the AHP/ANP in order to link project evaluation to the program. In this study we evaluated the case of Chino city in Japan, but this framework is possible to apply to projects of the program about gender equality in other local governments.

VARIABLE-SCALE CLUSTERING FOR DECISION MAKING

Xuedong Gao, Donglinks School of Economics and Management, University of Science and Technology Beijing; Ai Wang, Donlinks School of Economics and Management, University of Science and Technology Beijing

Abstract

Decision making can be regarded as a problem-solving activity and decision makers usually consider a problem from different perspectives, hierarchies, dimensions, that is referred to as scale transformation (ST). Although the research on ST related to clustering have achieved some progress, it is mainly confined to the geography and image area. This paper mainly studies the ST problem among clustering analysis especially for decision making. We establish the scale transformation rate (STR) to measure the effect of ST based on the rough set theory. What's more, a variable-scale clustering algorithm (VSC) is also proposed. Experiment illustrates that comparing to the k-means, the VSC is able to ensure every cluster are qualified (which is not limited to only optimize the overall performance) and shows great potential in decision making.

MULTICRITERIA ANALYSIS CONSIDERING UNCERTAINTY FOR THE SELECTION OF THE ELECTRIC POWER SUPPLY SYSTEM - POZO HONDO, PARAGUAYAN CHACO

Carlos Romero, Facultad Politécnica, Universidad Nacional de Asunción; Luis Morinigo, Facultad Politécnica, Universidad Nacional de Asunción; Richard Ríos, Facultad Politécnica, Universidad Nacional de Asunción; Arturo Ramón González Osorio, Universidad Nacional de Asunción - Facultad Politécnica.; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Eduardo Ortigoza, Facultad Politécnica, Universidad Nacional de Asunción; Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.

Abstract

This investigation aims to propose a solution to the lack of electricity supply to the city of Pozo Hondo, a community belonging to the Paraguayan Chaco. A financial analysis is carried out for the proposal of a system that supplies the electric power to the town. Additionally, a multicriteria analysis was carried out with the following evaluation criteria: i) the cost of energy, ii) levels of greenhouse gas emissions, iii) feasibility or political decision. The premise applied in the analysis of the projection of the electric power demand of the village was based on historical data from villages of similar characteristics within the country. The energy supply alternatives considered were: thermal (diesel), renewable (wind and solar) and an extension of the distribution line (23kV). In order to find the best alternative, the HOMER Pro® software was used, which in the simulation process obtains optimum system arrangements as results. With the optimized models, the Monte Carlo methodology is applied so as to introduce fluctuations in the price of diesel fuel into the financial analysis in such a way as to contrast the thermal generation with the generation based on renewable energy. Finally, the Analytic Hierarchy Process (AHP) is applied to obtain the most convenient alternative, taking into account multiple criteria. The research concludes that the optimal supply solution, considering multiple criteria would be that of a hybrid system (thermal and solar).

OPPORTUNITY COST ANALISYS OF THE SALE OF PARAGUAYAN ENERGY FROM ITAIPU TO THE BRAZILIAN MARKET BASED ON A AHP MODEL

Arturo Ramón González Osorio, Universidad Nacional de Asunción -

Facultad Politécnica.; Gerardo Alejandro Blanco, Polytechnic Faculty, National University of Asuncion; Richard Ríos, Facultad Politécnica, Universidad Nacional de Asunción; Cecilia Llamosas, Facultad Politécnica, Universidad Nacional de Asunción; Victorio Oxilia, Facultad Politécnica, UNA; Felix Fernando Fernandez, Universidad Nacional de Asunción - Facultad Politécnica.

Abstract

The abundance of electricity, clean and renewable, is a strategic asset for the development of the countries since this resource has the potential to contribute to economic growth and social progress of the same, generating economic rents through its commercialization and/or promote industrial development processes that could significantly leverage the country's development and improve the quality of life of the population. Given this scenario, the case of Paraguay is noteworthy due to its great availability of hydroelectric power based on its participation in the Itaipú and Yacyreta binational power plants. Today, Paraguay only consumes a small portion of the energy that corresponds to it, and the surplus is ceded to the condominiums -which compensate Paraguay- according to the regulatory framework established by the Treaties constituting the enterprise. The strategic use of surplus hydroelectricity that is currently on loan could be key to driving the process of economic and social development of Paraguay; however, due to the high complexity of decision-making processes in energy policy matters, particularly for countries like Paraguay that are in the middle of the road to development, it implies a complex decision problem that is made up of several options of strategies to follow, which have the potential to influence the welfare of the country and all dimensions of socio-economic development. Given this scenario, this paper proposes a methodology to address the decision-making problem raised in Paraguay, using the AHP to determine the opportunity costs of selling the surplus energy corresponding to Paraguay from Itaipu to the Brazilian electricity market.

