ANALYTICAL HIERARCHY PROCESS (AHP) AND ANALYTIC NETWORK PROCESS METHODS AND THEIR APPLICATIONS: A TWENTY YEAR REVIEW FROM 2000-2019

Amin Ullah Khan
Ph.D. Scholar at Department of Economics and Law
University of Macerata, Italy
&
Master's in Engineering Management, Department of Management Science
Ghulam Ishaq Khan Institute of Engineering Sciences & Technology, Topi
Amin.llh@gmail.com

Yousaf Ali Ph.D.
Assistant Professor Department of Management Science
Ghulam Ishaq Khan Institute of Engineering Sciences & Technology Topi, Swabi, KPK, Pakistan
yousafkhan@giki.edu.pk

ABSTRACT

This research aims to analyze a literature review of publications that have incorporated the Analytical Hierarchy Process (AHP) and Analytic Network Process (ANP) methods. The AHP and ANP methods have contributed to decision-making in complex situations in recent years and possess widespread applications. Such applications are spread over the years with publications in various major areas such as engineering/technology/applied sciences, social sciences, health sciences, and environmental studies. These two methods provide multiple solutions to researchers in these fields, which is why they are being considered in the current study. For this purpose, data was collected from 920 research papers after a vigorous literature review using different search engines. This paper aims to classify the publications on AHP and ANP methods from the years 2000 to 2019 to identify recognized journals based on their indexes. Furthermore, another objective of this study is to compare total publications by year, publications by field by year, and lastly, observe the distribution by country of the studies. This paper concludes that the highest number of publications are from Turkey, and the highest number of publications used AHP method applications in every category. Most of the publications belonged to the technical fields, followed by social sciences. The study concluded that the AHP method is more widely preferred by researchers in almost every field and application because it tends to produce more accurate results than the ANP.

Keywords: decision science; AHP; ANP; applications; literature review

1. Introduction

In the current world, technological advancement has had a positive impact on our society. With the latest advancements, various fields of study have emerged that have the possibility to create huge improvements and new developments in the future (Almannai, Marom, & Sutton, 2016). In the past, there were fewer fields of study,

such as conventional engineering programs or a general physician in medicine because things were more straightforward (Sax, et al., 2016). As time has progressed, various fields have emerged that require demanding research topics and research methods to cope with complex problems. Such complex situations require solutions that can provide long-term answers to researchers, and enable them to formulate conclusions and policies based on the results (Laukkanen, Itkonen, & Lassenius, 2017). Such complex situations create multifacted decision-making scenarios that need to be dealt with by various experts in the concerned fields. Such decision-making scenarios require various multi-criteria decision-making (MCDM) techniques that can handle complex situations and provide logical answers. These analytical solutions can pave the way for policymakers to formulate their decisions (Kabak, Burmaoglu, & Kazancoglu, 2012).

MCDM is a tool that is both qualitative and quantitative. It helps evaluate complex problems and helps decision-makers reach a conclusive decision (Mardani, Jusoh, & Zavadskas, 2015). It also helps formulate a mathematical tool that can support the decision and the policymaker's evaluation of the functioning criteria. Similarly, the MCDM tool efficiently provides a promising framework based on multiple criteria evaluation (Wątróbski et al., 2019). The alternatives that are deemed the best are selected based on proper criteria analysis through various tools (Chen, et al., 2011). This helps choose a suitable alternative in the form of technology, supplier, or location, etc. (Nallusamy, Kumar, Balakannan, & Chakraborty, 2016). Furthermore, MCDM involves both engineering and managerial levels and is considered a dynamic and complex tool in decision analysis scenarios (Opricovic & Tzeng, 2004).

MCDM techniques are well suited for solving complex problems and are used by experts in complex decision situations. Different forms of MCDM tools vary from selecting alternatives based on multiple criteria to relying only on the attributes or criteria for decision analysis. Some of the MCDM methods are as follows: Analytic Hierarchy Process (AHP), Analytic Network Process (ANP), Aggregated Indices Randomization Method (AIRM), Base-criterion method (BCM), Choosing By Advantages (CBA), Data Envelopment Analysis (DEA), ELECTRE, Goal Programming (GP), Grey Relational Analysis (GRA), Measuring Attractiveness by a categorical Based Evaluation Technique (MACBETH), Simple Multi-Attribute Rating Technique (SMART), New Approach to Appraisal (NATA), PROMETHEE, Stochastic Multicriteria Acceptability Analysis (SMAA), Technique for the Order of Prioritization by Similarity to Ideal Solution (TOPSIS), Value Analysis (VA), VIKOR and Weighted Product Model (WPM), to name a few (Zavadskas & Turskis, 2011, Yang, et al., 2008). These methods address different needs in the form of alternative selection based on distinct criteria. Similarly, some experts even consider solving complex situations by only analyzing different criteria. All of the methods can be applied in different instances according to the purpose they might fulfill for a specific problem or issue (Chui-Hua, Tzeng, & Lee, 2012). In order to highlight the different uses of these methods, this paper only considers the AHP and ANP approaches and reviews their usage from 2000 to 2019. This review is based on the application of these two methodologies in the four following fields: engineering/technology/applied sciences, social sciences, health sciences, and environmental studies.

The Analytical Hierarchy Process (AHP) has been a favorite tool of research experts from various fields such as engineering, technology, manufacturing, production, social sciences, etc. It has proved to be a reliable and efficient technique. Experts

have applied it with various other methodologies to obtain more beneficial results (Davies, 2001). Professor Thomas L. Saaty developed the AHP in the 1970s to support researchers who were analyzing complex decision problems (Golden, Wasil, & Harker, 1989). The AHP is based on a pairwise comparison of the elements in each level of the hierarchy. Furthermore, it analyzes the alternatives at the lowest level of the hierarchy to select the best alternative (Saaty and Shang, 2011). In this way, experts can convert subjective judgments to objective measures (Sipahi & Timor, 2010). Further, to study the AHP method and the areas it has been utilized in, this paper will review all of the articles published in recognized journals from 2000 to 2019.

The Analytic Network Process (ANP) is currently in the development stage. As the world progresses, its uses will increase as further improvisations are made. Professor Thomas L. Saaty also developed the ANP in 1996 (Saaty, 2001) which is considered a more general form of the AHP. The ANP helps solve more complex situations, relationships, and interdependencies and even provides feedback among the elements in the hierarchy. ANP applications can also be found in various fields such as engineering, social sciences, and environmental studies and provide a more in-depth focus on the risk and uncertainty (Sipahi & Timor, 2010).

The purpose of reviewing the AHP and ANP methods in this study is to identify the publications that have employed these two methodologies separately or with other tools in prominent journals. Furthermore, this study's main purpose is to review the studies that were published in prominent journals using AHP and ANP methodologies from 2000 to 2019. The main information that the study seeks to discover includes: (1) Determining the total number of publications where each tool is discussed; (2) Determining the total number of publications where each tool is discussed per year; (3) Determining the total number of publications where each tool is used in four different sectors, i.e., engineering/technology/applied sciences, social sciences, health care, and environmental studies; (4) Identifying and determining the different journal indexes that publish journals that have papers related to each tool and (5) Determining the total number of published articles in each country in descending order (using the country of the first author). Further sections of this paper comprise the literature review, followed by the methodology, results, discussion, and conclusion.

2. Literature review

Multi-criteria decision-making techniques enable researchers and experts to make decisions about qualitative and quantitative scenarios that leave no room for doubt about the experts' decisions that were based on the comprehensive analysis carried out on vigorously collected data (Bonissone, Subbu, & Lizzi, 2009). Different MCDM techniques offer different solutions based on their applications and according to a specific situation's required solution. Some of the most common MCDM techniques that are applied in current research studies include ELECTRE (Roy, 1968), Grey Relational Analysis (GRA) (Deng, 1989), PROMETHEE (Brans & Vincke, 1985), Technique for the Order of Prioritization by Similarity to Ideal Solution (TOPSIS) (Hwang & Yoon, 1995), VIKOR (Opricovic & Tzeng, 2004), AHP and ANP.

MCDM techniques help make decisions in a complicated decision-making situation. They help resolve complex scenarios based on multiple different criteria and

attributes and choose the best and most efficient alternative. Such techniques have had many applications in different research areas and are applied according to the specific requirements of each study. One such technique, the ELECTRE method has different applications in the fields of web-based applications (Yanie, et al., 2018), mobile applications (Aggarwal, Grover, & Ahuja, 2019), supplier selection (Ozturk, Pekel, & Elevli, 2018), and many more. Similarly, the Grey Relational Analysis method also has various applications in different situations. Such applications include the case of energy sources evaluation (Ayag & Samanlioglu, 2019), electrochemical discharge machining optimization (Garg, Singh, & Singh, 2019), and ERP package evaluation (Ayag & Yucekaya, 2019). Furthermore, another famous MCDM tool is the PROMETHEE technique which has been recently applied in the areas of material selection (Gul, Celik, Gumus, & Guneri, 2018), medical imaging (Ozsahin, Sharif, Ozsahin, & Uzun, 2019), and the urban regeneration process (Bottero, D'Alpaos, & Oppio, 2018). Some of the most famous techniques such as TOPSIS and VIKOR have vigorous applications and are being used worldwide. Some of the most recent applications of TOPSIS can be found in the fields of technology (Aloini, Dulmin, Mininno, Pellegrini, & Farina, 2018), ISO quality management systems (Gokpinar, Tansel, & Yurdakul, 2019), and the agriculture sector (Seyedmohammadi, Sarmadian, Jafarzadeh, Ghorbani, & Shahbazi, 2018). Similarly, VIKOR also has applications in major areas such as waste management (Gundogdu, Kahraman, & Karasan, 2019), financial failure analysis (Apan, Oztel, & Islamoglu, 2018), and hospital care (Chen T.-Y. , 2018).

The most important methodologies that will be reviewed in this paper are the AHP and ANP. Thomas L. Saaty developed the AHP in the early 1970s, and it has been widely implemented in numerous studies since then. The AHP is considered one of the most widely used MCDM methods and is a preference of researchers in complex decision-making (Yang, et al., 2019). The AHP's purpose is to analyze complex scenarios and support experts in their efforts to make the best decision based on their obtained priorities. Similarly, the AHP also helps manage the consistency of the data and identify inconsistencies. Inconsistent data results in faulty and inauthentic conclusions (Wang, Yue, Gao, & Chen, 2018). The AHP's applications can be found in various decision-making studies in many different fields. One study conducted by Zohoori, Vahedi, Meo, & Sorrentino (2016) targeted the area of wind farm applications using the improved AHP method and deduced solutions for the suggested applications. Furthermore, another study highlighted the issue of landfills for a site in Iraq by using AHP and GIS applications, proving the adaptability of AHP when used with other methodologies (Chabuk, et al., 2017). Similarly, the AHP's applications can also be found in the construction industry. One study aimed to provide augmented solutions for the industry to make them feasible in the long term (Darko, et al., 2019). Furthermore, it has been applied in 3D technology for cultural heritage applications (Angelo, Stefano, Fratocchi, & Marzola, 2018). The AHP technique's applications have also been extended for use in maintenance areas of production focusing on the automotive industry (Shinde & Prasad, 2018). Similarly, the AHP has been used in plant site selection for solar PV (photovoltaic) focusing on efficient transmission lines in urban cities (Garni & Awasthi, 2017). The AHP has also been implemented to improve recommended projects in an electricity generating company (Ezzabadi, Saryazdi, & Mostafeipour, 2015). Lastly, the AHP is not limited to technological applications. For example, one study employed the AHP for store location selection in Turkey (Koc & Burhan, 2015).

The ANP was also developed by Thomas L. Saaty (Saaty T. L., 2004). The ANP formulates a specific problem into a network instead of converting it into a hierarchy process as in the AHP. The purpose of the ANP is to select the best alternative based on multiple decision criteria. Such a decision is carried out by pair comparison of the weights of the components which leads to the selection of an alternative in a decision-making scenario (Ayag & Ozdemir, 2009). One application of the ANP is in the Internet of Things (IoT) for security features in the specified field. The ANP method helped evaluate security features and arrangements for the IoT industry (Hinduja & Pandey, 2020). Similarly, another study employed the ANP in European countries for the implementation of information and communication technologies (ICT) (Becker, Becker, Sulikowski, & Zdziebko, 2018). Another study highlighted the hurdles that SMEs might face in industry 4.0 application implementation using the ANP methodology (Sevinc, Gur, & Eren, 2018). Furthermore, the ANP also has applications in the area of sustainability and decision-making scenarios (Shen & Tzeng, 2018). Lastly, Zegordi, Nik, & Nazari (2012) employed fuzzy ANP and fuzzy TOPSIS for risk assessment in a power plant project. The hybrid methodologies were applied to study the factors that can be risky in the functioning of the power plant.

This study aims to review all of the publications involving AHP/ANP in internationally recognized journals based on four different categories. The aim is to highlight the applications of the AHP and ANP techniques in these four fields from 2000 to 2019. Based on the review of these papers, we will determine which technique is more trustworthy for analysis. That goal and the research questions defined in the introduction formulate the novelty of this study.

3. Methodology

This paper's data collection consisted of a vigorous literature review from papers that were published in recognized international journals. The data was extracted using the four different search engines mentioned below:

- *Researchgate*
- *Science Direct*
- *Google Scholar*
- *Microsoft Academic*

The recognized journals were selected based on the following indexes:

- Science Citation Index Expanded (SCIE)
- Social Sciences Citation Index (SSCI)
- Emerging Sources Citation Index (ESCI) and
- Scopus

The journal index is defined as the uniqueness allotted to the journals based on authenticity in their respective fields, i.e., engineering, social sciences, emerging sciences, and Scopus database (Mongeon & Paul-Hus, 2016). The methodology of this study is shown in Figure 1.
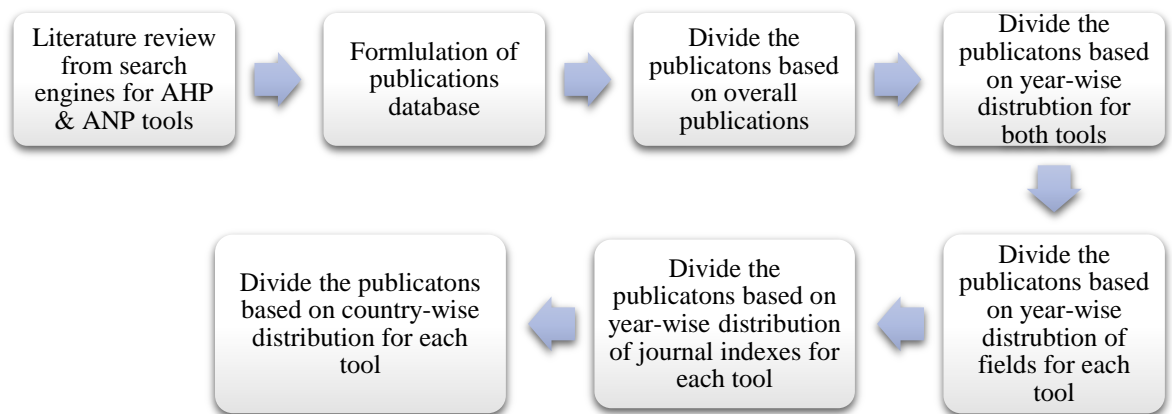
Figure 1 The procedural hierarchy for the study

The research papers were then divided based on the two methodologies, i.e., AHP and ANP, from 2000 to 2019. The papers were arranged according to four main fields, i.e., engineering/technology/applied sciences, social sciences, health studies, and environmental studies. These papers were obtained using a vigorous literature review and analyzed using methodological decision analysis. Then, they were arranged according to the subject or field category and the authors' countries were highlighted. In papers where the author's country name was not known, the journal's origin country was used. University-based journals, Masters and Ph.D. theses, and papers that were not published in English were excluded. A total of 343 papers using the ANP and 577 papers using the AHP fit the study's requirements. A total of 920 research papers were filtered from almost 16,400 research papers using the AHP and ANP methods and were arranged according to the research questions in the results and discussion section.

4. Results and discussion

The data for the publications related to the AHP and ANP methods were collected after a detailed literature review using search engines. The purpose was to gather the information related to the publications about these two methods depending on the fields of study such as engineering/technology/applied sciences, social sciences, medical studies, and environmental studies. A few of the prominent journals found to be using these tools after an analysis of the literature review are mentioned in Table 1.

Table 1
Prominent journals with articles using AHP and ANP tools

Computers & Industrial Engineering	**Journal of the Operational Research Society**
Mathematical and Computer Modelling	*Journal of Intelligent & Fuzzy Systems*
Expert Systems with Applications	*International Journal of Production Research*
Applied Soft Computing	*Energy*
Omega	*International Journal of Production Economics*
Production Planning & Control	*Renewable and Sustainable Energy Reviews*
Sustainability	*Information Sciences*
Natural Hazards	*Journal of Cleaner Production*
European Journal of Operational Research	*Waste Management*
Tourism Management	*IEEE Transactions of Fuzzy Systems*
International Journal of Systems Science: Operations & Logistics	*Supply Chain Forum: An International Journal*
Cogent Engineering	*Journal of Control and Decision*
International Journal of Management Science and Engineering Management	*International Journal of the Analytic Hierarchy Process*

These journals had the highest number of publications where researchers had adopted the AHP and ANP methods for analysis. Some of the journals that had a higher number of publications related to AHP and ANP in different research fields are depicted in Table 2.

Table 2
Fields of research highlighted in AHP and ANP studies

Engineering	*Manufacturing*
Civil Works	*Strategies*
Economic	*Quality*
Construction	*E-Invoicing*
Agriculture	*Supply Chain*
Finance	*Health Care*
Forestry	*Environment*
Earthquakes Hazards	*Natural Disasters*
Food	*Safety*
Geographical	*Sustainability*
Water	*Pipeline Systems*
Purchasing	*Automobiles*
Information and Technology	*Research and Development*
Human Error Assessment	*Hydrogen Energy Technology*
Banking	*Policy Making*
History	*Software*
Maritime Industry	*Mathematics*
Navigation	*Organic*
Profit and Loss	*Management*
Green Initiatives	*Tourism*

Transportation	Waste Management
Landslides	Entropy

Table 2 shows the significant areas of research that were assessed using these two methods as applications. Furthermore, the research papers were divided into four categories, and different forms of data were extracted such as the author's country, journal's index, and the year they were published. The papers were collected from the years 2000 to 2019, and only the articles published in internationally recognized journals were selected and evaluated.

4.1 Total publications

The total number of research papers that were published using the AHP and ANP techniques was approximately 12,900 for the AHP and 3,500 for the ANP between 2000 and 2019. From these research papers, there were 577 for the AHP and 343 for the ANP that fulfilled this study's requirements, i.e., the papers were published in recognized journals. The number of total publications is depicted graphically in Figure 2.
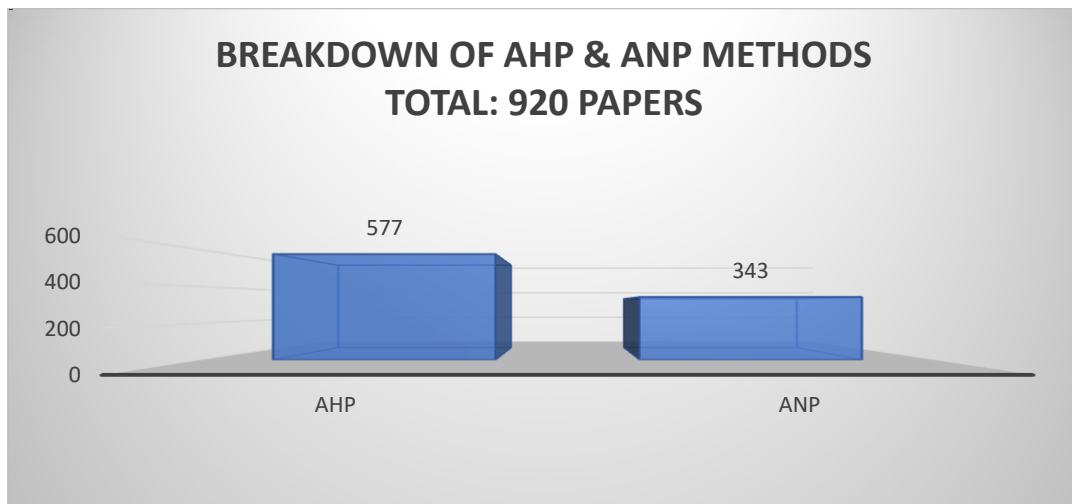

Figure 2 Total number of publications for AHP and ANP from 2000-2019

4.2 Yearly distribution of AHP and ANP publications

The total number of papers published in recognized journals can be further divided into yearly distribution of publications for both methods. Figure 3 shows the trends for each year.
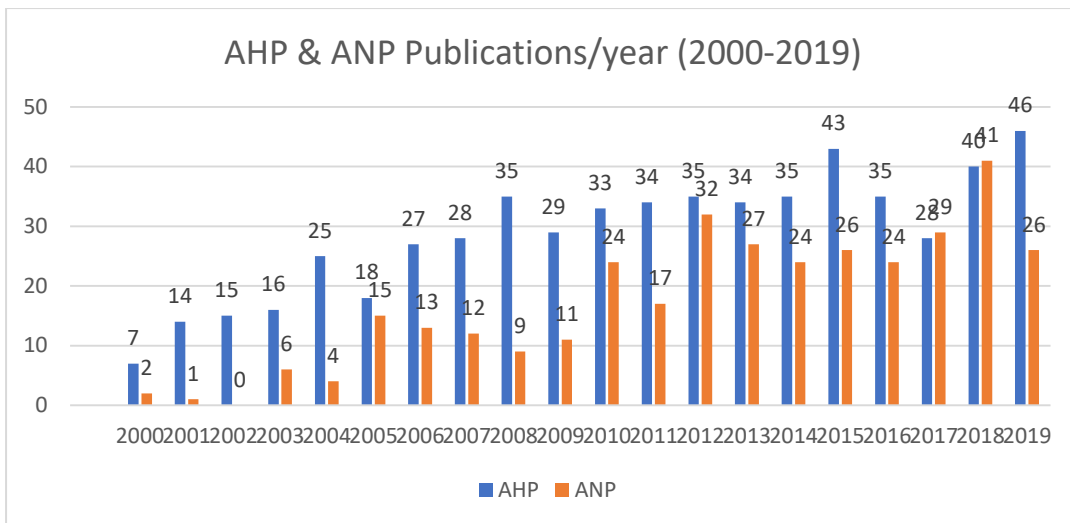
Figure 3 Yearly breakdown of AHP and ANP publications

Figure 3 shows that the publications by year started at a slow pace in the early 2000s, with the numbers increasing after 2010 for both methods. The ANP method had no publications in recognized journals in 2002, and similarly, the AHP method had the lowest number of publications in the year 2000. The highest number of publications was 46 in 2019 and 41 in 2018 for the AHP and ANP methodologies, respectively.

4.3 Comparison by field

The next phase of this study determined the number of publications by category for each technique. The purpose was to identify the total number of publications in each category for both methods. The categories were formulated after a detailed literature review and included engineering/technology/applied sciences, social sciences, health studies, and environmental studies. The first step was to determine the overall comparison of the publications in each category for both the AHP and ANP methods. The general comparison by field is depicted in Figure 4.
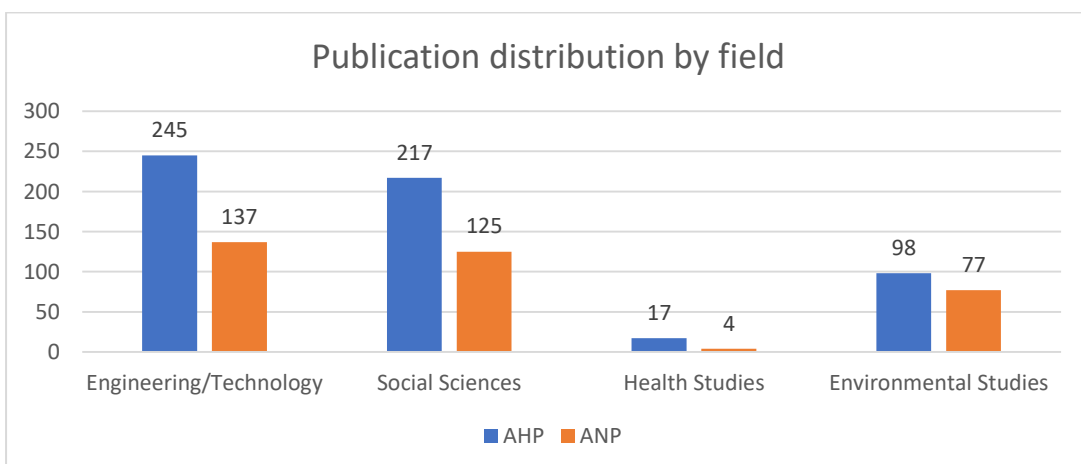

Figure 4 Overall comparison by field for AHP and ANP

As shown in Figure 4, engineering/technology/applied sciences had the highest number of publications when compared to the other categories for both the AHP and ANP. Engineering had the highest number of publications, i.e., 245 for the AHP and 137 for the ANP. Similarly, the social sciences category had a higher number of publications for the AHP, i.e., 217 as compared to 125 for the ANP. The AHP and ANP methods did not have too many applications in the health category as shown by the lowest number of publications for both methods in this category, i.e., 17 for the AHP and only 4 for the ANP. Lastly, the AHP had the most publications in the environmental studies category with 98 publications, while the ANP had 77 in this category. Therefore it can be concluded that both methodologies possess a more significant number of applications in the engineering/technology/applied sciences sector than in any other field. The high number of publications for both methods shows the validity of the techniques in terms of deducing technical results. For the next phase of this study, the author's separated the articles by category into yearly publications for both techniques for comparison purposes and mentioned all of the relevant publications by topic and author.

4.3.1 Engineering/technology/applied sciences

Engineering/technology/applied cciences had numerous applications for the AHP and ANP methods in different engineering and technological advancements. The studies related to the formulation of new hybrid techniques were also included in this category, which shows the wider scope of this area. This wider scope is evidenced by the higher number of publications in this category, i.e., 245 for the AHP and 137 for the ANP method. However, these figures do not give the complete details about the trends of the yearly publication for the AHP and ANP in this category. This requires an annual comparison of publications, which is depicted in Figure 5.
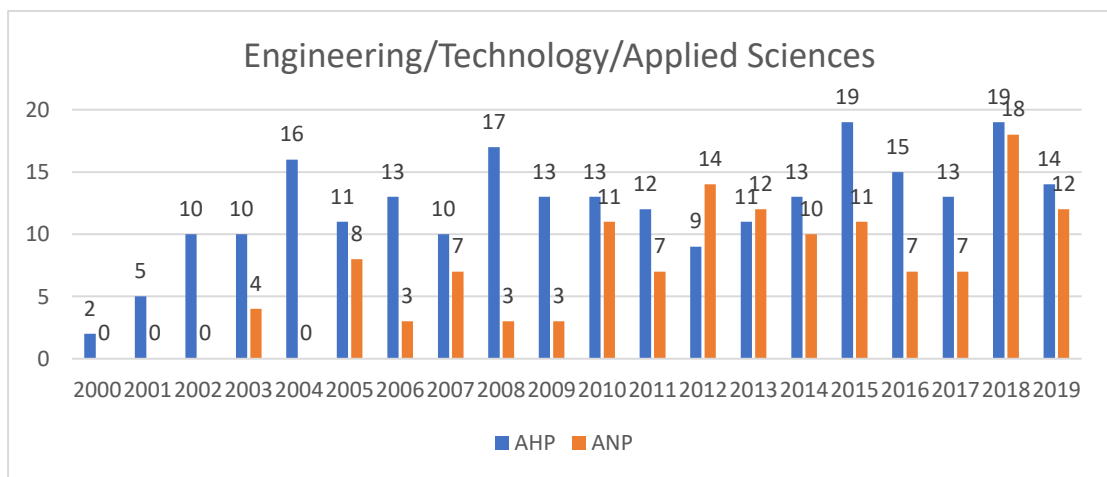
Figure 5 Yearly comparison for engineering/technology/applied sciences for AHP & ANP

Figure 5 shows that the average number of publications per year for the AHP is 12, and 7 for the ANP. The figure shows that the number of publications was low in the early 2000s for the ANP, but doubled by 2010. The highest number of publications in a year for the AHP was 19 in 2018 and 18 for the ANP in 2018. These numbers show that the AHP was the top choice for researchers in this category for authentic results when compared to the ANP technique.

After the comparison by year, the research studies done in this category using the AHP and ANP need to be mentioned. The areas that these two methods covered as applications are mentioned in Table 2. The research studies for this category are highlighted according to their journal names, research titles, and author names in Table 3 for the ANP and Table 4 for the AHP in Appendix A.

4.3.2 Social sciences

Social sciences had the second-highest number of publications using the AHP and ANP methodologies. The research areas highlighted in this category included human resource management, supply chain, management, and social issues. The distribution by year for the AHP and ANP publications in this category shows that the highest number of papers published in a year was 19 in 2012 and 2019 for the AHP and 13 in 2018 for the ANP. The details are shown in Figure 6.
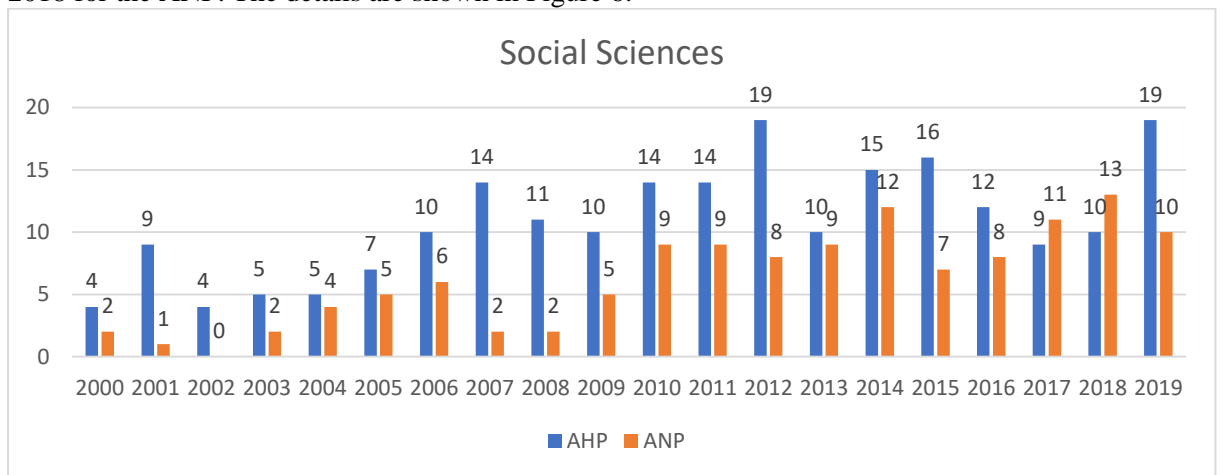
Figure 6 Distribution by year for social sciences publications for the AHP & ANP

These numbers are also evidence that the AHP was a more authentic and preferable choice for researchers than the ANP. Tables 5 and 6 show the research publication details in terms of area, authors, and journals for the ANP and AHP, respectively in Appendix B.

4.3.3 Health studies

The cateogory of health studies includes the least amount of applications of the AHP and ANP methods. The few areas of health that were studied focused mainly on hospitals and their management, and a few studies related to diseases. Figure 7 shows the distribution by year for health or medical courses from 2000 to 2019 for the AHP and ANP.

Figure 7 Comparison by year for health studies for the AHP & ANP

Figure 7 shows that the highest number of publications in a year was two for the AHP and one for the ANP. The total number of publications from 2000-2019 was 17 for th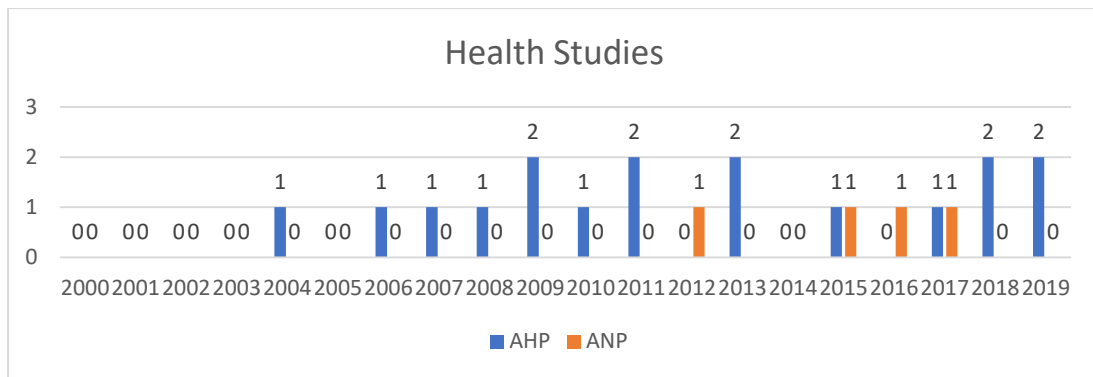e AHP and 4 for the ANP, which was the fewest of all of the categories. Furthermore, the publications for both of the methodologies are mentioned in Table 7 for the ANP and Table 8 for the AHP. The publications are divided again on the basis of area, journal name, and author names in Appendix C.

4.3.4 Environmental studies

Environmental studies had the third-highest number of publications among all of the categories. Environmental applications are currently highlighted more and more in studies as the world's environmental situation deteriorates. The studies that are being highlighted using the AHP and ANP methods include landslides, environmental emissions, resources, transportation, etc. The distribution by year for environmental studies is shown in Figure 8. The figure highlights that the AHP method was the most used technique when compared to the ANP. The highest number of publications in a year for the AHP was 11 in both 2013 and 2019, whereas, for the ANP, it was 10 in 2017 and 2018. The total number of publications was 98 for the AHP and 77 for the ANP method. This again shows that the AHP was the preferred technique in this category.

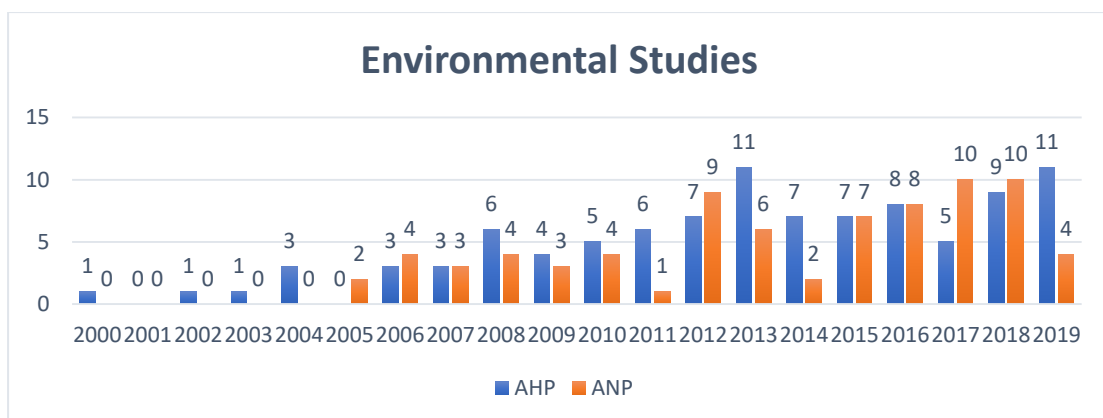Figure 8 Comparison by year for environmental sciences publications for the AHP & ANP

Furthermore, the publications in this category were distributed by area, journal name, and author name in Tables 9 and 10 for the ANP and AHP, respectively in Appendix

International Journal of the
Analytic Hierarchy Process

380

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

D. Only some of the papers are cited in the Appendix because of the large number of papers and space constraints.

4.4 Journal index

The next step involved assessing the indexing of the internationally recognized journals in which the papers related to the AHP and ANP were published. The journal indexes were extracted from data obtained from the journals' websites and a database website known as Clarivate Analytics. This database helps browse journals by name, category and ISSN number (Clarivate, 2019). These research journal indexes were also categorized into four major fields using the AHP and ANP techniques.

