

Prof. Umut Rifat TUZKAYA

Personal Information

Office Phone: [+90 212 383 2896](tel:+902123832896)

Email: tuzkaya@yildiz.edu.tr

Other Email: tuzkaya@gmail.com

Web: <https://avesis.yildiz.edu.tr/tuzkaya>

Biography

Prof. Dr. Umut Rifat TUZKAYA, obtained BS and MS degrees in Industrial Engineering field at the Department of Industrial Engineering in Yıldız Technical University with an honors degree and attended to MBA program in Social Science Institute of Istanbul Technical University. He completed Ph.D. in Industrial Engineering Department at Yıldız Technical University in 2007. He joined the Faculty of Yıldız Technical University in 2007, and he has been serving as a Professor in the same university since 2015. He held a visiting appointment at the University of Louisville in 2011 and worked in the Real-Time Decision Support System for Emergency Logistics Project.

Research interests of him are logistics management, supply chain management, operations & production management, quality management, and facility planning. He has many international publications and gave many courses to the academy and industry in the above-mentioned areas.

Some of the recent projects of him are related to logistics master plans, feasibility studies, process analysis & improvement, strategic planning, and sector analysis.

Currently, he is the Vice Rector in Yıldız Technical University and is the board of directors' member in LODER-Logistics Association. He is married with two children.

Education Information

Doctorate, Yıldız Technical University, Faculty Of Mechanical Engineering, Department Of Industry Engineering, Turkey 2002 - 2007

Post Graduate, Istanbul Technical University, İşletme, İşletme, Turkey 2000 - 2003

Post Graduate, Yıldız Technical University, Faculty Of Mechanical Engineering, Department Of Industry Engineering, Turkey 2000 - 2002

Under Graduate, Yıldız Technical University, Faculty Of Mechanical Engineering, Department Of Industry Engineering, Turkey 1996 - 2000

Research Areas

Industrial Engineering , Optimization Theory and Methods, Linear Programming, Production Planning and Control, Facility Location and Design, Service Systems Modeling and Analysis, Supply Chain and Logistics Management, Network Design, Engineering and Technology

Academic Titles / Tasks

Professor, Yıldız Technical University, Faculty of Mechanical Engineering, Department of Industry Engineering, 2015 -

Continues

Associate Professor, Yıldız Technical University, Faculty of Mechanical Engineering, Department of Industry Engineering, 2010 - 2015

Assistant Professor, Yıldız Technical University, Faculty of Mechanical Engineering, Department of Industry Engineering, 2009 - 2010

Academic and Administrative Experience

Yıldız Teknik Üniversitesi, 2016 - Continues

Courses

Tedarik Zinciri Ve Lojistik Yönetimi, Under Graduate, 2017 - 2018

Advising Theses

TUZKAYA U. R. , AIRLINE CREW SCHEDULING AND ROSTERING PROBLEM, Post Graduate, V.KILIÇ(Student), 2018

TUZKAYA U. R. , KENTSEL DAĞITIM MERKEZİ YERLEŞİMİ İÇİN OPTİMİZASYON MODELLERİ: MEYVE SEBZE HALI UYGULAMASI, Doctorate, N.Demirtaş(Student), 2016

TUZKAYA U. R. , Lojistik yönetimde yalın düşünce ile sistem tasarımı ve bir uygulama, Post Graduate, M.MUSTAFA(Student), 2016

TUZKAYA U. R. , Üretim lojistiğinde süreç iyileştirme ve uygulaması, Post Graduate, S.KARAGÖZ(Student), 2016

TUZKAYA U. R. , Otomotiv sektöründe operasyonel verimliliği artırıcı yönde bir yaklaşım, Post Graduate, S.ŞAHİN(Student), 2016

TUZKAYA U. R. , The Optimization of A Multi Objective Network Design Problem in Supply Chain by Using Goal Programming and Multi Criteria Decision Making Methods, Post Graduate, N.Ceyda(Student), 2016

TUZKAYA U. R. , Envanter sınıflandırma tabanlı depo içi yerleşim planlaması ve bir uygulama, Post Graduate, B.ŞENER(Student), 2016

TUZKAYA U. R. , Physical Distribution Network Design and A Case Study, Post Graduate, Y.Emre(Student), 2016

Jury Memberships

Associate Professor Exam, Associate Professor Exam, University of Erciyes, December, 2017