Session Chair: *Monica Garcia-Melon*, Universitat Politecnica de Valencia, Spain

3.2 HEALTHCARE DECISION MAKING

10:30 am to 12:00 pm

Room: Grand Room III

EVALUATION OF HEALTH-CARE WASTE TREATMENT TECHNOLOGIES BASED ON ANALYTIC NETWORK PROCESS

Xi Chen, Xidian University; Yaya Sun, Xidian University

Abstract

The safety of health-care waste(HCW) treatment is an important part of maintaining the health of the group, and it is very crucial to choose an appropriate method of HCW management. Based on the understanding of the HCW disposal methods and the consideration of the interdependence of indicators, the objective of this paper is to give a reasonable evaluation of the HCW treatment alternatives by using Analytic Network Process (ANP). Finally, steam sterilization is the best method of HCW management at this stage, so as to further maintain the health of the community and improve living standards of the people.

ASSESSMENT OF HEALTH-RELATED QUALITY OF LIFE (HRQL) IN LOW-BACK PAIN PATIENTS BEFORE AND AFTER VAX-D DISC DECOMPRESSION TREATMENT. ANALYSIS USING THE COMPUTER-ASSISTED ANALYTIC HIERARCHY PROCESS (AHP)

Ivan Naumov, Cyberspace Solutions, Inc; Albert Mancini, Fisioterapia Center; Kenneth Vinton, Pain Relief & Wellness Strategies Center; James Kittelberger, Physical Therapy Center; Thomas L. Saaty, University of Pittsburgh, U.S.

Abstract

Since the early 1990s, the vertebral axial decompression (VAX-D) spinal disc decompression therapy has been successfully implemented in the treatment of patients with low-back pain. Multiple clinical studies have demonstrated that this non-invasive treatment is an effective therapy for the management of low-back pain due to various pathologic conditions, including failed spinal surgery. The goal of this multi-center, international study was to both evidence and quantify the impact of the VAX-D therapy on the health-related quality of life (HRQL) in a sample of 105 patients, 49 male (average age 49.06 years) and 56 female (average age 48.23 years). These patients received a minimum of three, but usually not more

than ten VAX-D treatment sessions of 20-30 min duration each, prior to being assessed for HRQL outcomes. Twelve HRQL assessment criteria were chosen through health care-provider and patient-selected input, related to pain intensity, personal care, lifting, walking sitting, standing, sleeping, sex life, social life, travel, job/home-duty performance, and range of motion -- and incorporated in an AHP model using DecisionLens analytic hierarchy process (AHP) software. Our results demonstrate that this FDA-approved treatment has improved the overall HRQL in all patients, regardless of gender. The overall HRQL before treatment commenced was 0.432127 in males and 0.442481, on a ratio scale of 0-1, where 1 was the worst possible criteria assessment/outcome and 0 was the most positive. The overall HRQL after treatment ended was 0.0391147 (90.95% improvement) in males and 0.116742 (73.62% improvement) in females, the overall positive VAX-D effect being more pronounced in males. The VAX-D therapy improved the HRQL in all criteria categories, in both male and female patients. This provides evidence of significant personal and public-health benefits that this relatively low-cost, efficient treatment helps most patients with various low-back pain pathology and establishes it as a very valuable alternative to costly surgical low-back pain treatment whenever possible.

Session Chair: Enrique Mu, Carlow University - College of Leadership and Social Change

6.4 BUSINESS AND INNOVATION SYSTEMS

10:30 am to 12:00 pm

Room: Grand Room IV

OPEN INNOVATION: AN ASSESSMENT OF CRITICAL SUCCESS FACTORS USING ANALYTIC HIERARCHY PROCESS

Christian Tabi Amponsah, Yorkville University

Abstract

This paper explores the critical success factors for open innovation in systematization of knowledge exploration, and exploitation to expedite internal innovation and extricate the market for commercialization of business activities. Drawing on extant literature on open innovation and expert opinion from leading innovation firms listed in the Thomas Reuters Derwent World Patents Index covering North America, Europe,

Asia, Sub-Saharan Africa, the Middle East and North African, a plethora of factors were developed and finalized as success factors for open innovations. The Analytic Hierarchy Process, noted for its flexibility, systematic, robustness, and repeatable evaluation, was used to prioritize the factors and finally ranked in critical order. The findings suggest areas that organizations need to pay attention to for potential success of their innovation programs. The study concludes among others that, the accumulation of external knowledge and its dissimulation positively impacts the systematizing of innovativeness in organizations.

APPLICATION OF ANALYTIC HIERARCHY PROCESS FOR FACULTY SELECTION AT NEPALESE UNIVERSITIES

Prabal Sapkota, Kathmandu University, Dhulikhel, Kavre, Nepal; Madhav Prasad Pandey, Kathmandu University, Dhulikhel, Kavre, Nepal

Abstract

In recent times, with the increasing number of both educational institutions and the students, Nepalese education sector has become competitive. Institutions are working very hard to get qualified students as well as qualified faculties. Most of the institutions have developed competitive entrance examination system to select good students. But the selection of faculties becomes a difficult process as multiple criteria and sub-criteria need to be considered. Further, the process becomes more complex if we consider the perspective of two most important actors: the management and the students. It is a case of Multi Criteria Decision Making and AHP has already proven to be a useful tool in such scenarios. In this study, various factors, sub-factors associated with faculty selection have been identified and AHP has been used to prioritize these factors and sub-factors. The analysis has been done from the perspective of management, peer faculties and students. The research aims to provide a guideline for the faculty recruitment team at the universities regarding employee selection and can be applied to other educational institutions as well.