4.4.1 Engineering/technology/applied sciences

The index that mainly dominated the journal publications was the SCIE index, followed by Scopus. The majority of the publications related to the AHP and ANP were in SCIE indexed journals in this category, with 217 and 124 publications respectively. The second highest number of publications were in the SCOPUS index with 18 papers using the AHP and four using the ANP method. The SSCI indexed publications included 11 for the AHP and five for the ANP. Lastly, the emerging category of journals (ESCI) had two publications related to the AHP and four related to the ANP. Therefore, SCIE journals were the main focus for researchers, and again, the preferred technique was the AHP. The details are shown in Figure 9.
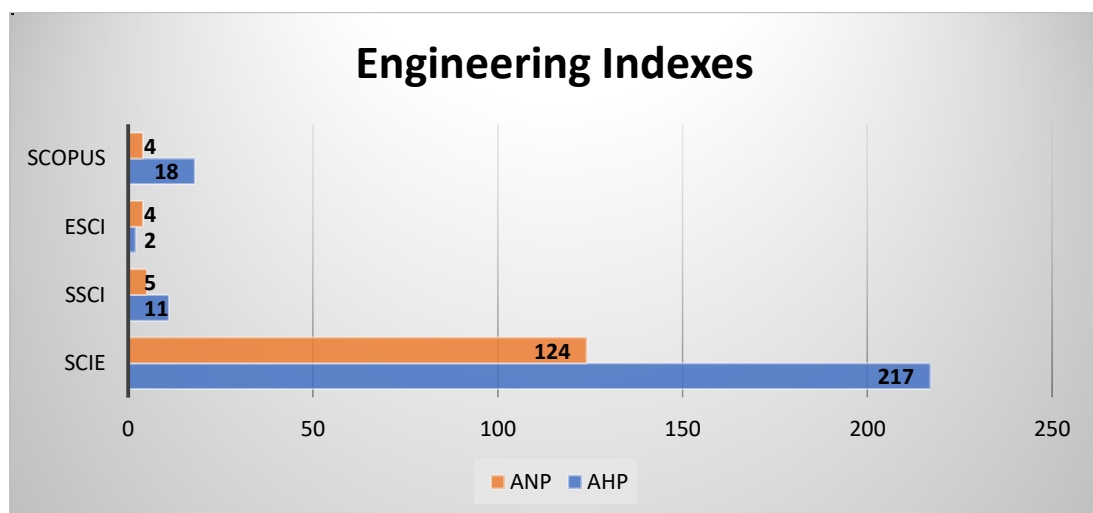
Figure 9 Journal indexes for engineering/technology/applied sciences for the AHP & ANP

4.4.2 Social sciences

Social sciences had the second-highest number of total publications in this study for the AHP and ANP. Figure 10 shows that the SCIE index dominated with 158 publications related to the AHP and 88 related to the ANP. The SSCI index had the second-highest indexed journals with 34 publications using the AHP and 27 using the ANP. The SCOPUS index had 25 publications using the AHP and seven publications using the ANP method. Furthermore, the AHP method had two publications, and the ANP method had six publications in ESCI indexed journals. The AHP methodology was the preferred method for experts for analysis in this specific category.
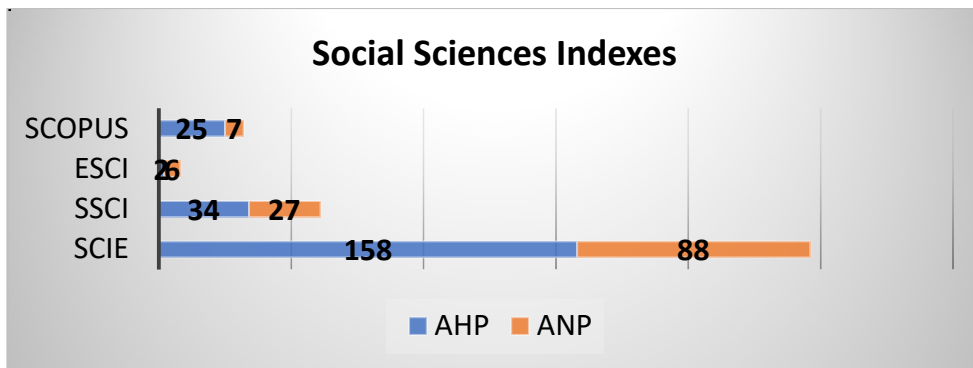
Figure 10 Journal indexes for social sciences for theAHP & ANP

4.4.3 Health sciences

The health sciences category had the lowest number of publications among all of the major categories that incorporated the AHP and ANP techniques. The index metrics are displayed in Figure 11 which shows that SCIE indexed journals had the highest number of publications, i.e., 13 for the AHP and one for the ANP. Furthermore, SSCI indexed journals had two publications using the AHP and two using the ANP. Similarly, SCOPUS indexed journals had two publications using the AHP and one using the ANP. There were no publications in ESCI indexed journals, most likely because the number of publications in the health category was exceptionally small and researchers preferred more established journals. The details are depicted in Figure 11.
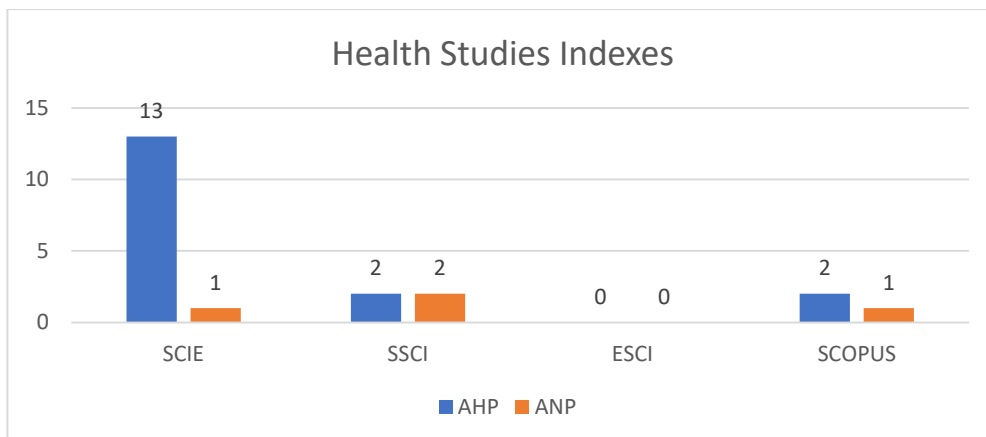
Figure 11 Journal indexes for health sciences for the AHP & ANP

4.4.4 Environmental studies

Environmental studies comprise the fourth category evaluated in the current research. Figure 12 shows that the SCIE indexed journals had the most publications related to these fields with 90 publications using the AHP and 66 using the ANP method. The rest of the indexes did not have a significant number of publications as compared to the SCIE. There were seven publications for the AHP and 10 for the ANP in the SSCI indexed journals. There were no publications related to AHP in the ESCI index, and only one study associated with the ANP. Lastly, the SCOPUS indexed journals had one publication that incorporated the AHP, while there were no publications included in this index that used the ANP method. Therefore, the AHP technique had the highest number of publications in this category as well.

International Journal of the
Analytic Hierarchy Process

382

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822
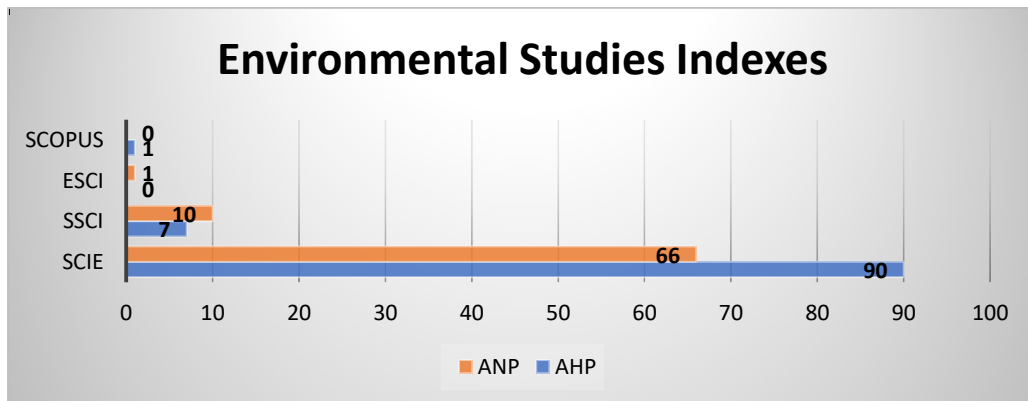
Figure 12 Journal indexes for environmental studies for the AHP & ANP

4.5 Distribution by country

The most important research question that this study aimed to determine was the concentration of publications by country. In other words, to determine which countries have contributed the most to the research in the four major fields of study through implementation of the AHP and ANP techniques. In order to do so, data related to the author's country of origin were collected from the databases of journal biographies. Authors whose countries were not mentioned or had no information at all were listed under the country of the journal. The data was collected using search engines and was extracted separately based on distribution by country. The objective was to determine the countries that have contributed the most to the use of these two techniques. The distribution by country was divided based on the method, showing the number of publications in a country in descending order.

4.5.1 AHP application, distribution by country

There were 577 total publications in recognized journals from 2000 to 2019 that employed the AHP method. The first countries that incorporated the AHP method in their studies were Italy, China, and Finland in 2000. The distribution by country is represented in Figure 13, along with representation on the map based on a country's publications in Figure 14.

International Journal of the
Analytic Hierarchy Process

383

Figure 13 Distribution by country for AHP publications
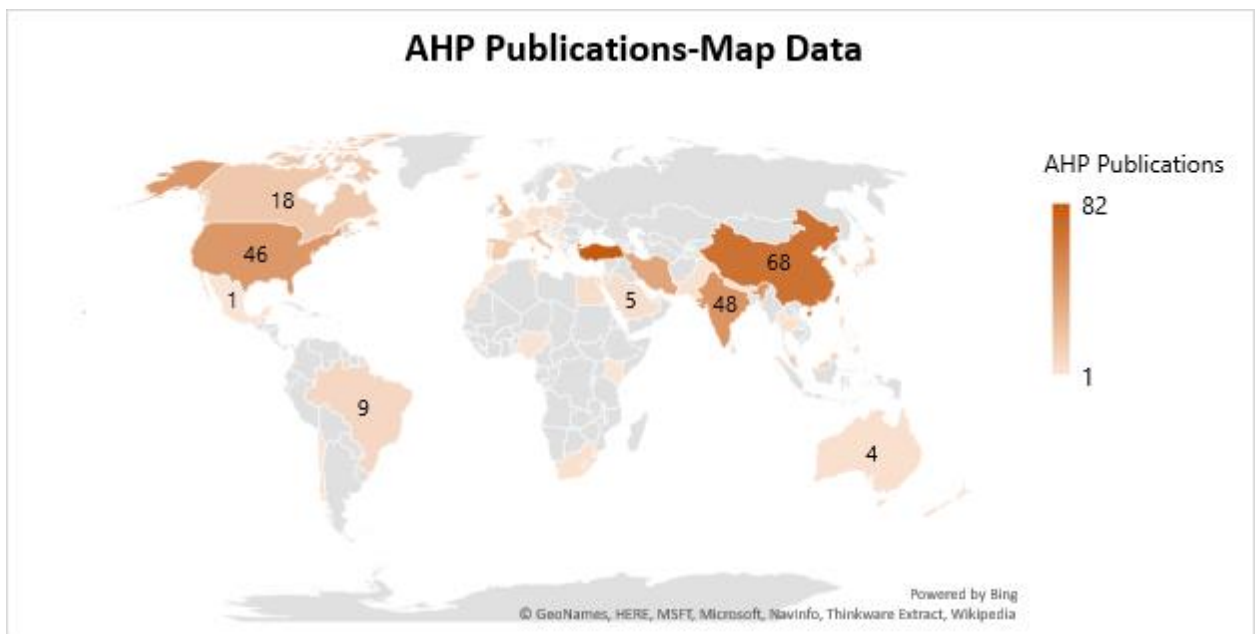
Figure 14 Map for the AHP publications concentrated in various countries

Figures 13 and 14 show that the highest number of publications using the AHP were in Turkey with 82 research studies, followed by China with 68 and India with 48 publications. The number of publications is arranged in descending order in Figure 13. The lowest number of publications can be seen in countries like Switzerland, the Czech Republic, and Kenya (1).

4.5.2 ANP method, distribution by country

There were 343 total ANP publications in recognized journals from 2000 to 2019. The number of publications using the ANP was very small compared to the AHP. The first country that employed the ANP method in its studies was South Korea in

International Journal of the
Analytic Hierarchy Process

384

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

2000. The distribution by country for the ANP technique is depicted in Figure 15 and a map-based representation is shown in Figure 16.
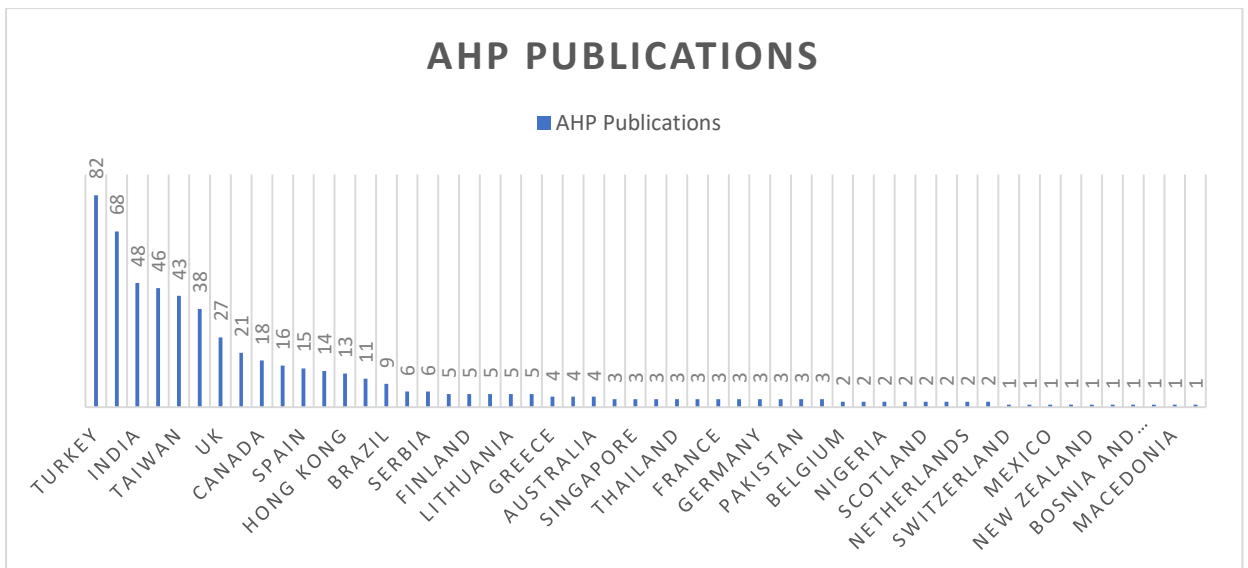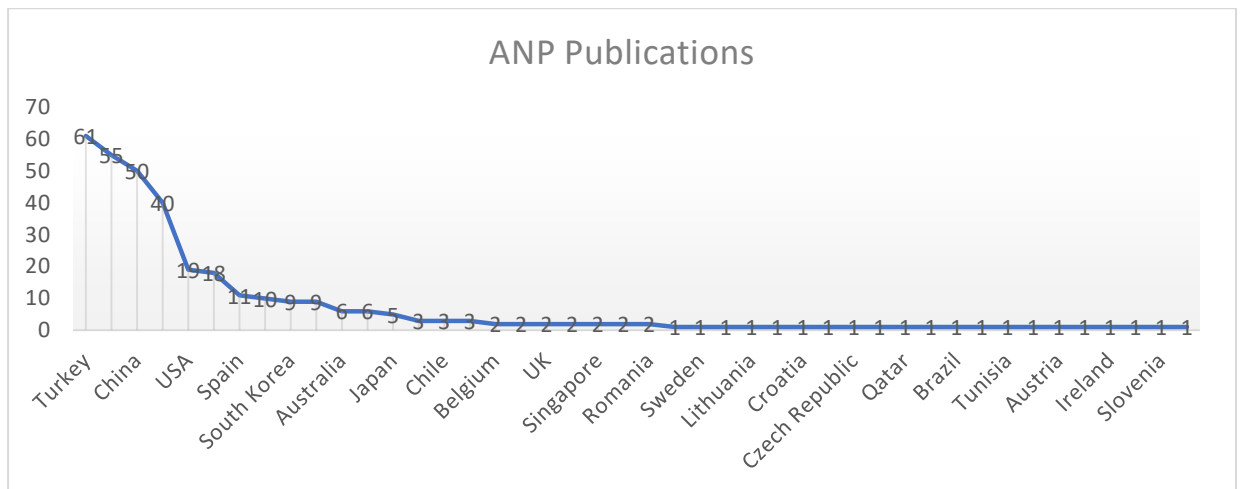

Figure 15 Distribution by country for ANP publications
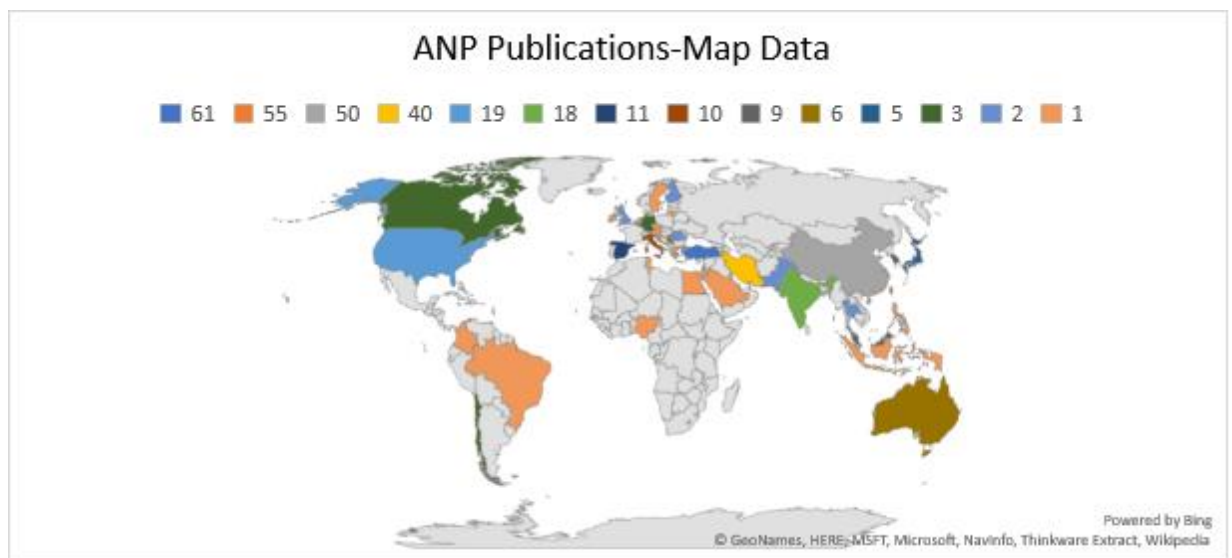
Figure 16 Map for ANP publications concentrated in various countries

This figure shows that Turkey again had the highest number of publications, i.e., 61, followed by Taiwan with 55 publications and China with 50 publications. The figure displays the number of publications in descending order by country. The lowest number of publications in a country was one in countries such as Hong Kong, Sweden, and Nigeria.

4.6 Comparison of the AHP and ANP methodologies

The data extracted about the AHP and ANP was mainly used to determine which technique had wider exposure and applications. The study explored these techniques based on the overall number of publications, publications by field, metrics of journal indexes, and distribution by country. From the above results, it can be concluded that

International Journal of the
Analytic Hierarchy Process

385

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

the AHP is the superior methodology when compared to the ANP in terms of applications, preference by the experts, and use in almost every major research field. Similarly, based on the publications and journals the articles were published in, the AHP method was more authentic, that is, there were more publications using that method in ISI indexed journals, the web of science, and even SCOPUS. Therefore, it can be safely stated that the AHP method produces more superior, authentic and efficient results than the ANP technique.

5. Conclusions

Various fields are emerging through improvisation and rapid changes which makes them extremely complicated. Researchers related to these new fields and the older classic fields are always looking to formulate a method to incorporate analysis into a study. The objective of this study was to conduct a detailed review of famous MCDM methodologies, the AHP and ANP, from 2000 to 2019. The data were collected through various search engines, and 577 papers using the AHP and 343 papers using the ANP were found that had been published in recognized journals, 920 papers in total. Then, the data were categorized in various ways depending on the requirements of the study. The overall requirements of the study included the following: determining the total number of publications for each technique as well as their distribution by year, distribution of the publications by year based on each category for both the AHP and ANP methods, distribution by year of the publications based on their journal indexes, and the distribution by country based on the author's country origin.

After the data analysis, it was concluded that the AHP has dominated the last 20 years in terms of number of publications in all of the major categories, i.e., engineering/technology/applied sciences, social sciences, health studies and environmental studies. The highest number of publications for the AHP shows that researchers highly trust this technique. The category with the highest number of publications was the engineering/technology/applied sciences category. This result is evidence that the highest number of publications were in SCIE indexed journals that are more focused on publishing technical content. Lastly, the country that had the most significant number of publications for both methodologies was Turkey. Turkey has employed both methods in almost every sector, showing that Turkey is growing at a very fast pace.

The study also concluded that the AHP was the top choice for analysis when compared to the ANP based on the number of applications in every category. This shows that the AHP produces more authentic and reliable results and has been mostly preferred by researchers in the last 20 years. The study can be extended in the future by studying more techniques for the same 20 years and analyzing them based on their categories, countries, and journal indexes.

International Journal of the
Analytic Hierarchy Process

386

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

REFERENCES

Agarwal, A., Shankar, R., & Tiwari, M. K. (2006). Modeling the metrics of lean, agile, and agile supply chain: An ANP-based approach. *European Journal of Operational Research, 173*(1), 211-225. doi: https://doi.org/10.1016/j.ejor.2004.12.005

Aggarwal, P. K., Grover, P. S., & Ahuja, L. (2019). Evaluating self-management features for mobile applications. *International Journal of E-Services and Mobile Applications (IJESMA), 11*(2), 43-55. doi: https://doi.org/10.4018/ijesma.2019040103

Al Khalil, M. I. (2002). Selecting the appropriate project delivery method using AHP. *International Journal of Project Management, 20*(6), 469-474. doi: https://doi.org/10.1016/s0263-7863(01)00032-1

Al-Harbi, K. M.-S. (, 2001). Application of the AHP in project management. *International Journal of ProjectMmanagement, 19*(1), 19-27.

Ali, Y., Butt, M., Sabir, M., Mumtaz, U., & Salman, A. (2018). Selection of suitable site in Pakistan for wind power plant installation using the analytic hierarchy process (AHP). *Journal of Control and Decision, 5*(2), 117-128. doi: https://doi.org/10.1080/23307706.2017.1346490

Ali, Y., Rasheed, Z., Muhammad, N., & Yousaf, S. (2018). Energy optimization in the wake of China Pakistan Economic Corridor (CPEC). *Journal of Control and Decision, 5*(2), 129-147. doi: https://doi.org/10.1080/23307706.2017.1353929

Almannai, M., Marom, R., & Sutton, V. R. (2016). Newborn screening: a review of history, recent advancements, and future perspectives in the era of next-generation sequencing. *Current Opinion in Pediatrics, 28*(6), 694-699. doi: https://doi.org/10.1097/mop.0000000000000414

Aloini, D., Dulmin, R., Mininno, V., Pellegrini, L., & Farina, G. (2018). Technology assessment with IF-TOPSIS: An application in the advanced underwater system sector. *Technological Forecasting and Social Change, 131*, 38-48. doi: https://doi.org/10.1016/j.techfore.2017.07.010

Angelo, L. D., Stefano, P. D., Fratocchi, L., & Marzola, A. (2018). An AHP-based method for choosing the best 3D scanner for cultural heritage applications. *Journal of Cultural Heritage, 34*, 109-115. doi: https://doi.org/10.1016/j.culher.2018.03.026

Apan, M., Oztel, A., & Islamoglu, M. (2018). Comparative empirical analysis of financial failures of enterprises with Altman z-Score and VIKOR methods: BIST food sector application. *Australasian Accounting, Business and Finance Journal, 12*(1), 77-101. doi: https://doi.org/10.14453/aabfj.v12i1.6

Ayag, Z., & Ozdemir, R. G. (2007). An intelligent approach to ERP software selection through fuzzy ANP. *International Journal of Production Research, 45*(10), 2169-2194. doi: https://doi.org/10.1080/00207540600724849

International Journal of the
Analytic Hierarchy Process

387

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

Ayag, Z., & Ozdemir, R. G. (2009). A hybrid approach to concept selection through fuzzy analytic network process. *Computers & Industrial Engineering, 56*(1), 368-379. doi: https://doi.org/10.1016/j.cie.2008.06.011

Ayag, Z., & Samanlioglu, F. (2019). Fuzzy AHP-GRA approach to evaluating energy sources: a case of Turkey. *International Journal of Energy Sector Management, ahead-of-print*(ahead-of-print), ahead-of-print. doi: https://doi.org/10.1108/ijesm-09-2018-0012

Ayag, Z., & Yucekaya, A. (2019). A fuzzy ANP-based GRA approach to evaluate ERP packages. *International Journal of Enterprise Information Systems (IJEIS), 15*(1), 45-68. doi: https://doi.org/10.4018/ijeis.2019010103

Badri, M. A. (2001). A combined AHP–GP model for quality control systems. *International Journal of Production Economics, 72*(1), 27-40. doi: https://doi.org/10.1016/s0925-5273(00)00077-3

Bahurmoz, A. M. (2006). A strategic model for safety during the Hajj pilgrimage: An ANP application. *Journal of Systems Science and Systems Engineering, 15*(2), 201-216. doi: https://doi.org/10.1007/s11518-006-5008-4

Becker, J., Becker, A., Sulikowski, P., & Zdziebko, T. (2018). ANP-based analysis of ICT usage in Central European enterprises. *Procedia computer science, 126*, 2173-2183. doi: https://doi.org/10.1016/j.procs.2018.07.231

Beynon, M. (2002). An analysis of distributions of priority values from alternative comparison scales within AHP. *European Journal of Operational Research, 140*(1), 104-117. doi: https://doi.org/10.1016/s0377-2217(01)00230-2

Beynon, M. (2002). DS/AHP method: A mathematical analysis, including an understanding of uncertainty. *European Journal of Operational Research, 140*(1), 148-164. doi: https://doi.org/10.1016/s0377-2217(01)00230-2

Bonissone, P. P., Subbu, R., & Lizzi, J. (2009). Multicriteria decision making (MCDM): a framework for research and applications. *IEEE Computational Intelligence Magazine, 4*(3), 48-61.doi: https://doi.org/10.1109/mci.2009.933093

Bottero, M., D'Alpaos, C., & Oppio, A. (2018). Multicriteria Evaluation of Urban Regeneration Processes: An Application of PROMETHEE Method in Northern Italy. *Advances in Operations Research*. doi: https://doi.org/10.1155/2018/9276075

Brans, J.-P., & Vincke, P. (1985). Note—a preferencerRanking organisation method: (The PROMETHEE method for multiple criteria decision-making). *Management Science, 31*(6), 647-656. doi: https://doi.org/10.1287/mnsc.31.6.647

Buyukozkan, G., Cifci, G., & Guleryuz, S. (2011). Strategic analysis of healthcare service quality using fuzzy AHP methodology. *Expert systems with applications, 38*(8), 9407-9424. doi: https://doi.org/10.1016/j.eswa.2011.01.103

International Journal of the
Analytic Hierarchy Process

388

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

Byun, D.-H. (2001). The AHP approach for selecting an automobile purchase model. *Information & Management, 38*(5), 289-297. doi: https://doi.org/10.1016/s0378-7206(00)00071-9

Cagno, E., Caron, F., Mancini, M., & Ruggeri, F. (2000). Using AHP in determining the prior distributions on gas pipeline failures in a robust Bayesian approach. *Reliability Engineering & System Safety, 67*(3), 275-284. doi: https://doi.org/10.1016/s0951-8320(99)00070-8

Cai, Y., & Wu, W. (2001). Synthetic financial evaluation by a method of combining DEA with AHP. *International Transactions in Operational Research, 8*(5), 603-609. doi: https://doi.org/10.1111/1475-3995.00336

Chabuk, A., Al-Ansari, N., Hussain, H. M., Knutsson, S., Pusch, R., & Laue, J. (2017). Combining GIS applications and method of multi-criteria decision-making (AHP) for landfill siting in Al-Hashimiyah Qadhaa, Babylon, Iraq. *Sustainability, 9*(11), 1932. doi: https://doi.org/10.3390/su9111932

Chen, J.-K., & Chen, I.-S. (2010). Using a novel conjunctive MCDM approach based on DEMATEL, fuzzy ANP, and TOPSIS as an innovation support system for Taiwanese higher education. *Expert Systems with Applications, 37*(3), 1981-1990. doi: https://doi.org/10.1016/j.eswa.2009.06.079

Chen, S.-H., & Lee, H.-T. (2008). Applying ANP approach to partner selection for strategic alliance. *Management Decision, 46*(3), 449-465. doi: https://doi.org/10.1108/00251740810863889

Chen, T.-Y. (2018). A novel VIKOR method with an application to multiple criteria decision analysis for hospital-based post-acute care within a highly complex uncertain environment. *Neural Computing and Applications*, 1-31. doi: https://doi.org/10.1007/s00521-017-3326-8

Chen, V. Y., Lien, H.-P., Liu, C.-H., Liou, J. J., Tzeng, G.-H., & Yang, L.-S. (2011). Fuzzy MCDM approach for selecting the best environment-watershed plan. *Applied Soft Computing, 11*(1), 265-275. doi: https://doi.org/10.1016/j.asoc.2009.11.017

Chen, Z., Li, H., & Wong, C. T. (2005). EnvironalPlanning: analytic network process model for environmentally conscious construction planning. *Journal of Construction Engineering and Management, 131*(1), 92-101. doi: https://doi.org/10.1061/(asce)0733-9364(2005)131:1(92)

Cheng, E. W., & Li, H. (2006). Job performance evaluation for construction companies: an analytic network process approach. *Journal of Construction Engineering and Management, 132*(8), 827-835. doi: https://doi.org/10.1061/(asce)0733-9364(2006)132:8(827)

Cheng, E. W., & Li, H. (2007). Application of ANP in process models: An example of strategic partnering. *Building and Environment, 42*(1), 278-287. doi: https://doi.org/10.1016/j.buildenv.2005.07.031

Chiang-Ku, F., Hui-Yin, T., & Jin-Lung, P. (2009). Using ANP and GRA to evaluate the employability of graduates from department of risk management and insurance. *Journal of Grey System, 21*(1).

Chin, K.-S., Pun, K.-F., Xu, Y., & Chan, J. S. (2002). An AHP based study of critical factors for TQM implementation in Shanghai manufacturing industries. *Technovation, 22*(11), 707-715. doi: https://doi.org/10.1016/s0166-4972(01)00065-7

Chui-Hua, L., Tzeng, G.-H., & Lee, M.-H. (2012). Improving tourism policy implementation–The use of hybrid MCDM models. *Tourism Management, 33*(2), 413-426. doi: https://doi.org/10.1016/j.tourman.2011.05.002

Chung, S.-H., Lee, A. H., & Pearn, W. L. (2005). Product mix optimization for semiconductor manufacturing based on AHP and ANP analysis. *The International Journal of Advanced Manufacturing Technology, 25*(11-12), 1144-1156. doi: https://doi.org/10.1007/s00170-003-1956-8

Chung, S.-H., Lee, A. H., & Pearn, W.-L. (2005). Analytic network process (ANP) approach for product mix planning in semiconductor fabricator. *International Journal of Production Economics, 96*(1), 15-36. doi: https://doi.org/10.1016/j.ijpe.2004.02.006

Chwolka, A., & Raith, M. G. (2001). Group preference aggregation with the AHP–implications for multiple-issue agendas. *European Journal of Operational Research, 132*(1), 176-186.doi: https://doi.org/10.1016/s0377-2217(00)00121-1

Clarivate. (2019). *Clarivate Analytics*. Retrieved September 10, 2019, from https://jcr.clarivate.com/JCRLandingPageAction.action?Init=Yes&SrcApp=IC2LS&locale=en_US&SID=J4-e2IptoIaXn4x2BroTz5FPDnOajW9FR7ix2Fw-18x2dnXVoPsSIZqWix2BC4bxxs5fRAx3Dx3DQde7JngomVh2u3oP9WLppgx3Dx3D-03Ff2gF3hTJGBPDScD1wSwx3Dx3D-cLUx2FoETAVeN3rTSMreq46gx3Dx

Coulter, K., & Sarkis, J. (2005). Development of a media selection model using the analytic network process. *International Journal of Advertising, 24*(2), 193-215. doi: https://doi.org/10.1080/02650487.2005.11072914

Dagdeviren, M., Yuksel, I., & Kurt, M. (2008). A fuzzy analytic network process (ANP) model to identify faulty behavior risk (FBR) in work system. *Safety Science, 46*(5), 771-783. doi: https://doi.org/10.1016/j.ssci.2007.02.002

Danner, M., Hummel, J. M., Volz, F., van Manen, J. G., & Wiegard, B. (2011). Integrating patients' views into health technology assessment: Analytic hierarchy process (AHP) as a method to elicit patient preferences. *International Journal of Technology Assessment in Health Care, 27*(4), 369-375. doi: https://doi.org/10.1017/s0266462311000523

Darko, A., Chan, A. P., Ameyaw, E. E., Owusu, E. K., Parn, E., & Edwards, D. J. (2019). Review of application of analytic hierarchy process (AHP) in construction. *International Journal of Construction Management, 19*(5), 436-452. doi: https://doi.org/10.1080/15623599.2018.1452098

Davies, M. (2001). Adaptive AHP: a review of marketing applications with extensions. *European Journal of Marketing, 35*(7/8), 872-894. doi: https://doi.org/10.1108/eum0000000005729

Deng, J. (1989). Introduction to grey system theory. *The Journal of Grey System, 1*(1), 1-24.

Dolan, J. G. (2008). Shared decision-making–transferring research into practice: the Analytic Hierarchy Process (AHP). *Patient Education and Counseling, 73*(3), 418-425. doi: https://doi.org/10.1016/j.pec.2008.07.032

Erdogmus, S., Aras, H., & Koc, E. (2006). Evaluation of alternative fuels for residential heating in Turkey using analytic network process (ANP) with group decision-making. *Renewable and Sustainable Energy Reviews, 10*(3), 269-279. doi:

Erdogmus, S., Kapanoglu, M., & Koc, E. (2005). Evaluating high-tech alternatives by using analytic network process with BOCR and multiactors. *Evaluation and Program Planning, 28*(4), 391-399. doi: https://doi.org/10.1016/j.evalprogplan.2005.07.003

Ertay, T., Buyukozkan, G., Kahraman, C., & Ruan, D. (2005). Quality function deployment implementation based on analytic network process with linguistic data: An application in automotive industry. *Journal of Intelligent & Fuzzy Systems, 16*(3), 221-232.

