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Message from the founder of the AHP and ANP disciplines

Thomas Saaty

Welcome to ISAHP2014 and welcome to Washington, DC! I imagine your days here will be busy ones. No doubt most of you come with notes on presentations you plan to make and notations about many panels and workshops you want to attend. Some will have plans for edited books and articles you want to discuss, ideas for collaborative research projects to be developed, dates for follow up conferences on particular themes, and numerous other professional concerns to pursue. As with other ISAHP meetings, almost everyone will come with lists of friends and colleagues to see and plans for sharing coffee or a meal. Many no doubt also come with keen interest in exploring the restaurants, museums (all public museums are free), music, cityscapes, shops, and other attractions that Washington, DC, has to offer. ISAHP2014 will follow in the tradition of the other ISAHP conferences; it will be a collage of interactions, catching up, discovery, debate, and enjoyment.

Credit for the wealth of panels, workshops, and discussion groups; the scholarly books to be made available; and the lure of new ideas and insights must be shared widely, as ISAHP2014 is the work of many hands. Central among these, of course, are the ISAHP2014 Conference Chairman Enrique Mu, and the Program Co-Chairs, Birsen Karpak and Antonella Petrillo, and the many track chairs who have worked so hard to put a wonderful program together. Maestro Meetings and its personnel, led by Milagros Pereyra-Rojas, along Maria Soledad Cabezas, handled the organizational details of the meeting beautifully. Their skills and years of experience ensured that the planning and operation of the Symposium were as flawless as possible. The numerous scholars who have put time and

effort into planning panels and encouraging colleagues to present papers are the bedrock of a successful meeting and I especially express my appreciation to them. Throughout the past year the Grand Hyatt Hotel staff have been helpful and cordial in responding to ISAHP's
many logistical needs. ISAHP2014 could not happen without the dedication and hard work of all these individuals.

It is my hope that among the many panels and other activities you have planned for yourself for ISAHP2014, you will make sure to attend the interesting plenary session at the start of each morning and also find time to drop by the Master's Students presentations on Monday. This Symposium promises to be rich with ideas and debates, and I hope it will leave all of you with new insights and refreshed enthusiasm and understanding of the Analytic Hierarchy Process and the Analytic Network Process for decision making and the many ways they have been applied in fields ranging from conflict resolution to supply-chain management. I look forward to seeing many of you in the meeting venues, the conference rooms, and the reception areas, and sharing with you your thoughts about ISAHP2014.

Thomas Saaty
Founder of the AHP and ANP disciplines

Message from the CEO Creative Decisions Foundation

Rozann Saaty

We are pleased to welcome you to Washington, DC, for this very special ISAHP meeting. My husband, Thomas Saaty, the creator of the AHP/ANP, a theory of measurement that is often used in decision making, will turn 88 this summer. So this meeting, the 13th such International Symposium on the AHP, will be a very special celebration. Our thanks to all of you, our longtime colleagues and friends from around the world, who have helped spread his remarkable ideas so widely. It is our pleasure that the foundation we established, Creative Decisions Foundation, has been the primary supporter of this important meeting.

Rozann Saaty
CEO Creative Decisions Foundation

Message from the Program Organizing Committee

Enrique Mu

Welcome to our ISAHP 2014 meeting! The theme for this symposium is "Beyond Decision Making" which refers to our idea that it is the time for AHP/ANP to get out of the toolbox of multi-criteria decision-making experts and to become the tool of everyday decision-makers. After all, this was the original intention of AHP/ANP creator, Dr. Thomas L. Saaty. A methodology that would help the world to be more rational when making decisions.

Antonella Petrillo

For this reason, ISAHP 2014 aspires to be the turning point for AHP/ANP to be accepted as the natural way of making rational decisions in all disciplines. Granted, we do not expect hierarchical thinking to be the only tool used by world decision-makers but rather the main organizing tool due to its intuitive simplicity and natural integration with other decision-making methods.

Birsen Karpak

We have worked very hard to make this symposium a reality and we have counted with the enthusiastic collaboration of the whole AHP/ANP community. Not only the members of the organizing community (program and track chairs whose work has been the hardest) but also from AHP/ANP scholars and practitioners worldwide. Consistent with the theme of the

symposium, we are pleased to report that approximately one third of our presenters are students. Furthermore, we have made a special effort to also involve master-level students, the next generation of AHP/ANP advocates, in this symposium.

Our efforts have been productive and we are confident that you will find new opportunities to participate, meet, and collaborate with other AHP/ANP colleagues among the approximately 200 expected ISAHP 2014 attendees. Enjoy the Symposium!

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The following journals are offering the opportunity to fast track suitable papers accepted to the ISAHP2014 Symposium for academic publishing.