UNDERSTANDING ORGANIZATIONAL CREATIVITY: INFLUENTIAL FACTORS FROM A MAINLAND CHINESE PERSPECTIVE

Ying Li, sichuan university; lei zhang, Beijing Jiaotong University; hong yan, the Hong Kong Polytechnic University; John Thomas Delaney, The

American University

Abstract

The rapid growth of China's economy over the past decade has produced large gains for the Chinese people. In combination with lower growth rates in recent years, the economic gains have exerted pressure on the Chinese government to adjust policies to maintain the standard of living. One adjustment path involves creation of policies encouraging innovation and encouraging organizational creativity. The path is challenged, however, by cultural norms discouraging the development of creative outcomes. This study draws on a rich innovation and creativity literature to identify key factors affecting employee and organizational creativity. We develop a model to prioritize the 35 factors suggested by research to affect creative outcomes. Instead of relying on statistical analysis to examine the relationship between these factors and creativity, we employ the Analytic Hierarchy Process (AHP) – a well-known multi-criteria decision making method to prioritize the determinants of creativity as asserted by a panel of Chinese educators. Results suggest paths to build a creative organizational environment in China, as well as other managerial implications.

THE COMPARATIVE ANALYSIS ON PRIORITIES OF E-LEARNING FACTORS BETWEEN CHINA AND KOREA

Xuting Li, chonnam national university; Jiaxin Wang, Chonnam National University; Min-Suk Yoon, Chonnam National University, Republic of Korea

Abstract

Appropriate supplier can lead the company to reach its competitive This study aims to identify the success factors of e(electronic)-learning using information & communication technology (ICT). For this purpose, this study focuses on identifying differences in success factors among countries in terms of differences in ICT levels and utilization among countries. As a way of solving this problem, this study is based on Analytic Hierarchy Process (AHP). At this point, Analytic Network Process (ANP) is also used to check the independence among elements. We use the compatibility index provided by AHP to compare the results of the two countries (China and Korea) and identify differences. This study summarizes the results of the study and presents future research.

Session Chair: Ying Li, sichuan university

7.2 TECHNOLOGY

12:00 pm to 1:00 pm
Room: Grand Room II

OPTIMIZATION OF QOS IN IP/MPLS/DIFFSERV NETWORKS

KHELLADI Abdelkader, USTHB, Algiers, ALGERIA; LOURIACHI Zineb, USTHB, Algiers, ALGERIA

Abstract

Integration of new services (videoconferencing, IP ...) in data networks with limited performance penalized Quality of Service.

TCP and ATM were used and in early 2000's IP / MPLS / DiffServ solution gave new ongoing development.

Combining MPLS routers mechanisms of differentiated service (DiffServ), separates treatment of flows, according to characteristics and differentiated packets.

These mechanisms are differentiated by the ways they treat information and depend on the mechanism of classification of the network managers. This mechanism classifies different types of traffic in classes of DiffServ, taking into account several parameters, traffic requirements on one hand and preferences of decision-makers on the other hand. Decision-making becomes a delicate task and network manager's face a problem requiring deep study that leads to a multi-criteria analysis.

We split the problem into two phases:

The first phase is multicriteria analysis, AHP is used double hierarchy:

♣ The first concerns different types of traffic in the network and determine priority of each of them and evaluate their requirements to main QoS.

♣ The second concerns DiffServ classes depending on QoS guarantee offered.

The second phase is a mathematical programming: it is a modeling, with a mathematical program in which we integrate the vectors priority calculated by the AHP, the problem of assignment of traffic in the appropriate classes of service, respecting the constraints of availability of network resources on one hand, and the guarantee of the level of service required by the traffics on the other hand.

The program is a binary single-objective, a special case of integer

programming, where the set of feasible solutions is non-empty. In our case, we use the Branch and Bound method to solve this program. At the end, we obtain an optimal assignment, so an optimization of the first mechanism that is the classification.

ADDRESSING THE PROBLEM OF OUTDATED AND IRRELEVANT KNOWLEDGE IN IT-RELATED EDUCATION PROCESS

Mikhail Nikolaev, National Research University Higher School of Economics; Andrey Kulikov, National Research University Higher School of Economics; Konstantin Degtyarev, National Research University Higher School of Economics

Abstract

The emerging field of IT attracts much attention of high school graduates. Overcoming much practical work, hours spent in front of computer's monitor and poring over books, many students and graduates are still facing difficulties with full-time (and even parttime) employment in companies related to IT and software areas of specialization. The present paper is aimed at 'soft' and 'hard' system analysis of weak points of IT-related educational process mainly by the example of Russian Federation, but some points and observations covered are general enough. CATWOE method as a main constituent of P. Checkland's Soft System Methodology (SSM) is used to define a context of the problem (its pain spots) that sets the boundary, within which the information from stakeholders is elicited. Further analysis of data obtained allows to infer criteria and alternatives of possible improving changes for the benefit of the interference in IT-related educational process. Finally, an enhanced Thomas L. Saaty's Analytic Hierarchy Process (AHP) as a refined 'hard' modeling approach is applied to deduce prioritized list of such solutions; their practical effectiveness is empirically substantiated by referring to the educational experience in other countries. Observations and conclusions drawn in the research mirror closely enough transnational tendencies observed on the path of ongoing vital qualitative changes in IT-related educational process.