Ezzabadi, J. H., Saryazdi, M. D., & Mostafeipour, A. (2015). Implementing Fuzzy Logic and AHP into the EFQM model for performance improvement: A case study. *Applied Soft Computing, 36*, 165-176. doi: https://doi.org/10.1016/j.asoc.2015.06.051

Fahmy, H. M. (2001). Reliability evaluation in distributed computing environments using the AHP. *Computer Networks, 36*(5-6), 597-615. doi: https://doi.org/10.1016/s1389-1286(01)00175-x

Fiala, P. (2006). An ANP/DNP analysis of economic elements in today's world network economy. *Journal of Systems Science and Systems Engineering, 15*(2), 131-140. doi: https://doi.org/10.1007/s11518-006-5002-x

Ganguly, A., & Kumar, C. (2019). Evaluating supply chain resiliency strategies in the Indian pharmaceutical sector: A fuzzy analytical hierarchy process (F-AHP) approach. *International Journal of the Analytic Hierarchy Process, 11*(2), 153-180. doi: https://doi.org/10.13033/ijahp.v11i2.620

Garg, M. P., Singh, M., & Singh, S. (2019). *Micro-machining and process optimization of electrochemical discharge machining (ECDM) process by GRA method*. Cham: Springer.doi: https://doi.org/10.1007/978-3-030-16943-5_33

Garni, H. Z., & Awasthi, A. (2017). Solar PV power plant site selection using a GIS-AHP based approach with application in Saudi Arabia. *Applied Energy, 206*, 1225-1240. doi: https://doi.org/10.1016/j.apenergy.2017.10.024

Garuti, C., & Spencer, I. (2007). Parallels between the analytic hierarchy and network processes (AHP/ANP) and fractal geometry. *Mathematical and Computer Modelling, 46*(7-8), 926-934. doi: https://doi.org/10.1016/j.mcm.2007.03.029

Gokpinar, E., Tansel, Y., & Yurdakul, M. (2019). Analysis of performance improvement brought by the application of an ISO 9001 Quality Management System with TOPSIS approach. *International Journal of Knowledge-Based Organizations (IJKBO), 9*(3), 1-13. doi: https://doi.org/10.4018/ijkbo.2019070101

Golden, B. L., Wasil, E. A., & Harker, P. T. (1989). *The analytic hierarchy process.* Berlin: Springer, Berlin, Heidelberg.

Gul, M. (2018). Application of Pythagorean fuzzy AHP and VIKOR methods in occupational health and safety risk assessment: the case of a gun and rifle barrel external surface oxidation and colouring unit. *International Journal of Occupational Safety and Ergonomics, 1*(1), 1-14. doi: https://doi.org/10.1080/10803548.2018.1492251

Gul, M., Celik, E., Gumus, A. T., & Guneri, A. F. (2018). A fuzzy logic based PROMETHEE method for material selection problems. *Beni-Suef University Journal of Basic and Applied Sciences, 7*(1), 68-79. doi: https://doi.org/10.1016/j.bjbas.2017.07.002

Gundogdu, F. K., Kahraman, C., & Karasan, A. (2019). *Spherical Fuzzy VIKOR method and its application to waste management.* Cham: Springer.
Guneri, A. F., Cengiz, M., & Seker, S. (2009). A fuzzy ANP approach to shipyard location selection. *Expert Systems with Applications, 36*(4), 7992-7999.

Gungor, A. (2006). Evaluation of connection types in design for disassembly (DFD) using analytic network process. *Computers & Industrial Engineering, 50*(1-2), 35-54. doi: https://doi.org/10.1016/j.cie.2005.12.002

Hallikainen, P., Kivijarvi, H., & Tuominen, M. (2009). Supporting the module sequencing decision in the ERP implementation process—An application of the ANP method. *International Journal of Production Economics, 119*(2), 259-270. doi: https://doi.org/10.1016/j.ijpe.2009.03.008

Herat, A. T., Noorossana, R., & Serkani, E. S. (2012). Using DEMATEL analytic network process (ANP) hybrid algorithm approach for selecting improvement projects of Iranian excellence model in healthcare sector. *African Journal of Business Management, 6*(2), 627-645. doi: https://doi.org/10.5897/ajbm11.2148

Hillerman, T., Souza, J. C., Reis, A. C., & Carvalho, R. N. (2017). Applying clustering and AHP methods for evaluating suspect healthcare claims. *Journal of computational science, 19*(1), 97-111. doi: https://doi.org/10.1016/j.jocs.2017.02.007

Hinduja, A., & Pandey, M. (2020). *An ANP-GRA-based evaluation model for security features of IoT systems*. Singapore: Springer.

Hsu, T.-H., & Pan, F. F. (2009). Application of Monte Carlo AHP in ranking dental quality attributes. *Expert Systems with Applications, 36*(2), 2310-2316. doi: https://doi.org/10.1016/j.eswa.2007.12.023

Huang, J.-J., Tzeng, G.-H., & Ong, C.-S. (2005). Multidimensional data in multidimensional scaling using the analytic network process. *Pattern Recognition Letters, 26*(6), 755-767. doi: https://doi.org/10.1016/j.patrec.2004.09.027

Huang, Y.-H., Chang, P.-Y., Hung, C.-Y., Wang, K.-I., & Chang, K.-J. (2006). An AHP model for bringing experts to consensus on medical payment standards. *Journal of Systems Science and Systems Engineering, 15*(2), 247-255. doi: https://doi.org/10.1007/s11518-006-5011-9

Hwang, C.-L., & Yoon, K. P. (1995). *Multiple attribute decision making: An introduction.* California: Sage Publications, Inc.

IIbahar, E., Karasan, A., Cebik, S., & Kahraman, C. (2018). A novel approach to risk assessment for occupational health and safety using Pythagorean fuzzy AHP & fuzzy inference system. *Safety science , 103*(1), 124-136. doi: https://doi.org/10.1016/j.ssci.2017.10.025

Jackson, J. (2001). Prioritising customers and other stakeholders using the AHP. *European Journal of Marketing, 35*(7/8), 858-873. doi: https://doi.org/10.1108/eum0000000005728

Jain, R., & Rao, B. (2013). Application of AHP tool for decision making of choice of technology for extraction of anti-cancer bioactive compounds of plant origin. *International Journal of the Analytic Hierarchy Process, 5*(1), 3-29. doi: https://doi.org/10.13033/ijahp.v5i1.153

Jharkharia, S., & Shankar, R. (2007). Selection of logistics service provider: An analytic network process (ANP) approach. *Omega, 35*(3), 274-289. doi: https://doi.org/10.1016/j.omega.2005.06.005

Kabak, M., Burmaoglu, S., & Kazancoglu, Y. (2012). A fuzzy hybrid MCDM approach for professional selection. *Expert Systems with Applications, 39*(3), 3516-3525. doi: https://doi.org/10.1016/j.eswa.2011.09.042

Kahraman, C., Ertay, T., & Buyukozkan, G. (2006). A fuzzy optimization model for QFD planning process using analytic network approach. *European Journal of Operational Research, 171*(2), 390-411. doi: https://doi.org/10.1016/j.ejor.2004.09.016

Karami, E. (2006). Appropriateness of farmers' adoption of irrigation methods: The application of the AHP model. *Agricultural Systems, 87*(1), 101-119. doi: https://doi.org/10.1016/j.agsy.2005.01.001

Karsak, E. E., Sozer, S., & Alptekin, S. E. (2003). Product planning in quality function deployment using a combined analytic network process and goal

*International Journal of the
Analytic Hierarchy Process*

393

*Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822*

programming approach. *Computers & Industrial Engineering, 44*(1), 171-190. doi: https://doi.org/10.1016/s0360-8352(02)00191-2

Koc, E., & Burhan, H. A. (2015). An application of analytic hierarchy process (AHP) in a real world problem of store location selection. *Advances in Management and Applied Economics, 5*(1), 41.

Kone, A. C., & Buke, T. (2007). An Analytical Network Process (ANP) evaluation of alternative fuels for electricity generation in Turkey. *Energy policy, 35*(10), 5220-5228.

Kovacs, J. M., Malczewski, J., & Flores-Verdugo, F. (2004). Examining local ecological knowledge of hurricane impacts in a mangrove forest using an analytical hierarchy process (AHP) approach. *Journal of Coastal Research, 1*(1), 792-800. doi: https://doi.org/10.2112/1551-5036(2004)20[792:elekoh]2.0.co;2

Kuo, R. J., Chi, S.-C., & Kao, S.-S. (2002). A decision support system for selecting convenience store location through integration of fuzzy AHP and artificial neural network. *Computers in Industry, 47*(2), 199-214. doi: https://doi.org/10.1016/s0166-3615(01)00147-6

Kurttila, M., Pesonen, M., Kangas, J., & Kajanus, M. (2000). Utilizing the analytic hierarchy process (AHP) in SWOT analysis—a hybrid method and its application to a forest-certification case. *Forest Policy and Economics, 1*(1), 41-52. doi: https://doi.org/10.1016/s1389-9341(99)00004-0

Kwong, C.-K., & Bai, H. (2002). A fuzzy AHP approach to the determination of importance weights of customer requirements in quality function deployment. *Journal of Intelligent Manufacturing, 13*(5), 367-377.

Lai, V. S., Wong, B. K., & Cheung, W. (2002). Group decision making in a multiple criteria environment: A case using the AHP in software selection. *European Journal of Operational Research, 137*(1), 134-144. doi: https://doi.org/10.1016/s0377-2217(01)00084-4

Laukkanen, E., Itkonen, J., & Lassenius, C. (2017). Problems, causes and solutions when adopting continuous delivery—A systematic literature review. *Information and Software Technology, 82*, 55-79. doi: https://doi.org/10.1016/j.infsof.2016.10.001

Lee, H., Kim, C., Cho, H., & Park, Y. (2009). An ANP-based technology network for identification of core technologies: A case of telecommunication technologies. *Expert Systems with Applications, 36*(1), 894-908. doi: https://doi.org/10.1016/j.eswa.2007.10.026

Lee, J. W., & Kim, S. H. (2000). Using analytic network process and goal programming for interdependent information system project selection. *Computers & Operations Research, 27*(4), 367-382. doi: https://doi.org/10.1016/s0305-0548(99)00057-x

International Journal of the
Analytic Hierarchy Process

394

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

Lee, S. K., Yoon, Y. J., & Kim, J. W. (2007). A study on making a long-term improvement in the national energy efficiency and GHG control plans by the AHP approach. *Energy Policy, 35*(5), 2862-2868. doi: https://doi.org/10.1016/j.enpol.2006.09.019

Leung, L. C., & Cao, D. (2000). On consistency and ranking of alternatives in fuzzy AHP. *European Journal of Operational Research, 124*(1), 102-113. doi: https://doi.org/10.1016/s0377-2217(99)00118-6

Leung, L. C., & Cao, D. (2001). On the efficacy of modeling multi-attribute decision problems using AHP and Sinarchy. *European Journal of Operational Research, 132*(1), 39-49. doi: https://doi.org/10.1016/s0377-2217(00)00111-9

Leung, L. C., Hui, Y. V., & Zheng, M. (2003). Analysis of compatibility between interdependent matrices in ANP. *Journal of the Operational Research Society, 54*(7), 758-768. doi: https://doi.org/10.1057/palgrave.jors.2601569

Leung, L. C., Lam, K. C., & Cao, D. (2006). Implementing the balanced scorecard using the analytic hierarchy process & the analytic network process. *Journal of the Operational Research Society, 57*(6), 682-691. doi: https://doi.org/10.1057/palgrave.jors.2602040

Lin, Y.-H., Chiu, C.-C., & Tsai, C.-H. (2008). The study of applying ANP model to assess dispatching rules for wafer fabrication. *Expert Systems with Applications, 34*(3), 2148-2163. doi: https://doi.org/10.1016/j.eswa.2007.02.033

Lin, Y.-H., Tsai, K.-M., Shiang, W.-J., Kuo, T.-C., & Tsai, C.-H. (2009). Research on using ANP to establish a performance assessment model for business intelligence systems. *Expert Systems with Applications, 36*(2), 4135-4146. doi: https://doi.org/10.1016/j.eswa.2008.03.004

Lipovetsky, S., & Conklin, W. M. (2002). Robust estimation of priorities in the AHP. *European Journal of Operational Research, 137*(1), 110-122. doi: https://doi.org/10.1016/s0377-2217(01)00071-6

Lu, E., & Hsiao, S.-w. (2006). ANP-GP approach for product variety design. *The International Journal of Advanced Manufacturing Technology, 29*(3-4), 216-225. doi: https://doi.org/10.1007/s00170-005-2506-3

Marcarelli, G. (2017). Evaluating healthcare organizations by a network model which integrates ANP with a revised-bsc. *International Journal of the Analytic Hierarchy Process, 9*(1), 1. doi: https://doi.org/10.13033/ijahp.v9i1.443

Mardani, A., Jusoh, A., & Zavadskas, E. K. (2015). Fuzzy multiple criteria decision-making techniques and applications–Two decades review from 1994 to 2014. *Expert systems with Applications, 42*(8), 4126-4148. doi: https://doi.org/10.1016/j.eswa.2015.01.003

Mardle, S., Pascoe, S., & Herrero, I. (2004). Management objective importance in fisheries: an evaluation using the analytic hierarchy process (AHP). *Environmental Management, 33*(1), 1-11. doi: https://doi.org/10.1007/s00267-003-3070-y

Mikhailov, L., & Singh, M. G. (2003). Fuzzy analytic network process and its application to the development of decision support systems. *IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews), 33*(1), 33-41. doi: https://doi.org/10.1109/tsmcc.2003.809354

Millet, I., & Saaty, T. L. (2000). On the relativity of relative measures– accommodating both rank preservation and rank reversals in the AHP. *European Journal of Operational Research, 121*(1), 205-212. doi: https://doi.org/10.1016/s0377-2217(99)00040-5

Modarres, M., & Zarei, B. (2002). Application of network theory and AHP in urban transportation to minimize earthquake damages. *Journal of the Operational Research Society, 53*(12), 1308-1316. doi: https://doi.org/10.1057/palgrave.jors.2601470

Mohanty, R. P., Agarwal, R., Choudhury, A. K., & Tiwari, M. K. (2005). A fuzzy ANP-based approach to R&D project selection: a case study. *International Journal of Production Research, 43*(24), 5199-5216. doi: https://doi.org/10.1080/00207540500219031

Momoh, J. A., & Zhu, J. (2003). Optimal generation scheduling based on AHP/ANP. *IEEE Transactions on Systems, Man, and Cybernetics, Part B (Cybernetics), 33*(3), 531-535. doi: https://doi.org/10.1109/tsmcb.2003.811122

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of Web of Science and Scopus: a comparative analysis. *Scientometrics, 106*(1), 213-228. doi: https://doi.org/10.1007/s11192-015-1765-5

Monitto, M., Pappalardo, P., & Tolio, T. (2002). A new fuzzy AHP method for the evaluation of automated manufacturing systems. *CIRP Annals, 51*(1), 395-398. doi: https://doi.org/10.1016/s0007-8506(07)61545-5

Mu, E. (2006). A unified framework for site selection and business forecasting using ANP. *Journal of Systems Science and Systems Engineering, 15*(2), 178-188. doi: https://doi.org/10.1007/s11518-006-5006-6

Muller, M. H., & Fairlie-Clarke, A. C. (2001). Using the AHP to determine the correlation of product issues to profit. *European Journal of Marketing, 35*(7/8), 843-858. doi: https://doi.org/10.1108/03090560110396269

Nallusamy, S., Kumar, D. S., Balakannan, K., & Chakraborty, P. S. (2016). MCDM tools application for selection of suppliers in manufacturing industries using AHP, Fuzzy Logic and ANN. *International Journal of Engineering Research in Africa, 19*, 130-137. doi: https://doi.org/10.4028/www.scientific.net/jera.19.130

Neaupane, K. M., & Piantanakulchai, M. (2006). Analytic network process model for landslide hazard zonation. *Engineering Geology, 85*(3-4), 281-294. doi: https://doi.org/10.1016/j.enggeo.2006.02.003

Nguyen, T., & Nahavandi, S. (2015). Modified AHP for gene selection and cancer classification using type-2 fuzzy logic. *IEEE Transactions on Fuzzy Systems, 24*(2), 273-287. doi: https://doi.org/10.1109/tfuzz.2015.2453153

Niemira, M. P., & Saaty, T. L. (2004). An analytic network process model for financial-crisis forecasting. *International Journal of Forecasting, 20*(4), 573-587. doi: https://doi.org/10.1016/j.ijforecast.2003.09.013

Nilashi, M., Ahmadi, H., Ahani, A., Ravangard, R., & Ibrahim, O. b. (2016). Determining the importance of hospital information system adoption factors using fuzzy analytic network process (ANP). *Technological Forecasting and Social Change, 111*(1), 244-264. doi: https://doi.org/10.1016/j.techfore.2016.07.008

Nishizawa, K. (2000). Bi-directional nearness in a network by AHP (Analytic Hierarchy Process) and ANP (Analytic Network Process). *RAIRO-Operations Research-Recherche Opérationnelle, 34*(3), 313-330. doi: https://doi.org/10.1051/ro:2000116

Ohta, K., Kobashi, G., Takano, S., Kagaya, S., Yamada, H., Minkami, H., & Yamamura, E. (2007). Analysis of the geographical accessibility of neurosurgical emergency hospitals in Sapporo city using GIS and AHP. *International Journal of Geographical Information Science, 21*(6), 687-698. https://doi.org/10.1080/13658810601135692

Omasa, T., Kishimoto, M., Kawase, M., & Yagi, K. (2004). An attempt at decision making in tissue engineering: reactor evaluation using the analytic hierarchy process (AHP). *Biochemical Engineering Journal, 20*(2-3), 173-179. doi: https://doi.org/10.1016/j.bej.2003.09.015

Opricovic, S., & Tzeng, G.-H. (2004). Compromise solution by MCDM methods: A comparative analysis of VIKOR and TOPSIS. *European journal of operational research, 156*(2), 445-455. doi: https://doi.org/10.1016/s0377-2217(03)00020-1

Ortiz, M. A., Felizzola, H. A., & Isaza, S. N. (2015). A contrast between DEMATEL-ANP and ANP methods for six sigma project selection: a case study in healthcare industry. *BMC Medical Informatics and Decision Making, 15*(3), S3. doi: https://doi.org/10.1186/1472-6947-15-s3-s3

Ozsahin, I., Sharif, T., Ozsahin, D. U., & Uzun, B. (2019). Evaluation of solid-state detectors in medical imaging with fuzzy PROMETHEE. *Journal Of Instrumentation, 14*(1), C01019. doi: https://doi.org/10.1088/1748-0221/14/01/c01019

Ozturk, H., Pekel, E., & Elevli, B. (2018). Using ANP and ELECTRE Methods for Supplier Selection: Cable Industry Application. *Sakarya University Journal of Science, 22*(5), 1190-1198.

Pal, D. K., Ravi, B., & Bhargava, L. S. (2007). Rapid tooling route selection for metal casting using QFD–ANP methodology. *International Journal of Computer Integrated Manufacturing, 20*(4), 338-354. doi: https://doi.org/10.1080/09511920600883229

Pecchia, L., Martin, J. L., Ragozzino, A., & Vanzanella, C. (2013). User needs elicitation via analytic hierarchy process (AHP). A case study on a Computed Tomography (CT) scanner. *BMC Medical Informatics and Decision Making, 13*(1), 2. doi: https://doi.org/10.1186/1472-6947-13-2

Promentilla, M. A., Furuichi, K. I., & Tanikawa, N. (2006). Evaluation of remedial countermeasures using the analytic network process. *Waste Management, 26*(12), 1410-1421. doi: https://doi.org/10.1016/j.wasman.2005.11.020

Ravi, V., Shankar, R., & Tiwari, M. K. (2005). Analyzing alternatives in reverse logistics for end-of-life computers: ANP and balanced scorecard approach. *Computers & industrial engineering, 48*(2), 327-356. doi: https://doi.org/10.1016/j.cie.2005.01.017

Ravi, V., Shankar, R., & Tiwari, M. K. (2008). Selection of a reverse logistics project for end-of-life computers: ANP and goal programing approach. *International Journal of Production Research, 46*(17), 4849-4870. doi: https://doi.org/10.1080/00207540601115989

Roy, B. (1968). Classement et choix en présence de points de vue multiples. *Revue Française D'informatique et de Recherche Opérationnelle, 2*(8), 57-75. doi: https://doi.org/10.1051/ro/196802v100571

Saaty, T. L. (2001). *Decision making with dependence and feedback: The Analytic Network Process* (2, illustrated ed.). Pittsburgh: RWS Publications.

Saaty, T. L. (2004). Decision making—the analytic hierarchy and network processes (AHP/ANP). *Journal of Systems Science and Systems Engineering, 13*(1), 1-35. doi: https://doi.org/10.1007/s11518-006-0151-5

Saaty, T. L. (2004). Fundamentals of the analytic network process—Dependence and feedback in decision-making with a single network. *Journal of Systems Science and Systems Engineering, 13*(2), 129-157. doi: https://doi.org/10.1007/s11518-006-0158-y

Saaty, T. L. (2004). Fundamentals of the analytic network process—multiple networks with benefits, costs, opportunities and risks. *Journal of Systems Science and Systems Engineering,, 13*(3), 348-379. doi: https://doi.org/10.1007/s11518-006-0171-1

Saaty, T. L. (2005). Making and validating complex decisions with the AHP/ANP. *Journal of Systems Science and Systems Engineering, 14*(1), 1-36. doi: https://doi.org/10.1007/s11518-006-0179-6

Saaty, T. L. (2007). Time dependent decision-making; dynamic priorities in the AHP/ANP: Generalizing from points to functions and from real to complex variables. *Mathematical and Computer Modelling, 46*(7-8), 860-891. doi: https://doi.org/10.1016/j.mcm.2007.03.028

Sax, L. J., Kanny, M. A., Jacobs, J. A., Whang, H., Weintraub, D. S., & Hroch, A. (2016). Understanding the changing dynamics of the gender gap in undergraduate engineering majors: 1971–2011. *Research in Higher Education, 57*(5), 570-600. doi: https://doi.org/10.1007/s11162-015-9396-5

Sekitani, K., & Takahashi, I. (2001). A unified model and analysis for AHP and ANP. *Journal of the Operations Research Society of Japan, 44*(1), 67-89. doi: https://doi.org/10.15807/jorsj.44.67

Sekitani, K., & Takahashi, I. (2005). A new approach of revising unstable data in ANP by Bayes theorem. *Journal of the Operations Research Society of Japan, 48*(1), 24-40. doi: https://doi.org/10.15807/jorsj.48.24

Sevinc, A., Gur, S., & Eren, T. (2018). Analysis of the difficulties of SMEs in industry 4.0 applications by Analytical Hierarchy Process and Analytical Network Process. *Processes, 6*(12), 264. doi: https://doi.org/10.3390/pr6120264

Seyedmohammadi, J., Sarmadian, F., Jafarzadeh, A. A., Ghorbani, M. A., & Shahbazi, F. (2018). Application of SAW, TOPSIS and fuzzy TOPSIS models in cultivation priority planning for maize, rapeseed and soybean crops. *Geoderma, 310*, 178-190. doi: https://doi.org/10.1016/j.geoderma.2017.09.012

Shen, K.-Y., & Tzeng, G.-H. (2018). Advances in multiple criteria decision making for sustainability: modeling and applications. *Sustainability, 10*(5), 1600. doi: https://doi.org/10.3390/su10051600

Shinde, D. D., & Prasad, R. (2018). Application of AHP for ranking of total productive maintenance pillars. *Wireless Personal Communications, 100*(2), 449-462. doi: https://doi.org/10.1007/s11277-017-5084-4

Shyur, H.-J. (2006). COTS evaluation using modified TOPSIS and ANP. *Applied Mathematics and Computation, 177*(1), 251-259. doi: https://doi.org/10.1016/j.amc.2005.11.006

Simunich, B. (2007). In the fall of 2002, the ANP had shown a better way to deal with Iraq. *Mathematical and Computer Modelling, 46*(7-8), 1130-1143. doi: https://doi.org/10.1016/j.mcm.2007.03.002

Singh, A., & Prasher, A. (2019). Measuring healthcare service quality from patients' perspective: using Fuzzy AHP application. *Total Quality Management & Business Excellence, 30*(3-4), 284-300. doi: https://doi.org/10.1080/14783363.2017.1302794

Sinuany-Stern, Z., Mehrez, A., & Hadad, Y. (2000). An AHP/DEA methodology for ranking decision making units. *International Transactions in Operational Research, 7*(2), 109-124. doi: https://doi.org/10.1111/j.1475-3995.2000.tb00189.x

Sipahi, S., & Timor, M. (2010). The analytic hierarchy process and analytic network process: an overview of applications. *Management Decision, 48*(5), 775-808. doi: https://doi.org/10.1108/00251741011043920

Solnes, J. (2003). Environmental quality indexing of large industrial development alternatives using AHP. *Environmental Impact Assessment Review, 23*(3), 283-303. doi: https://doi.org/10.1016/s0195-9255(03)00004-0

Su, X. Y., Hipel, K. W., & Kilgour, D. M. (2005). Comparison of the analytic network process and the graph model for conflict resolution. *Journal of Systems Science and Systems Engineering, 14*(3), 308-325. doi: https://doi.org/10.1007/s11518-006-0196-5

Tam, M. C., & Tummala, V. R. (2001). An application of the AHP in vendor selection of a telecommunications system. *Omega, 29*(2), 171-182. doi: https://doi.org/10.1016/s0305-0483(00)00039-6

Tesfamariam, D., & Lindberg, B. (2005). Aggregate analysis of manufacturing systems using system dynamics and ANP. *Computers & Industrial Engineering, 49*(1), 98-117. doi: https://doi.org/10.1016/j.cie.2005.05.001

Tesfamariam, S., & Sadiq, R. (2006). Risk-based environmental decision-making using fuzzy analytic hierarchy process (F-AHP). *Stochastic Environmental Research and Risk Assessment, 21*(1), 35-50. doi: https://doi.org/10.1007/s00477-006-0042-9

Tosun, O. K., Gungor, A., & Topcu, Y. l. (2008). ANP application for evaluating Turkish mobile communication operators. *Journal of Global Optimization, 42*(2), 313-324. doi: https://doi.org/10.1007/s10898-007-9257-7

Tsai, W.-H., & Chou, W.-C. (2009). Selecting management systems for sustainable development in SMEs: A novel hybrid model based on DEMATEL, ANP, and ZOGP. *Expert systems with applications, 36*(2), 1444-1458. doi: https://doi.org/10.1016/j.eswa.2007.11.058

Tummala, V. R., & Ling, H. (2000). A note on the sampling distribution of the information content of the priority vector of a consistent pairwise comparison judgment matrix of AHP. *Journal of the Operational Research Society, 51*(2), 237-240. doi: https://doi.org/10.1057/palgrave.jors.2600857

Vahidnia, M. H., Alesheikh, A. A., & Alimohammadi, A. (2009). Hospital site selection using fuzzy AHP and its derivatives. *Journal of Environmental Management, 90*(10), 3048-3056. doi: https://doi.org/10.1016/j.jenvman.2009.04.010

Van der Honert, R. C. (2001). Decisional power in group decision making: a note on the allocation of group members' weights in the multiplicative AHP and SMART. *Group Decision and Negotiation, 10*(3), 275-286. doi: https://doi.org/10.1023/a:1011201501379

Wang, J., Fan, K., & Wang, W. (2010). Integration of fuzzy AHP and FPP with TOPSIS methodology for aeroengine health assessment. *Expert Systems with Applications, 37*(12), 8516-8526. doi: https://doi.org/10.1016/j.eswa.2010.05.024

Wang, M., Yue, X., Gao, C., & Chen, Y. (2018). *Feature selection ensemble for symbolic data classification with AHP.* Beijing: IEEE. doi: https://doi.org/10.1109/icpr.2018.8546098

Wedley, W. C., Choo, E. U., & Schoner, B. (2001). Magnitude adjustment for AHP benefit/cost ratios. *European Journal of Operational Research, 133*(2), 342-351. doi: https://doi.org/10.1016/s0377-2217(00)00302-7

Wey, W.-M., & Wu, K.-Y. (2007). Using ANP priorities with goal programming in resource allocation in transportation. *Mathematical and Computer Modelling, 46*(7-8), 985-1000. doi: https://doi.org/10.1016/j.mcm.2007.03.017

Wijnmalen, D. J. (2007). Analysis of benefits, opportunities, costs, and risks (BOCR) with the AHP–ANP: A critical validation. *Mathematical and Computer Modelling, 46*(7-8), 892-905. doi: https://doi.org/10.1016/j.mcm.2007.03.020

Wolfslehner, B., Vacik, H., & Lexer, M. J. (2005). Application of the analytic network process in multi-criteria analysis of sustainable forest management. *Forest Ecology and Management, 207*(1-2), 157-170. doi: https://doi.org/10.1016/j.foreco.2004.10.025

Wu, W.-W. (2008). Choosing knowledge management strategies by using a combined ANP and DEMATEL approach. *Expert Systems with Applications, 35*(3), 828-835. doi: https://doi.org/10.1016/j.eswa.2007.07.025

Xu, Z. (2000). On consistency of the weighted geometric mean complex judgement matrix in AHP. *European Journal of Operational Research, 126*(3), 683-687. doi: https://doi.org/10.1016/s0377-2217(99)00082-x

Yang, J. L., Chiu, H. N., Tzeng, G.-H., & Yeh, R. H. (2008). Vendor selection by integrated fuzzy MCDM techniques with independent and interdependent relationships. *Information Sciences, 178*(21), 4166-4183. doi: https://doi.org/10.1016/j.ins.2008.06.003

Yang, J., Shen, L., Jin, X., Hou, L., Shang, S., & Zhang, Y. (2019). Evaluating the quality of simulation teaching in Fundamental Nursing Curriculum: AHP-Fuzzy comprehensive evaluation. *Nurse Education Today, 77*, 77-82. doi: https://doi.org/10.1016/j.nedt.2019.03.012

Yanie, A., Hasibuan, A., Shak, I., Marsono, M., Lubis, S., Nurmalini, N., . . . Nudiyanto, H. (2018). *Web based application for decision support system with ELECTRE method.* Makassar: IOP Publishing. doi: https://doi.org/10.1088/1742-6596/1028/1/012054

Ying, X., Zeng, G.-M., Chen, G.-Q., Tang, L., Wang, K.-L., & Huang, D.-Y. (2007). Combining AHP with GIS in synthetic evaluation of eco-environment quality—A

case study of Hunan Province, China. *Ecological modelling, 209*(2-4), 97-109. doi: https://doi.org/10.1016/j.ecolmodel.2007.06.007

Yoshimatsu, H., & Abe, S. (2006). A review of landslide hazards in Japan and assessment of their susceptibility using an analytical hierarchic process (AHP) method. *Landslides, 3*(2), 149-158. doi: https://doi.org/10.1007/s10346-005-0031-y

Yu, C.-S. (2002). A GP-AHP method for solving group decision-making fuzzy AHP problems. *Computers & Operations Research, 29*(14), 1969-2001. doi: https://doi.org/10.1016/s0305-0548(01)00068-5

Yuksel, I., & Dagdeviren, M. (2007). Using the analytic network process (ANP) in a SWOT analysis–A case study for a textile firm. *Information sciences, 177*(16), 3364-3382. doi: https://doi.org/10.1016/j.ins.2007.01.001

Yurdakul, M. (2003). Measuring long-term performance of a manufacturing firm using the Analytic Network Process (ANP) approach. *International Journal of Production Research, 41*(11), 2501-2529. doi: https://doi.org/10.1080/0020754031000088183

Yusuff, R. M., Yee, K. P., & Hashmi, M. S. (2001). A preliminary study on the potential use of the analytical hierarchical process (AHP) to predict advanced manufacturing technology (AMT) implementation. *Robotics and Computer-Integrated Manufacturing, 17*(5), 421-427. doi: https://doi.org/10.1016/s0736-5845(01)00016-3

Zavadskas, E. K., & Turskis, Z. (2011). Multiple criteria decision making (MCDM) methods in economics: an overview. *Technological and economic development of economy, 17*(2), 397-427. doi: https://doi.org/10.3846/20294913.2011.593291

Zegordi, S. H., Nik, E. R., & Nazari, A. (2012). Power plant project risk assessment using a fuzzy-ANP and fuzzy-TOPSIS method. *International Journal of Engineering-Transactions B: Applications, 25*(2), 107-120. doi: https://doi.org/10.5829/idosi.ije.2012.25.02b.04

Zheng, D., & Ruan, P. (2007). General conception of livable city basing on ANP [J]. *Urban Studies, 3*(1).

Zhi-xiang, C. (2004). Model and algorithms of supply and demand coordination performance measurement based on ANP theory [J]. *Computer Integrated Manufacturing Systems, 3*.