The International Journal of Production Economics

Annals of Management Science

International Journal of the Analytic Hierarchy Process

International Journal of Management and Decision Making

Papers will be screened, selected and recommended for publication to specific journals based on ISAHP2014 reviewer committee evaluation. Authors will be notified of the decision prior to submitting papers to journals.

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The Creative Decisions Foundation was established by Thomas and Rozann Saaty to promote more rational decision-making by people. The Foundation sponsors education, research and software development in advanced methods of decision-making involving the AHP. Of particular interest are conflict resolution, group decision-making on societal issues by incorporating strength of preference rather than the yes-no traditional way of voting, purchasing and resource allocation decisions for private and governmental organizations, and decision-making over the internet.

creativedecisions.net

International Journal of Analytic Hierarchy Process

The International Journal of the Analytic Hierarchy Process (IJAHP) is an electronic journal published by the Creative Decisions Foundation about multi-criteria decision making using the Analytic Hierarchy Process (AHP) and Analytic Network Process (ANP). The IJAHP is published three times a year in an open-access format.

ijahp.org

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Paper Proposals

2014 ISAHP Book of Abstracts/Schedule

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A Combined AHP-Delphi Approach to Assess the Social Responsibility Degree of Equity Mutual Funds

Mónica García-Melón, Tomás Gómez-Navarro, Blanca Pérez-Gladish, and Paz Mendez-Rodriguez

DOI:

A Decision Support Tool to Support Innovative and Strategic Processes

Antonella Petrillo, Leandro Pecchia, and Fabio De Felice

DOI:

A Dynamic Methodology on Determining the Most Appropriate Due Date Assignment Models for Job Shop Scheduling

Şerafettin Alpay

DOI:

A Framework of a Comprehensive Uncertainty Analysis of the Analytic Hierarchy Process Methodology in the Context of Environmental Decision Making

Werner Toth, Bernhard Wolfslehner, and Harald Vacik

DOI:

A Grey Number Approach to Establish Judgment Matrix in AHP

Xiaojia Wang and Jennifer Shang

DOI:

A Group AHP Consensus Reaching Model for Supplier Selection in Collaborative Product Development

Qingxing Dong and Keyu Zhu

DOI:

A Linear Programming Approach Determining Eminent Drivers of Customer Based Brand Equity in Sportswear Industry

G.N. Patel, Richa Singh, and Veenu Sharma

DOI:

A Method of Risk Analysis and Threat Management Using Analytic Hierarchy Process: An Application to Air Defense

G. S. Malik and S. K. Das

DOI:

A New Offering FAHP and FTPSIS Approach, Productvity Indexes Iranian Central Iron Ore Company

Rasoul Motakiaee

DOI:

A Review and Critique of Hybrid MADM Methods Application in Real Business

Jiri Franek and Katerina Kashi

DOI:

A Study of the Acceptance of Wearable Technology for Consumers —An Analytical Network Process Perspective

Chiau-Ching Chen and Hsu-Shih Shih

DOI:

A χ 2 based approach to consistency evaluation of multiplicative preference relations

Michele Fedrizzi and Fabio Ferrari

DOI:

Academic Performance Evaluation of the Departments in Engineering Faculty of a University by Utilizing TOPSIS and Fuzzy Delphi

Oğuz Torağay and Murat Arikan

DOI:

Aggregating Pair-Wise Comparisons Given in Scales of Different Detail Degree

Vitaliy V. Tsyganok and Oleh V. Andriichuk

DOI:

AHP Based Decision Model for Appraising Residential Real Estates in an Abstracted Zone

Seçil Kavas and Y. Ilker Topçu

DOI:

AHP for Recruitment Risk Management in R&D Sector

Sokhi, R.K.

DOI:

AHP in Personnel Management: Can the Key Competencies Change with Company's Strategy?

Katerina Kashi and Jiri Franek

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AHP Model for Quality Assessment of Architectural Design

Tihomir Hunjak and Vjeran Strahonja

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AHP Modification for Decision Making Under Uncertainty

Alexander V. Bochkov and Nikolay N. Zhigirev

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AHP Priorities and Markov-Chapman-Kolmogorov Steady-States Probabilities

Stan Lipovetsky and W. Michael Conklin

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Alignment of Leagile Strategies With Off-site Manufacturing: Application of ANP in Australian Housing Supply

Sherif Mostafa and Jantanee Dumrak

DOI:

An AHP Model to Design Mobile Applications

Emre Çimen and Gürkan Öztürk

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An AHP, ANP Decision Support Approach for the Prioritisation and Selection of "Restoration" and "Improvement" Projects Within an Industrial Environment

Jean Khalil

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An Analysis of the Process in Deriving Further Benefits of an AHP Model

Chakradhar Iyyunni, Viraj Trivedi, and Vittal Anantatmula

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An ANP Approach for the Stakeholder Analysis in Participatory Environmental Management. The Case of Spanish Wetland La Albufera