Articles Published in Journals That Entered SCI, SSCI and AHCI Indexes

- I. **A Single Side Priority Based GA Approach for 3D Printing Center Integration to Spare Part Supply Chain in Automotive Industry**
TUZKAYA U. R. , Sahin S.
TEHNICKI VJESNIK-TECHNICAL GAZETTE, vol.28, no.3, pp.836-844, 2021 (Journal Indexed in SCI)
- II. **Occupational health and safety-oriented medical waste management: A case study of Istanbul**
Eren E., Tuzkaya U. R.
WASTE MANAGEMENT & RESEARCH, vol.37, no.9, pp.876-884, 2019 (Journal Indexed in SCI)
- III. **FRUITS AND VEGETABLES MARKET HALL LOCATION SELECTION BY USING INTERVAL-VALUED TRAPEZOIDAL FUZZY GREY RELATIONAL ANALYSIS: AN APPLICATION FOR ISTANBUL**
Bilişik Ö. N. , Tuzkaya U. R. , Baraçlı H., Tanyas M.
INTERNATIONAL JOURNAL OF INDUSTRIAL ENGINEERING-THEORY APPLICATIONS AND PRACTICE, vol.26,

pp.719-736, 2019 (Journal Indexed in SCI)

- IV. **A DEMATEL Integrated Interval Valued Intuitionistic Fuzzy PROMETHEE Approach for Parking Lots Evaluation**
SENNAROĞLU B., YILMAZER K. B. , TUZKAYA G., TUZKAYA U. R.
JOURNAL OF MULTIPLE-VALUED LOGIC AND SOFT COMPUTING, vol.30, pp.177-198, 2018 (Journal Indexed in SCI)
- V. **Layout of Urban Distribution Center Using Possibilistic Programming**
Demirtas N., TUZKAYA U. R. , Tanyas M.
INTERNATIONAL JOURNAL OF COMPUTATIONAL INTELLIGENCE SYSTEMS, vol.9, no.6, pp.1068-1081, 2016
(Journal Indexed in SCI)
- VI. **An Integrated Methodology for the Emergency Logistics Centers Location Selection Problem and its Application for the Turkey Case**
TUZKAYA U. R. , Yilmazer K. B. , TUZKAYA G.
JOURNAL OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT, vol.12, no.1, pp.121-144, 2015 (Journal Indexed in SSCI)
- VII. **A two-stage stochastic mixed-integer programming approach to physical distribution network design**
Kilic Y. E. , TUZKAYA U. R.
INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH, vol.53, no.4, pp.1291-1306, 2015 (Journal Indexed in SCI)
- VIII. **Supply Chain Performance Measurement: An Integrated DEMATEL and Fuzzy-ANP Approach**
ŞENVAR Ö., TUZKAYA U. R. , Kahraman C.
SUPPLY CHAIN MANAGEMENT UNDER FUZZINESS: RECENT DEVELOPMENTS AND TECHNIQUES, vol.313, pp.143-165, 2014 (Journal Indexed in SCI)
- IX. **A Strategic Planning Methodology for the Multimodal Transportation Systems: A Case Study from Turkey**
Tuzkaya U. R. , Önüt S., Tuzkaya G.
JOURNAL OF APPLIED MATHEMATICS, 2014 (Journal Indexed in SCI)
- X. **Designing a large-scale emergency logistics network - a case study for Kentucky**
TUZKAYA U. R. , Heragu S. S. , Evans G. W. , Johnson M.
EUROPEAN JOURNAL OF INDUSTRIAL ENGINEERING, vol.8, no.4, pp.513-532, 2014 (Journal Indexed in SCI)
- XI. **Garage Location Selection for Public Transportation System in Istanbul: An Integrated Fuzzy AHP and Fuzzy Axiomatic Design Based Approach**
BİLİŞİK Ö. N. , DEMIRTAS N., TUZKAYA U. R. , BARAÇLI H.
JOURNAL OF APPLIED MATHEMATICS, 2014 (Journal Indexed in SCI)
- XII. **A comparative analysis of meta-heuristic approaches for facility layout design problem: a case study for an elevator manufacturer**
Tuzkaya G., GÜLSÜN B., TUZKAYA U. R. , ÖNÜT S., Bildik E.
JOURNAL OF INTELLIGENT MANUFACTURING, vol.24, no.2, pp.357-372, 2013 (Journal Indexed in SCI)
- XIII. **Supply chain partners and configuration selection: An intuitionistic fuzzy Choquet integral operator based approach**
ASHAYERİ J., TUZKAYA G., TUZKAYA U. R.
EXPERT SYSTEMS WITH APPLICATIONS, vol.39, no.3, pp.3642-3649, 2012 (Journal Indexed in SCI)
- XIV. **A Multi-Criteria Decision Making Approach for Machine Tool Selection Problem in a Fuzzy Environment**
ÖZGEN A., TUZKAYA G., TUZKAYA U. R. , ÖZGEN D.
INTERNATIONAL JOURNAL OF COMPUTATIONAL INTELLIGENCE SYSTEMS, vol.4, no.4, pp.431-445, 2011 (Journal Indexed in SCI)
- XV. **A MULTI-OBJECTIVE ENERGY RESOURCE ALLOCATION MODEL FOR TURKISH MANUFACTURING INDUSTRY USING LINEAR PHYSICAL PROGRAMMING**
ÖNÜT S., TUZKAYA U. R. , Tuzkaya G., GÜLSÜN B.
INTERNATIONAL JOURNAL OF INNOVATIVE COMPUTING INFORMATION AND CONTROL, vol.7, no.6, pp.3147-3169, 2011 (Journal Indexed in SCI)