Zohoori, A., Vahedi, A., Meo, S., & Sorrentino, V. (2016). An improved AHP method for multi-objective design of FSPM machine for wind farm applications. *Journal of Intelligent & Fuzzy Systems, 30*(1), 159-169. doi: https://doi.org/10.3233/ifs-151742

Appendix A
ENGINEERING/TECHNOLOGY/APPLIED SCIENCES

Table 3
Research publications in engineering/technology/applied science category for ANP-2000 to 2019

ANP		
Authors	**Research Title**	**Journal Name**
(Yurdakul, 2003)	Measuring long-term performance of a manufacturing firm using the Analytic Network Process (ANP) approach.	*International Journal of Production Research*
(Leung, Hui, & Zheng, 2003)	Analysis of compatibility between interdependent matrices in ANP	*Journal of the Operational Research Society*
(Karsak, Sozer, & Alptekin, 2003)	Product planning in quality function deployment using a combined analytic network process and goal programming approach	*Computers & industrial engineering*
(Zhi-xiang, 2004)	Model and Algorithms of Supply and Demand Coordination Performance Measurement Based on ANP Theory [J]	*Computer Integrated Manufacturing Systems*
(Ravi, Shankar, & Tiwari, 2005)	Analyzing alternatives in reverse logistics for end-of-life computers: ANP and balanced scorecard approach.	*Computers & industrial engineering,*
(Mohanty, Agarwal, Choudhury, & Tiwari, 2005)	A fuzzy ANP-based approach to R&D project selection: a case study	*International Journal of Production Research*
(Chung, Lee, & Pearn, Product mix optimization for semiconductor manufacturing based on AHP and ANP analysis, 2005)	Product mix optimization for semiconductor manufacturing based on AHP and ANP analysis	*The International Journal of Advanced Manufacturing Technology*
(Tesfamariam & Lindberg, 2005)	Aggregate analysis of manufacturing systems using system dynamics and ANP	*Computers & Industrial Engineering*
(Erdogmus, Kapanoglu, & Koc, Evaluating high-tech alternatives by using analytic network process with BOCR and multiactors, 2005)	Evaluating high-tech alternatives by using analytic network process with BOCR and multi actors	*Evaluation and Program Planning*
(Ertay, Buyukozkan, Kahraman, & Ruan, 2005)	Quality function deployment implementation based on analytic network process with linguistic data: An application in automotive industry	*Journal of Intelligent & Fuzzy Systems*
(Su, Hipel, & Kilgour, 2005)	Comparison of the analytic network process and the graph model for conflict resolution	*Journal of Systems Science and Systems Engineering*
(Lu & Hsiao, 2006)	ANP-GP approach for product variety design	*The International Journal of Advanced Manufacturing Technology*
(Kahraman, Ertay, & Buyukozkan, 2006)	A fuzzy optimization model for QFD planning process using analytic network approach	*European Journal of Operational Research*

*International Journal of the
Analytic Hierarchy Process*

403

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

(Gungor, 2006)	Evaluation of connection types in design for disassembly (DFD) using analytic network process	*Computers & Industrial Engineering*
(Ayag & Ozdemir, An intelligent approach to ERP software selection through fuzzy ANP, 2007)	An intelligent approach to ERP software selection through fuzzy ANP	*International Journal of Production Research*
(Saaty T. L., Time dependent decision-making; dynamic priorities in the AHP/ANP: Generalizing from points to functions and from real to complex variables, 2007)	Time-dependent decision-making; dynamic priorities in the AHP/ANP: Generalizing from points to functions and from real to complex variables	*Mathematical and Computer Modelling*
(Cheng & Li, Application of ANP in process models: An example of strategic partnering, 2007)	Application of ANP in process models: An example of strategic partnering	*Building and environment*
(Wijnmalen, 2007)	Analysis of benefits, opportunities, costs, and risks (BOCR) with the AHP–ANP: A critical validation	*Mathematical and computer modelling*
(Wey & Wu, 2007)	Using ANP priorities with goal programming in resource allocation in transportation	*Mathematical and computer modelling*
(Pal, Ravi, & Bhargava, 2007)	Rapid tooling route selection for metal casting using QFD–ANP methodology	*International Journal of Computer Integrated Manufacturing*
(Garuti & Spencer, 2007)	Parallels between the analytic hierarchy and network processes (AHP/ANP) and fractal geometry	*Mathematical and Computer Modelling*
(Lin, Chiu, & Tsai, The study of applying ANP model to assess dispatching rules for wafer fabrication, 2008)	The study of applying ANP model to assess dispatching rules for wafer fabrication	*Expert Systems with Applications*
(Ravi, Shankar, & Tiwari, 2008)	Selection of a reverse logistics project for end-of-life computers: ANP and goal programing approach	*International Journal of Production Research*
(Tosun, Gungor, & Topcu, 2008)	ANP application for evaluating Turkish mobile communication operators	*Journal of Global Optimization*
(Lee H. , Kim, Cho, & Park, 2009)	An ANP-based technology network for identification of core technologies: A case of telecommunication technologies	*Expert Systems with Applications*
Yang, Chang-Lin, Shan-Ping Chuang, and Rong-Hwa Huang	Manufacturing evaluation system based on AHP/ANP approach for wafer fabricating industry	*expert Systems with Applications*
Pi-Fang, Hsu	Evaluation of Advertising Spokespersons via the ANP-GRA Selection Model	*Journal of Grey System*
Yüksel, İhsan, and Metin Dağdeviren	Using the fuzzy analytic network process (ANP) for Balanced Scorecard (BSC): A case study for a manufacturing firm	*Expert Systems with Applications*
Aragonés-Beltrán, P., F. Chaparro-González, J. P. Pastor-Ferrando, and F. Rodríguez-Pozo	An ANP-based approach for the selection of photovoltaic solar power plant investment projects	*Renewable and sustainable energy reviews*

Jung, Uk, and D. W. Seo	An ANP approach for R&D project evaluation based on interdependencies between research objectives and evaluation criteria	*Decision Support Systems*
Lee, Hakyeon, Chulhyun Kim, and Yongtae Park	Evaluation and management of new service concepts: An ANP-based portfolio approach	*Computers & Industrial Engineering*
Yazgan, Harun Resit, Semra Boran, and Kerim Goztepe	Selection of dispatching rules in FMS: ANP model based on BOCR with Choquet integral	*The International Journal of Advanced Manufacturing Technology*
Luo, Zhi-meng, Jian-Zhong Zhou, Li-ping Zheng, Li Mo, and Yao-Yao He	A TFN–ANP based approach to evaluate Virtual Research Center comprehensive performance	*Expert Systems with Applications*
Kasirian, M. Navid, and Rosnah Mohd Yusuff	Application of AHP and ANP in supplier selection process-a case in an automotive company	*International journal of management science and Engineering Management*
Caballero-Luque, Antonio, Pablo Aragonés-Beltrán, Mónica García-Melón, and Carlos Dema-Pérez	Analysis of the alignment of company goals to web content using ANP	*International Journal of Information Technology & Decision Making*
Liao, Sen-Kuei, Kuei-Lun Chang, and Tzeng-Wei Tseng	Optimal selection of program suppliers for TV companies using an analytic network process (ANP) approach	*Asia-Pacific Journal of Operational Research*
Gumus, Alev Taskin, and Gokhan Yilmaz	Sea vessel type selection via an integrated VAHP–ANP methodology for high-speed public transportation in Bosphorus	*Expert Systems with Applications*
Mohan, K. Krishna, Ajit Srividya, and Ajit Kumar Verma	ANP-based software reliability prediction using PoCs and subsequent employment of orthogonal defect classification measurements for risk mitigation during prototype studies	*International Journal of Systems Assurance Engineering and Management*
Hsu, Chia-Wei, Allen H. Hu, Cherng-Ying Chiou, and Ta-Che Chen	Using the FDM and ANP to construct a sustainability balanced scorecard for the semiconductor industry	*Expert Systems with Applications*
Lipovetsky, Stan	An interpretation of the AHP global priority as the eigenvector solution of an ANP supermatrix	*International Journal of the Analytic Hierarchy Process*
Liou, James JH, Gwo-Hshiung Tzeng, Chieh-Yuan Tsai, and Chao-Che Hsu	A hybrid ANP model in fuzzy environments for strategic alliance partner selection in the airline industry	*Applied Soft Computing*
Kim, Chulhyun, Hakyeon Lee, Hyeonju Seol, and Changyong Lee	Identifying core technologies based on technological cross-impacts: An association rule mining (ARM) and analytic network process (ANP) approach	*Expert Systems with Applications*
Paramasivam, V., V. Senthil, and N. Rajam Ramasamy	Decision making in equipment selection: an integrated approach with digraph and matrix approach, AHP and ANP	*The International Journal of Advanced Manufacturing Technology*
Yazgan, Harun Resit	Selection of dispatching rules with fuzzy ANP approach	*The International Journal of Advanced Manufacturing Technology*
Yang, Chang-Lin, Ching Lien Huang, and Shan-Ping Chuang	Outsourcing evaluation system based on AHP/ANP approach for LED industry	*Journal of Statistics and Management Systems*
Sevkli, Mehmet, Asil Oztekin, Ozgur Uysal, Gökhan Torlak, Ali	Development of a fuzzy ANP based SWOT analysis for the airline industry in Turkey	*Expert Systems with Applications*

Turkyilmaz, and Dursun Delen		
Zaim, Selim, Ali Turkyılmaz, Mehmet F. Acar, Umar Al-Turki, and Omer F. Demirel.	Maintenance strategy selection using AHP and ANP algorithms: a case study	*Journal of Quality in Maintenance Engineering*
Atmaca, Ediz, and Hasan Burak Basar	Evaluation of power plants in Turkey using Analytic Network Process (ANP)	*Energy*
Ayağ, Zeki, and Rifat Gürcan Özdemir	Evaluating machine tool alternatives through modified TOPSIS and alpha-cut based fuzzy ANP	*International Journal of Production Economics*
Kang, He-Yau, Amy HI Lee, and C-Y. Yang	A fuzzy ANP model for supplier selection as applied to IC packaging	*Journal of Intelligent Manufacturing*
Hsu, Tsuen-Ho, Li-Chu Hung, and Jia-Wei Tang	A hybrid ANP evaluation model for electronic service quality	*Applied Soft Computing*
Özdağoğlu, Aşkın	A multi-criteria decision-making methodology on the selection of facility location: fuzzy ANP	*The International Journal of Advanced Manufacturing Technology*
De Felice, Fabio	Research and applications of AHP/ANP and MCDA for decision making in manufacturing	*INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH*
Ordoobadi, Sharon M	Application of ANP methodology in evaluation of advanced technologies	*Journal of Manufacturing Technology Management*
Vahdani, Behnam, Hasan Hadipour, and Reza Tavakkoli-Moghaddam	Soft computing based on interval-valued fuzzy ANP-A novel methodology	*Journal of Intelligent Manufacturing*
Ozaki, Toshimasa, Mei-Chen Lo, Eizo Kinoshita, and Gwo-Hshiung Tzeng	Decision-making for the best selection of suppliers by using minor ANP	*Journal of Intelligent Manufacturing*
Zolfani, Sarfaraz H., Nahid Rezaeiniya, and J. Saparauskas	Selecting the best multi-role artist of rock bands of Iran 2000s by applying ANP and TOPSIS grey	*Economic Computation and Economic Cybernetics Studies and Research*
Goztepe, Kerim, and Semra Boran	A decision support system for supplier selection using fuzzy analytic network process (Fuzzy ANP) and artificial neural network integration	*Scientific Research and Essays*
Sabri, Soheil, Ahmad Nazri Muhammad M. Ludin, and Chin Siong Ho	Conceptual design for an integrated geosimulation and analytic network process (ANP) in gentrification appraisal	*Applied Spatial Analysis and Policy*
Tavana, Madjid, Ehsan Momeni, Nahid Rezaeiniya, Seyed Mostafa Mirhedayatian, and Hamidreza Rezaeiniya	A novel hybrid social media platform selection model using fuzzy ANP and COPRAS-G	*Expert Systems with Applications*
Eshtehardian, Ehsan, Parviz Ghodousi, and Azadeh Bejanpour	Using ANP and AHP for the supplier selection in the construction and civil engineering companies; case study of Iranian company	*KSCE Journal of Civil Engineering*
Liang, Xingyu, Xiuxiu Sun, Gequn Shu, Kang Sun, Xu Wang, and Xinlei Wang	Using the analytic network process (ANP) to determine method of waste energy recovery from engine	*Energy Conversion and Management*
Tavana, Madjid, Faramak	A hybrid fuzzy group ANP–TOPSIS framework for assessment of e-government	*Information & Management*

Zandi, and Michael N. Katehakis	readiness from a CiRM perspective	
Kiriş, Şafak	Multi-criteria inventory classification by using a fuzzy analytic network process (ANP) approach	*Informatica*
Hsiao, Shih-Wen, Ya-Chuan Ko, Chi-Hung Lo, and Shih-Ho Chen	An ISM, DEI, and ANP based approach for product family development	*Advanced Engineering Informatics*
Keramati, Abbas, and Mona Salehi	Website success comparison in the context of e-recruitment: An analytic network process (ANP) approach	*Applied Soft Computing*
Chen, Zhen, Arham B. Abdullah, Chimay J. Anumba, and Heng Li	ANP experiment for demolition plan evaluation	*Journal of Construction Engineering and Management*
Zhou, Jian-Lan, Bai Zhe-Hua, and Zhi-Yu Sun	Safety assessment of high-risk operations in hydroelectric-project based on accidents analysis, SEM, and ANP	*Mathematical Problems in Engineering*
Chen, Hsing Hung, and Hao Gu	A fuzzy ANP model integrated with benefits, opportunities, costs, and risks to prioritize intelligent power grid systems	*Mathematical Problems in Engineering*
Hui-Ru, Zhao, and Li Na-na	A novel hybrid evaluation model for the performance of ERP project based on ANP and improved matter-element extension model	*Mathematical Problems in Engineering*
Ting, Chih-Wen, Jyun-Wei Huang, Ding-Shan Wang, and Gwo-Hshiung Tzeng	Combining DEMATEL with ANP to modify multidimensional scaling in identifying the similarities of e-shopping stores	*African Journal of Business Management*
Aragonés-Beltrán, Pablo, Fidel Chaparro-González, Juan-Pascual Pastor-Ferrando, and Andrea Pla-Rubio	An AHP (Analytic Hierarchy Process)/ANP (Analytic Network Process)-based multi-criteria decision approach for the selection of solar-thermal power plant investment projects	*Energy*
Van Horenbeek, Adriaan, and Liliane Pintelon	Development of a maintenance performance measurement framework—using the analytic network process (ANP) for maintenance performance indicator selection	*Omega*
Zaim, Selim, Mehmet Sevkli, Hatice Camgöz-Akdağ, Omer F. Demirel, A. Yesim Yayla, and Dursun Delen	Use of ANP weighted crisp and fuzzy QFD for product development	*Expert Systems with Applications*
Yeh, Tsu-Ming, and Yu-Lang Huang	Factors in determining wind farm location: Integrating GQM, fuzzy DEMATEL, and ANP	*Renewable Energy*
Shahabi, Reza Shakoor, Mohammad Hossein Basiri, Mahdi Rashidi Kahag, and Samad Ahangar Zonouzi	An ANP–SWOT approach for interdependency analysis and prioritizing the Iran′s steel scrap industry strategies	*Resources Policy*
Wu, Che-I., Hsu-Yang Kung, Chi-Hua Chen, and Li-Chia Kuo	An intelligent slope disaster prediction and monitoring system based on WSN and ANP	*Expert Systems with Applications*
Li, Kewen, Yu Zhang, and Wenying Liu	Weight analysis based on ANP and QFD in software quality evaluation	*Applied Mathematics & Information Sciences*
Demirtaş, Nurgül, Şenim	Selecting e-purse smart card technology via fuzzy AHP and ANP	*Journal of Applied Mathematics*

Özgürler, Mesut Özgürler, and Ali Fuat Güneri		
Pan, R., W. Zhang, S. Yang, and Y. Xiao	A state entropy model integrated with BSC and ANP for supplier evaluation and selection	*International Journal of Simulation Modelling*
Jeong, Hwa-Young, Jong Hyuk Park, and Young-Sik Jeong	An ANP-based practical quality model for a secure embedded system with sensor network	*International Journal of Distributed Sensor Networks*
Uygun, Özer, Hasan Kaçamak, and Ünal Atakan Kahraman	An integrated DEMATEL and Fuzzy ANP techniques for evaluation and selection of outsourcing provider for a telecommunication company	*Computers & Industrial Engineering*
Mostafa, Sherif, Tariq Abdelhamid, Nicholas Chileshe, and Jantanee Dumrak	Decision support model using ANP to align leagile strategies to off-site manufacturing in Australia	*International Journal of the Analytic Hierarchy Process*
Chemweno, Peter, Liliane Pintelon, Adriaan Van Horenbeek, and Peter Muchiri	Development of a risk assessment selection methodology for asset maintenance decision making: An analytic network process (ANP) approach	*International Journal of Production Economics*
Lee, Sora, Youngjung Geum, Sungjoo Lee, and Yongtae Park	Evaluating new concepts of PSS based on the customer value: Application of ANP and niche theory	*Expert systems with Applications*
Nilashi, Mehrbakhsh, Rozana Zakaria, Othman Ibrahim, Muhd Zaimi Abd Majid, Rosli Mohamad Zin, and Mohammadali Farahmand	MCPCM: a DEMATEL-ANP-based multi-criteria decision-making approach to evaluate the critical success factors in construction projects	*Arabian Journal for Science and Engineering*
Wang, Xin, Zhengjiang Liu, and Yao Cai	A rating based fuzzy analytic network process (F-ANP) model for evaluation of ship maneuverability	*Ocean Engineering*
Aliakbari Nouri, Fahimeh, Saber Khalili Esbouei, and Jurgita Antucheviciene	A hybrid MCDM approach based on fuzzy ANP and fuzzy TOPSIS for technology selection	*Informatica*
Kumru, Mesut, and Pınar Yıldız Kumru	A fuzzy ANP model for the selection of 3D coordinate-measuring machine	*Journal of Intelligent Manufacturing*
Chen, Wen-Chin, Hui-Pin Chang, Kuan-Ming Lin, and Neng-Hao Kan	An Efficient Model for NPD Performance Evaluation Using DEMATEL and Fuzzy ANP—Applied to the TFT-LCD Touch Panel Industry in Taiwan	*Energies*
Tang-Nguyen, Hanh, and Young-Chan Lee	The SWOT-ANP decision framework for the enterprise's cloud computing strategy	*Information*
Jin, Lisheng, Keyong Li, Yuying Jiang, Huacai Xian, and Linlin Gao	Classifying Secondary Task Driving Safety Using Method of F-ANP	*Advances in Mechanical Engineering*
Chen, I-Shuo	A combined MCDM model based on DEMATEL and ANP for the selection of airline service quality improvement criteria: A study based on the Taiwanese airline industry	*Journal of Air Transport Management*

Mei, Ying, Jiawei Ye, and Zhigang Zeng	Entropy-weighted ANP fuzzy comprehensive evaluation of interim product production schemes in one-of-a-kind production	*Computers & Industrial Engineering*
Ramkumar, M., Tobias Schoenherr, and Mamata Jenamani	Risk assessment of outsourcing e-procurement services: integrating SWOT analysis with a modified ANP-based fuzzy inference system.	*Production Planning & Control*
Ozdemir, Yavuz, and Huseyin Basligil	Aircraft selection using Fuzzy ANP and the generalized Choquet Integral method: The Turkish Airlines case	*Journal of Intelligent & Fuzzy Systems*
Al-Refaie, A., E. Sy, I. Rawabdeh, and W. Alaween	Integration of SWOT and ANP for effective strategic planning in the cosmetic industry	*Advances in Production Engineering & Management*
Samanlioglu, Funda, and Zeki Ayağ	Fuzzy ANP-based PROMETHEE II approach for evaluation of machine tool alternatives	*Journal of Intelligent & Fuzzy Systems*
Oztaysi, Basar, Tuncay Gurbuz, Esra Albayrak, and Cengiz Kahraman	Target Marketing Strategy Determination for Shopping Malls Using Fuzzy ANP	*Journal of Multiple-Valued Logic & Soft Computing*
Wang, Xiaojia, Chenggong Li, Jennifer Shang, Changhui Yang, Bingli Zhang, and Xinsheng Ke	Strategic choices of China's new energy vehicle industry: An analysis based on ANP and SWOT	*Energies*
Shariati, Shahram, Masoumeh Abedi, Alieh Saedi, Abdolreza Yazdani-Chamzini, Jolanta Tamošaitienė, Jonas Šaparauskas, and Stanislav Stupak	Critical factors of the application of nanotechnology in construction industry by using ANP technique under fuzzy intuitionistic environment	*Journal of Civil Engineering and Management*
Cheng, Chia-Hua, James Liou, and Chui-Yu Chiu	A consistent fuzzy preference relation based ANP model for R&D project selection	*Sustainability*
Toosi, SL Razavi, and J. M. V. Samani	Prioritizing watersheds using a novel hybrid decision model based on fuzzy DEMATEL, fuzzy ANP and fuzzy VIKOR	*Water resources management*
Kabak, Mehmet, and Metin Dagdeviren	A hybrid approach based on ANP and grey relational analysis for machine selection	*Tehnički vjesnik*
Özdemir, Ali, and Fatih Tüysüz	An Integrated Fuzzy DEMATEL and Fuzzy ANP Based Balanced Scorecard Approach: Application in Turkish Higher Education Institutions	*Journal of Multiple-Valued Logic & Soft Computing*
Li, Kunlun, and Jun Wang	Multi-objective Optimization for cloud task scheduling based on the ANP model	*Chinese Journal of Electronics*
Ervural, Beyzanur Cayir, Selim Zaim, Omer F. Demirel, Zeynep Aydin, and Dursun Delen	An ANP and fuzzy TOPSIS-based SWOT analysis for Turkey's energy planning	*Renewable and Sustainable Energy Reviews*
Azizi, Majid, and Gholamreza Mehdikhanloo	APPLYING ANP TO ANALYZE THE ROLE OF DESIGN IN THE FURNITURE INDUSTRY	*International Journal of the Analytic Hierarchy Process*
Hemmati, Narges, Masoud Rahiminezhad Galankashi, Din Mohammad Imani, and Hiwa Farughi	Maintenance policy selection: a fuzzy-ANP approach	*Journal of Manufacturing Technology Management*

Ebrahimi, M., M. Aramesh, and Y. Khanjari	Innovative ANP model to prioritization of PV/T systems based on cost and efficiency approaches: With a case study for Asia	*Renewable Energy*
Sayyadi, Reza, and Anjali Awasthi	An integrated approach based on system dynamics and ANP for evaluating sustainable transportation policies	*International Journal of Systems Science: Operations & Logistics*
Ganji, SR Seyedalizadeh, Amir Abbas Rassafi, and Ali Abdi Kordani	Vehicle safety analysis based on a hybrid approach integrating DEMATEL, ANP and ER	*KSCE Journal of Civil Engineering*
Hasnain, Muhammad, Muhammad Jamaluddin Thaheem, and Fahim Ullah	Best value contractor selection in road construction projects: ANP-based decision support system	*International Journal of Civil Engineering*
Bongo, Miriam F., Kissy Mae S. Alimpangog, Jennifer F. Loar, Jason A. Montefalcon, and Lanndon A. Ocampo	An application of DEMATEL-ANP and PROMETHEE II approach for air traffic controllers' workload stress problem: A case of Mactan Civil Aviation Authority of the Philippines	*Journal of Air Transport Management*
Wu, Yunna, Buyuan Zhang, Chuanbo Xu, and Lingwenying Li	Site selection decision framework using fuzzy ANP-VIKOR for large commercial rooftop PV system based on sustainability perspective	*Sustainable cities and society*
Chou, Chien-chang	Application of ANP to the selection of shipping registry: the case of Taiwanese maritime industry	*International Journal of Industrial Ergonomics*
Li, Xuerui, Suihuai Yu, and Jianjie Chu	Optimal selection of manufacturing services in cloud manufacturing: A novel hybrid MCDM approach based on rough ANP and rough TOPSIS	*Journal of Intelligent & Fuzzy Systems*
Liu, Guiwen, Saina Zheng, Pengpeng Xu, and Taozhi Zhuang	An ANP-SWOT approach for ESCOs industry strategies in Chinese building sectors	*Renewable and Sustainable Energy Reviews*
Yazgan, Ebru, and Ayşe Kucuk Yilmaz	Prioritisation of factors contributing to human error for airworthiness management strategy with ANP	*Aircraft Engineering and Aerospace Technology*
Erginel, Nihal, Meryem Uluskan, Gamze Küçük, and Merve Altintaş	Evaluation methods for completed Six Sigma projects through an interval type-2 fuzzy ANP	*Journal of Intelligent & Fuzzy Systems*
Li, Lianhui, and Hongguang Wang	A green supplier assessment method for manufacturing enterprises based on rough ANP and evidence theory	*Information*
Tang, Gongbin, Yifan Chen, Feng Xiao, Shanshan Zhang, and Fuchuan Huang	The development of hydraulic oils for the new fuel-efficient hydraulic hybrid vehicles with ANP method	*Industrial Lubrication and Tribology*
Yang, Jing, Changhui Yang, Yiming Song, and Xiaojia Wang	Exploring Promotion Effect for FIT Policy of Solar PV Power Generation Based on Integrated ANP: Entropy Model	*Mathematical Problems in Engineering*
Khan, Muhammad Aamir, Ahmad Ali, Muhammad Iftikhar ul Husnain, and Muhammad Zakaria	Analysis of power plants in China Pakistan economic corridor (CPEC): An application of analytic network process (ANP)	*Journal of Renewable and Sustainable Energy*
Karaşan, Ali, and Cengiz Kahraman	A novel intuitionistic fuzzy DEMATEL–ANP–TOPSIS integrated methodology for freight village location selection	*Journal of Intelligent & Fuzzy Systems*

Fargnoli, Mario, and Nicolas Haber	A practical ANP-QFD methodology for dealing with requirements' inner dependency in PSS development	*Computers & Industrial Engineering*
Mahdiyar, Amir, Sanaz Tabatabaee, Serdar Durdyev, Syuhaida Ismail, Arham Abdullah, and Wan Nurul Mardiah Wan Mohd Rani	A prototype decision support system for green roof type selection: A cybernetic fuzzy ANP method	*Sustainable cities and society*
Kazemi-Beydokhti, M., R. Ali Abbaspour, M. Kheradmandi, and A. Bozorgi-Amiri	Determination of the physical domain for air quality monitoring stations using the ANP-OWA method in GIS	*Environmental monitoring and assessment*
Tan, Zhongfu, Qingkun Tan, Liwei Ju, Shenbo Yang, Huangfu Cheng, and Jiale Ma	Trend Analysis and Comprehensive Evaluation of Green Production Principal Component of Thermal Power Unit Based on ANP-MEEM Model	*Discrete Dynamics in Nature and Society*
Seyedmohammadi, Javad, Fereydoon Sarmadian, Ali Asghar Jafarzadeh, and Richard W. McDowell	Integration of ANP and Fuzzy set techniques for land suitability assessment based on remote sensing and GIS for irrigated maize cultivation	*Archives of Agronomy and Soil Science*
Hu, Yaoguang, Shasha Xiao, Jingqian Wen, and Jinliang Li	An ANP-multi-criterion-based methodology to construct maintenance networks for agricultural machinery cluster in a balanced scorecard context	*Computers and electronics in agriculture*
Ligardo-Herrera, Ivan, Tomás Gómez-Navarro, and Hannia Gonzalez-Urango	Application of the ANP to the prioritization of project stakeholders in the context of responsible research and innovation	*Central European Journal of Operations Research*
Poudeh, Hossein Dehghani, Mohsen Cheshmberah, Hassan Torabi, Mohammad Hossein Karimi Gavareshki, and Reza Hosnavi	Determining and prioritizing the factors influencing the outsourcing of Complex Product Systems R&D projects employing ANP and grey-DEMATEL method (case study: Aviation Industries Organization, Iran)	*Technology in Society*
Yucelgazi, Fikri, and İbrahim Yitmen	An ANP Model for Risk Assessment in Large-Scale Transport Infrastructure Projects	*Arabian Journal for Science and Engineering*
Choi, Cheol-Rim, and Hwa-Young Jeong	Quality evaluation for multimedia contents of e-learning systems using the ANP approach on high-speed network	*Multimedia Tools and Applications*
Karimi, Marziyeh, Amir Hossein Niknamfar, and Seyed Taghi Akhavan Niaki	An application of fuzzy-logic and grey-relational ANP-based SWOT in the ceramic and tile industry	*Knowledge-Based Systems*

Table 4
Research publications in engineering/technology/applied science category for AHP-2000 to 2019

AHP		
Authors	**Research Title**	**Journal Name**
(Cagno, Caron, Mancini, & Ruggeri, 2000)	Using AHP in determining the prior distributions on gas pipeline failures in a robust Bayesian approach	*Reliability Engineering & System Safety*
(Tummala & Ling, 2000)	A note on the sampling distribution of the information content of the priority vector of a consistent pairwise comparison judgment matrix of AHP	*Journal of the Operational Research Society*
(Tam & Tummala, 2001)	An application of the AHP in vendor selection of a telecommunications system	Omega
(Byun, 2001)	The AHP approach for selecting an automobile purchase model	*Information & Management*
(Badri, 2001)	A combined AHP–GP model for quality control systems	*International Journal of Production Economics*
(Yusuff, Yee, & Hashmi, 2001)	A preliminary study on the potential use of the analytical hierarchical process (AHP) to predict advanced manufacturing technology (AMT) implementation	*Robotics and Computer-Integrated Manufacturing*
(Fahmy, 2001)	Reliability evaluation in distributed computing environments using the AHP	*Computer Networks*
(Kwong & Bai, 2002)	A fuzzy AHP approach to the determination of importance weights of customer requirements in quality function deployment	*Journal of intelligent manufacturing*
(Lai, Wong, & Cheung, 2002)	Group decision making in a multiple criteria environment: A case using the AHP in software selection	*European Journal of Operational Research*
(Kuo, Chi, & Kao, 2002)	A decision support system for selecting convenience store location through integration of fuzzy AHP and artificial neural network	*Computers in industry*
(Beynon, DS/AHP method: A mathematical analysis, including an understanding of uncertainty, 2002)	DS/AHP method: A mathematical analysis, including an understanding of uncertainty	*European Journal of Operational Research*
(Lipovetsky & Conklin, 2002)	Robust estimation of priorities in the AHP	*European Journal of Operational Research*
(Chin, Pun, Xu, & Chan, 2002)	An AHP based study of critical factors for TQM implementation in Shanghai manufacturing industries	*Technovation*
(Beynon, An analysis of distributions of priority values from alternative comparison scales within AHP, 2002)	An analysis of distributions of priority values from alternative comparison scales within AHP	*European Journal of Operational Research*
(Monitto, Pappalardo, & Tolio, 2002)	A new fuzzy AHP method for the evaluation of automated manufacturing systems	*CIRP Annals*
Forgionne, Guisseppi A., Rajiv Kohli, and Darniet Jennings	An AHP analysis of quality in AI and DSS journals	*Omega*
Mohamadghasemi, A., and A. Hadi-Vencheh	A decision support system for selecting convenience store location through integration of fuzzy AHP and artificial neural network	*Computers in industry*

Thirumalaivasan, D., M. Karmegam, and K. Venugopal	AHP-DRASTIC: software for specific aquifer vulnerability assessment using DRASTIC model and GIS	*Environmental Modelling & Software*
Abdi, Mohammad Reza, and Ashraf W. Labib	A design strategy for reconfigurable manufacturing systems (RMSs) using analytical hierarchical process (AHP): a case study	*International Journal of production research*
Laininen, Pertti, and Raimo P. Hämäläinen	Analyzing AHP-matrices by regression	*European Journal of Operational Research*
Stam, Antonie, and A. Pedro Duarte Silva	On multiplicative priority rating methods for the AHP	*European Journal of Operational Research*
Ji, Ping, and Renyan Jiang	Scale transitivity in the AHP	*Journal of the Operational Research Society*
Shee, Daniel Y., Gwo-Hshiung Tzeng, and Tzung-I. Tang	AHP, fuzzy measure and fuzzy integral approaches for the appraisal of information service providers in Taiwan	*Journal of Global Information Technology Management*
Ong, S. K., M. J. Sun, and A. Y. C. Nee	A fuzzy set AHP-based DFM tool for rotational parts	*Journal of Materials Processing Technology*
Fogliatto, Flavio S., and Susan L. Albin	An AHP-based procedure for sensory data collection and analysis in quality and reliability applications	*Food Quality and Preference*
Bozóki, Sándor	A method for solving LSM problems of small size in the AHP	*Central European Journal of Operations Research*
Yang, Z. Y., Y. H. Chen, and W. S. Sze	Using AHP and fuzzy sets to determine the build orientation in layer-based machining	*International Journal of Computer Integrated Manufacturing*
Macharis, Cathy, Johan Springael, Klaas De Brucker, and Alain Verbeke	PROMETHEE and AHP: The design of operational synergies in multicriteria analysis.: Strengthening PROMETHEE with ideas of AHP	*European Journal of Operational Research*
Lirn, T. C., H. A. Thanopoulou, Malcolm James Beynon, and Anthony Kenneth Charles Beresford	An application of AHP on transhipment port selection: a global perspective	*Maritime Economics & Logistics*
Shrestha, Ram K., Janaki RR Alavalapati, and Robert S. Kalmbacher	Exploring the potential for silvopasture adoption in south-central Florida: an application of SWOT–AHP method	*Agricultural Systems*
Albayrak, Esra, and Yasemin Claire Erensal	Using analytic hierarchy process (AHP) to improve human performance: An application of multiple criteria decision-making problem	*Journal of Intelligent Manufacturing*
Escobar, María Teresa, Juan Aguarón, and José María Moreno-Jiménez	A note on AHP group consistency for the row geometric mean priorization procedure	*European Journal of Operational Research*
Yurdakul, Mustafa	AHP as a strategic decision-making tool to justify machine tool selection	*Journal of Materials Processing Technology*
Sugihara, Kazutomi, Hiroaki Ishii, and Hideo Tanaka	Interval priorities in AHP by interval regression analysis	*European Journal of Operational Research*
Kwiesielewicz, Miroslaw, and Ewa Van Uden	Inconsistent and contradictory judgements in pairwise comparison method in the AHP	*Computers & Operations Research*
Enea, Mario, and Tommaso Piazza	Project selection by constrained fuzzy AHP	*Fuzzy optimization and decision making*

Mikhailov, Ludmil	Group prioritization in the AHP by fuzzy preference programming method	*Computers & operations research*
Gass, Saul I., and Tamás Rapcsák	Singular value decomposition in AHP	*European Journal of Operational Research*
Yurdakul, Mustafa, and Yusuf Tansel Ic	AHP approach in the credit evaluation of the manufacturing firms in Turkey	*International Journal of Production Economics*
Feng, Y. J., H. Lu, and K. Bi	An AHP/DEA method for measurement of the efficiency of R&D management activities in universities	*International Transactions in Operational Research*
Ishizaka, Alessio, and Markus Lusti	An expert module to improve the consistency of AHP matrices	*International Transactions in Operational Research*
Zeshui, X. U	A practical method for improving consistency of judgement matrix in the AHP	*Journal of systems science and complexity*
Ginevičius, Romualdas, Valentinas Podvezko, and Algirdas Andruškevičius	Determining of technological effectiveness of building systems by AHP method	*Technological and Economic Development of Economy*
Bhattacharya, Arijit, Bijan Sarkar*, and Sanat Kumar Mukherjee	Integrating AHP with QFD for robot selection under requirement perspective	*International Journal of production research*
Salmeron, Jose L., and Ines Herrero	An AHP-based methodology to rank critical success factors of executive information systems	*Computer Standards & Interfaces*
Bayazit, Ozden	Use of AHP in decision-making for flexible manufacturing systems	*Journal of Manufacturing Technology Management*
Ayağ, Zeki	A fuzzy AHP-based simulation approach to concept evaluation in a NPD environment	*IIE transactions*
Yurdakul*, Mustafa, and Y. Tansel Ic	Development of a performance measurement model for manufacturing companies using the AHP and TOPSIS approaches	*International Journal of production research*
Beynon, Malcolm J	Understanding local ignorance and non-specificity within the DS/AHP method of multi-criteria decision making	*European Journal of Operational Research*
Majumdar, A., B. Sarkar, and P. K. Majumdar	Determination of quality value of cotton fibre using hybrid AHP-TOPSIS method of multi-criteria decision-making	*Journal of the Textile Institute*
Liu, Chih-Ming, Hen-Shen Hsu, Shen-Tsu Wang, and Hai-Kun Lee	A performance evaluation model based on AHP and DEA	*Journal of the Chinese Institute of Industrial Engineers*
Bozóki, Sandor, and Robert H. Lewis	Solving the Least Squares Method problem in the AHP for 3 x 3 and 4 x 4 matrices	*Central European Journal of Operations Research*
Chougule, R. G., and B. Ravi	Variant process planning of castings using AHP-based nearest neighbour algorithm for case retrieval	*International Journal of production research*
MarÍa, JosÉ, Moreno JimÉnez, Juan AguarÓn Joven, AgustÍn Raluy Pirla, and Alberto TurÓn Lanuza	A spreadsheet module for consistent consensus building in AHP-group decision making	*Group Decision and Negotiation*
Lee, Younghwa, and Kenneth A. Kozar	Investigating the effect of website quality on e-business success: An analytic hierarchy process (AHP) approach	*Decision support systems*