Pablo Aragonés-Beltrán and Mónica García-Melón

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An Application of Incomplete Pairwise Comparison Matrices for Ranking Top Tennis Players

József Temesi, Sándor Bozóki, and László Csató

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An Empirical Evaluation of M-Payment Business Models Using Analytic Hierarchy Process and Sensitivity Analysis

Abid Ali

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An Empirical Identification of Vendor Selection Process via Deployment of Multiple Attribute Decision Making (MADM): Comparison Among Swedish and Iranian Companies

Mostafa H. Deldoost, Mohsen Faizollahi, Fabio De Felice, and Antonella Petrillo

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An Innovative Multi-Criteria Decision Method for Impacts' Assessment of UNESCO Brand

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Zhanglin Peng, Shanlin Yang, and Xiaojia Wang

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An Integrated Ranking Procedure for Replacement Decisions of Critical Medical Equipments

Tugba Efendigil

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Analysis and Evaluation of Alternative Sites for a New Heavy Crude Upgrading Plant in Colombia

Mario Castillo, John-Jairo Rios, Astrid Bernal, César Bejarano, and Óscar Martinez

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Analysis of Agricultural Mechanization in Zanjan Province, Iran: Application of SWOT-AHPMethod

Mostafa Nazari Nasab and Majid Azizi

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Analysis of the Factors Affecting the Decision Making Process of Recruitment and Selection of Strategic Positions

Prof. MSc. Alexis Olmedo, Paolo Herrera Manriquez, Felipe Rojas Rojas, and Michael Olivares Maturana

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Analytic Hierarchy Process as a Ranking Tool for Decision Making Units

Josef Jablonsky

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Analytic Hierarchy Process to Assess Technological System in Water Treatment Plants

Claudio Macuada and Astrid Oddershede

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Analytic Network Process for Deciding Disaster Recovery Program in Yogyakarta Indonesia

Ignatius Luddy Indra Purnama, Ririn Diar Astanti, Hery, and Mujgan Sagir Ozdemir

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ANP and DEMATEL for Six Sigma Project Selection and Evaluation Process in a Colombian Hospital

Miguel Angel Ortíz Barrios, Heriberto Alexander Felizzola Jimenez, and Santiago Nieto Isaza

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ANP Row Sensitivity and the Resulting Influence Analysis

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Prabal Sapkota

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Comparison Accuracy – Implications for Deriving Priorities and Consistency

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ERP SOFTWARE SELECTION MODEL USING ANALYTIC NETWORK PROCESS

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ABSTRACT

During the implementation of Enterprise Resource Planning (ERP) in any company, one of the most important issues is the selection of ERP software that can satisfy the needs and objectives of the company. This issue is crucial since it may affect the duration of ERP implementation and the costs incurred for the ERP implementation. This research tries to construct a model of the selection of ERP software that are beneficial to the company in order to carry out the selection of the right ERP software vendors according to the needs and objectives of the company. The proposed ERP software selection model is constructed based on three different perspectives, that are business, technology, and organizational perspectives. Each perspective consists of various criteria needed to be considered in the selection of ERP software. The proposed model is built over four clusters, which are Business Perspective (Cost, Quality, Vendor Status, Customization), Technological Perspective (Functionality, Duration of Implementation, User Friendliness, Software Update), Organizational Perspective (Training, Employee Needs, Company Culture, Human Resistance), and Vendor Alternative (Vendor A, Vendor B, Vendor C). Since this problem of ERP software selection is involving many criteria and there exist dependency among criteria, the ERP software selection model is constructed based on the Analytic Network Process methodology. The Super Decision software used in this research for solving the model using an illustrative example from an automotive finance company in Indonesia.

Keywords: Analytic Network Process, Multi Criteria Decision Making, Enterprise Resource Planning, Software Selection.

1. Introduction

Enterprise Resource Planning (ERP) is an emerging business concept for integrating all departments and business processes of a company into a single computer system that can serve all company requirements. This concept is widely accepted by various type of industry nowadays due to highly competitive business atmosphere that force any company to improve their business processes and business goals through any means including the advance of their information technology. During the implementation of ERP in any company, one of the most important issues is the selection of ERP software that can satisfy the needs and objectives of the company. This issue is crucial since it may affect the duration of ERP implementation and the costs incurred for the ERP implementation.

2. Literature Review

Parthasarathy (2007) stated that there are three different perspectives should be considered during the ERP software selection, which are business, technological, and organizational perspectives. Some researchers already used some criteria based on business and technological perspectives such as Wei et al. (2005), Ayag and Ozdemir (2007), Kahraman et al. (2010), Lin et al. (2011). The literatures show that organizational perspective has not been included yet in the selection criteria.