A MULTI-CRITERIA MODEL FOR SELECTING THE MOST SUITABLE CLASSIFIER FOR SUPPORTING ASSISTIVE TECHNOLOGY ADOPTION IN PEOPLE WITH DEMENTIA

Miguel Angel Ortiz Barrios, Universidad de la Costa, Colombia; Antanas Verikas, Halmstad University; Chris Nugent, Ulster University; Mark Donnelly, Ulster University; Leo Galway, Ulster University; Macarena Espinilla, University of Jaen; Ian Cleland, Ulster University

Abstract

The aging population is increasing significantly in developed countries where living standards are high. Aging comes with the inevitable decline in physical and cognitive function that typically requires some form of intervention of self-management to maintain quality of life. In this respect, classifiers were created to evaluate the appropriateness of incorporating assistive technology into everyday living of people with dementia. In this paper, a hybrid fuzzy AHP-TOPSIS method for selecting the most suitable classifier to support and maintain assistive technology adoption in people with dementia is presented. Taking into consideration characteristics related to performance, usability, scalability, flexibility and design of various assistive technologies. This paper discusses the development of decision models, which were based on a number of carefully selected data.

Session chair: José María Moreno-Jiménez, University of Zaragoza

6.3 BUSINESS AND INNOVATION SYSTEMS

12:00 pm to 1:00 pm

Room: Grand Room IV

ANALYSIS OF ROLE OF DESIGN IN FURNITURE PRODUCTION AND MARKET BY APPLYING ANP

majid azizi, University of Tehran; Gholamreza Mehdikhanloo, University of Tehran

Abstract

This study was carried out due to the severe dearth of research on the role of design in the country's furniture production and market. Accordingly this research represent a decision making model developed to select best solution of role of design in the industry. Four possibilities

can be considered as potential solutions: using fashion design in furniture production (S1), using engineering design in furniture production (S2), using a combination of fashion and engineering designs in furniture production (S3), applying leading countries' design capability with an outsourcing approach in furniture production (S4). The Analytic Network Process and the Super Decision software were used to synthesize and analyze the model. In was found that all calculated decisions were influenced by strategic criteria. A value-weighted competency model was calculated in the first stage with the influence of strategic criteria on the competency model. Hierarchical designs decisions were made for each of the competencies and their subsets (298 sub criteria and 31 middle indices). Paired comparison matrices associated with the degree of importance of each of the competencies were achieved in the second stage. In the final stage, subsets of competencies' weights and their sub-options were identified with the combination of the competencies and the best solution was obtained.

AHP STRATEGIC ANALYSIS FOR HEADQUARTERS RE-LOCATION

Enrique Mu, Carlow University - College of Leadership and Social Change; Milagros Pereyra, University of Pittsburgh, U.S.

Abstract

The purpose of this study is to demonstrate how AHP can be used in conjunction with an organizational change analysis framework (which is qualitative in nature), to address an important decision in a quantitative way. A brief explanation of the theoretical framework will be followed by a case study of an actual organization that used this approach to perform an organizational self-assessment and determine where to re-locate their headquarters.

AHP FOR COMPREHENSIVE APPROACH OF QFD

Catherine Y. P. Chan, Hong Kong Quality Function Deployment Association; Glenn Mazur, QFD Institute, International Council for QFD, University of Michigan; Kim Stansfield, Warwick University WMG

Abstract

The aim of the paper is to explain why and illustrate how the practice of Comprehensive QFD is enhanced with incorporating AHP. With AHP, QFD could use valid priority data to perform coherent and cohesive

deployment. With AHP, QFD is able to address with greater the needs of not a single but multiple customers and seamlessly link the project with management goals. To explain how AHP is used in Comprehensive QFD in greater detail, a reported case about an energy transition programme was borrowed for illustration.

Session Chair: Enrique Mu, Carlow University - College of Leadership and Social Change

LUNCH & CLOSING CEREMONY

1:00 to 2:30 pm

Room: Foyer in between the Grand Rooms

INDEX OF AUTHORS

N

O

P

R

S

T

V

W

X

Y

Z

CONFERENCE PARTICIPANTS – CONTACT INFORMATION

A

Abbas, Haidar, Al Buraimi University College, haidar@buc.edu.om
Abdelkader, KHELLADI, USTHB, Algiers, ALGERIA, aekhelladi@gmail.com
Adebayo, Anthony Kayode, Department of Architecture, University of Lagos, anthonykayodeadebayo@gmail.com
Adebiyi, Sulaimon Olanrewaju, Department of Business Administration, University of Lagos. Nigeria, lanre18april@gmail.com
Adekoya, Adebola Glorious, University of Lagos, Nigeria, agadekoya@unilag.edu.ng
Adelore, Cephas Adeoye, Department of Architecture, University of Lagos, arcephii@yahoo.com
Adhikari, Madhusudhan, Institute of Engineering, Pulchwok, madhusudhan.adhikari@yahoo.com
ALTUZARRA, ALFREDO, FACULTAD DE ECONOMIA Y EMPRESA UNIVERSIDAD DE ZARAGOZA (SPAIN), altuzarr@unizar.es
Amarilla, Raúl Emilio, Polytechnic Faculty, National University of Asuncion, raul7387@gmail.com
Amponsah, Christian Tabi, Yorkville University, chris_tabi@hotmail.com
Ashournejad, Qadir, Ph.D Student of RS & GIS Uni. of Tehran, Faculty of Geography, Dep. of RS & GIS, ashournejad@ut.ac.ir
Azizi, majid, University of Tehran, majid.omid11@gmail.com