International Journal of the
Analytic Hierarchy Process

414

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

Ayağ, Zeki, and Rifat Gürcan Özdemir	A fuzzy AHP approach to evaluating machine tool alternatives	*Journal of intelligent manufacturing*
Chen, Ching-Fu	Applying the analytical hierarchy process (AHP) approach to convention site selection	*Journal of Travel Research*
Bertolini, Massimo, and Maurizio Bevilacqua	A combined goal programming—AHP approach to maintenance selection problem	*Reliability Engineering & System Safety*
Aull-Hyde, Rhonda, Sevgi Erdogan, and Joshua M. Duke	An experiment on the consistency of aggregated comparison matrices in AHP	*European Journal of Operational Research*
Fu, Hsin-Pin, Yung-Ching Ho, Roger CY Chen, Tien-Hsiang Chang, and Pei-Hsiang Chien	Factors affecting the adoption of electronic marketplaces: A fuzzy AHP analysis	*International Journal of Operations & Production Management*
Hanumaiah, Naga, B. Ravi, and N. P. Mukherjee	Rapid hard tooling process selection using QFD-AHP methodology	*Journal of Manufacturing Technology Management*
Braglia, Marcello, Gionata Carmignani, Marco Frosolini, and Andrea Grassi	AHP-based evaluation of CMMS software	*Journal of Manufacturing Technology Management*
Ung, S. T., V. Williams, H. S. Chen, S. Bonsall, and J. Wang	Human error assessment and management in port operations using fuzzy AHP	*Marine Technology Society Journal*
Wang, Jianqiang	Multi-criteria decision-making approach with incomplete certain information based on ternary AHP	*Journal of Systems Engineering and Electronics*
Beskese, Ahmet, and F. TUNÇ BOZBURA	Prioritization of relational capital measurement indicators using fuzzy AHP	*Applied Artificial Intelligence*
Sharma, B. C., and O. P. Gandhi	RUL assessment of lube oil using AHP and vector projection approach	*Industrial Lubrication and Tribology*
Damigos, D., and D. Kaliampakos	Developing fuzzy AHP system to evaluate rehabilitation alternatives of asbestos industrial complex	*Mineral Processing and Extractive Metallurgy*
Chang, Che-Wei, Cheng-Ru Wu, Chin-Tsai Lin, and Huang-Chu Chen	An application of AHP and sensitivity analysis for selecting the best slicing machine	*Computers & Industrial Engineering*
Gerdsri, Nathasit, and Dundar F. Kocaoglu	Applying the Analytic Hierarchy Process (AHP) to build a strategic framework for technology road mapping	*Mathematical and Computer Modelling*
Chiu, Yu-Jing, and Yuh-Wen Chen	Using AHP in patent valuation	*Mathematical and Computer Modelling*
Kang, He-Yau, and Amy HI Lee	Priority mix planning for semiconductor fabrication by fuzzy AHP ranking	*Expert Systems with Applications*
Çimren, Emrah, Bülent Çatay, and Erhan Budak	Development of a machine tool selection system using AHP	*The International Journal of Advanced Manufacturing Technology*
Jablonsky, Josef	Measuring the efficiency of production units by AHP models	*Mathematical and Computer Modelling*
Kreng, Victor B., and Chao-Yi Wu	Evaluation of knowledge portal development tools using a fuzzy AHP approach: The case of Taiwanese stone industry	*European Journal of Operational Research*
Ayağ, Z	A hybrid approach to machine-tool selection through AHP and simulation	*International journal of production research*

Li, Han-Lin, and Li-Ching Ma	Detecting and adjusting ordinal and cardinal inconsistencies through a graphical and optimal approach in AHP models	*Computers & Operations Research*
Mamat, Nur Jumaadzan Zaleha, and Jacob Karikottu Daniel	Statistical analyses on time complexity and rank consistency between singular value decomposition and the duality approach in AHP: A case study of faculty member selection	*Mathematical and Computer Modelling*
Lee, Amy HI, Wen-Chin Chen, and Ching-Jan Chang	A fuzzy AHP and BSC approach for evaluating performance of IT department in the manufacturing industry in Taiwan	*Expert Systems with Applications*
Lin, Ming-Chyuan, Chen-Cheng Wang, Ming-Shi Chen, and C. Alec Chang	Using AHP and TOPSIS approaches in customer-driven product design process	*Computers in industry*
Dağdeviren, Metin	Decision making in equipment selection: an integrated approach with AHP and PROMETHEE	*Journal of intelligent manufacturing*
e Costa, Carlos A. Bana, and Jean-Claude Vansnick	A critical analysis of the eigenvalue method used to derive priorities in AHP	*European Journal of Operational Research*
Durán, Orlando, and José Aguilo	Computer-aided machine-tool selection based on a Fuzzy-AHP approach	*Expert Systems with Applications*
Pan, Nang-Fei	Fuzzy AHP approach for selecting the suitable bridge construction method	*Automation in construction*
Wong, Johnny KW, and Heng Li	Application of the analytic hierarchy process (AHP) in multi-criteria analysis of the selection of intelligent building systems	*Building and Environment*
Zayed, Tarek, Mohamed Amer, and Jiayin Pan	Assessing risk and uncertainty inherent in Chinese highway projects using AHP	*International journal of project management*
Wang, Ying-Ming, Jun Liu, and Taha MS Elhag	An integrated AHP–DEA methodology for bridge risk assessment	*Computers & Industrial Engineering*
Cakir, Ozan, and Mustafa S. Canbolat	A web-based decision support system for multi-criteria inventory classification using fuzzy AHP methodology	*Expert Systems with Applications*
Dong, Yucheng, Yinfeng Xu, Hongyi Li, and Min Dai	A comparative study of the numerical scales and the prioritization methods in AHP	*European Journal of Operational Research*
Azadeh, Ali, S. F. Ghaderi, and H. Izadbakhsh	Integration of DEA and AHP with computer simulation for railway system improvement and optimization	*Applied Mathematics and Computation*
Chen, Mei-Fang, Gwo-Hshiung Tzeng, and Cherng G. Ding	Combining fuzzy AHP with MDS in identifying the preference similarity of alternatives	*Applied Soft Computing*
Lee, Seong Kon, Gento Mogi, and Jong Wook Kim	The competitiveness of Korea as a developer of hydrogen energy technology: the AHP approach	*Energy policy*
Chin, Kwai-Sang, Dong-ling Xu, Jian-Bo Yang, and James Ping-Kit Lam	Group-based ER–AHP system for product project screening	*Expert Systems with Applications*
Chang, Che-Wei, Cheng-Ru Wu, and Huang-Chu Chen	Using expert technology to select unstable slicing machine to control wafer slicing quality via fuzzy AHP	*Expert Systems with Applications*
Melon, Monica Garcia, Pablo Aragonés Beltran, and M. Carmen González Cruz	An AHP-based evaluation procedure for Innovative Educational Projects: A face-to-face vs. computer-mediated case study	*Omega*
Dağdeviren, Metin, Serkan Yavuz, and Nevzat Kılınç	Weapon selection using the AHP and TOPSIS methods under fuzzy environment	*Expert Systems with Applications*

Saaty, Thomas L	Words from the AHP Creator	*International Journal of the Analytic Hierarchy Process*
Cebeci, Ufuk	Fuzzy AHP-based decision support system for selecting ERP systems in textile industry by using balanced scorecard	*Expert Systems with Applications*
Celik, Metin, I. Deha Er, and A. Fahri Ozok	Application of fuzzy extended AHP methodology on shipping registry selection: The case of Turkish maritime industry	*Expert Systems with Applications*
Tseng, Ming-Lang, Yuan-Hsu Lin, and Anthony SF Chiu	Fuzzy AHP-based study of cleaner production implementation in Taiwan PWB manufacturer	*Journal of Cleaner Production*
Li, Yanlai, Jiafu Tang, Xinggang Luo, and Jie Xu	An integrated method of rough set, Kano's model and AHP for rating customer requirements' final importance	*Expert Systems with Applications*
Li, Te-Sheng, and Hsing-Hsin Huang	RETRACTED: Applying TRIZ and Fuzzy AHP to develop innovative design for automated manufacturing systems	*Expert Systems with Applications*
Perini, Anna, Filippo Ricca, and Angelo Susi	Tool-supported requirements prioritization: Comparing the AHP and CBRank methods	*Information and Software Technology*
Sharma, Sanjay, and Narayan Agrawal	Selection of a pull production control policy under different demand situations for a manufacturing system by AHP-algorithm	*Computers & Operations Research*
Karaarslan, Nevin, and Emin Gundogar	An application for modular capability-based ERP software selection using AHP method	*The International Journal of Advanced Manufacturing Technology*
Lozano, Sebastián, and Gabriel Villa	Multi-objective target setting in data envelopment analysis using AHP	*Computers & Operations Research*
Aguilar-Lasserre, Alberto A., Marco A. Bautista Bautista, Antonin Ponsich, and Magno A. González Huerta	An AHP-based decision-making tool for the solution of multiproduct batch plant design problem under imprecise demand	*Computers & Operations Research*
Xu, Yingtao, and Ying Zhang	An online credit evaluation method based on AHP and SPA	*Communications in Nonlinear Science and Numerical Simulation*
Amiri, Morteza Pakdin	Project selection for oil-fields development by using the AHP and fuzzy TOPSIS methods	*Expert Systems with Applications*
Lipovetsky, Stan	An interpretation of the AHP eigenvector solution for the layperson	*International Journal of the Analytic Hierarchy Process*
Torfi, Fatemeh, Reza Zanjirani Farahani, and Shabnam Rezapour	Fuzzy AHP to determine the relative weights of evaluation criteria and Fuzzy TOPSIS to rank the alternatives	*Applied Soft Computing*
Chamodrakas, Ioannis, D. Batis, and Drakoulis Martakos	Supplier selection in electronic marketplaces using satisficing and fuzzy AHP	*Expert Systems with Applications*
Hsu, Yu-Lung, Cheng-Haw Lee, and Victor B. Kreng	The application of Fuzzy Delphi Method and Fuzzy AHP in lubricant regenerative technology selection	*Expert Systems with Applications*
Lin, Hsiu-Fen	An application of fuzzy AHP for evaluating course website quality	*Computers & Education*
Nepal, Bimal, Om P. Yadav, and Alper Murat	A fuzzy-AHP approach to prioritization of CS attributes in target planning for automotive product development	*Expert Systems with Applications*
Vidal, Ludovic-Alexandre, Evren Sahin, Nicolas Martelli, Malik Berhoune, and Brigitte	Applying AHP to select drugs to be produced by anticipation in a chemotherapy compounding unit	*Expert Systems with Applications*

International Journal of the
Analytic Hierarchy Process
417
Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

Bonan		
Lee, Seong Kon, Gento Mogi, Sang Kon Lee, K. S. Hui, and Jong Wook Kim	Econometric analysis of the R&D performance in the national hydrogen energy technology development for measuring relative efficiency: The fuzzy AHP/DEA integrated model approach	*International journal of hydrogen energy*
Haghighi, Mahammad, Ali Divandari, and Masoud Keimasi	The impact of 3D e-readiness on e-banking development in Iran: A fuzzy AHP analysis	*Expert Systems with Applications*
Li, Tesheng	Retracted article: Applying TRIZ and AHP to develop innovative design for automated assembly systems	*The International Journal of Advanced Manufacturing Technology*
Kuo, R. J., L. Y. Lee, and Tung-Lai Hu	Developing a supplier selection system through integrating fuzzy AHP and fuzzy DEA: a case study on an auto lighting system company in Taiwan	*Production Planning and Control*
Tudes, Sule, and Nazan Duygu Yigiter	Preparation of land use planning model using GIS-based on AHP: case study Adana-Turkey	*Bulletin of engineering geology and the environment*
Yu, Xiaobing, Shunsheng Guo, Jun Guo, and Xiaorong Huang	Rank B2C e-commerce websites in e-alliance based on AHP and fuzzy TOPSIS	*Expert Systems with Applications*
Tsyganok, Vitaliy V	About one approach to AHP/ANP stability measurement	*International Journal of the Analytic Hierarchy Process*
Lipovetsky, Stan	An interpretation of the AHP global priority as the eigenvector solution of an ANP supermatrix	*International Journal of the Analytic Hierarchy Process*
Peng, Yi, Gang Kou, Guoxun Wang, Wenshuai Wu, and Yong Shi	Ensemble of software defect predictors: an AHP-based evaluation method	*International Journal of Information Technology & Decision Making*
Aydogan, Emel Kızılkaya	Performance measurement model for Turkish aviation firms using the rough-AHP and TOPSIS methods under fuzzy environment	*Expert Systems with Applications*
Dehghanian, Payman, Mahmud Fotuhi-Firuzabad, Saeed Bagheri-Shouraki, and Ali Asghar Razi Kazemi	Critical component identification in reliability-centered asset management of power distribution systems via fuzzy AHP	*IEEE Systems Journal*
Tavana, Madjid, and Adel Hatami-Marbini	A group AHP-TOPSIS framework for human spaceflight mission planning at NASA	*Expert Systems with Applications*
Durán, Orlando	Computer-aided maintenance management systems selection based on a fuzzy AHP approach	*Advances in Engineering Software*
Lee, SeongKon, Gento Mogi, SangKon Lee, and JongWook Kim	Prioritizing the weights of hydrogen energy technologies in the sector of the hydrogen economy by using a fuzzy AHP approach	*International journal of hydrogen energy*
Bernardon, Daniel Pinheiro, Mauricio Sperandio, Vinícius Jacques Garcia, Luciane Neves Canha, Alzenira da Rosa Abaide, and Eric Fernando Boeck Daza	AHP decision-making algorithm to allocate remotely controlled switches in distribution networks	*IEEE Transactions on Power Delivery*
Benítez, Joaquín, Xitlali Delgado-Galván, J. A.	Balancing consistency and expert judgment in AHP	*Mathematical and Computer Modelling*

*International Journal of the
Analytic Hierarchy Process*

418

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

Gutiérrez, and Joaquín Izquierdo		
Wu, Qiang, Yuanzhang Liu, Donghai Liu, and Wanfang Zhou	Prediction of floor water inrush: the application of GIS-based AHP vulnerable index method to Donghuantuo coal mine, China	*Rock Mechanics and Rock Engineering*
Kutlu, Ahmet Can, and Mehmet Ekmekçioğlu	Fuzzy failure modes and effects analysis by using fuzzy TOPSIS-based fuzzy AHP	*Expert Systems with Applications*
Girard, Luigi Fusco, Maria Cerreta, and Pasquale De Toro	Analytic hierarchy process (AHP) and geographical information systems (GIS): an integrated spatial assessment for planning strategic choices	*International Journal of the Analytic Hierarchy Process*
Büyüközkan, Gülçin, and Gizem Çifçi	A combined fuzzy AHP and fuzzy TOPSIS based strategic analysis of electronic service quality in healthcare industry	*Expert Systems with Applications*
Choudhary, Devendra, and Ravi Shankar	A STEEP-fuzzy AHP-TOPSIS framework for evaluation and selection of thermal power plant location: A case study from India	*Energy*
Chou, Ying-Chyi, Chia-Chi Sun, and Hsin-Yi Yen	Evaluating the criteria for human resource for science and technology (HRST) based on an integrated fuzzy AHP and fuzzy DEMATEL approach	*Applied Soft Computing*
Javanbarg, Mohammad Bagher, Charles Scawthorn, Junji Kiyono, and Babak Shahbodaghkhan	Fuzzy AHP-based multicriteria decision making systems using particle swarm optimization	*Expert Systems with Applications*
Taha, Zahari, and Sarkawt Rostam	A hybrid fuzzy AHP-PROMETHEE decision support system for machine tool selection in flexible manufacturing cell	*Journal of Intelligent Manufacturing*
Lee, Sangjae, Wanki Kim, Young Min Kim, and Kyong Joo Oh	Using AHP to determine intangible priority factors for technology transfer adoption	*Expert Systems with Applications*
Chan, Hing Kai, Xiaojun Wang, Gareth Reginald Terence White, and Nick Yip	An extended fuzzy-AHP approach for the evaluation of green product designs	*IEEE Transactions on Engineering Management*
Uyan, Mevlut	GIS-based solar farms site selection using analytic hierarchy process (AHP) in Karapinar region, Konya/Turkey	*Renewable and Sustainable Energy Reviews*
Cho, Jaemin, and Jaeho Lee	Development of a new technology product evaluation model for assessing commercialization opportunities using Delphi method and fuzzy AHP approach	*Expert Systems with Applications*
Nikou, Shahrokh, and József Mezei	Evaluation of mobile services and substantial adoption factors with Analytic Hierarchy Process (AHP)	*Telecommunications Policy*
Chen, Yun, Jia Yu, and Shahbaz Khan	The spatial framework for weight sensitivity analysis in AHP-based multi-criteria decision making	*Environmental modelling & software*
Caputo, Antonio C., Pacifico M. Pelagagge, and Paolo Salini	AHP-based methodology for selecting safety devices of industrial machinery	*Safety science*
Bas, Esra	The integrated framework for analysis of electricity supply chain using an integrated SWOT-fuzzy TOPSIS methodology combined with AHP: The case of Turkey	*International Journal of Electrical Power & Energy Systems*
Lee, Seong Kon, Gento Mogi, and K. S. Hui	A fuzzy analytic hierarchy process (AHP)/data envelopment analysis (DEA) hybrid model for efficiently allocating energy R&D resources: In the case of energy technologies against high oil prices	*Renewable and Sustainable Energy Reviews*

Yang, Xiaojun, Liaoliao Yan, and Luan Zeng	How to handle uncertainties in AHP: The Cloud Delphi hierarchical analysis	*Information Sciences*
Mousavi, S. Meysam, R. Tavakkoli-Moghaddam, M. Heydar, and S. Ebrahimnejad	Multi-criteria decision making for plant location selection: an integrated Delphi–AHP–PROMETHEE methodology	*Arabian Journal for Science and Engineering*
Wu, Jian, Hai-bin Huang, and Qing-Wei Cao	Research on AHP with interval-valued intuitionistic fuzzy sets and its application in multi-criteria decision-making problems	*Applied Mathematical Modelling*
Hadi-Vencheh, A., and A. Mohamadghasemi	An integrated AHP–NLP methodology for facility layout design	*Journal of Manufacturing Systems*
Deng, Xinyang, Yong Hu, Yong Deng, and Sankaran Mahadevan	Supplier selection using AHP methodology extended by D numbers	*Expert Systems with Applications*
Taylan, Osman, Abdallah O. Bafail, Reda MS Abdulaal, and Mohammed R. Kabli	Construction projects selection and risk assessment by fuzzy AHP and fuzzy TOPSIS methodologies	*Applied Soft Computing*
Kou, Gang, and Changsheng Lin	A cosine maximization method for the priority vector derivation in AHP	*European Journal of Operational Research*
Oztaysi, Basar	A decision model for information technology selection using AHP integrated TOPSIS-Grey: The case of content management systems	*Knowledge-Based Systems*
Wang, Ying, Kyung-Ae Jung, Gi-tae Yeo, and Chien-Chang Chou	Selecting a cruise port of call location using the fuzzy-AHP method: A case study in East Asia	*Tourism Management*
Avikal, Shwetank, P. K. Mishra, and Rajeev Jain	A Fuzzy AHP and PROMETHEE method-based heuristic for disassembly line balancing problems	*International Journal of production research*
Vinodh, S., M. Prasanna, and N. Hari Prakash	Integrated Fuzzy AHP–TOPSIS for selecting the best plastic recycling method: A case study	*Applied Mathematical Modelling*
Pedrycz, Witold, and Mingli Song	A granulation of linguistic information in AHP decision-making problems	*Information Fusion*
Tan, R. R., K. B. Aviso, A. P. Huelgas, and M. A. B. Promentilla	Fuzzy AHP approach to selection problems in process engineering involving quantitative and qualitative aspects	*Process Safety and Environmental Protection*
Kutut, V., E. K. Zavadskas, and M. Lazauskas	Assessment of priority alternatives for preservation of historic buildings using model based on ARAS and AHP methods	*Archives of Civil and Mechanical Engineering*
Ozgen, Dogan, and Bahadir Gulsun	Combining possibilistic linear programming and fuzzy AHP for solving the multi-objective capacitated multi-facility location problem	*Information Sciences*
Jalao, Eugene Rex, Teresa Wu, and Dan Shunk	A stochastic AHP decision-making methodology for imprecise preferences	*Information Sciences*
Song, Zeyang, Hongqing Zhu, Guowei Jia, and Chaonan He	Comprehensive evaluation on self-ignition risks of coal stockpiles using fuzzy AHP approaches	*Journal of Loss Prevention in the Process Industries*
Podgórski, Daniel	Measuring operational performance of OSH management system–A demonstration of AHP-based selection of leading key performance indicators	*Safety science*
Saracoglu, Burak Omer	An AHP application in the investment selection problem of small hydropower plants in Turkey	*International Journal of the Analytic Hierarchy Process*

Oyatoye, Emmanuel Olateju, Sulaimon Olanrewaju Adebiyi, and Bilqis Bolanle Amole	Evaluating Subscribers' preference for service attributes of mobile telecommunication in Nigeria using analytic hierarchy process (AHP)	*International Journal of the Analytic Hierarchy Process*
Ocampo, Lanndon, and Eppie Clark	An analytic hierarchy process (AHP) approach in the selection of sustainable manufacturing initiatives: a case in a semiconductor manufacturing firm in the Philippines	*International Journal of the Analytic Hierarchy Process*
Ganguly, Anirban, and Donald N. Merino	An Integrated AHP-QFD Approach for Evaluating Competing Technological Processes	*International Journal of the Analytic Hierarchy Process*
Nachtnebel, Hans Peter, and Rana Pratap Singh	Prioritizing hydropower development using Analytical Hierarchy Process (AHP)-A case study of Nepal	*International Journal of the Analytic Hierarchy Process*
Zhu, Guo-Niu, Jie Hu, Jin Qi, Chao-Chen Gu, and Ying-Hong Peng	An integrated AHP and VIKOR for design concept evaluation based on rough number	*Advanced Engineering Informatics*
Turskis, Zenonas, Edmundas Kazimieras Zavadskas, Jurgita Antucheviciene, and Natalja Kosareva	A hybrid model based on fuzzy AHP and fuzzy WASPAS for construction site selection	*International Journal of Computers Communications & Control*
Sivakumar, Ramakrishnan, Devika Kannan, and Palzha Murugesan	Green vendor evaluation and selection using AHP and Taguchi loss functions in production outsourcing in mining industry	*Resources Policy*
Hyun, Ki-Chang, Sangyoon Min, Hangseok Choi, Jeongjun Park, and In-Mo Lee	Risk analysis using fault-tree analysis (FTA) and analytic hierarchy process (AHP) applicable to shield TBM tunnels	*Tunnelling and Underground Space Technology*
Zaidan, A. A., B. B. Zaidan, Ahmed Al-Haiqi, Miss Laiha Mat Kiah, Muzammil Hussain, and Mohamed Abdulnabi	Evaluation and selection of open-source EMR software packages based on integrated AHP and TOPSIS	*Journal of biomedical informatics*
Akkaya, Gökay, Betül Turanoğlu, and Sinan Öztaş	An integrated fuzzy AHP and fuzzy MOORA approach to the problem of industrial engineering sector choosing	*Expert Systems with Applications*
Lai, Po-Lin, Andrew Potter, Malcolm Beynon, and Anthony Beresford	Evaluating the efficiency performance of airports using an integrated AHP/DEA-AR technique	*Transport Policy*
Galvez, Daniel, Auguste Rakotondranaivo, Laure Morel, Mauricio Camargo, and Michel Fick	Reverse logistics network design for a biogas plant: An approach based on MILP optimization and Analytical Hierarchical Process (AHP)	*Journal of Manufacturing Systems*
Nguyen, Huu-Tho, Siti Zawiah Md Dawal, Yusoff Nukman, Hideki Aoyama, and Keith Case	An integrated approach of fuzzy linguistic preference-based AHP and fuzzy COPRAS for machine tool evaluation	*PloS one*
Kułakowski, Konrad	Notes on order preservation and consistency in AHP	*European Journal of Operational Research*
Ezzabadi, Jamal Hosseini, Mohammad Dehghani	Implementing Fuzzy Logic and AHP into the EFQM model for performance improvement: A case study	*Applied Soft Computing*

Saryazdi, and Ali Mostafaeipour		
Dong, Minggao, Shouyi Li, and Hongying Zhang	Approaches to group decision making with incomplete information based on power geometric operators and triangular fuzzy AHP	*Expert Systems with Applications*
Oztaysi, Basar	A Group Decision Making Approach Using Interval Type-2 Fuzzy AHP for Enterprise Information Systems Project Selection	*Journal of Multiple-Valued Logic & Soft Computing*
Dweiri, Fikri, Sameer Kumar, Sharfuddin Ahmed Khan, and Vipul Jain	Designing an integrated AHP based decision support system for supplier selection in automotive industry	*Expert Systems with Applications*
Kubler, Sylvain, Jérémy Robert, William Derigent, Alexandre Voisin, and Yves Le Traon	A state-of the-art survey & testbed of Fuzzy AHP (FAHP) applications	*Expert Systems with Applications*
Fan, Guichao, Denghua Zhong, Fugen Yan, and Pan Yue	A hybrid fuzzy evaluation method for curtain grouting efficiency assessment based on an AHP method extended by D numbers	*Expert Systems with Applications*
Singh, Rana Pratap, and Hans Peter Nachtnebel	Analytical hierarchy process (AHP) application for reinforcement of hydropower strategy in Nepal	*Renewable and Sustainable Energy Reviews*
Galankashi, Masoud Rahiminezhad, Syed Ahmad Helmi, and Pooria Hashemzahi	Supplier selection in automobile industry: A mixed balanced scorecard–fuzzy AHP approach	*Alexandria Engineering Journal*
Beşikçi, E. Bal, T. Kececi, O. Arslan, and O. Turan	An application of fuzzy-AHP to ship operational energy efficiency measures	*Ocean Engineering*
Chaudhary, Pandav, Sachin Kumar Chhetri, Kiran Man Joshi, Basanta Man Shrestha, and Prabin Kayastha	Application of an Analytic Hierarchy Process (AHP) in the GIS interface for suitable fire site selection: A case study from Kathmandu Metropolitan City, Nepal	*Socio-Economic Planning Sciences*
Elia, Valerio, Maria Grazia Gnoni, and Alessandra Lanzilotto	Evaluating the application of augmented reality devices in manufacturing from a process point of view: An AHP based model	*Expert Systems with Applications*
Lee, Sangwon, and Kwang-Kyu Seo	A hybrid multi-criteria decision-making model for a cloud service selection problem using BSC, fuzzy Delphi method and fuzzy AHP	*Wireless Personal Communications*
Hanine, Mohamed, Omar Boutkhoum, Abdessadek Tikniouine, and Tarik Agouti	Application of an integrated multi-criteria decision making AHP-TOPSIS methodology for ETL software selection	*SpringerPlus*
Singh, Sujit, Ezutah Udoncy Olugu, Siti Nurmaya Musa, Abu Bakar Mahat, and Kuan Yew Wong	Strategy selection for sustainable manufacturing with integrated AHP-VIKOR method under interval-valued fuzzy environment	*The International Journal of Advanced Manufacturing Technology*
Hosseini Firouz, Mansour, and Noradin Ghadimi	Optimal preventive maintenance policy for electric power distribution systems based on the fuzzy AHP methods	*Complexity*
Ishizaka, Alessio, Sajid Siraj, and Philippe Nemery	Which energy mix for the UK (United Kingdom)? An evolutive descriptive mapping with the integrated GAIA (graphical analysis for interactive aid)–AHP (analytic hierarchy process) visualization tool	*Energy*

Garbuzova-Schlifter, Maria, and Reinhard Madlener	AHP-based risk analysis of energy performance contracting projects in Russia	*Energy policy*
Luzon, Bushra, and Sameh M. El-Sayegh	Evaluating supplier selection criteria for oil and gas projects in the UAE using AHP and Delphi	*International Journal of Construction Management*
Sindhu, Sonal, Vijay Nehra, and Sunil Luthra	Investigation of feasibility study of solar farms deployment using hybrid AHP-TOPSIS analysis: Case study of India	*Renewable and Sustainable Energy Reviews*
Mizuno, Takafumi	An algebraic representation via differential equations for pairwise comparisons of AHP	*International Journal of the Analytic Hierarchy Process*
Li, Wenhua, Suihuai Yu, Huining Pei, Chuan Zhao, and Baozhen Tian	A hybrid approach based on fuzzy AHP and 2-tuple fuzzy linguistic method for evaluation in-flight service quality	*Journal of Air Transport Management*
Al Garni, Hassan Z., and Anjali Awasthi	Solar PV power plant site selection using a GIS-AHP based approach with application in Saudi Arabia	*Applied energy*
Özcan, Evren Can, Sultan Ünlüsoy, and Tamer Eren	A combined goal programming–AHP approach supported with TOPSIS for maintenance strategy selection in hydroelectric power plants	*Renewable and Sustainable Energy Reviews*
Bian, Tian, Jiantao Hu, and Yong Deng	Identifying influential nodes in complex networks based on AHP	*Physica A: Statistical Mechanics and its Applications*
Raviv, Gabriel, Aviad Shapira, and Barak Fishbain	AHP-based analysis of the risk potential of safety incidents: Case study of cranes in the construction industry	*Safety science*
Soner, Omer, Erkan Celik, and Emre Akyuz	Application of AHP and VIKOR methods under interval type 2 fuzzy environment in maritime transportation	*Ocean Engineering*
Karahalios, Hristos	The application of the AHP-TOPSIS for evaluating ballast water treatment systems by ship operators	*Transportation Research Part D: Transport and Environment*
Fallahpour, Alireza, Ezutah Udoncy Olugu, and Siti Nurmaya Musa	A hybrid model for supplier selection: integration of AHP and multi expression programming (MEP)	*Neural Computing and Applications*
Pandey, Asmita, and Amit Kumar	Commentary on "Evaluating the criteria for human resource for science and technology (HRST) based on an integrated fuzzy AHP and fuzzy DEMATEL approach"	*Applied Soft Computing*
Meesariganda, Bhaskara Raju, and Alessio Ishizaka	Mapping verbal AHP scale to numerical scale for cloud computing strategy selection	*Applied Soft Computing*
Sindhu, Sonal, Vijay Nehra, and Sunil Luthra	Solar energy deployment for sustainable future of India: Hybrid SWOC-AHP analysis	*Renewable and Sustainable Energy Reviews*
Jain, Vipul, Arun Kumar Sangaiah, Sumit Sakhuja, Nittin Thoduka, and Rahul Aggarwal	Supplier selection using fuzzy AHP and TOPSIS: a case study in the Indian automotive industry	*Neural Computing and Applications*
Goepel, Klaus D	Implementation of an online software tool for the analytic hierarchy process (AHP-OS)	*International Journal of the Analytic Hierarchy Process*
Kahraman, Cengiz, and Irem Otay	Solar PV power plant location selection using a Z-fuzzy number based AHP	*International Journal of the Analytic Hierarchy Process*
Ohta, Robison	Selection of industrial maintenance strategy: classical AHP and fuzzy AHP applications	*International Journal of the Analytic Hierarchy Process*

Topcu, Ilker, Berna Unver, Mine Isik, and Ozgur Kabak	An AHP based prioritization model for risk evaluation factors in the automotive industry	*International Journal of the Analytic Hierarchy Process*
Zhou, Xinyi, Yong Hu, Yong Deng, Felix TS Chan, and Alessio Ishizaka	A DEMATEL-based completion method for incomplete pairwise comparison matrix in AHP	*Annals of Operations Research*
Fattahi, Reza, and Mohammad Khalilzadeh	Risk evaluation using a novel hybrid method based on FMEA extended MULTIMOORA, and AHP methods under fuzzy environment	*Safety science*
Abdel-Basset, Mohamed, Gunasekaran Manogaran, Mai Mohamed, and Naveen Chilamkurti	Three-way decisions based on neutrosophic sets and AHP-QFD framework for supplier selection problem	*Future Generation Computer Systems*
Abdel-Basset, Mohamed, Mai Mohamed, and Arun Kumar Sangaiah	Neutrosophic AHP-Delphi Group decision-making model based on trapezoidal neutrosophic numbers	*Journal of Ambient Intelligence and Humanized Computing*
Sennaroglu, Bahar, and Gulsay Varlik Celebi	A military airport location selection by AHP integrated PROMETHEE and VIKOR methods	*Transportation Research Part D: Transport and Environment*
Goyal, Raman Kumar, Sakshi Kaushal, and Arun Kumar Sangaiah	The utility-based non-linear fuzzy AHP optimization model for network selection in heterogeneous wireless networks	*Applied Soft Computing*
Pamučar, Dragan, Željko Stević, and Edmundas Kazimieras Zavadskas	Integration of interval rough AHP and interval rough MABAC methods for evaluating university web pages	*Applied Soft Computing*
Azimifard, Arezoo, Seyed Hamed Moosavirad, and Shahram Ariafar	Selecting sustainable supplier countries for Iran's steel industry at three levels by using AHP and TOPSIS methods	*Resources Policy*
(Ali, Butt, Sabir, Mumtaz, & Salman, 2018)	Selection of suitable site in Pakistan for wind power plant installation using analytic hierarchy process (AHP)	*Journal of Control and Decision*
Celik, Erkan, and Emre Akyuz	An interval type-2 fuzzy AHP and TOPSIS methods for decision-making problems in maritime transportation engineering: the case of ship loader	*Ocean Engineering*
Dožić, Slavica, Tatjana Lutovac, and Milica Kalić	Fuzzy AHP approach to passenger aircraft type selection	*Journal of Air Transport Management*
Merrouni, Ahmed Alami, Fakhreddine Elwali Elalaoui, Abdellatif Ghennioui, Ahmed Mezrhab, and Abdelhamid Mezrhab	A GIS-AHP combination for the sites assessment of large-scale CSP plants with dry and wet cooling systems. Case study: Eastern Morocco	*Solar Energy*
Shinde, Dnyandeo Dattatraya, and Ramjee Prasad	Application of AHP for ranking of total productive maintenance pillars	*Wireless Personal Communications*
(Ali, Rasheed, Muhammad, & Yousaf, 2018)	Energy optimization in the wake of China Pakistan Economic Corridor (CPEC)	*Journal of Control and Decision*
Darko, Amos, Albert Ping Chuen Chan, Ernest Effah Ameyaw, Emmanuel Kingsford Owusu, Erika Pärn, and David	Review of application of analytic hierarchy process (AHP) in construction	*International Journal of Construction Management*

John Edwards		
Shaygan, Amir, and Özlem Müge Testik	A fuzzy AHP-based methodology for project prioritization and selection	*Soft computing*
Roy, Tribeni, and Ranjit Kumar Dutta	Integrated fuzzy AHP and fuzzy TOPSIS methods for multi-objective optimization of electro-discharge machining process	*Soft computing*
Yucesan, Melih, and Gökhan Kahraman	Risk evaluation and prevention in hydropower plant operations: A model based on Pythagorean fuzzy AHP	*Energy policy*
Abdelmaguid, Tamer F., and Waleed Elrashidy	Halting decisions for gas pipeline construction projects using AHP: a case study	*Operational Research*
Kumar, Naresh, Tej Singh, J. S. Grewal, Amar Patnaik, and Gusztáv Fekete	A novel hybrid AHP-SAW approach for optimal selection of natural fiber reinforced non-asbestos organic brake friction composites	*Materials Research Express*
Ahmed, Mohd, M. N. Qureshi, Javed Mallick, Mohd Hasan, and Mahmoud Hussain	Decision support model for design of high-performance concrete mixtures using two-phase AHP-TOPSIS approach	*Advances in Civil Engineering*
İnce, Murat, Tuncay Yiğit, and Ali Hakan Işık	A hybrid AHP-GA method for metadata-based learning object evaluation	*Neural Computing and Applications*
Goyal, Tanu, and Sakshi Kaushal	Handover optimization scheme for LTE-Advance networks based on AHP-TOPSIS and Q-learning	*Computer Communications*
Amohadi, Masoud, and MAHMUD FOTUHI FIRUZABAD	Optimal placement of switching and protection devices in radial distribution networks to enhance system reliability using the AHP-PSO method	*Turkish Journal of Electrical Engineering & Computer Sciences*
Altuzarra, Alfredo, Pilar Gargallo, José María Moreno-Jiménez, and Manuel Salvador	Homogeneous groups of actors in an AHP-local decision-making context: A Bayesian analysis	*Mathematics*
Havle, Celal Alpay, and Bilal Kılıç	A hybrid approach based on the fuzzy AHP and HFACS framework for identifying and analyzing gross navigation errors during transatlantic flights	*Journal of Air Transport Management*
Silva, Maisa M., Keith W. Hipel, D. Marc Kilgour, and Ana Paula CS Costa	Strategic analysis of a regulatory conflict using Dempster-Shafer theory and AHP for preference elicitation	*Journal of Systems Science and Systems Engineering*
Singh, Lakhwinder Pal, and Satnam Singh	Strategic enhancement of workplace safety in small scale manufacturing industries using AHP approach	*International Journal of the Analytic Hierarchy Process*