3. Hypotheses/Objectives

This research tries to construct a model of the selection of ERP software that are beneficial to the company in order to carry out the selection of the right ERP software vendors according to the needs and objectives of the company. The proposed ERP software selection model is constructed based on business, technology, and organizational perspectives. Since this problem of ERP software selection is involving many criteria and there exist dependency among criteria, therefore, the ERP software selection model is constructed based on the Analytic Network Process methodology.

4. Research Design/Methodology

The proposed ANP model for selecting ERP software is developed based existing literature review on ERP software selection and considering some inputs from experts from an automotive finance company in Indonesia. The criteria exist in the literature for selecting ERP software are listed. Based on the discussion with the experts, some criteria are selected and grouped into three clusters, which are business perspective, technological perspective, and organizational perspective. The ANP network structure of this problem are then developed based on the inner and outer dependence among criteria. An example of ERP software selection based on the experts' experience in their company is being used for illustrative purpose. The illustrative example is solved following ANP methodology assisted by Super Decision software.

5. Data/Model Analysis

The proposed ERP software selection model is built over four clusters, which are business perspective, technological perspective, organizational perspective, and vendor alternative. business perspective cluster consists of four criteria, which are cost, quality, vendor status, and customization. Technological perspective cluster consists of four

criteria, which are functionality, duration of implementation, user friendliness, and software update. Organizational perspective cluster consists of four criteria, which are training, employee needs, company culture, and human resistance. Vendor alternative cluster consists of alternatives of vendor, namely vendor A, B, and C. The network structure of criteria within the proposed ERP software selection model is presented in Figure 1.

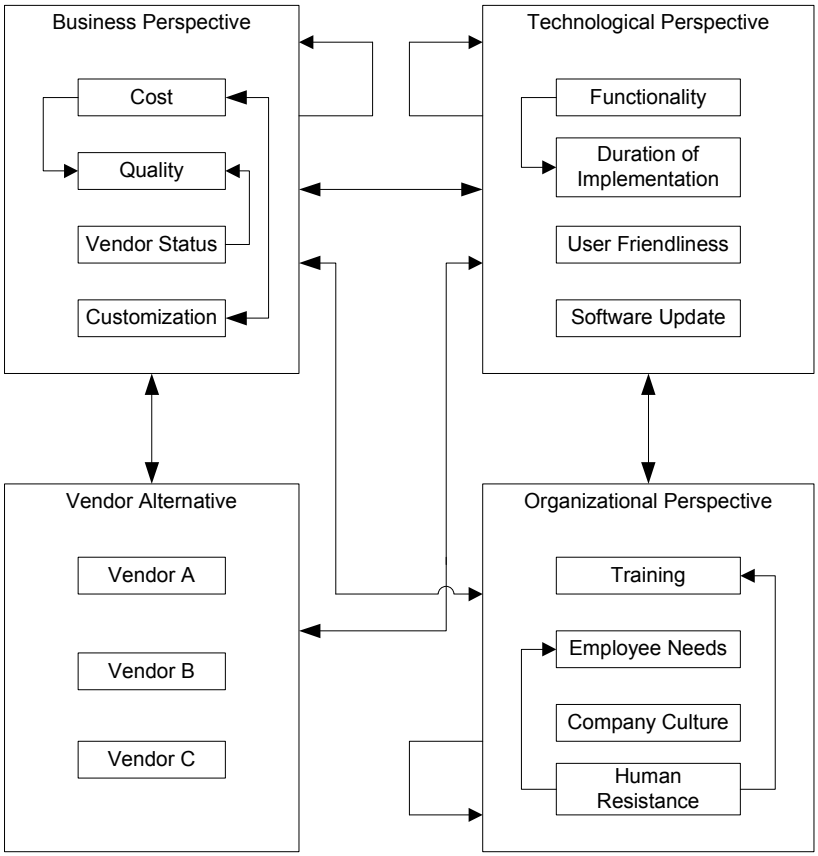

Figure 1 Network structure of ERP software selection model

Following the ANP methodology, finally, at the synthesis step the raw, normalized, and ideals values of each vendor alternative are presented in Table 1.

Table 1
Synthesis results of ERP software selection model

Vendor Alternative	Raw	Normalized	Ideals
Vendor A	0.0166	0.5320	1
Vendor B	0.0062	0.1987	0.3734
Vendor C	0.084	0.2692	0.5060

6. Conclusions

This research is able to build an ERP software selection model based on ANP method. The ERP software selection model comprises of four clusters, which are business perspective, technological perspective, organizational perspective, and vendor alternative. From an illustrative example from an automotive finance company in Indonesia, it is found that the ideal value for vendor A, vendor B, and vendor C, are 1, 0.3734, and 0.5050, respectively. This synthesis result show that the vendor A is the best ERP software for this company.

This research should be extended to various type of industry, so that the ERP software selection model can be generalized.

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