B

Baeza, Andrés, School of Sustainability, Arizona State University, andres.baeza@gmail.com
Bahurmoz, Asma M, Bahurmoz Consult, Saudi Arabia, asma@bahurmoz.com
Basak, Indrani, Penn State Altoona, i8b@psu.edu
Blanco, Gerardo Alejandro, Polytechnic Faculty, National University of Asuncion, gblanco@pol.una.py
Bojórquez-Tapia, Luis Antonio, LANCIS UNAM, Mexico, luis@multicriteria.org
Botter, Rui Carlos, University of Sao Paulo, rcbotter@usp.br

C

Cabrera, Francisco E., University of Malaga, fecabrera@uma.es
Cao, Gaohui, Central China Normal University, ghcao@mail.ccnu.edu.cn

Chan, Catherine Y. P., Hong Kong Quality Function Deployment Association, catherine@qfdhk.org
Chen, Xi, Xidian University, xchen@xidian.edu.cn
Chen, Xi, Xidian University, chenxivip710@126.com
Cleland, Ian, Ulster University, i.cleland@ulster.ac.uk
Cómbita-Niño, Dayana Patricia, Universidad de la Costa CUC, dcombita1@cuc.edu.co
Cooper, Orrin, University of Memphis,U.S., olcooper@memphis.edu

D

Dawiec, Dominika, AGH University of Science and Technology, domiwos@agh.edu.pl
De Felice, Fabio, University of Cassino and Southern Lazio, Italy, defelice@unicas.it
Degtyarev, Konstantin, National Research University Higher School of Economics, kdegtiarev@hse.ru
Delaney, John Thomas, The American University, jtdelaney@american.edu
De Ocampo, John Mari Yupangco, Thesis on AHP, john_mari_deocampo@dlsu.edu.ph
Dhital, Ram Prasad, Alternative Energy Promotion Centre, ram.dhital@aepc.gov.np
Dionisio, Dean Andre, Thesis Presenter on AHP, dean_dionisio@dlsu.edu.ph
Dixon-Ogbechi, Bolajoko Nkemdinim, Department of Business Administration, University of Lagos, Nigeria, bdogbechi@gmail.com
Dong, Qingxing, Central China Normal University, qxdong@mail.ccnu.edu.cn
Donnelly, Mark, Ulster University, mp.donnelly@ulster.ac.uk

E

E, Erjiang, Department of Industrial Engineering, Tsinghua University, eej17@mails.tsinghua.edu.cn
Eakin, Hallie, School of Sustainability, Arizona State University, Hallie.Eakin@asu.edu
Espinilla, Macarena, University of Jaen, mestevez@ujaen.es

F

Feng, Junwen, Nanjing university of Science and technology, 213472714@qq.com
Fernandez, Felix Fernando, Universidad Nacional de Asunción - Facultad Politécnica., felixfernandez85@gmail.com

Forbes, Julie E., Carlow University - UPMC Presbyterian-Shadyside, jeforbes@live.carlow.edu

G

Galagar, Karyn Jean, University of San Carlos, karyngalagar@yahoo.com
Galway, Leo, Ulster University, l.galway@ulster.ac.uk
Gao, Xuedong, Donglinks School of Economics and Management, University of Science and Technology Beijing, gaoxuedong@manage.ustb.edu.cn
Garcia-Melon, Monica, Universitat Politecnica de Valencia, Spain, mgarciam@dpi.upv.es
Gargallo, Pilar, Universidad de Zaragoza, pigarga@unizar.es
Gawlik, Remigiusz, Cracow University of Economics, remigiusz.gawlik@uek.krakow.pl
Ginda, Grzegorz, AGH University of Science and Technology, Poland, gg.ginda@gmail.com
Goepel, Klaus D, BPMSG, drklaus@bpmsg.com
Gomez-Navarro, Tomas, Universitat Politècnica de València, tgomezupv@gmail.com
González Osorio, Arturo Ramón, Universidad Nacional de Asunción - Facultad Politécnica., argopy@gmail.com
González-Urango, Hannia Karime, Universitat Politecnica de Valencia, gonzalezurango@gmail.com
Guo, Jianchun, SWPU IN CHINA, guojianchun@126.com
Gutiérrez-Severiche, Edward, Universidad de la Costa CUC, egutierr23@cuc.edu.co