Appendix B

SOCIAL SCIENCES

Table 5
Research publications in social science category for ANP-2000 to 2019

ANP		
Authors	**Research Title**	**Journal Name**
(Lee & Kim, 2000)	Using analytic network process and goal programming for interdependent information system project selection	*Computers & Operations Research*
(Nishizawa, 2000)	Bi-directional nearness in a network by AHP (Analytic Hierarchy Process) and ANP (Analytic Network Process)	*RAIRO-Operations Research-Recherche Opérationnelle*
(Sekitani & Takahashi, A unified model and analysis for AHP and ANP, 2001; Momoh & Zhu, Optimal generation scheduling based on AHP/ANP, 2003)	A unified model and analysis for AHP and ANP	*Journal of the Operations Research Society of Japan*
(Momoh & Zhu, Optimal generation scheduling based on AHP/ANP, 2003)	Optimal generation scheduling based on AHP/ANP	*IEEE Transactions on Systems, Man, and Cybernetics, Part B (Cybernetics)*
(Mikhailov & Singh, 2003)	Fuzzy analytic network process and its application to the development of decision support systems	*IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)*
(Saaty T. L., Decision making—the analytic hierarchy and network processes (AHP/ANP), 2004)	Decision making—the analytic hierarchy and network processes (AHP/ANP)	*Journal of systems science and systems engineering,*
(Niemira & Saaty, 2004)	An analytic network process model for financial-crisis forecasting.	*International Journal of Forecasting*
(Saaty T. L., Fundamentals of the analytic network process—Dependence and feedback in decision-making with a single network, 2004)	Fundamentals of the analytic network process—Dependence and feedback in decision-making with a single network	*Journal of Systems science and Systems engineering*
(Saaty T. L., Fundamentals of the analytic network process—multiple networks with benefits, costs, opportunities and risks, 2004)	Fundamentals of the analytic network process—multiple networks with benefits, costs, opportunities and risks	*journal of systems science and systems engineering*
(Saaty T. L., Making and	Making and validating complex decisions with the AHP/ANP	*Journal of Systems Science and Systems*

International Journal of the
Analytic Hierarchy Process
426
Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

validating complex decisions with the AHP/ANP, 2005)		*Engineering*
(Sekitani & Takahashi, A new approach of revising unstable data in ANP by Bayes theorem, 2005)	A new approach of revising unstable data in ANP by Bayes theorem	*Journal of the Operations Research Society of Japan*
(Chung, Lee, & Pearn, Analytic network process (ANP) approach for product mix planning in semiconductor fabricator, 2005)	Analytic network process (ANP) approach for product mix planning in semiconductor fabricator	*International journal of production economics*
(Huang, Tzeng, & Ong, 2005)	Multidimensional data in multidimensional scaling using the analytic network process	*Pattern Recognition Letters*
(Coulter & Sarkis, 2005)	Development of a media selection model using the analytic network process	*International journal of advertising*
(Agarwal, Shankar, & Tiwari, 2006)	Modeling the metrics of lean, agile and leagile supply chain: An ANP-based approach	*European Journal of Operational Research*
(Shyur, 2006)	COTS evaluation using modified TOPSIS and ANP	*Applied mathematics and computation*
(Fiala, 2006)	An ANP/DNP analysis of economic elements in today's world network economy	*Journal of Systems Science and Systems Engineering*
(Mu, 2006)	A unified framework for site selection and business forecasting using ANP	*Journal of systems science and systems engineering*
(Leung, Lam, & Cao, Implementing the balanced scorecard using the analytic hierarchy process & the analytic network process, 2006)	Implementing the balanced scorecard using the analytic hierarchy process & the analytic network process	*Journal of the Operational Research Society*
(Cheng & Li, Job performance evaluation for construction companies: an analytic network process approach, 2006)	Job performance evaluation for construction companies: an analytic network process approach	*Journal of Construction Engineering and Management*
(Jharkharia & Shankar, 2007)	Selection of logistics service provider: An analytic network process (ANP) approach	*Omega*
(Yuksel & Dagdeviren, 2007)	Using the analytic network process (ANP) in a SWOT analysis–A case study for a textile firm	*Information Sciences*
(Wu, 2008)	Choosing knowledge management strategies by using a combined ANP and DEMATEL approach	*Expert Systems with Applications*
(Chen & Lee, 2008)	Applying ANP approach to partner selection for strategic alliance	*Management Decision*
(Tsai & Chou, 2009)	Selecting management systems for sustainable development in SMEs: A novel hybrid model based on DEMATEL, ANP, and ZOGP	*Expert systems with applications*
(Guneri, Cengiz, & Seker, 2009)	A fuzzy ANP approach to shipyard location selection	*Expert Systems with Applications*

(Lin, Tsai, Shiang, Kuo, & Tsai, 2009)	Research on using ANP to establish a performance assessment model for business intelligence systems	*Expert Systems with Applications*
(Hallikainen, Kivijarvi, & Tuominen, 2009)	Supporting the module sequencing decision in the ERP implementation process—An application of the ANP method	*International Journal of Production Economics*
(Chiang-Ku, Hui-Yin, & Jin-Lung, 2009)	Using ANP and GRA to Evaluate the Employability of Graduates from Department of Risk Management and Insurance	*Journal of Grey System*
(Chen & Chen, 2010)	Using a novel conjunctive MCDM approach based on DEMATEL, fuzzy ANP, and TOPSIS as an innovation support system for Taiwanese higher education	*Expert Systems with Applications*
Dağdeviren, Metin, and İhsan Yüksel	A fuzzy analytic network process (ANP) model for measurement of the sectoral competition level (SCL)	*Expert Systems with Applications*
Wu, Cheng-Shiung, Chin-Tsai Lin, and Chuan Lee	Optimal marketing strategy: A decision-making with ANP and TOPSIS	*International Journal of Production Economics*
Carlucci, Daniela	Evaluating and selecting key performance indicators: an ANP-based model	*Measuring Business Excellence*
Tsai, Wen-Hsien, and Wei Hsu	A novel hybrid model based on DEMATEL and ANP for selecting cost of quality model development	*Total Quality Management*
Pastor-Ferrando, Juan-Pascual, Pablo Aragonés-Beltrán, Antonio Hospitaler-Pérez, and Mónica García-Melón	An ANP-and AHP-based approach for weighting criteria in public works bidding	*Journal of the Operational Research Society*
Kirytopoulos, Konstantinos, Vrassidas Leopoulos, George Mavrotas, and Dimitra Voulgaridou	Multiple sourcing strategies and order allocation: an ANP-AUGMECON meta-model	*Supply Chain Management: An International Journal*
Polat, Gul, and Umit Donmez	ANP-based marketing activity selection model for construction companies	*Construction Innovation*
Polat, Gul.	Using ANP priorities with goal programming in optimally allocating marketing resources	*Construction Innovation*
Yang, Jiann Liang, and Gwo-Hshiung Tzeng	An integrated MCDM technique combined with DEMATEL for a novel cluster-weighted with ANP method	*Expert Systems with Applications*
Lami, Isabella Maria, Elena Masala, and Stefano Pensa	Analytic network process (ANP) and visualization of spatial data: the use of dynamic maps in territorial transformation processes	*International Journal of the Analytic Hierarchy Process*
Chen, Fu-Hsiang, Tsung-Shin Hsu, and Gwo-Hshiung Tzeng	A balanced scorecard approach to establish a performance evaluation and relationship model for hot spring hotels based on a hybrid MCDM model combining DEMATEL and ANP	*International Journal of Hospitality Management*
Ergu, Daji, Gang Kou, Yi Peng, and Yong Shi	A simple method to improve the consistency ratio of the pair-wise comparison matrix in ANP	*European Journal of Operational Research*
Yücenur, G. Nilay, Özalp Vayvay, and Nihan Çetin Demirel	Supplier selection problem in global supply chains by AHP and ANP approaches under fuzzy environment	*International Journal of Advanced Manufacturing Technology*
Onut, Semih, Umut R. Tuzkaya, and Erçin Torun	Selecting container port via a fuzzy ANP-based approach: A case study in the Marmara Region, Turkey	*Transport Policy*
Hung, Shih-Jieh	Activity-based divergent supply chain planning for competitive advantage in the risky global environment: A DEMATEL-ANP fuzzy goal programming approach	*Expert Systems with Applications*

Azimi, Reza, Abdolreza Yazdani-Chamzini, Mohammad Majid Fouladgar, Edmundas Kazimieras Zavadskas, and Mohammad Hossein Basiri	Ranking the strategies of mining sector through ANP and TOPSIS in a SWOT framework	*Journal of business economics and management*
Thakkar, Jitesh J., Arun Kanda, and S. G. Deshmukh	A decision framework for supply chain planning in SMEs: A QFD-ISM-enabled ANP-GP approach	*Supply Chain Forum: An International Journal*
Wang, Yung-Lan, and Gwo-Hshiung Tzeng	Brand marketing for creating brand value based on a MCDM model combining DEMATEL with ANP and VIKOR methods	*Expert Systems with Applications*
Büyüközkan, Gülçin, and Gizem Çifçi	Evaluation of the green supply chain management practices: a fuzzy ANP approach	*Production Planning & Control*
Poveda-Bautista, Rocío, Doris C. Baptista, and Mónica García-Melón	Setting competitiveness indicators using BSC and ANP	*International Journal of Production Research*
Yang, Hao-Wei, and Kuei-Feng Chang	Combining means-end chain and fuzzy ANP to explore customers' decision process in selecting bundles	*International Journal of Information Management*
Pamučar, Dragan, Boban Đorović, Darko Božanić, and Goran Ćirović	Modification of the dynamic scale of marks in analytic hierarchy process (AHP) and analytic network approach (ANP) through application of fuzzy approach	*Scientific Research and Essays*
Kivijärvi, Hannu, Petri Hallikainen, and Esko Penttinen	Supporting IT implementation decisions with ANP—supplier scheduling for E-invoicing	*International Journal of Information Technology & Decision Making*
Talebi, K., M. Ghavamipour, and A. Ir	Innovation in Iran's small and medium-size enterprises (SMEs): Prioritize influence factors affecting innovation of SMEs, using analytic network process (ANP) method	*African Journal of Business Management*
Shen, Jung-Lu, and Yong-Mei Liu	Integrated multi-criteria decision-making (MCDM) method combined with decision-making trial and evaluation laboratory (DEMATEL) and analytic network process (ANP) in food supplier selection	*African Journal of Business Management*
Yang, Yu-Ping Ou, How-Ming Shieh, and Gwo-Hshiung Tzeng	A VIKOR technique based on DEMATEL and ANP for information security risk control assessment	*Information Sciences*
Saaty, Thomas L	The modern science of multicriteria decision making and its practical applications: The AHP/ANP approach	*Operations research*
Cil, Ibrahim, and Yusuf S. Turkan	An ANP-based assessment model for lean enterprise transformation	*International Journal of Advanced Manufacturing Technology*
Kabak, Mehmet	A Fuzzy DEMATEL-ANP Based Multi-Criteria Decision-Making Approach for Personnel Selection	*Journal of Multiple-Valued Logic & Soft Computing*
Chang, An-Yuan, Kuo-Jen Hu, and Yun-Lin Hong	An ISM-ANP approach to identifying key agile factors in launching a new product into mass production	*International Journal of Production Research*
Zareinejad, Mohsen, Habibollah Javanmard, and Iran Arak	Evaluation and selection of a third-party reverse logistics provider using ANP and IFG-MCDM methodology	*Life Science Journal*
Ada, Erhan, Yigit Kazancoglu, and Muhittin Sagnak	Improving Competitiveness of Small-and Medium-Sized Enterprises (SMEs) in Agriproduct Export Business Through ANP: The Turkey Case	*Agribusiness*

International Journal of the
Analytic Hierarchy Process

429

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

Najafi, Asadallah	Analytic network process (ANP) approach for selecting strategies influencing the productivity of knowledge women workers	*African Journal of Business Management*
Cooper, Orrin, and Qingxing Dong	Bilateral relations between China and the United States: Policy prioritization with the ANP	*Journal of Systems Science and Systems Engineering*
Bhattacharya, Arijit, Priyabrata Mohapatra, Vikas Kumar, Prasanta Kumar Dey, Malcolm Brady, Manoj Kumar Tiwari, and Sai S. Nudurupati	Green supply chain performance measurement using fuzzy ANP-based balanced scorecard: a collaborative decision-making approach	*Production Planning & Control*
Miri, Mohsen, Manouchehr Omidvari, Ahmad Sadeghi, and Hasan Haleh	Developing ANP to rank the branches of an insurance company based on SERVQUAL	*International Journal of the Analytic Hierarchy Process*
Tadić, Snežana, Slobodan Zečević, and Mladen Krstić	A novel hybrid MCDM model based on fuzzy DEMATEL, fuzzy ANP and fuzzy VIKOR for city logistics concept selection	*Expert Systems with Applications*
Wong, Wai Peng, Joshua Ignatius, and Keng Lin Soh	What is the leanness level of your organisation in lean transformation implementation? An integrated lean index using ANP approach	*Production Planning & Control*
Theißen, Sebastian, and Stefan Spinler	Strategic analysis of manufacturer-supplier partnerships: An ANP model for collaborative CO2 reduction management	*European Journal of Operational Research*
Boj, Jorge Juan, Raul Rodriguez-Rodriguez, and Juan-Jose Alfaro-Saiz	An ANP-multi-criterion-based methodology to link intangible assets and organizational performance in a Balanced Scorecard context	*Decision Support Systems*
Baykasoglu, Adil, and Zeynep DU Durmusoglu	A hybrid MCDM for private primary school assessment using DEMATEL based on ANP and fuzzy cognitive map	*International Journal of Computational Intelligence*
Zamani, Mahmoud, Arefeh Rabbani, Abdolreza Yazdani-Chamzini, and Zenonas Turskis	An integrated model for extending brand based on fuzzy ARAS and ANP methods	*Journal of Business Economics and Management*
Rouyendegh, Babak Daneshvar	Developing an integrated ANP and intuitionistic fuzzy TOPSIS model for supplier selection	*Journal of Testing and Evaluation*
Ernesto Quezada and, Luis, Pedro Ivan Palominos, Rosa E. Galleguillos, and Alexis H. Olmedo	A method for generating strategy maps using ANP	*Journal of Manufacturing Technology Management*
Ergu, Daji, Gang Kou, and Jennifer Shang	A modular-based supplier evaluation framework: A comprehensive data analysis of ANP structure	*International Journal of Information Technology & Decision Making*
Wang, Shih-Ching, and Ming-Kuen Chen	The use of a hybrid ANP-VIKOR approach for establishing the performance evaluation model of e-business project	*African Journal of Business Management*
Kilic, Huseyin Selcuk, Selim Zaim, and Dursun Delen	Selecting "The Best" ERP system for SMEs using a combination of ANP and PROMETHEE methods	*Expert Systems with Applications*
Aragonés-Beltrán, Pablo, Mónica García-Melón, and Vicent Estruch-Guitart	Analysis of the participation of stakeholders in environmental management based on ANP: Application to a Spanish natural park	*International Journal of the Analytic Hierarchy Process*
Lam, Jasmine Siu Lee	Designing a sustainable maritime supply chain: A hybrid QFD–ANP approach	*Transportation Research Part E: Logistics and Transportation Review*

Pourahmad, Ahmad, Ali Hosseini, Audrius Banaitis, Hossein Nasiri, Nerija Banaitienė, and Gwo-Hshiung Tzeng	Combination of fuzzy-AHP and DEMATEL-ANP with GIS in a new hybrid MCDM model used for the selection of the best space for leisure in a blighted urban site	*Technological and Economic Development of Economy*
Hu, Yaoguang, Jingqian Wen, and Yan Yan	Measuring the performance of knowledge resources using a value perspective: integrating BSC and ANP	*Journal of Knowledge Management*
Ju, Yanbing, Aihua Wang, and Tianhui You	Emergency alternative evaluation and selection based on ANP, DEMATEL, and TL-TOPSIS	*Natural Hazards*
Gupta, Manish, and Rakesh Narain	A fuzzy ANP based approach in the selection of the best E-Business strategy and to assess the impact of E-Procurement on organizational performance	*Information Technology and Management*
Gölcük, İlker, and Adil Baykasoğlu	An analysis of DEMATEL approaches for criteria interaction handling within ANP	*Expert Systems with Applications*
Jayant, Arvind	Selection of Reverse Logistics Service Provider (RLSP) Using Analytical Network Process (ANP): A Case Study Of An Automotive Company	*International Journal of the Analytic Hierarchy Process*
Vinodh, S., TS Sai Balagi, and Adithya Patil	A hybrid MCDM approach for agile concept selection using fuzzy DEMATEL, fuzzy ANP and fuzzy TOPSIS	*The International Journal of Advanced Manufacturing Technology*
Supeekit, Tuangyot, Tuanjai Somboonwiwat, and Duangpun Kritchanchai	DEMATEL-modified ANP to evaluate internal hospital supply chain performance	*Computers & Industrial Engineering*
Peker, Iskender, Birdogan Baki, Mehmet Tanyas, and Ilker Murat Ar	Logistics center site selection by ANP/BOCR analysis: A case study of Turkey	*Journal of Intelligent & Fuzzy Systems*
Shieh, Lon-Fon, Ching-Chiang Yeh, and Ming-Cheng Lai	Critical success factors in digital publishing technology using an ANP approach	*Technological and Economic Development of Economy*
Kong, Feng, Wei Wei, and Jia-Hao Gong	Rank reversal and rank preservation in ANP method	*Journal of Discrete Mathematical Sciences and Cryptography*
Liao, Chin-Nung, Chih-Hsiang Lin, and Yan-Kai Fu	Integrative model for the selection of a new product launch strategy, based on ANP, TOPSIS and MCGP: a case study	*Technological and Economic Development of Economy*
Wan, Shu-ping, Gai-li Xu, and Jiu-Ying Dong	Supplier selection using ANP and ELECTRE II in interval 2-tuple linguistic environment	*Information Sciences*
Pamučar, Dragan, Milan Mihajlović, Radojko Obradović, and Predrag Atanasković	Novel approach to group multi-criteria decision making based on interval rough numbers: Hybrid DEMATEL-ANP-MAIRCA model	*Expert Systems with Applications*
Büyüközkan, Gülçin, Sezin Güleryüz, and Birsen Karpak	A new combined IF-DEMATEL and IF-ANP approach for CRM partner evaluation	*International journal of production economics*
Dehdasht, Gholamreza, Rosli Mohamad Zin, M. Ferwati, Mohammed Abdullahi, Ali Keyvanfar, and Ronald McCaffer	DEMATEL-ANP risk assessment in oil and gas construction projects	*Sustainability*
Aragonés-Beltrán, Pablo, Rocío Poveda-Bautista, and Fernando	An in-depth analysis of a TTO's objectives alignment within the university strategy: An ANP-based approach	*Journal of Engineering and Technology Management*

Jiménez-Sáez		
Tang, Hui-Wen Vivian, Kuopao Chang, Mu-Shang Yin, and Ru-Shou Sheu	Critical factors for implementing a programme for international MICE professionals: A hybrid MCDM model combining DEMATEL and ANP	*Current Issues in Tourism*
Zheng, Xia-Zhong, Fei Wang, and Jian-Lan Zhou	A hybrid approach for evaluating faulty behavior risk of high-risk operations using ANP and evidence theory	*Mathematical Problems in Engineering*
Xu, Zhitao, Adel Elomri, Shaligram Pokharel, and X. G. Ming	Product-service supplier pre-evaluation with modified fuzzy ANP reducing decision information distortion	*International Journal of Computer Integrated Manufacturing*
Grimaldi, Michele, Vincenzo Pellecchia, and Isidoro Fasolino	Urban plan and water infrastructures planning: A methodology based on spatial ANP	*Sustainability*
Yavuz, Idil, and Orrin Cooper	A dynamic clustering method to improve the coherency of an ANP Super matrix	*Annals of Operations Research*
Mostamand, Morteza, Razavi Hajiagha, Seyed Hossein, and Maryam Daneshvar	Selecting Strategies by Considering Budget Limitation: A Hybrid Algorithm of SWOT-DEMATEL-ANP and Binary Programming with Grey Information	*Informatica*
Abdel-Basset, Mohamed, Mai Mohamed, and Florentin Smarandache	A hybrid neutrosophic group ANP-TOPSIS framework for supplier selection problems	*Symmetry*
Quezada, Luis E., Héctor A. López-Ospina, Pedro I. Palominos, and Astrid M. Oddershede	Identifying causal relationships in strategy maps using ANP and DEMATEL	*Computers & Industrial Engineering*
Wu, Wann-Yih, Alfiyatul Qomariyah, Nguyen Thi Truong Sa, and Yingkai Liao	The Integration between Service Value and Service Recovery in the Hospitality Industry: An Application of QFD and ANP	*International Journal of Hospitality Management*
Bottani, Eleonora, Piera Centobelli, Teresa Murino, and Ehsan Shekarian	A QFD-ANP method for supplier selection with benefits, opportunities, costs and risks considerations	*International Journal of Information Technology & Decision Making*
Modak, Mousumi, Kunal Kanti Ghosh, and Khanindra Pathak	A BSC-ANP approach to organizational outsourcing decision support-A case study	*Journal of Business Research*
Liu, Shuo-Fang, Yang Zhang, and Min Jiang	ANP-based analysis of design strategy, customer demand, and firm performance of the elderly motorized mobility scooter	*Journal of Interdisciplinary Mathematics*
Hellebrandt, Thomas, Ina Heine, and Robert H. Schmitt	ANP-based knowledge management solutions framework for the long-term complaint knowledge transfer	*Total Quality Management & Business Excellence*
Chen, You-Shyang, Huan-Ming Chuang, Arun Kumar Sangaiah, Chien-Ku Lin, and Wen-Bin Huang	A study for project risk management using an advanced MCDM-based DEMATEL-ANP approach	*Journal of Ambient Intelligence and Humanized Computing*
Ozdemir, Yavuz	Airport Safety Risk Evaluation for Bureaucrats Using Fuzzy ANP and the Generalized Choquet Integral Method	*Transylvanian Review*

Kargari, Mehrdad	Ranking of Performance Assessment Measures at Tehran Hotel by Combining DEMATEL, ANP, and SERVQUAL Models under Fuzzy Condition	*Mathematical Problems in Engineering*
dos Santos, Hugo Henrique, Regiane Máximo de Souza, and Aílton Souza Aragão	Decision analysis in referrals of children and adolescent victims of violence: An ANP approach	*Journal of the Operational Research Society*
Chen, Tingqiang, Shuaibin Wang, Lei Pei, and Jining Wang	Assessment of Dairy Product Safety Supervision in Sales Link: A Fuzzy-ANP Comprehensive Evaluation Method	*Journal of Food Quality*
Tang, Hui-Wen Vivian	Modeling critical leadership competencies for junior high school principals: A hybrid MCDM model combining DEMATEL and ANP	*Kybernetes*
Özder, Emir Hüseyin, Evrencan Özcan, and Tamer Eren	Staff Task-Based Shift Scheduling Solution with an ANP and Goal Programming Method in a Natural Gas Combined Cycle Power Plant	*Mathematics*
Dinçer, Hasan, Serhat Yüksel, and Luis Martínez	Interval type 2-based hybrid fuzzy evaluation of financial services in E7 economies with DEMATEL-ANP and MOORA methods	*Applied Soft Computing*
Asadabadi, Mehdi Rajabi, Elizabeth Chang, and Morteza Saberi	Are MCDM Methods Useful? A Critical Review of Analytic Hierarchy Process (AHP) and Analytic Network Process (ANP)	*Cogent Engineering*
Leksono, Eko Budi, Suparno Suparno, and Iwan Vanany	Integration of a Balanced Scorecard, DEMATEL, and ANP for Measuring the Performance of a Sustainable Healthcare Supply Chain	*Sustainability*
Kiani Mavi, Reza, Hamed Gheibdoust, Ahmad A. Khanfar, and Neda Kiani Mavi	Ranking factors influencing strategic management of university business incubators with ANP	*Management Decision*
Salah, Souhir Ben, Wafa Ben Yahia, Omar Ayadi, and Faouzi Masmoudi	An integrated Fuzzy ANP-MOP approach for partner selection problem and order allocation optimization: The case of virtual enterprise configuration	*RAIRO-Operations Research*
Zhou, Xiaoyang, Liqin Wang, Jindong Qin, Jian Chai, and Carlos Quiterio Gómez Muñoz	Emergency rescue planning under probabilistic linguistic information: An integrated FTA-ANP method	*International Journal of Disaster Risk Reduction*
Yuan, Jiahai, Xinying Li, Chuanbo Xu, Changhong Zhao, and Yuanxin Liu	Investment risk assessment of coal-fired power plants in countries along the Belt and Road initiative based on ANP-Entropy-TODIM method	*Energy*
Bathaei, Ahmad, Abbas Mardani, Tomas Baležentis, Siti Rahmah Awang, Dalia Streimikiene, Goh Chin Fei, and Norhayati Zakuan	Application of Fuzzy Analytical Network Process (ANP) and VIKOR for the Assessment of Green Agility Critical Success Factors in Dairy Companies	*Symmetry*
Mimovic, Predrag Miroslav, Ana Krstic, and Jovana Savic	Serbia joining the European union: an ANP model for forecasting the accessing date	*International Journal of the Analytic Hierarchy Process*

Table 6
Research publications in social sciences category for AHP-2000 to 2019

AHP		
Authors	**Research Title**	**Journal Name**
(Xu, 2000)	On consistency of the weighted geometric mean complex judgement matrix in AHP	*European Journal of Operational Research*
(Leung & Cao, On consistency and ranking of alternatives in fuzzy AHP, 2000)	On consistency and ranking of alternatives in fuzzy AHP	*European Journal of Operational Research*
(Sinuany-Stern, Mehrez, & Hadad, 2000)	An AHP/DEA methodology for ranking decision-making units	*International Transactions in Operational Research*
(Millet & Saaty, 2000)	On the relativity of relative measures–accommodating both rank preservation and rank reversals in the AHP	*European Journal of Operational Research*
(Al-Harbi, 2001)	Application of the AHP in project management	*International journal of project management*
(Wedley, Choo, & Schoner, 2001)	Magnitude adjustment for AHP benefit/cost ratios	*European Journal of Operational Research*
(Leung & Cao, On the efficacy of modeling multi-attribute decision problems using AHP and Sinarchy, 2001)	On the efficacy of modeling multi-attribute decision problems using AHP and Sinarchy	*European Journal of Operational Research*
(Van der Honert, 2001)	Decisional power in group decision making: a note on the allocation of group members' weights in the multiplicative AHP and SMART	*Group Decision and Negotiation*
(Davies, Adaptive AHP: a review of marketing applications with extensions, 2001)	Adaptive AHP: a review of marketing applications with extensions	*European Journal of Marketing*
(Jackson, 2001)	Prioritising customers and other stakeholders using the AHP	*European Journal of Marketing*
(Chwolka & Raith, 2001)	Group preference aggregation with the AHP–implications for multiple-issue agendas	*European Journal of Operational Research*
(Cai & Wu, 2001)	Synthetic financial evaluation by a method of combining DEA with AHP	*International Transactions in Operational Research*
(Muller & Fairlie-Clarke, 2001)	Using the AHP to determine the correlation of product issues to profit	*European Journal of Marketing*
(Al Khalil, 2002)	Selecting the appropriate project delivery method using AHP	*International journal of project management*
(Yu, 2002)	A GP-AHP method for solving group decision-making fuzzy AHP problems	*Computers & Operations Research*
Khasnabis, Snehamay, Emadeddin Alsaidi, Libo Liu,	Comparative study of two techniques of transit performance assessment: AHP and GAT	*Journal of Transportation Engineering*

International Journal of the
Analytic Hierarchy Process

434

Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822

and Richard Darin Ellis		
Batubara, Maruhum, Hidehiko Tanimura, Monday Ohi Asikhia, and Atsushi Toshimori	An application of the AHP to urban residential upgrading in Jakarta	*Journal of Asian Architecture and Building Engineering*
Saaty, Thomas L	Decision-making with the AHP: Why is the principal eigenvector necessary	*European Journal of Operational Research*
Kwong, Chun-Kit, and H. Bai	Determining the importance weights for the customer requirements in QFD using a fuzzy AHP with an extent analysis approach	*Iie Transactions*
Aguaron, Juan, María Teresa Escobar, and José María Moreno-Jiménez	Consistency stability intervals for a judgement in AHP decision support systems	*European Journal of Operational Research*
Radcliffe, Larry L., and Marc J. Schniederjans	Trust evaluation: an AHP and multi-objective programming approach	*Management Decision*
Korhonen, P., and H. Topdagi	Performance of the AHP in comparison of gains and losses	*Mathematical and Computer Modelling*
Kahraman, Cengiz, Ufuk Cebeci, and Da Ruan	Multi-attribute comparison of catering service companies using fuzzy AHP: The case of Turkey	*International journal of production economics*
Yang, Ching-Chow, and Bai-Sheng Chen	Key quality performance evaluation using fuzzy AHP	*Journal of the Chinese Institute of Industrial Engineers*
Chan, Alan HS, W. Y. Kwok, and Vincent G. Duffy	Using AHP for determining priority in a safety management system	*Industrial Management & Data Systems*
Sundarraj, R. P	A Web-based AHP approach to standardize the process of managing service-contracts	*Decision Support Systems*
Entani, Tomoe, Hidetorno Ichihashi, and Hideo Tanaka	Evaluation method based on interval AHP and DEA	*Central European Journal of Operations Research*
Wei, Chun-Chin, Chen-Fu Chien, and Mao-Jiun J. Wang	An AHP-based approach to ERP system selection	*International journal of production economics*
Liu, Duen-Ren, and Ya-Yueh Shih	Integrating AHP and data mining for product recommendation based on customer lifetime value	*Information & Management*
Ngai, Eric WT, and E. W. C. Chan	Evaluation of knowledge management tools using AHP	*Expert systems with applications*
Mahdi, Ibrahim M., and Khaled Alreshaid	Decision support system for selecting the proper project delivery method using analytical hierarchy process (AHP)	*International journal of project management*
Beynon, Malcolm J	A method of aggregation in DS/AHP for group decision-making with the non-equivalent importance of individuals in the group	*Computers & Operations Research*
Shapira, Aviad, and Marat Goldenberg	AHP-based equipment selection model for construction projects	*Journal of Construction Engineering and Management*
Mau-Crimmins, Theresa, Joseph E. de Steiguer, and Donald Dennis	AHP as a means for improving public participation: a pre–post experiment with university students	*Forest policy and economics*
Gaudenzi, Barbara, and Antonio Borghesi	Managing risks in the supply chain using the AHP method	*The International Journal of Logistics Management*

Bertolini, M., Marcello Braglia, and Gionata Carmignani	Application of the AHP methodology in making a proposal for a public work contract	*International Journal of Project Management*
Ishizaka, Alessio, and Markus Lusti	How to derive priorities in AHP: a comparative study	*Central European Journal of Operations Research*
Pi, Wei-Ning, and Chinyao Low	Supplier evaluation and selection via Taguchi loss functions and an AHP	*The International Journal of Advanced Manufacturing Technology*
Ugboma, Chinonye, Ogochukwu Ugboma, and Innocent C. Ogwude	An analytic hierarchy process (AHP) approach to port selection decisions–empirical evidence from Nigerian ports	*Maritime Economics & Logistics*
Wang, Ying-Ming, and Taha MS Elhag	An approach to avoiding rank reversal in AHP	*decision Support Systems*
Pérez, Joaquín, José L. Jimeno, and Ethel Mokotoff	Another potential shortcoming of AHP	*Top*
Beynon, Malcolm J	The role of the DS/AHP in identifying inter-group alliances and majority rule within-group decision making	*Group Decision and Negotiation*
Raharjo, Hendry, and Dini Endah	Evaluating relationship of consistency ratio and number of alternatives on rank reversal in the AHP	*Quality Engineering*
Garuti, Claudio, and Mario Sandoval	The AHP: A multicriteria decision-making methodology for shiftwork prioritizing	*Journal of Systems Science and Systems Engineering*
Chan, Felix TS, and Niraj Kumar	Global supplier development considering risk factors using fuzzy extended AHP-based approach	*Omega*
Bozbura, F. Tunç, Ahmet Beskese, and Cengiz Kahraman	Prioritization of human capital measurement indicators using fuzzy AHP	*Expert systems with applications*
Ramanathan, Ramakrishnan	Supplier selection problem: integrating DEA with the approaches of total cost of ownership and AHP	*Supply Chain Management: an international journal*
Bozbura, F. Tunç, and Ahmet Beskese	Prioritization of organizational capital measurement indicators using fuzzy AHP	*International journal of approximate reasoning*
Escobar, María Teresa, and José Maria Moreno-Jimenéz	Aggregation of individual preference structures in AHP-group decision making	*Group Decision and Negotiation*
Korpela, Jukka, Antti Lehmusvaara, and Jukka Nisonen	Warehouse operator selection by combining AHP and DEA methodologies	*International journal of production economics*
Rabelo, Luis, Hamidreza Eskandari, Tarek Shaalan, and Magdy Helal	Value chain analysis using hybrid simulation and AHP	*International journal of production economics*
Altuzarra, Alfredo, José María Moreno-Jiménez, and Manuel Salvador	A Bayesian priorization procedure for AHP-group decision making	*European Journal of Operational Research*
Kahraman, Cengiz, Nihan Cetin Demirel, and Tufan Demirel	Prioritization of e-Government strategies using a SWOT-AHP analysis: the case of Turkey	*European Journal of Information Systems*
Carlucci, Daniela, and Giovanni Schiuma	Knowledge assets value creation map: assessing knowledge assets value drivers using AHP	*Expert systems with applications*