- XVI. **Selecting container port via a fuzzy ANP-based approach: A case study in the Marmara Region, Turkey**
 Önüt S., Tuzkaya U. R. , Torun E.
 TRANSPORT POLICY, vol.18, pp.182-193, 2011 (Journal Indexed in SSCI)
- XVII. **Environmental performance evaluation of suppliers: A hybrid fuzzy multi-criteria decision approach**
 TUZKAYA G., ÖZGEN A., ÖZGEN D., TUZKAYA U. R.
 INTERNATIONAL JOURNAL OF ENVIRONMENTAL SCIENCE AND TECHNOLOGY, vol.6, no.3, pp.477-490, 2009
 (Journal Indexed in SCI)
- XVIII. **A holonic approach based integration methodology for transportation and warehousing functions of the supply network**
 Tuzkaya U. R. , Önüt S.
 COMPUTERS & INDUSTRIAL ENGINEERING, vol.56, pp.708-723, 2009 (Journal Indexed in SCI)
- XIX. **Evaluating The Environmental Effects of Transportation Modes Using An Integrated Methodology and An Application**
 TUZKAYA U. R.
 International Journal Of Environmental Science And Technology, vol.6, pp.277-290, 2009 (Journal Indexed in SCI Expanded)
- XX. **An Aggregate Production Planning Strategy Selection Methodology based on Linear Physical Programming**
 GÜLSÜN B., Tuzkaya G., TUZKAYA U. R. , ÖNÜT S.
 INTERNATIONAL JOURNAL OF INDUSTRIAL ENGINEERING-THEORY APPLICATIONS AND PRACTICE, vol.16, no.2, pp.135-146, 2009 (Journal Indexed in SCI)
- XXI. **Analytic network process approach for locating undesirable facilities: An example from Istanbul, Turkey**
 Tuzkaya G., ÖNÜT S., TUZKAYA U. R. , GÜLSÜN B.
 JOURNAL OF ENVIRONMENTAL MANAGEMENT, vol.88, no.4, pp.970-983, 2008 (Journal Indexed in SCI)
- XXII. **A fuzzy analytic network process based approach to transportation-mode selection between Turkey and Germany: A case study**
 Tuzkaya U. R. , Önüt S.
 INFORMATION SCIENCES, vol.178, pp.3133-3146, 2008 (Journal Indexed in SCI)
- XXIII. **Multiple criteria evaluation of current energy resources for Turkish manufacturing industry**
 Önüt S., Tuzkaya U. R. , Saadet N.
 ENERGY CONVERSION AND MANAGEMENT, vol.49, pp.1480-1492, 2008 (Journal Indexed in SCI)
- XXIV. **A particle swarm optimization algorithm for the multiple-level warehouse layout design problem**
 Önüt S., Tuzkaya U. R. , Dogac B.
 COMPUTERS & INDUSTRIAL ENGINEERING, vol.54, pp.783-799, 2008 (Journal Indexed in SCI)
- XXV. **A two-phase possibilistic linear programming methodology for multi-objective supplier evaluation and order allocation problems**
 ÖZGEN D., ÖNÜT S., GÜLSÜN B., TUZKAYA U. R. , Tuzkaya G.
 INFORMATION SCIENCES, vol.178, no.2, pp.485-500, 2008 (Journal Indexed in SCI)
- XXVI. **Integrating data envelopment analysis and analytic hierarchy for the facility layout design in manufacturing systems**
 Ertay T., Ruan D., Tuzkaya U. R.
 INFORMATION SCIENCES, vol.176, no.3, pp.237-262, 2006 (Journal Indexed in SCI)