H

Hebb, Abigail M., Carlow University - UPMC Presbyterian-Shadyside, amhebb@live.carlow.edu
Herrera Fontalvo, Zulmeira, Department of Industrial Engineering, Universidad de la Costa CUC, zherrera1@cuc.edu.co
Ho, Chiung Ching, Multimedia University Cyberjaya, ccho@mmu.edu.my
Hosseini, Seyed Javad, Graduate M.S. of Geomorphology from University of Tehran, Tehran, Iran., sjhoseini@ut.ac.ir

I

Iida, Yoichi, Suwa University of Science, youichi.iida@gmail.com
Inturri, Giuseppe, University of Catania, ginturri@dica.unict.it
Islam, Rafikul, International Islamic University Malaysia, rislam@iium.edu.my

J

Jácome-Enríquez, Wilson, Universidad de las Fuerzas Armadas - ESPE, wojacome@espe.edu.ec
jan, naila, Research Assistant, i161093@nu.edu.pk
Janssen, Marco A, School of Sustainability, Arizona State University, janssen@asu.edu
Jassemi-Zargani, Rahim, DRDC Ottawa, Canada, rahim.jassemi@drdc-rddc.gc.ca

K

Kabak, Ozgur, Istanbul Technical University, Turkey, kabak@itu.edu.tr
Kamps, Caelum, DRDC, Caelum.Kamps@DRDC-RDDC.gc.ca
Kashyap, Nathan, Mr, nathan.kashyap@drdc-rddc.gc.ca
Khan, Zaheer Ahmed, Mazoon College, Muscat, zaheeruae@gmail.com
Kharisma, Bayu, Faculty of Business and Economics Universitas Padjadjaran, bayu.kharisma@unpad.ac.id
Kılınç, Hakan, Koc University, hakankilic345@gmail.com
King, Janine Simone Bocalan, Thesis on AHP, janine_s_king@dlsu.edu.ph
Kittelberger, James, Physical Therapy Center
Koirala, Shilpa, Sanima Hydro, koiralashilpa@gmail.com
Koizumi, Ryo, suwa university of science, gh17606@ed.sus.ac.jp
Kulakowski, Konrad, AGH University Of Science and Technology, kkulak@agh.edu.pl
Kulikov, Andrey, National Research University Higher School of Economics, ankulikov@edu.hse.ru
Kuzko, Oleksandr, National Antarctic Scientific Center of Ukraine, uackuzko@ukr.net

L

Lakhani, Ali, Griffith University, a.lakhani@griffith.edu.au
Leonov, Mykola, National Antarctic Scientific Center of Ukraine, g60s1981@gmail.com
Le Pira, Michela, University of Catania, mlepira@dica.unict.it
Li, Xuting, chonnam national university, lixuting@naver.com
Li, Ying, sichuan university, liyinggs@scu.edu.cn
Lichacz, Fredrick, Dr, fred.lichacz@drdc-rddc.gc.ca
Ligardo-Herrera, Iván, Universitat Politècnica de València, ivanligardo@gmail.com

Llamosas, Cecilia, Facultad Politécnica, Universidad Nacional de Asunción, cllamosas@pol.una.py
Lozano-Aguilar, Félix, Universitat Politecnica de Valencia, jlozan@dpi.upv.es
Luo, Yuan, Xidian University, 18710895707@163.com

M

Mancini, Albert, Fisioterapia Center, mancini@inbox.com
MANGARAJ, BIJAYA KRUSHNA, XLRI-Xavier School of Management, Jamshedpur-831001, INDIA, mangaraj@xlri.ac.in
Mansor, Muhd Ridzuan, Universiti Teknikal Malaysia Melaka, muhd.ridzuan@utem.edu.my
Mazur, Glenn, QFD Institute, International Council for QFD, University of Michigan, glenn@mazur.net
Mehdikhanloo, Gholamreza, University of Tehran, mehdikhanloo@ut.ac.ir
Miranda-De la Hoz, Carlos, Department of Industrial and Agroindustrial Management and Operations, Universidad de la Costa CUC, cmiranda6@cuc.edu.co
Mirshams, Mehran, Faculty Member, mirshams@kntu.ac.ir
Mizuno, Daniele, Sao Paulo State University, dani.mizuno@gmail.com
Mizuno, Takafumi, Meijo University, tmizuno@meijo-u.ac.jp
Mohamed, Shafie Sharif, International Islamic University Malaysia, fayosom@hotmail.com
Mohammad Taha, Mastura, Universiti Teknikal Malaysia Melaka, mastura.taha@utem.edu.my
Mohd Salit, Sapuan, universiti putra malaysia, sapuan@upm.edu.my
Monsonís-Paya, Irene, Universitat Politecnica de Valencia, irmonpa@doctor.upv.es
Moreno-Jiménez, José María, University of Zaragoza, moreno@unizar.es
Morinigo, Luis, Facultad Politécnica, Universidad Nacional de Asunción, mpluis_@hotmail.com
Mu, Enrique, Carlow University - College of Leadership and Social Change, emu@carlow.edu
Mursanto, Petrus, Universitas Indonesia, Indonesia, santo@cs.ui.ac.id
Naseh, Hassan, Faculty Member, hnaseh@ari.ac.ir
Naumov, Ivan, Cyberspace Solutions, Inc, program8@inbox.com
Nikolaev, Mikhail, National Research University Higher School of Economics, menikolaev@edu.hse.ru