Cebeci, Ufuk, and D. A. Ruan	A multi-attribute comparison of Turkish quality consultants by fuzzy AHP	*International Journal of Information Technology & Decision Making*
Abudayyeh, Osama, Saad J. Zidan, Sherif Yehia, and Dennis Randolph	Hybrid prequalification-based, innovative contracting model using AHP	*Journal of management in engineering*
Chen, S. C., C. C. Yang, W. T. Lin, T. M. Yeh, and Y. S. Lin	Construction of key model for knowledge management system using AHP-QFD for semiconductor industry in Taiwan	*Journal of Manufacturing Technology Management*
Hsu, Pi-Fang, and Bi-Yu Chen	Developing and implementing a selection model for bedding chain retail store franchisee using Delphi and fuzzy AHP	*Quality and Quantity*
Wang, Ying-Ming, Ying Luo, and Zhongsheng Hua	On the extent analysis method for fuzzy AHP and its applications	*European Journal of Operational Research*
Chan, Felix TS, Niraj Kumar, Manoj Kumar Tiwari, Henry CW Lau, and K. L. Choy	Global supplier selection: a fuzzy-AHP approach	*International Journal of production research*
Huang, Chi-Cheng, Pin-Yu Chu, and Yu-Hsiu Chiang	A fuzzy AHP application in government-sponsored R&D project selection	*Omega*
Önüt, Semih, and Selin Soner	Transshipment site selection using the AHP and TOPSIS approaches under fuzzy environment	*Waste Management*
Dağdeviren, Metin, and İhsan Yüksel	Developing a fuzzy analytic hierarchy process (AHP) model for behavior-based safety management	*Information sciences*
Ertuğrul, İrfan, and Nilsen Karakaşoğlu	Comparison of fuzzy AHP and fuzzy TOPSIS methods for facility location selection	*The International Journal of Advanced Manufacturing Technology*
Wang, Tien-Chin, and Yueh-Hsiang Chen	Applying fuzzy linguistic preference relations to the improvement of consistency of fuzzy AHP	*Information sciences*
Hua, Zhongsheng, Bengang Gong, and Xiaoyan Xu	A DS–AHP approach for multi-attribute decision-making problem with incomplete information	*Expert systems with applications*
Lee, Grace KL, and Edwin HW Chan	The analytic hierarchy process (AHP) approach for assessment of urban renewal proposals	*Social indicators research*
Moreno-Jiménez, J. M., J. Aguarón, and M. T. Escobar	The core of consistency in AHP-group decision making	*Group Decision and Negotiation*
Lai, Yu-Ting, Wei-Chih Wang, and Han-Hsiang Wang	AHP-and simulation-based budget determination procedure for public building construction projects	*Automation in Construction*
Güngör, Zülal, Gürkan Serhadlıoğlu, and Saadettin Erhan Kesen	A fuzzy AHP approach to personnel selection problem	*Applied Soft Computing*
Podvezko, Valentinas	Application of AHP technique	*Journal of Business Economics and Management*
Lin, Hsiu-Fen, Hsuan-Shih Lee, and Da Wei Wang	Evaluation of factors influencing knowledge sharing based on a fuzzy AHP approach	*Journal of Information Science*
Tseng, Ya-Fen, and Tzai-Zang Lee	Comparing appropriate decision support of human resource practices on organizational performance with DEA/AHP model	*Expert systems with applications*
Lee, Amy HI	A fuzzy AHP evaluation model for buyer-supplier relationships with the consideration of benefits, opportunities, costs and risks	*International Journal of production research*

*International Journal of the
Analytic Hierarchy Process*

437

*Vol. 12 Issue 3 2020
ISSN 1936-6744
https://doi.org/10.13033/ijahp.v12i3.822*

Li, Shuliang, and Jim Zheng Li	Hybridising human judgment, AHP, simulation and a fuzzy expert system for strategy formulation under uncertainty	*Expert systems with applications*
Sueyoshi, Toshiyuki, Jennifer Shang, and Wen-Chyuan Chiang	A decision support framework for internal audit prioritization in a rental car company: A combined use between DEA and AHP	*European Journal of Operational Research*
Bhagwat, Rajat, and Milind Kumar Sharma	An application of the integrated AHP-PGP model for performance measurement of supply chain management	*Production Planning & Control*
Arslan, Ozcan, and Osman Turan	Analytical investigation of marine casualties at the Strait of Istanbul with SWOT–AHP method	*Maritime Policy & Management*
Ünal, Can, and Mücella G. Güner	Selection of ERP suppliers using AHP tools in the clothing industry	*International Journal of Clothing Science and Technology*
Sun, Chia-Chi	A performance evaluation model by integrating fuzzy AHP and fuzzy TOPSIS methods	*Expert systems with applications*
Costa, Helder Gomes, and P. S. Correa	Construction of an AHP-based model to catch criteria weights in post-occupancy evaluation	*International Journal of the Analytic Hierarchy Process*
Dong, Yucheng, Guiqing Zhang, Wei-Chiang Hong, and Yinfeng Xu	Consensus models for AHP group decision making under row geometric mean prioritization method	*Decision Support Systems*
Abdelgawad, Mohamed, and Aminah Robinson Fayek	Risk management in the construction industry using combined fuzzy FMEA and fuzzy AHP	*Journal of Construction Engineering and Management*
Jaskowski, Piotr, Slawomir Biruk, and Robert Bucon	Assessing contractor selection criteria weights with fuzzy AHP method application in group decision environment	*Automation in Construction*
Lee, Shyh-Hwang	Using fuzzy AHP to develop intellectual capital evaluation model for assessing their performance contribution in a university	*Expert systems with applications*
Chen, Ming-Kuen, and Shih-Ching Wang	The critical factors of success for information service industry in developing international market: Using analytic hierarchy process (AHP) approach	*Expert systems with applications*
Chan, Felix TS, and Hing Kai Chan	An AHP model for selection of suppliers in the fast-changing fashion market	*The International Journal of Advanced Manufacturing Technology*
Altuzarra, Alfredo, José María Moreno-Jiménez, and Manuel Salvador	Consensus building in AHP-group decision making: A Bayesian approach	*Operations research*
De Feo, Giovanni, and Sabino De Gisi	Using an innovative criteria weighting tool for stakeholders involvement to rank MSW facility sites with the AHP	*Waste Management*
Şen, Ceyda Güngör, and Gökçe Çınar	Evaluation and pre-allocation of operators with multiple skills: A combined fuzzy AHP and max-min approach	*Expert systems with applications*
Che, ZhengHua, H. S. Wang, and Chih-Ling Chuang	A fuzzy AHP and DEA approach for making bank loan decisions for small and medium enterprises in Taiwan	*Expert systems with applications*
Ordoobadi, Sharon M	Application of AHP and Taguchi loss functions in supply chain	*Industrial Management & Data Systems*
Chen, Ming-Kuen, and Shih-Ching Wang	The use of a hybrid fuzzy-Delphi-AHP approach to develop global business intelligence for information service firms	*Expert systems with applications*
Kilincci, Ozcan, and Suzan Aslı Onal	Fuzzy AHP approach for supplier selection in a washing machine company	*Expert systems with applications*

von Solms, Sibs	Validity of the AHP/ANP: Comparing apples and oranges	*International Journal of the Analytic Hierarchy Process*
Mu, Enrique	Editor-in-chief Enrique mu uses AHP to help city of Pittsburgh move to the cloud	*International Journal of the Analytic Hierarchy Process*
Vidal, Ludovic-Alexandre, Franck Marle, and Jean-Claude Bocquet	Using a Delphi process and the Analytic Hierarchy Process (AHP) to evaluate the complexity of projects	*Expert systems with applications*
Pedrycz, Witold, and Mingli Song	Analytic hierarchy process (AHP) in group decision making and its optimization with an allocation of information granularity	*IEEE Transactions on Fuzzy Systems*
Joshi, Rohit, D. K. Banwet, and Ravi Shankar	A Delphi-AHP-TOPSIS based benchmarking framework for performance improvement of a cold chain	*Expert systems with applications*
Li, Jie, and Patrick XW Zou	Fuzzy AHP-based risk assessment methodology for PPP projects	*Journal of Construction Engineering and Management*
Saaty, Thomas L., and Jennifer S. Shang	An innovative orders-of-magnitude approach to AHP-based multi-criteria decision making: Prioritizing divergent intangible humane acts	*European Journal of Operational Research*
Lee, Seungbum, and Patrick Walsh	SWOT and AHP hybrid model for sport marketing outsourcing using a case of intercollegiate sport	*Sport Management Review*
Hadi-Vencheh, A., and A. Mohamadghasemi	A fuzzy AHP-DEA approach for multiple criteria ABC inventory classification	*Expert systems with applications*
Lin, Ming-Ian, Yuan-Duen Lee, and Tsai-Neng Ho	Applying integrated DEA/AHP to evaluate the economic performance of local governments in China	*European Journal of Operational Research*
Isaai, Mohammad T., Aram Kanani, Mahshid Tootoonchi, and Hamid R. Afzali	Intelligent timetable evaluation using fuzzy AHP	*Expert systems with applications*
Ishizaka, Alessio, Dieter Balkenborg, and Todd Kaplan	Influence of aggregation and measurement scale on ranking a compromise alternative in AHP	*Journal of the Operational Research Society*
Rostamzadeh, Reza, and Saudah Sofian	Prioritizing effective 7Ms to improve production systems performance using fuzzy AHP and fuzzy TOPSIS (case study)	*Expert systems with applications*
Shaw, Krishnendu, Ravi Shankar, Surendra S. Yadav, and Lakshman S. Thakur	Supplier selection using fuzzy AHP and fuzzy multi-objective linear programming for developing low carbon supply chain	*Expert systems with applications*
Koul, Saroj, and Rakesh Verma	Dynamic vendor selection: A fuzzy AHP approach	*International Journal of the Analytic Hierarchy Process*
Wang, Xiaojun, Hing Kai Chan, Rachel WY Yee, and Ivan Diaz-Rainey	A two-stage fuzzy-AHP model for risk assessment of implementing green initiatives in the fashion supply chain	*International journal of production economics*
Bruno, Giuseppe, Emilio Esposito, Andrea Genovese, and Renato Passaro	AHP-based approaches for supplier evaluation: Problems and perspectives	*Journal of purchasing and supply management*
Ho, William, Ting He, Carman Ka Man Lee, and Ali Emrouznejad	Strategic logistics outsourcing: An integrated QFD and fuzzy AHP approach	*Expert systems with applications*
Bentes, Alexandre Veronese, Jorge Carneiro, Jorge Ferreira	Multidimensional assessment of organizational performance: Integrating BSC and AHP	*Journal of business research*

da Silva, and Herbert Kimura		
Dai, Jing, and Jennifer Blackhurst	A four-phase AHP–QFD approach for supplier assessment: a sustainability perspective	*International Journal of production research*
Ishizaka, Alessio, Craig Pearman, and Philippe Nemery	AHPSort: an AHP-based method for sorting problems	*International Journal of production research*
Falsini, Diego, Federico Fondi, and Massimiliano M. Schiraldi	A logistics provider evaluation and selection methodology based on AHP, DEA and linear programming integration	*International Journal of production research*
Das, Manik Chandra, Bijan Sarkar, and Siddhartha Ray	A framework to measure relative performance of Indian technical institutions using integrated fuzzy AHP and COPRAS methodology	*Socio-Economic Planning Sciences*
Zhang, Yajuan, Xinyang Deng, Daijun Wei, and Yong Deng	Assessment of E-Commerce security using AHP and evidential reasoning	*Expert systems with applications*
Ju, Yanbing, Aihua Wang, and Xiaoyue Liu	Evaluating emergency response capacity by fuzzy AHP and 2-tuple fuzzy linguistic approach	*Expert systems with applications*
Paksoy, Turan, Nimet Yapici Pehlivan, and Cengiz Kahraman	Organizational strategy development in distribution channel management using fuzzy AHP and hierarchical fuzzy TOPSIS	*Expert systems with applications*
Bulut, Emrah, Okan Duru, Tuba Keçeci, and Shigeru Yoshida	Use of consistency index, expert prioritization and direct numerical inputs for generic fuzzy-AHP modeling: A process model for shipping asset management	*Expert systems with applications*
Fouladgar, Mohammad Majid, Abdolreza Yazdani-Chamzini, Ali Lashgari, Edmundas Kazimieras Zavadskas, and Zenonas Turskis	Maintenance strategy selection using AHP and COPRAS under fuzzy environment	*International journal of strategic property management*
Ju, Yanbing, and Aihua Wang	Emergency alternative evaluation under group decision-makers: A method of incorporating DS/AHP with extended TOPSIS	*Expert systems with applications*
Vinodh, Shivraman, K. R. Shivraman, and S. Viswesh	AHP-based lean concept selection in a manufacturing organization	*Journal of Manufacturing Technology Management*
Zolfani, Sarfaraz Hashemkhani, I-Shuo Chen, Nahid Rezaeiniya, and Jolanta Tamošaitienė	A hybrid MCDM model encompassing AHP and COPRAS-G methods for selecting company supplier in Iran	*Technological and economic development of economy*
Zolfani, Sarfaraz Hashemkhani, Nahid Rezaeiniya, Mohammad Hasan Aghdaie, and Edmundas Kazimieras Zavadskas	Quality control manager selection based on AHP-COPRAS-G methods: a case in Iran	*Economic Research-Ekonomska Istraživanja*
Aminbakhsh, Saman, Murat Gunduz, and Rifat Sonmez	Safety risk assessment using analytic hierarchy process (AHP) during planning and budgeting of construction projects	*Journal of safety research*
De Felice, Fabio, Birsen Karpak, Enrique Mu, Leandro Pecchia, Antonella Petrillo	Publishing AHP/ANP Papers	*International Journal of the Analytic Hierarchy Process*
Calabrese, Armando, Roberta Costa, and Tamara Menichini	Using Fuzzy AHP to manage Intellectual Capital assets: An application to the ICT service industry	*Expert systems with applications*

Samvedi, Avinash, Vipul Jain, and Felix TS Chan	Quantifying risks in a supply chain through integration of fuzzy AHP and fuzzy TOPSIS	*International Journal of production research*
Rezaei, Jafar, and Roland Ortt	Multi-criteria supplier segmentation using a fuzzy preference relation based AHP	*European Journal of Operational Research*
Ishizaka, Alessio, and Nam Hoang Nguyen	Calibrated fuzzy AHP for current bank account selection	*Expert systems with applications*
Daim, Tugrul U., Andreas Udbye, and Aparna Balasubramanian	Use of analytic hierarchy process (AHP) for selection of 3PL providers	*Journal of Manufacturing Technology Management*
Aghdaie, Mohammad Hasan, Sarfaraz Hashemkhani Zolfani, and Edmundas Kazimieras Zavadskas	Market segment evaluation and selection based on application of fuzzy AHP and COPRAS-G methods	*Journal of Business Economics and Management*
Tadic, Danijela, Alev Taskin Gumus, Slavko Arsovski, Aleksandar Aleksic, and Miladin Stefanovic	An evaluation of quality goals by using fuzzy AHP and fuzzy TOPSIS methodology	*Journal of Intelligent & Fuzzy Systems*
Xu, Lei, D. Thresh Kumar, K. Madan Shankar, Devika Kannan, and Gang Chen	Analyzing criteria and sub-criteria for the corporate social responsibility-based supplier selection process using AHP	*The International Journal of Advanced Manufacturing Technology*
Junior, Francisco Rodrigues Lima, Lauro Osiro, and Luiz Cesar Ribeiro Carpinetti	A comparison between Fuzzy AHP and Fuzzy TOPSIS methods to supplier selection	*Applied Soft Computing*
Bhandari, Ashish, and Amrit Man Nakarmi	Performance evaluation of commercial banks in Nepal using AHP	*International Journal of the Analytic Hierarchy Process*
Pegetti, Ana Lucia, and Jessé D. Souza Júnior	Cognitive maps and AHP for supplier selection in a private higher education institution	*International Journal of the Analytic Hierarchy Process*
Patil, Sachin K., and Ravi Kant	A fuzzy AHP-TOPSIS framework for ranking the solutions of Knowledge Management adoption in Supply Chain to overcome its barriers	*Expert systems with applications*
Somsuk, Nisakorn, and Tritos Laosirihongthong	A fuzzy AHP to prioritize enabling factors for strategic management of university business incubators: Resource-based view	*Technological forecasting and social change*
Rezaei, Jafar, Patrick BM Fahim, and Lori Tavasszy	Supplier selection in the airline retail industry using a funnel methodology: Conjunctive screening method and fuzzy AHP	*Expert systems with applications*
Mandic, Ksenija, Boris Delibasic, Snezana Knezevic, and Sladjana Benkovic	Analysis of the financial parameters of Serbian banks through the application of the fuzzy AHP and TOPSIS methods	*Economic Modelling*
Lolli, Francesco, Alessio Ishizaka, and Rita Gamberini	New AHP-based approaches for multi-criteria inventory classification	*International journal of production economics*
Cevik Onar, Sezi, Başar Oztaysi, and Cengiz Kahraman	Strategic decision selection using hesitant fuzzy TOPSIS and interval type-2 fuzzy AHP: a case study	*International Journal of Computational intelligence systems*
Gudienė, Neringa, Audrius Banaitis, Valentinas Podvezko, and Nerija Banaitienė	Identification and evaluation of the critical success factors for construction projects in Lithuania: AHP approach	*Journal of Civil Engineering and Management*

Kamvysi, Konstantina, Katerina Gotzamani, Andreas Andronikidis, and Andreas C. Georgiou	Capturing and prioritizing students' requirements for course design by embedding Fuzzy-AHP and linear programming in QFD	*European Journal of Operational Research*
Rezaie, Kamran, Sara Saeidi Ramiyani, Salman Nazari-Shirkouhi, and Ali Badizadeh	Evaluating performance of Iranian cement firms using an integrated fuzzy AHP–VIKOR method	*Applied Mathematical Modelling*
Radivojević, Gordana, and Vladimir Gajović	Supply chain risk modeling by AHP and Fuzzy AHP methods	*Journal of Risk Research*
Jakhar, Suresh Kumar, and Mukesh Kumar Barua	An integrated model of supply chain performance evaluation and decision-making using structural equation modelling and fuzzy AHP	*Production Planning & Control*
Arroyo, P., I. D. Tommelein, and G. Ballard	Comparing AHP and CBA as decision methods to resolve the choosing problem in detailed design	*Journal of Construction Engineering and Management*
Mangla, Sachin Kumar, Pradeep Kumar, and Mukesh Kumar Barua	Risk analysis in green supply chain using fuzzy AHP approach: A case study	*Resources, Conservation and Recycling*
Saracoglu, Burak Omer, Orhantepe Mahallesi, Tekel Caddesi, and Geziyolu Sokak	A comparative study of AHP, ELCTRE iii & ELECTRE iv by equal objective & shannon's entropy objective & saaty's subjective criteria weighting in a private small hydropower plants investments selection problem	*International Journal of the Analytic Hierarchy Process*
Singh, Rana Pratap, and Hans Peter Nachtnebel	Prioritizing hydropower development using analytical hierarchy process (AHP). a case study of Nepal	*International Journal of the Analytic Hierarchy Process*
Kozak, Meryem Akoğlan, Emre Ozan Aksoz, and Çağıl Hale Özel.	An analytic hierarchy process (AHP) model for understanding convention planners 'prior factors of convention hotel selection	*International Journal of the Analytic Hierarchy Process*
Jantscher, Martin, Christopher Schwarz, and Erwin Zinser	Decision support in it service management: Applying AHP methodology to the itil incident management process	*International Journal of the Analytic Hierarchy Process*
Minhas, Amer Imran	GIS-Based Geo Hazard Assessment of Pakistan For Future Urban Development Using AHP	*International Journal of the Analytic Hierarchy Process*
von Solms, Sibs	Comparability, Decision Theory and The AHP	*International Journal of the Analytic Hierarchy Process*
Mosadeghi, Razieh, Jan Warnken, Rodger Tomlinson, and Hamid Mirfenderesk	Comparison of Fuzzy-AHP and AHP in a spatial multi-criteria decision-making model for urban land-use planning	*Computers, Environment and Urban Systems*
Chen, Jeng-Fung, Ho-Nien Hsieh, and Quang Hung Do	Evaluating teaching performance based on fuzzy AHP and comprehensive evaluation approach	*Applied Soft Computing*
Prakash, Chandra, and M. K. Barua	Integration of AHP-TOPSIS method for prioritizing the solutions of reverse logistics adoption to overcome its barriers under fuzzy environment	*Journal of Manufacturing Systems*
Su, Xiaoyan, Sankaran Mahadevan, Peida Xu, and Yong Deng	Dependence assessment in human reliability analysis using evidence theory and AHP	*Risk Analysis*
Abdullah, Lazim, and Norsyahida Zulkifli	Integration of fuzzy AHP and interval type-2 fuzzy DEMATEL: An application to human resource management	*Expert systems with applications*
Beikkhakhian, Yokabed, Mohammad Javanmardi, Mahdi	The application of ISM model in evaluating agile supplier's selection criteria and ranking suppliers using fuzzy TOPSIS-AHP methods	*Expert systems with applications*

Karbasian, and Bijan Khayambashi		
Kumar, Ajay, Ravi Shankar, and Roma Mitra Debnath	Analyzing customer preference and measuring relative efficiency in telecom sector: A hybrid fuzzy AHP/DEA study	*Telematics and Informatics*
Zhou, Yanhong, Kudzayi Maumbe, Jinyang Deng, and Steven W. Selin	Resource-based destination competitiveness evaluation using a hybrid analytic hierarchy process (AHP): The case study of West Virginia	*Tourism Management Perspectives*
Büyüközkan, Gülçin, and Ali Görener	Evaluation of product development partners using an integrated AHP-VIKOR model	*Kybernetes*
Thanki, Shashank, Kannan Govindan, and Jitesh Thakkar	An investigation on lean-green implementation practices in Indian SMEs using analytical hierarchy process (AHP) approach	*Journal of Cleaner Production*
Boltürk, Eda, S. Çevik Onar, Başar Öztayşi, Cengiz Kahraman, and K. Goztepe	Multi-attribute warehouse location selection in humanitarian logistics using hesitant fuzzy AHP	*International Journal of the Analytic Hierarchy Process*
Bhandari, Ashish, and Amrit Man Nakarmi	A financial performance evaluation of commercial banks in Nepal using AHP model	*International Journal of the Analytic Hierarchy Process*
Wang, Xia, Xiang Robert Li, Feng Zhen, and JinHe Zhang	How smart is your tourist attraction? Measuring tourist preferences of smart tourism attractions via a FCEM-AHP and IPA approach	*Tourism Management*
Bouzon, Marina, Kannan Govindan, Carlos M. Taboada Rodriguez, and Lucila MS Campos	Identification and analysis of reverse logistics barriers using fuzzy Delphi method and AHP	*Resources, Conservation and Recycling*
Tavana, Madjid, Mohsen Zareinejad, Debora Di Caprio, and Mohamad Amin Kaviani	An integrated intuitionistic fuzzy AHP and SWOT method for outsourcing reverse logistics	*Applied Soft Computing*
Luthra, Sunil, Sachin Kumar Mangla, Lei Xu, and Ali Diabat	Using AHP to evaluate barriers in adopting sustainable consumption and production initiatives in a supply chain	*International journal of production economics*
Dong, Qingxing, and Orrin Cooper	A peer-to-peer dynamic adaptive consensus reaching model for the group AHP decision making	*European Journal of Operational Research*
Dong, Qingxing, and Orrin Cooper	An orders-of-magnitude AHP supply chain risk assessment framework	*International journal of production economics*
Delbari, Seyyed Ali, Siew Imm Ng, Yuhanis Abdul Aziz, and Jo Ann Ho	An investigation of key competitiveness indicators and drivers of full-service airlines using Delphi and AHP techniques	*Journal of Air Transport Management*
Aguarón, Juan, María Teresa Escobar, and José María Moreno-Jiménez	The precise consistency consensus matrix in a local AHP-group decision making context	*Annals of Operations Research*
Adebanjo, Dotun, Tritos Laosirihongthong, and Premaratne Samaranayake	Prioritizing lean supply chain management initiatives in healthcare service operations: a fuzzy AHP approach	*Production Planning & Control*
Zyoud, Shaher H., and Daniela Fuchs-Hanusch	A bibliometric-based survey on AHP and TOPSIS techniques	*Expert systems with applications*
Cooper, Orrin	The magic of the analytic hierarchy process (AHP)	*International Journal of the Analytic Hierarchy Process*

Mu, Enrique	AHP conflict resolution in action: the Peruvian hostage crisis of 1996-1997 re-visited	*International Journal of the Analytic Hierarchy Process*
Kokangül, Ali, Ulviye Polat, and Cansu Dağsuyu	A new approximation for risk assessment using the AHP and Fine Kinney methodologies	*Safety science*
Zhou, Xinyi, Xinyang Deng, Yong Deng, and Sankaran Mahadevan	Dependence assessment in human reliability analysis based on D numbers and AHP	*Nuclear Engineering and Design*
Emrouznejad, Ali, and Marianna Marra	The state-of-the-art development of AHP (1979–2017): a literature review with a social network analysis	*International Journal of production research*
Kumar, Divesh, Zillur Rahman, and Felix TS Chan	A fuzzy AHP and fuzzy multi-objective linear programming model for order allocation in a sustainable supply chain: A case study	*International Journal of Computer Integrated Manufacturing*
Wang, Ting-Kwei, Qian Zhang, Heap-Yih Chong, and Xiangyu Wang	Integrated supplier selection framework in a resilient construction supply chain: An approach via analytic hierarchy process (AHP) and grey relational analysis (GRA)	*Sustainability*
Pramanik, Dipika, Anupam Haldar, Samar Chandra Mondal, Sukanta Kumar Naskar, and Amitava Ray	Resilient supplier selection using AHP-TOPSIS-QFD under a fuzzy environment	*International Journal of Management Science and Engineering Management*
Abdel-Basset, Mohamed, Mai Mohamed, and Florentin Smarandache	An extension of neutrosophic AHP–SWOT analysis for strategic planning and decision-making	*Symmetry*
Kahraman, Cengiz	A Brief Literature Review for Fuzzy AHP	*International Journal of the Analytic Hierarchy Process*
Mimovic, Predrag Miroslav, Kristina Budimčević, and Aleksandra Marcikić-Horvat	MEASURING PERFORMANCE OF MIDDLE EAST AIRLINES–AHP APPROACH.	*International Journal of the Analytic Hierarchy Process*
Cebi, Selcuk, and Esra Ilbahar	Warehouse risk assessment using interval-valued intuitionistic fuzzy AHP	*International Journal of the Analytic Hierarchy Process*
Awasthi, Anjali, Kannan Govindan, and Stefan Gold	Multi-tier sustainable global supplier selection using a fuzzy AHP-VIKOR based approach	*International journal of production economics*
Sirisawat, Pornwasin, and Tossapol Kiatcharoenpol	Fuzzy AHP-TOPSIS approaches to prioritizing solutions for reverse logistics barriers	*Computers & Industrial Engineering*
Ecer, Fatih	Third-party logistics (3PLs) provider selection via Fuzzy AHP and EDAS integrated model	*Technological and Economic Development of Economy*
He, Xiangshuo, and Jian Zhang	Supplier selection study under the respective of low-carbon supply chain: A hybrid evaluation model based on FA-DEA-AHP	*Sustainability*
Karaman, Abdullah S., and Engin Akman	Taking-off corporate social responsibility programs: An AHP application in airline industry	*Journal of Air Transport Management*
Ghorbanzadeh, Omid, Bakhtiar Feizizadeh, and Thomas Blaschke	An interval matrix method used to optimize the decision matrix in AHP technique for land subsidence susceptibility mapping	*Environmental earth sciences*
Deng, Xinyang, and Yong Deng	D-AHP method with different credibility of information	*Soft Computing*

Hosseini, Seyedmohsen, and Abdullah Al Khaled	A hybrid ensemble and AHP approach for resilient supplier selection	*Journal of Intelligent Manufacturing*
Stević, Željko, Marko Vasiljević, Adis Puška, Ilija Tanackov, Raimundas Junevičius, and Slavko Vesković	Evaluation of suppliers under uncertainty: a multiphase approach based on fuzzy AHP and fuzzy EDAS	*Transport*
Calabrese, Armando, Roberta Costa, Nathan Levialdi, and Tamara Menichini	Integrating sustainability into strategic decision-making: A fuzzy AHP method for the selection of relevant sustainability issues	*Technological Forecasting and Social Change*
Baffoe, Gideon	Exploring the utility of Analytic Hierarchy Process (AHP) in ranking livelihood activities for effective and sustainable rural development interventions in developing countries	*Evaluation and program planning*
Ghorbanzadeh, Omid, Sarbast Moslem, Thomas Blaschke, and Szabolcs Duleba	Sustainable urban transport planning considering different stakeholder groups by an interval-AHP decision support model	*Sustainability*
Fu, Yan-Kai	An integrated approach to catering supplier selection using AHP-ARAS-MCGP methodology	*Journal of Air Transport Management*
Chou, Ying-Chyi, Hsin-Yi Yen, Van Thac Dang, and Chia-Chi Sun	Assessing the Human Resource in Science and Technology for Asian Countries: Application of Fuzzy AHP and Fuzzy TOPSIS	*Symmetry*
Vladeanu, Greta J., and John C. Matthews	Consequence-of-failure model for risk-based asset management of wastewater pipes using AHP	*Journal of Pipeline Systems Engineering and Practice*
Rafiee, Marzieh, and Salman Abbasian-Naghneh	Prioritization of critical individual factors influencing willingness to communicate: AHP method	*Journal of Multilingual and Multicultural Development*
Fu, Jing	A study on foreign direct investment mode based on AHP and entropy learning	*International Journal of Machine Learning and Cybernetics*
Moslem, Sarbast, Omid Ghorbanzadeh, Thomas Blaschke, and Szabolcs Duleba.	Analysing Stakeholder Consensus for a Sustainable Transport Development Decision by the Fuzzy AHP and Interval AHP	*Sustainability*
Benítez, Julio, Silvia Carpitella, Antonella Certa, and Joaquín Izquierdo	Management of uncertain pairwise comparisons in AHP through probabilistic concepts	*Applied Soft Computing*
Danaeefard, Hassan, Hanieh Ahmadi, and Ali Asghar Pourezzat	Expert consensus on factors reducing policy coherence in the context of Iran: Delphi-AHP	*International Journal of Public Administration*
Singh, P. K., and P. Sarkar	A framework based on fuzzy AHP-TOPSIS for prioritizing solutions to overcome the barriers in the implementation of eco-design practices in SMEs	*International Journal of Sustainable Development & World Ecology*
Karasan, Ali	A novel hesitant intuitionistic fuzzy linguistic AHP method and its application to prioritization of investment alternatives	*International Journal of the Analytic Hierarchy Process*
Go, Daryn Joy, Michael Angelo Promentilla, Kathleen Aviso, and Krista Danielle Yu	An AHP-based composite index for sector prioritization	*International Journal of the Analytic Hierarchy Process*

Bahurmoz, Asma Mohammed	Measuring corporate social responsibility performance: a comprehensive AHP based index	*International Journal of the Analytic Hierarchy Process*
Gawlik, Remigiusz	Enhancing the work-life balance through AHP modelling of early career decision-making	*International Journal of the Analytic Hierarchy Process*

Appendix C
HEALTH SCIENCES

Table 7
Research publications in health sciences category for ANP-2000 to 2019

ANP		
Authors	**Research Titles**	**Journal Name**
(Herat, Noorossana, & Serkani, 2012)	Using DEMATEL Analytic network process (ANP) hybrid algorithm approach for selecting improvement projects of Iranian excellence model in healthcare sector.	*African Journal of Business Management*
(Ortiz, Felizzola, & Isaza, 2015)	A contrast between DEMATEL-ANP and ANP methods for six sigma project selection: a case study in healthcare industry	*BMC medical informatics and decision making*
(Nilashi, Ahmadi, Ahani, Ravangard, & Ibrahim, 2016)	Determining the importance of hospital information system adoption factors using fuzzy analytic network process (ANP)	*Technological Forecasting and Social Change*
(Marcarelli, 2017)	Evaluating healthcare organizations by a network model which integrates ANP with a revised-BSC	*International Journal of the Analytic Hierarchy Process*

Table 8
Research publications in health sciences category for AHP-2000 to 2019

AHP		
Authors	**Research Title**	**Journal Name**
(Omasa, Kishimoto, Kawase, & Yagi, 2004)	An attempt at decision making in tissue engineering: reactor evaluation using the analytic hierarchy process (AHP)	*Biochemical Engineering Journal*
(Huang, Chang, Hung, Wang, & Chang, 2006)	An AHP model for bringing experts to consensus on medical payment standards	Journal of Systems Science and Systems Engineering
(Ohta, et al., 2007)	Analysis of the geographical accessibility of neurosurgical emergency hospitals in Sapporo city using GIS and AHP	*International journal of geographical information science*
(Dolan, 2008)	Shared decision-making–transferring research into practice: The Analytic Hierarchy Process (AHP)	*Patient education and counseling*
(Vahidnia, Alesheikh, & Alimohammadi, 2009)	Hospital site selection using fuzzy AHP and its derivatives	JOURNAL OF ENVIRONMENTAL MANAGEMENT
(Hsu & Pan, 2009)	Application of Monte Carlo AHP in ranking dental quality attributes	*Expert Systems with Applications*
(Wang, Fan, & Wang, 2010)	Integration of fuzzy AHP and FPP with TOPSIS methodology for aeroengine health assessment	*Expert Systems with Applications*
(Buyukozkan, Cifci, & Guleryuz, 2011)	Strategic analysis of healthcare service quality using fuzzy AHP methodology	*Expert Systems with Applications*

(Danner, Hummel, Volz, van Manen, & Wiegard, 2011)	Integrating patients' views into health technology assessment: Analytic hierarchy process (AHP) as a method to elicit patient preferences	*International journal of technology assessment in health care*
(Pecchia, Martin, Ragozzino, & Vanzanella, 2013)	User needs elicitation via analytic hierarchy process (AHP). A case study on a Computed Tomography (CT) scanner	*BMC medical informatics and decision making*
(Jain & Rao, 2013)	Application of AHP tool for decision making of choice of technology for extraction of anti-cancer bioactive compounds of plant origin	*International Journal of the Analytic Hierarchy Process*
(Nguyen & Nahavandi, 2015)	Modified AHP for gene selection and cancer classification using type-2 fuzzy logic	*IEEE Transactions on Fuzzy Systems*
(Hillerman, Souza, Reis, & Carvalho, 2017)	Applying clustering and AHP methods for evaluating suspect healthcare claims	*Journal of computational science*
(IIbahar, Karasan, Cebik, & Kahraman, 2018)	A novel approach to risk assessment for occupational health and safety using Pythagorean fuzzy AHP & fuzzy inference system	*Safety science*
(Gul, Application of Pythagorean fuzzy AHP and VIKOR methods in occupational health and safety risk assessment: the case of a gun and rifle barrel external surface oxidation and colouring unit, 2018)	Application of Pythagorean fuzzy AHP and VIKOR methods in occupational health and safety risk assessment: the case of a gun and rifle barrel external surface oxidation and colouring unit	*International journal of occupational safety and ergonomics*
(Singh & Prasher, 2019)	Measuring healthcare service quality from patients' perspective: using Fuzzy AHP application	*Total Quality Management & Business Excellence*
(Ganguly & Kumar, 2019)	Evaluating supply chain resiliency strategies in the Indian pharmaceutical sector: a fuzzy analytic hierarchy process (F-AHP) approach	*International Journal of the Analytic Hierarchy Process*

Appendix D
ENVIRONMENTAL STUDIES

Table 9
Research publications in environmental studies category for ANP-2000 to 2019

ANP		
Authors	**Research Titles**	**Journal Name**
(Wolfslehner, Vacik, & Lexer, 2005)	Application of the analytic network process in multi-criteria analysis of sustainable forest management	*Forest ecology and management*
(Chen, Li, & Wong, 2005)	EnvironalPlanning: analytic network process model for environmentally conscious construction planning	*Journal of construction engineering and management*
(Erdogmus, Aras, & Koc, Evaluation of alternative fuels for residential heating in Turkey using analytic network process (ANP) with group decision-making, 2006)	Evaluation of alternative fuels for residential heating in Turkey using analytic network process (ANP) with group decision-making	*Renewable and Sustainable Energy Reviews*
(Bahurmoz, 2006)	A strategic model for safety during the Hajj pilgrimage: An ANP application	*Journal of Systems Science and Systems Engineering*
(Neaupane & Piantanakulchai, 2006)	Analytic network process model for landslide hazard zonation	*Engineering Geology*
(Promentilla, Furuichi, & Tanikawa, 2006)	Evaluation of remedial countermeasures using the analytic network process	*Waste Management*
(Kone & Buke, 2007)	An Analytical Network Process (ANP) evaluation of alternative fuels for electricity generation in Turkey	*Energy policy*
(Zheng & Ruan, 2007)	General Conception of Livable City Basing on ANP [J]	*Urban Studies*
(Simunich, 2007)	In the Fall of 2002, the ANP had shown a better way to deal with Iraq	*Mathematical and Computer Modelling*
(Dagdeviren, Yuksel, & Kurt, 2008)	A fuzzy analytic network process (ANP) model to identify faulty behavior risk (FBR) in work system	*Safety science*
Dağdeviren, M. and Eraslan, E	Priority determination in strategic energy policies in Turkey using analytic network process (ANP) with group decision making	*International Journal of Energy Research*
Chen, Zhen, Heng Li, Andrew Ross, Malik M. Khalfan, and Stephen C. Kong	Knowledge-driven ANP approach to vendors evaluation for sustainable construction	*Journal of Construction Engineering and Management*
Tseng, Ming-Lang	Application of ANP and DEMATEL to evaluate the decision-making of municipal solid waste management in Metro Manila	*Environmental Monitoring and Assessment*
Chang, Yu-Hern, Wann-Ming Wey, and Hsiao-Yu Tseng	Using ANP priorities with goal programming for revitalization strategies in historic transport: A case study of the Alishan Forest Railway	*Expert Systems with Applications*

Demirel, Tufan, Hande Muşdal, Nihan Cetin Demirel, and G. Nilay Yücenur	Multi-criteria evaluation of land cover policies using fuzzy AHP and fuzzy ANP: The case of Turkey	*Human and Ecological Risk Assessment*
Celik, M. and Topcu, Y.I.	Use of an ANP to prioritize managerial responsibilities of maritime stakeholders in environmental incidents: An oil spill case	*Transportation Research Part D: Transport and Environment*
Lin, YuanHsu, Hui-Ping Cheng, Ming-Lang Tseng, and Jim CC Tsai	Using QFD and ANP to analyze the environmental production requirements in linguistic preferences	*Expert Systems with Applications*
Bottero, Marta, and Valentina Ferretti	Integrating the analytic network process (ANP) and the driving force-pressure-state-impact-responses (DPSIR) model for the sustainability assessment of territorial transformations	*Management of Environmental Quality: An International Journal*
García-Melón, Mónica, Tomás Gómez-Navarro, and Silvia Acuña-Dutra	An ANP approach to assess the sustainability of tourist strategies for the coastal national parks of Venezuela	*Technological and Economic Development of Economy*
Wang, Wei-Ming, Amy HI Lee, and Ding-Tsair Chang	An integrated FDM–ANP evaluation model for sustainable development of housing community	*Optimization Letters*
Lin, Chin-Tsai, Chie-Bein Chen, and Ying-Chan Ting	A green purchasing model by using ANP and LP methods	*Journal of Testing and Evaluation*
Büyüközkan, Gülçin, and Gizem Çifçi	A novel hybrid MCDM approach based on fuzzy DEMATEL, fuzzy ANP and fuzzy TOPSIS to evaluate green suppliers	*Expert Systems with Applications*
García-Melón, Mónica, Tomás Gómez-Navarro, and Silvia Acuña-Dutra	A combined ANP-delphi approach to evaluate sustainable tourism	*Environmental Impact Assessment Review*
Zammori, Francesco, and Roberto Gabbrielli	ANP/RPN: A multi criteria evaluation of the risk priority number	*Quality and Reliability Engineering International*
Vujanović, Davor, Vladimir Momčilović, Nebojša Bojović, and Vladimir Papić	Evaluation of vehicle fleet maintenance management indicators by application of DEMATEL and ANP	*Expert Systems with Applications*
Rezaeiniya, Nahid, Sarfaraz Hashemkhani Zolfani, and Edmundas Kazimieras Zavadskas	Greenhouse locating based on ANP-COPRAS-G methods–an empirical study based on Iran	*International Journal of Strategic Property Management*
Toosi, SL Razavi, and JM V. Samani	Evaluating water transfer projects using analytic network process (ANP)	*Water resources management*
Ghajar, Ismael, and Akbar Najafi	Evaluation of harvesting methods for sustainable forest management (SFM) using the analytical network process (ANP)	*Forest policy and economics*
Demirel, Nihan Çetin, G. Nilay Yücenur, Tufan Demirel, and Hande Muşdal	Risk-based evaluation of Turkish agricultural strategies using fuzzy AHP and fuzzy ANP	*Human and Ecological Risk Assessment: An International Journal*
Chen, I-Shuo	A revised Inno-Qual performance system for higher education: the integrated applications of DEMATEL and ANP	*Journal of the Operational Research Society*
Catron, Jonathan, G. Andrew Stainback, Puneet Dwivedi, and John M. Lhotka	Bioenergy development in Kentucky: A SWOT-ANP analysis	*Forest Policy and Economics*

Xu, Pengpeng, and Edwin HW Chan	ANP model for sustainable Building Energy Efficiency Retrofit (BEER) using Energy Performance Contracting (EPC) for hotel buildings in China	*Habitat International*
Agarwal, Etishree, Rajat Agarwal, R. D. Garg, and P. K. Garg	Delineation of groundwater potential zone: An AHP/ANP approach	*Journal of earth system science*
Isalou, A. A., V. Zamani, B. Shahmoradi, and H. Alizadeh	Landfill site selection using integrated fuzzy logic and analytic network process (F-ANP)	*Environmental Earth Sciences*
Zebardast, Esfandiar	Constructing a social vulnerability index to earthquake hazards using a hybrid factor analysis and analytic network process (F'ANP) model	*Natural hazards*
Lee, Paul Tae-Woo, Jei-Zheng Wu, Kai-Chieh Hu, and Matthew Flynn	Applying analytic network process (ANP) to rank critical success factors of waterfront redevelopment	*International Journal of Shipping and Transport Logistics*
Azizi, Ali, Bahram Malekmohammadi, Hamid Reza Jafari, Hossein Nasiri, and Vahid Amini Parsa	Land suitability assessment for wind power plant site selection using ANP-DEMATEL in a GIS environment: case study of Ardabil province, Iran	*Environmental monitoring and assessment*
Toosi, SL Razavi, and J. M. V. Samani	A new integrated MADM technique combined with ANP, FTOPSIS and fuzzy max-min set method for evaluating water transfer projects	*Water resources management*
Lam, Jasmine Siu Lee, and Kee-hung Lai	Developing environmental sustainability by ANP-QFD approach: the case of shipping operations	*Journal of Cleaner Production*
Xu, Pengpeng, Edwin HW Chan, Henk J. Visscher, Xiaoling Zhang, and Zezhou Wu	Sustainable building energy efficiency retrofit for hotel buildings using EPC mechanism in China: analytic Network Process (ANP) approach	*Journal of Cleaner Production*
Fazli, Safar, Reza Kiani Mavi, and Mohammadali Vosooghidizaji	Crude oil supply chain risk management with DEMATEL–ANP	*Operational Research*
Kuo, R. J., C. W. Hsu, and Y. L. Chen	Integration of fuzzy ANP and fuzzy TOPSIS for evaluating carbon performance of suppliers	*International journal of environmental science and technology*
Asadzadeh, Asad, Theo Kötter, and Esfandiar Zebardast	An augmented approach for measurement of disaster resilience using connective factor analysis and analytic network process (F'ANP) model	*International Journal of Disaster Risk Reduction*
Grošelj, Petra, and Lidija Zadnik Stirn	The environmental management problem of Pohorje, Slovenia: A new group approach within ANP–SWOT framework	*Journal of environmental management*
Dobrea, Răzvan, Gabriela Molănescu, and Cristian Bușu	Food Sustainable Model Development: An ANP Approach to Prioritize Sustainable Factors in the Romanian Natural Soft Drinks Industry Context	*Sustainability*
Büyüközkan, Gülçin, and Sezin Güleryüz	An integrated DEMATEL-ANP approach for renewable energy resources selection in Turkey	*International Journal of Production Economics*
Ignatius, Joshua, Amirah Rahman, Morteza Yazdani, Jonas Šaparauskas, and Syarmila Hany Haron	An integrated fuzzy ANP–QFD approach for green building assessment	*Journal of Civil Engineering and Management*
Morteza, Zarei, Fatemi Mohamad Reza, Mortazavi Mohammad Seddiq,	Selection of the optimal tourism site using the ANP and fuzzy TOPSIS in the framework of Integrated Coastal Zone Management: A case of Qeshm Island	*Ocean & coastal management*

Pourebrahim Sharareh, and Ghoddousi Jamal		
Chung, Chih-Chao, Li-Chung Chao, and Shi-Jer Lou	The establishment of a green supplier selection and guidance mechanism with the ANP and IPA	*Sustainability*
Zhao, Shuang-Yao, Shanlin Yang, Changyong Liang, and Dongxiao Gu	Where is the way for rare earth industry of China: An analysis via ANP-SWOT approach	*Resources Policy*
Vimal, K. E. K., and S. Vinodh	LCA integrated ANP framework for selection of sustainable manufacturing processes	*Environmental Modeling & Assessment*
Di Lallo, Giulio, Mauro Maesano, Mauro Masiero, Giuseppe Scarascia Mugnozza, and Marco Marchetti	Analyzing strategies to enhance small and low intensity managed forests certification in Europe using SWOT-ANP	*Small-scale Forestry*
Malmir, Maryam, Mir Masoud Kheirkhah Zarkesh, Seyed Masoud Monavari, Seyed Ali Jozi, and Esmail Sharifi	Analysis of land suitability for urban development in Ahwaz County in southwestern Iran using fuzzy logic and analytic network process (ANP)	*Environmental Modeling & Assessment*
Arsić, Sanela, Djordje Nikolić, and Živan Živković	Hybrid SWOT-ANP-FANP model for prioritization strategies of sustainable development of ecotourism in National Park Djerdap, Serbia	*Forest policy and economics*
Zhao, Xiaojing, Long Chen, Wei Pan, and Qiuchen Lu	AHP-ANP–fuzzy integral integrated network for evaluating performance of innovative business models for sustainable building	*Journal of construction engineering and management*
Chou, Ying-Chyi, Chia-Han Yang, Ching-Hua Lu, Van Dang, and Pei-An Yang	Building criteria for evaluating green project management: An integrated approach of DEMATEL and ANP	*sustainability*
Chen, Tingqiang, Lei Wang, and Jining Wang	Transparent assessment of the supervision information in China's food safety: A fuzzy-ANP comprehensive evaluation method	*Journal of Food Quality*
Aliani, H., S. BabaieKafaky, A. Saffari, and S. M. Monavari	Land evaluation for ecotourism development—an integrated approach based on FUZZY, WLC, and ANP methods	*International Journal of Environmental Science and Technology*
Pakand, Mehran, and Vahab Toufigh	A multi-criteria study on rammed earth for low carbon buildings using a novel ANP-GA approach	*Energy and Buildings*
Aminu, Mansir, Abdul Nasir Matori, Khamaruzaman Wan Yusof, Amirhossein Malakahmad, and Rosilawati Binti Zainol	Analytic network process (ANP)-based spatial decision support system (SDSS) for sustainable tourism planning in Cameron Highlands, Malaysia	*Arabian Journal of Geosciences*
Zheng, Xiong, Fangchao Xu, and Lipan Feng	Analysis of Driving Factors for Extended Producer Responsibility by Using Interpretative Structure Modelling (ISM) and Analytic Network Process (ANP)	*Sustainability*
Garewal, Sahajpreet Kaur, Avinash D. Vasudeo, Vishrut S. Landge, and Aniruddha D. Ghare	A GIS-based Modified DRASTIC (ANP) method for assessment of groundwater vulnerability: a case study of Nagpur city, India	*Water Quality Research Journal*
Gharedaghi, Gholamreza, and Manouchehr Omidvari	A pattern of contractor selection for oil and gas industries in a safety approach using ANP-DEMATEL in a Grey environment	*International Journal of Occupational Safety and Ergonomics*

Mavi, Reza Kiani, and Craig Standing	Critical success factors of sustainable project management in construction: A fuzzy DEMATEL-ANP approach	*Journal of cleaner production*
Rad, Tahere Ghaemi, Abolghasem Sadeghi-Niaraki, Alireza Abbasi, and Soo-Mi Choi	A methodological framework for assessment of ubiquitous cities using ANP and DEMATEL methods	*Sustainable cities and society*
Feng, Yixiong, Zhaoxi Hong, Guangdong Tian, Zhiwu Li, Jianrong Tan, and Hesuan Hu	Environmentally friendly MCDM of reliability-based product optimisation combining DEMATEL-based ANP, interval uncertainty and Vlse Kriterijumska Optimizacija Kompromisno Resenje (VIKOR)	*Information Sciences*
Chen, Lihong, and Jingzheng Ren	Multi-attribute sustainability evaluation of alternative aviation fuels based on fuzzy ANP and fuzzy grey relational analysis	*Journal of Air Transport Management*
Alizadeh, Mohsen, Ibrahim Ngah, Mazlan Hashim, Biswajeet Pradhan, and Amin Pour	A hybrid analytic network process and artificial neural network (ANP-ANN) model for urban earthquake vulnerability assessment	*Remote Sensing*
Arsić, Sanela, Djordje Nikolić, Ivan Mihajlović, Aleksandra Fedajev, and Živan Živković	A new approach within ANP-SWOT framework for prioritization of ecosystem management and case study of National Park Djerdap, Serbia	*Ecological Economics*
Reisi, Marzieh, Afsaneh Afzali, and Lu Aye	Applications of analytical hierarchy process (AHP) and analytical network process (ANP) for industrial site selections in Isfahan, Iran	*Environmental earth sciences*
He, Gang, Baohua Yu, Shuzhou Li, and Yanna Zhu	Comprehensive evaluation of ecological security in mining area based on PSR–ANP–GRAY	*Environmental technology*
Zou, Tong, Yikun Su, and Yaowu Wang	Research on the Hybrid ANP-FCE Approach of Urban Community Sustainable Construction Problem	*Mathematical Problems in Engineering*
Chuang, Yen Hsun, Ruey Fang Yu, Wei Yea Chen, Ho Wen Chen, and Yu-Ting Su	Sustainable planning for a coastal wetland system with an integrated ANP and DPSIR model for conflict resolution	*Wetlands ecology and management*
Alilou, Hossein, Omid Rahmati, Vijay P. Singh, Bahram Choubin, Biswajeet Pradhan, Saskia Keesstra, Seid Saeid Ghiasi, and Seyed Hamidreza Sadeghi	Evaluation of watershed health using Fuzzy-ANP approach considering geo-environmental and topo-hydrological criteria	*Journal of environmental management*
Starr, Morgan, Omkar Joshi, Rodney E. Will, and Chris B. Zou	Perceptions regarding active management of the Cross-timbers forest resources of Oklahoma, Texas, and Kansas: A SWOT-ANP analysis	*Land use policy*
Peng, Szu-Hsien	Landscape Assessment for Stream Regulation Works in a Watershed Using the Analytic Network Process (ANP)	*Sustainability*
Chen, Zhihua, Xinguo Ming, Xianyu Zhang, Dao Yin, and Zhaohui Sun	A rough-fuzzy DEMATEL-ANP method for evaluating sustainable value requirement of product-service system	*Journal of Cleaner Production*

Table 10
Research publications in environmental studies category for AHP-2000 to 2019

Authors	Research Title	Journal Name
(Kurttila, Pesonen, Kangas, & Kajanus, 2000)	Utilizing the analytic hierarchy process (AHP) in SWOT analysis—a hybrid method and its application to a forest-certification case	*Forest policy and economics*
(Modarres & Zarei, 2002)	Application of network theory and AHP in urban transportation to minimize earthquake damages	*Journal of the Operational Research Society*
(Solnes, 2003)	Environmental quality indexing of large industrial development alternatives using AHP	*Environmental Impact Assessment Review*
(Mardle, Pascoe, & Herrero, 2004)	Management objective importance in fisheries: an evaluation using the analytic hierarchy process (AHP)	*Environmental Management*
(Kovacs, Malczewski, & Flores-Verdugo, 2004)	Examining local ecological knowledge of hurricane impacts in a mangrove forest using an analytical hierarchy process (AHP) approach	*Journal of coastal research*
(Tesfamariam & Sadiq, 2006)	Risk-based environmental decision-making using fuzzy analytic hierarchy process (F-AHP)	*Stochastic Environmental Research and Risk Assessment*
(Yoshimatsu & Abe, 2006)	A review of landslide hazards in Japan and assessment of their susceptibility using an analytical hierarchic process (AHP) method	*Landslides*
(Karami, 2006)	Appropriateness of farmers' adoption of irrigation methods: The application of the AHP model	*Agricultural systems*
(Ying, et al., 2007)	Combining AHP with GIS in synthetic evaluation of eco-environment quality—A case study of Hunan Province, China	*Ecological modelling*
(Lee, Yoon, & Kim, 2007)	A study on making a long-term improvement in the national energy efficiency and GHG control plans by the AHP approach	*Energy policy*
Bascetin, A	A decision support system using analytical hierarchy process (AHP) for the optimal environmental reclamation of an open-pit mine	*Environmental Geology*
Sambasivan, Murali, and Ng Yun Fei	Evaluation of critical success factors of implementation of ISO 14001 using analytic hierarchy process (AHP): a case study from Malaysia	*Journal of cleaner production*
Srdjevic, Bojan, and Yvonilde Dantas Pinto Medeiros	Fuzzy AHP assessment of water management plans	*Water Resources Management*
Parra-López, Carlos, Javier Calatrava-Requena, and Tomás de-Haro-Giménez	A systemic comparative assessment of the multifunctional performance of alternative olive systems in Spain within an AHP-extended framework	*Ecological Economics*
Sinha, R., G. V. Bapalu, L. K. Singh, and B. Rath	Flood risk analysis in the Kosi river basin, north Bihar using multi-parametric approach of analytical hierarchy process (AHP)	*Journal of the Indian Society of Remote Sensing*
Rezaei-Moghaddam, K., and E. Karami	A multiple criteria evaluation of sustainable agricultural development models using AHP	*Environment, Development and Sustainability*
Al-Barqawi, Hassan, and Tarek Zayed	Infrastructure management: Integrated AHP/ANN model to evaluate municipal water mains' performance	*Journal of Infrastructure Systems*

Gumus, Alev Taskin	Evaluation of hazardous waste transportation firms by using a two-step fuzzy-AHP and TOPSIS methodology	*Expert systems with applications*
Wang, Guiqin, Li Qin, Guoxue Li, and Lijun Chen	Landfill site selection using spatial information technologies and AHP: a case study in Beijing, China	*Journal of environmental management*
Sadiq, Rehan, and Solomon Tesfamariam	Environmental decision-making under uncertainty using intuitionistic fuzzy analytic hierarchy process (IF-AHP)	*Stochastic Environmental Research and Risk Assessment*
Shapira, Aviad, and Meir Simcha	AHP-based weighting of factors affecting safety on construction sites with tower cranes	*Journal of construction engineering and management*
Kaya, Tolga, and Cengiz Kahraman	Multicriteria renewable energy planning using an integrated fuzzy VIKOR & AHP methodology: The case of Istanbul	*Energy*
Şener, Şehnaz, Erhan Şener, Bilgehan Nas, and Remzi Karagüzel	Combining AHP with GIS for landfill site selection: a case study in the Lake Beyşehir catchment area (Konya, Turkey)	*Waste management*
Heo, Eunnyeong, Jinsoo Kim, and Kyung-Jin Boo	Analysis of the assessment factors for renewable energy dissemination program evaluation using fuzzy AHP	*Renewable and Sustainable Energy Reviews*
Moeinaddini, Mazaher, Nematollah Khorasani, Afshin Danehkar, and Ali Asghar Darvishsefat	Siting MSW landfill using weighted linear combination and analytical hierarchy process (AHP) methodology in GIS environment (case study: Karaj)	*Waste management*
Arunraj, N. S., and J. Maiti	Risk-based maintenance policy selection using AHP and goal programming	*Safety science*
Awasthi, Anjali, and Satyaveer S. Chauhan	Using AHP and Dempster–Shafer theory for evaluating sustainable transport solutions	*Environmental Modelling & Software*
Şener, Şehnaz, Erhan Sener, and Remzi Karagüzel	Solid waste disposal site selection with GIS and AHP methodology: a case study in Senirkent–Uluborlu (Isparta) Basin, Turkey	*Environmental monitoring and assessment*
Kaya, Tolga, and Cengiz Kahraman	An integrated fuzzy AHP–ELECTRE methodology for environmental impact assessment	*Expert systems with applications*
Kaya, Tolga, and Cengiz Kahraman	Fuzzy multiple criteria forestry decision making based on an integrated VIKOR and AHP approach	*Expert systems with applications*
Reza, Bahareh, Rehan Sadiq, and Kasun Hewage	Sustainability assessment of flooring systems in the city of Tehran: An AHP-based life cycle analysis	*Construction and Building Materials*
Pires, Ana, Ni-Bin Chang, and Graça Martinho	An AHP-based fuzzy interval TOPSIS assessment for sustainable expansion of the solid waste management system in Setúbal Peninsula, Portugal	*Resources, Conservation and Recycling*
Pourghasemi, Hamid Reza, Biswajeet Pradhan, and Candan Gokceoglu	Application of fuzzy logic and analytical hierarchy process (AHP) to landslide susceptibility mapping at Haraz watershed, Iran	*Natural Hazards*
Zheng, Guozhong, Neng Zhu, Zhe Tian, Ying Chen, and Binhui Sun	Application of a trapezoidal fuzzy AHP method for work safety evaluation and early warning rating of hot and humid environments	*Safety science*
Awasthi, Anjali, and Satyaveer S. Chauhan	A hybrid approach integrating Affinity Diagram, AHP and fuzzy TOPSIS for sustainable city logistics planning	*Applied Mathematical Modelling*
Hasekioğulları, Gökçe Deniz, and Murat Ercanoglu	A new approach to use AHP in landslide susceptibility mapping: a case study at Yenice (Karabuk, NW Turkey)	*Natural Hazards*

Anane, Makram, Lamia Bouziri, Atef Limam, and Salah Jellali	Ranking suitable sites for irrigation with reclaimed water in the Nabeul-Hammamet region (Tunisia) using GIS and AHP-multicriteria decision analysis	*Resources, Conservation and Recycling*
Gao, Lei, and Atakelty Hailu	Ranking management strategies with complex outcomes: An AHP-fuzzy evaluation of recreational fishing using an integrated agent-based model of a coral reef ecosystem	*Environmental Modelling & Software*
Donevska, Katerina R., Pece V. Gorsevski, Milorad Jovanovski, and Igor Peševski	Regional non-hazardous landfill site selection by integrating fuzzy logic, AHP and geographic information systems	*Environmental Earth Sciences*
Akıncı, Halil, Ayşe Yavuz Özalp, and Bülent Turgut	Agricultural land-use suitability analysis using GIS and AHP technique	*Computers and electronics in agriculture*
Kayastha, Prabin, Megh Raj Dhital, and Florimond De Smedt	Application of the analytical hierarchy process (AHP) for landslide susceptibility mapping: a case study from the Tinau watershed, west Nepal	*Computers & Geosciences*
Zou, Qiang, Jianzhong Zhou, Chao Zhou, Lixiang Song, and Jun Guo	Comprehensive flood risk assessment based on set pair analysis-variable fuzzy sets model and fuzzy AHP	*Stochastic Environmental Research and Risk Assessment*
Stefanidis, Stefanos, and Dimitrios Stathis	Assessment of flood hazard based on natural and anthropogenic factors using analytic hierarchy process (AHP)	*Natural Hazards*
Orencio, Pedcris M., and Masahiko Fujii	A localized disaster-resilience index to assess coastal communities based on an analytic hierarchy process (AHP)	*International Journal of Disaster Risk Reduction*
Sener, Erhan, and Aysen Davraz	Assessment of groundwater vulnerability based on a modified DRASTIC model, GIS and an analytic hierarchy process (AHP) method: the case of Egirdir Lake basin (Isparta, Turkey)	*Hydrogeology Journal*
Cay, Tayfun, and Mevlut Uyan	Evaluation of reallocation criteria in land consolidation studies using the Analytic Hierarchy Process (AHP)	*Land use policy*
Kim, Mincheol, Yong-Chul Jang, and Seunguk Lee	Application of Delphi-AHP methods to select the priorities of WEEE for recycling in a waste management decision-making tool	*Journal of environmental management*
Nefeslioglu, Hakan A., Ebru Akcapinar Sezer, Candan Gokceoglu, and Z. Ayas	A modified analytical hierarchy process (M-AHP) approach for decision support systems in natural hazard assessments	*Computers & Geosciences*
Ertay, Tijen, Cengiz Kahraman, and İhsan Kaya	Evaluation of renewable energy alternatives using MACBETH and fuzzy AHP multicriteria methods: the case of Turkey	*Technological and Economic Development of Economy*
Janackovic, Goran Lj, Suzana M. Savic, and Miomir S. Stankovic	Selection and ranking of occupational safety indicators based on fuzzy AHP: A case study in road construction companies	*South African Journal of Industrial Engineering*
Ouma, Yashon, and Ryutaro Tateishi	Urban flood vulnerability and risk mapping using integrated multi-parametric AHP and GIS: methodological overview and case study assessment	*Water*
Kaliraj, S., N. Chandrasekar, and N. S. Magesh	Identification of potential groundwater recharge zones in Vaigai upper basin, Tamil Nadu, using GIS-based analytical hierarchical process (AHP) technique	*Arabian Journal of Geosciences*
Uyan, Mevlut	MSW landfill site selection by combining AHP with GIS for Konya, Turkey	*Environmental Earth Sciences*
Shi, Lei, Jian Shuai, and Kui Xu	Fuzzy fault tree assessment based on improved AHP for fire and explosion accidents for steel oil storage tanks	*Journal of hazardous materials*

Shi, Shenggang, Jingcan Cao, Li Feng, Wenyan Liang, and Liqiu Zhang	Construction of a technique plan repository and evaluation system based on AHP group decision-making for emergency treatment and disposal in chemical pollution accidents	*Journal of hazardous materials*
Feng, Lan, Xiaodong Zhu, and Xiang Sun	Assessing coastal reclamation suitability based on a fuzzy-AHP comprehensive evaluation framework: a case study of Lianyungang, China	*Marine pollution bulletin*
Roodposhti, Majid Shadman, Saeed Rahimi, and Mansour Jafar Beglou	PROMETHEE II and fuzzy AHP: an enhanced GIS-based landslide susceptibility mapping	*Natural Hazards*
Graham, Gary, James Freeman, and Tao Chen	Green supplier selection using an AHP-Entropy-TOPSIS framework	*Supply Chain Management: An International Journal*
Zhang, Jiuquan, Yirong Su, Jinshui Wu, and Hongbo Liang	GIS-based land suitability assessment for tobacco production using AHP and fuzzy set in Shandong province of China	*Computers and Electronics in Agriculture*
Beskese, Ahmet, H. Handan Demir, H. Kurtulus Ozcan, and H. Eser Okten	Landfill site selection using fuzzy AHP and fuzzy TOPSIS: a case study for Istanbul	*Environmental Earth Sciences*
Shen, Lixin, Kamalakanta Muduli, and Akhilesh Barve	Developing a sustainable development framework in the context of mining industries: AHP approach	*Resources Policy*
Shekhar, Shashank, and Arvind Chandra Pandey	Delineation of groundwater potential zone in hard rock terrain of India using remote sensing, geographical information system (GIS) and analytic hierarchy process (AHP) techniques	*Geocarto International*
Taheri, Kamal, Francisco Gutiérrez, Hassan Mohseni, Ezzat Raeisi, and Milad Taheri	Sinkhole susceptibility mapping using the analytical hierarchy process (AHP) and magnitude–frequency relationships: A case study in Hamadan province, Iran	*Geomorphology*
Hossen, Muhammed Mufazzal, Sunkoo Kang, and Jonghyun Kim	Construction schedule delay risk assessment by using combined AHP-RII methodology for an international NPP project	*Nuclear engineering and technology*
Zyoud, Shaher H., Lorenz G. Kaufmann, Hafez Shaheen, Subhi Samhan, and Daniela Fuchs-Hanusch	A framework for water loss management in developing countries under fuzzy environment: Integration of Fuzzy AHP with Fuzzy TOPSIS	*Expert systems with applications*
Kohara, Kazuhiro, and Takuya Sugiyama	Simulating tsunami evacuation with multi-agents and determining a countermeasure with AHP	*International Journal of the Analytic Hierarchy Process*
Veisi, Hadi, Houman Liaghati, and Ali Alipour	Developing an ethics-based approach to indicators of sustainable agriculture using analytic hierarchy process (AHP)	*Ecological Indicators*
Chen, Wei, Wenping Li, Huichan Chai, Enke Hou, Xiaoqin Li, and Xiao Ding	GIS-based landslide susceptibility mapping using analytical hierarchy process (AHP) and certainty factor (CF) models for the Baozhong region of Baoji City, China	*Environmental Earth Sciences*
Kumar, Rohan, and R. Anbalagan	Landslide susceptibility mapping using analytical hierarchy process (AHP) in Tehri reservoir rim region, Uttarakhand	*Journal of the Geological Society of India*
Althuwaynee, Omar F., Biswajeet Pradhan, and Saro Lee	A novel integrated model for assessing landslide susceptibility mapping using CHAID and AHP pair-wise comparison	*International Journal of Remote Sensing*
Khalil, Natasha, Syahrul Nizam Kamaruzzaman, and Mohamad	Ranking the indicators of building performance and the users' risk via Analytical Hierarchy Process (AHP): Case of Malaysia	*Ecological Indicators*

Rizal Baharum		
Torabi-Kaveh, M., R. Babazadeh, S. D. Mohammadi, and M. Zaresefat	Landfill site selection using combination of GIS and fuzzy AHP, a case study: Iranshahr, Iran	*Waste Management & Research*
Pourghasemi, Hamid Reza, and Mauro Rossi	Landslide susceptibility modeling in a landslide-prone area in Mazandaran Province, north of Iran: a comparison between GLM, GAM, MARS, and M-AHP methods	*Theoretical and Applied Climatology*
Rahmat, Zeinab Ghaed, Mehdi Vosoughi Niri, Nadali Alavi, Gholamreza Goudarzi, Ali Akbar Babaei, Zeinab Baboli, and Mohsen Hosseinzadeh	Landfill site selection using GIS and AHP: a case study: Behbahan, Iran	*KSCE Journal of Civil Engineering*
Gigović, Ljubomir, Dragan Pamučar, Zoran Bajić, and Siniša Drobnjak	Application of GIS-interval rough AHP methodology for flood hazard mapping in urban areas	*Water*
Modak, Mousumi, Khanindra Pathak, and Kunal Kanti Ghosh	Performance evaluation of outsourcing decision using a BSC and Fuzzy AHP approach: A case of the Indian coal mining organization	*Resources Policy*
Yousefi, Hossein, Mohammad Hasan Ghodusinejad, and Younes Noorollahi	GA/AHP-based optimal design of a hybrid CCHP system considering economy, energy and emission	*Energy and Buildings*
Chen, Luyuan, and Xinyang Deng	A modified method for evaluating sustainable transport solutions based on AHP and Dempster–Shafer evidence theory	*Applied Sciences*
Lyu, Hai-Min, Jack Shen, and Arul Arulrajah	Assessment of geohazards and preventative countermeasures using AHP incorporated with GIS in Lanzhou, China	*Sustainability*
Kumar, Akshay, and Akhouri Pramod Krishna	Assessment of groundwater potential zones in coal mining impacted hard-rock terrain of India by integrating geospatial and analytic hierarchy process (AHP) approach	*Geocarto International*
Ghimire, Laxman Prasad, and Yeonbae Kim	An analysis on barriers to renewable energy development in the context of Nepal using AHP	*Renewable energy*
Yazdi, Mohammad, Orhan Korhan, and Sahand Daneshvar	Application of fuzzy fault tree analysis based on modified fuzzy AHP and fuzzy TOPSIS for fire and explosion in the process industry	*International journal of occupational safety and ergonomics*
Gottfried, Oliver, Djavan De Clercq, Elena Blair, Xin Weng, and Can Wang	SWOT-AHP-TOWS analysis of private investment behavior in the Chinese biogas sector	*Journal of cleaner production*
Arabameri, Alireza, Khalil Rezaei, Hamid Reza Pourghasemi, Saro Lee, and Mojtaba Yamani	GIS-based gully erosion susceptibility mapping: a comparison among three data-driven models and AHP knowledge-based technique	*Environmental Earth Sciences*
Hatefi, Seyed Morteza, and Jolanta Tamošaitienė	Construction projects assessment based on the sustainable development criteria by an integrated fuzzy AHP and improved GRA model.	*Sustainability*
Kamaruzzaman, Syahrul Nizam, Eric Choen Weng Lou, Phui Fung Wong, Ruth Wood, and Adi Irfan Che-Ani	Developing weighting system for refurbishment building assessment scheme in Malaysia through analytic hierarchy process (AHP) approach	*Energy policy*

Ren, Chongfeng, Zhehao Li, and Hongbo Zhang	Integrated multi-objective stochastic fuzzy programming and AHP method for agricultural water and land optimization allocation under multiple uncertainties	*Journal of cleaner production*
Wang, Bo, Junnian Song, Jingzheng Ren, Kexin Li, Haiyan Duan, and Xian'en Wang	Selecting sustainable energy conversion technologies for agricultural residues: A fuzzy AHP-VIKOR based prioritization from life cycle perspective	*Resources, Conservation and Recycling*
Kadam, Ajaykumar, Animesh S. Karnewar, Bhavana Umrikar, and R. N. Sankhua	Hydrological response-based watershed prioritization in semiarid, basaltic region of western India using frequency ratio, fuzzy logic and AHP method	*Environment, Development and Sustainability*
Arulbalaji, P., D. Padmalal, and K. Sreelash	GIS and AHP techniques-based delineation of groundwater potential zones: a case study from southern Western Ghats, India	*Scientific reports*
Solangi, Yasir Ahmed, Qingmei Tan, Nayyar Hussain Mirjat, Gordhan Das Valasai, Muhammad Waris Ali Khan, and Muhammad Ikram	An Integrated Delphi-AHP and Fuzzy TOPSIS Approach toward Ranking and Selection of Renewable Energy Resources in Pakistan	*Processes*
Laroche, Geneviève, Gérald Domon, Nancy Gélinas, Maurice Doyon, and Alain Olivier	Integrating agroforestry intercropping systems in contrasted agricultural landscapes: a SWOT-AHP analysis of stakeholders' perceptions	*Agroforestry Systems*
Souissi, Dhekra, Lahcen Zouhri, Salma Hammami, Mohamed Haythem Msaddek, Adel Zghibi, and Mahmoud Dlala	GIS-based MCDM-AHP modeling for flood susceptibility mapping of arid areas, southeastern Tunisia	*Geocarto International*
Büyüközkan, Gülçin, Fethullah Göçer, and Yağmur Karabulut	A new group decision-making approach with IF AHP and IF VIKOR for selecting hazardous waste carriers	*Measurement*
Ruan, Zhuen, Cuiping Li, Aixiang Wu, and Yong Wang	A New Risk Assessment Model for Underground Mine Water Inrush Based on AHP and D–S Evidence Theory	*Mine Water and the Environment*
Xu, Shuobo, Dishi Xu, and Lele Liu	Construction of regional informatization ecological environment based on the entropy weight modified AHP hierarchy model	*Sustainable Computing: Informatics and Systems*
Ma, Ye, Tianyu Shi, Wei Zhang, Yu Hao, Junbing Huang, and Yinan Lin	Comprehensive policy evaluation of NEV development in China, Japan, the United States, and Germany based on the AHP-EW model	*Journal of cleaner production*