N

Nugent, Chris, Ulster University, cd.nugent@ulster.ac.uk

Nunez, Donna Mae, University of San Carlos, donnanunez77@gmail.com

O

Ocampo, Lanndon, Cebu Technological University, lanndonocampo@gmail.com
Odulana, Adedotun A., University of Lagos, odlan1@yahoo.com
Ojha, Sakunda, Sanima Hydro, sakunda@sanimahydro.com
Ortigoza, Eduardo, Facultad Politécnica, Universidad Nacional de Asunción, eortigoza@pol.una.py
Ortiz Barrios, Miguel Angel, Universidad de la Costa, Colombia, mangelo2008@gmail.com
Oxilia, Victorio, Facultad Politécnica, UNA, voxilia@pol.una.py
Oyatoye, Emmanuel Olateju, University of Lagos, Nigeria, eoyatoye@unilag.edu.ng
Oyenuga, Olamilekan Gbenga, University of Lagos, Oyenuga_olamilekan@yahoo.com

P

Pahari, Bharat Raj, Institute of Engineering, Central Campus, Pulchowk., bharatpahari@gmail.com
Pandey, Madhav Prasad, Kathmandu University, Dhulikhel, Kavre, Nepal, mpp@ku.edu.np
Peasley, Michael, Middle Tennessee State University, mcpasley@memphis.edu
Pelaez, Jose Ignacio, University of Malaga, jipelaez@uma.es
Peng, Fan, SWPU in CHINA, swpupengfan@163.com
Pereira, Felipe George Gomes, University of Sao Paulo, eng.felipegeorge@gmail.com
Pereyra, Milagros, University of Pittsburgh, U.S., milagros@pitt.edu
Petrillo, Antonella, University of Naples "Parthenope", Italy, a.petrillo@unicas.it

R

Rahimi, Sara, Graduate M.S. of Regional Development Planning from Allameh Tabatabaei university, Tehran, Iran., rahimi.sara@yahoo.com
Ríos, Richard, Facultad Politécnica, Universidad Nacional de Asunción, ing.rios17@gmail.com
Robles, Léo Tadeu, Federal University of Maranhao, leotadeurobles@uol.com.br
Romero, Carlos, Facultad Politécnica, Universidad Nacional de Asunción, carlosdavidcho@gmail.com
Ruano, Marvin Antonio, PhD Student, marvin.ruano100@gmail.com

S

Saaty, Thomas L., University of Pittsburgh, U.S., saaty@katz.pitt.edu
Sagir Ozdemir, Mujgan, ESOGU, Turkey, mujgan.sagir@gmail.com
Salomon, Valerio, Sao Paulo State University, Brazil, salomon@feg.unesp.br
Salvador, Manuel, Universidad de Zaragoza, salvador@unizar.es
Sapkota, Prabal, Kathmandu University, Dhulikhel, Kavre, Nepal, prabal@ku.edu.np
Sato, Yuji, Graduate School of Management, Chukyo University, Japan, ysatoh@1988.jukuin.keio.ac.jp
Sheng, Qi, Central China Normal University, qisheng@mails.ccnu.edu.cn
Shrestha, Rajendra, Institute of Engineering, Central Campus, Pulchowk., rsfluid@ioe.edu.np
Smith, Dianne, Curtin University, dianne.smith@curtin.edu.au
Stansfield, Kim, Warwick University WMG, K.Stansfield@warwick.ac.uk
Suban, Valter, UNIVERSITY OF LJUBLJANA, Faculty of Maritime Studies and Transport, valter.suban@fpp.uni-lj.si
Sun, Yaya, Xidian University, yysun@stu.xidian.edu.cn
Szybowski, Jacek, AGH University of Science and Technology, szybowsk@agh.edu.pl

T

Taji, Kouichi, Nagoya University, taji@nagoya-u.jp
Taye, ABERA Gomeju, Kotebe Metropolitan University, goti11civil.26@gmail.com
Ting, Choo-Yee, Multimedia University Cyberjaya, cyting@mmu.edu.my
Tuljak-Suban, Danijela, UNIVERSITY OF LJUBLJANA, danijela.tuljak@fpp.uni-lj.si

V

Vallecera, Jessa Marie, University of San Carlos, jessamarievallecera@gmail.com
Vargas, Luis G, University of Pittsburgh, U.S., lgvargas@pitt.edu
Verikas, Antanas, Halmstad University, antanas.verikas@hh.se
Villanueva, Ricardo Antonio, Thesis Presenter on AHP, ricardo_villanueva@dlsu.edu.ph
Vinton, Kenneth, Pain Relief & Wellness Strategies Center, unknown@email.com

W

Wang, Ai, Donlinks School of Economics and Management, University of Science and Technology Beijing, wangai22222@126.com
Wang, Jiaxin, Chonnam National University, 1178420734@qq.com
Watling, David, Griffith University, david.watling@griffithuni.edu.au
Wong, Yat, The Hong Kong Polytechnic University, buildinglaw@gmail.com
Wright, Courtney J., Griffith University, courtney.wright@griffith.edu.au

X

Xiang, Jianhua, Engineering Technology Research Institute, xiangjianhua@126.com

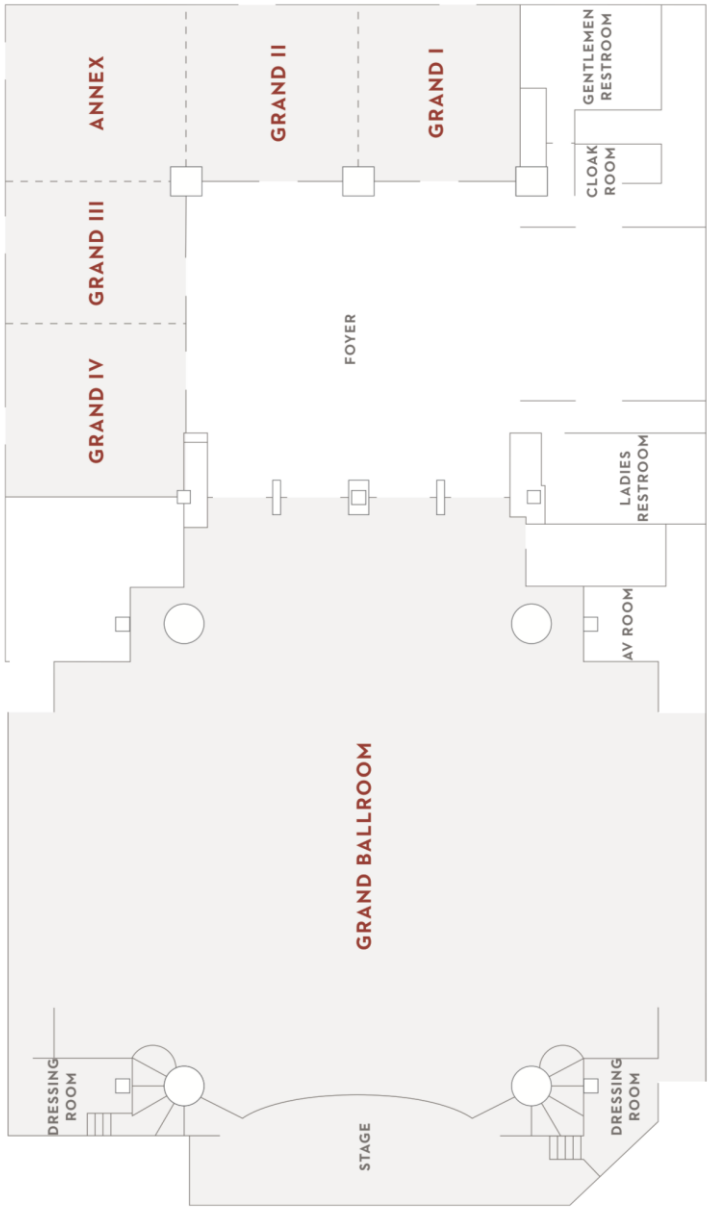
Y

Yan, Hong, the Hong Kong Polytechnic University, hong.yan@polyu.edu.hk
Yap, Jeremy, Multimedia University Cyberjaya, jeremyyap.kylmac@gmail.com
Yavuz, Idil, Dokuz Eylul University, idil.yavuz@deu.edu.tr
Yoon, Min-Suk, Chonnam National University, Republic of Korea, msyoon@chonnam.ac.kr
Yu, Ming, Department of Industrial Engineering, Tsinghua University, mingyu@mail.tsinghua.edu.cn

Z

Zeeman, Heidi, Griffith University, H.zeeman@griffith.edu.au
Zeng, Fanhui, SWPU in CHINA, zengfanhui023024@126.com
zhang, lei, Beijing Jiaotong University, zhanglei_neu@sina.com
Zhu, Keyu, Hefei University of Technology, China, cauchyandy@163.com

CONFERENCE ROOMS LAYOUT



CityU
ISAHP 2018 SPONSOR

Making a Difference through Excellence
in Research and Professional Education

CityU
香港城市大學
City University of Hong Kong
專業 創新 胸懷全球
Professional·Creative
For The World

Creating alternative sources of income for academic conferences across the Americas & Europe

"MaestroMeetings was a great partner to have. They have long experience in areas we'd never dealt with and very helpful in anticipating other issues we had not thought of." Dr. Ross Schneider / REPAL 2016 @ MIT

Learn why our partnership agreements are always warmly received by the executive boards of large and small academic associations

CONTACT US TO LEARN MORE

Nonprofit organizations interested in learning more about our partnerships can contact our offices directly at 412.407.2847 or connect@maestromeetings.org

maestromeetings.org

maestro MEETINGS

The Joseph M. Katz Graduate School of Business

is proud to sponsor

ISAHP2018

In honor of the late
Thomas L. Saaty,
Katz Graduate School of Business professor and developer of the analytic hierarchy process (AHP) and its extension, the analytic network process (ANP).

KATZ
UNIVERSITY OF PITTSBURGH
JOSEPH M. KATZ
GRADUATE SCHOOL
OF BUSINESS