Articles Published in Other Journals

- I. **Comparison of the Best Practice Studies in European Union for City Logistics**
 TUZKAYA U. R. , YILMAZER K. B. , ÖZGEN D.
 Humanities and Social Sciences Review, vol.5, pp.113-122, 2016 (Refereed Journals of Other Institutions)

II. R D PROJECT SELECTION BY INTEGRATED GREY ANALYTIC NETWORK PROCESS AND GREY RELATIONAL ANALYSIS AN IMPLEMENTATION FOR HOME APPLIANCES COMPANY

TUZKAYA U. R. , EZGİ Y.

Journal of Aeronautics and Space Technologies, vol.8, pp.35-41, 2015 (Refereed Journals of Other Institutions)

Books & Book Chapters

I. Dağıtım planlama ve ulaştırma

TUZKAYA U. R. , TUZKAYA G., ÖZKIR V., APAK S., KÜÇÜK B., TAŞEL F.

in: DAĞITIM KANALLARI PLANLAMASI, Umut Rifat Tuzkaya, Vecihi Yiğit, Editor, Açık Öğretim Fakülte Kitabevi, Erzurum, 2017

Refereed Congress / Symposium Publications in Proceedings

I. CITY LOGISTICS NETWORK PLANNING FOR A MULTI-OBJECTIVE AUTOMOTIVE INDUSTRY PROBLEM

Tuzkaya U. R. , Özer N. C.

17th International Logistics and Supply Chain Congress, İstanbul, Turkey, 17 - 18 October 2019, pp.1-2

II. SPARE PART SUPPLY CHAIN DESIGN IN AUTOMOTIVE INDUSTRY

Tuzkaya U. R. , Şahin S.

8. ULUSAL LOJİSTİK VE TEDARİK ZİNCİRİ KONGRESİ, Niğde, Turkey, 25 - 27 April 2019, pp.177-189

III. Vehicle Type Selection for Deliveries from Urban Consolidation Centers to End-Customers

YILMAZER K. B. , TUZKAYA U. R. , KAYA Ö. O.

The MacroTrend Conference on Social Science: Paris 2017, Paris, France, 28 - 29 December 2017

IV. A LOGISTICS ALLOCATION MODEL FOR FREIGHT VILLAGES: A CASE STUDY FOR TURKEY

TUZKAYA U. R. , TUZKAYA G., YILMAZER K. B. , KALENDER Z. T.

The 15th International Logistics and Supply Chain Congress, 19 - 20 October 2017

V. BEYAZ EŞYA ÜRETİM TESİSİNDE MİLK-RUN SİSTEMİ ENTEGRASYONU

TUZKAYA U. R. , ŞAHİN S.

VI. ULUSAL LOJİSTİK VE TEDARİK ZİNCİRİ KONGRESİ, Turkey, 17 - 19 May 2017

VI. YAŞ MEYVE VE SEBZE İÇİN AMBALAJ SEÇİMİNDE KALİTE FONKSİYONU GÖÇERİMİ

BİLİŞİK Ö. N. , TUZKAYA G., TUZKAYA U. R.

TÜRKAS Tüm Ürün, Kap ve Ambalaj Standartları Sempozyumu "Sebze & Meyve", Turkey, 5 - 06 October 2016

VII. EVALUATION OF THE PARKING LOTS BY USING INTERVAL VALUED INTUITIVINISTIC FUZZY

PROMETHEE APPROACH: AN EXAMPLE FOR ISTANBUL

TUZKAYA U. R. , YILMAZER K. B. , TUZKAYA G., SENNAROĞLU B.

THE 12TH INTERNATIONAL FLINS CONFERENCE: Uncertainty Modelling in Knowledge Engineering and Decision Making, Roubaix, France, 24 August 2016, pp.943-947

VIII. BULANIK DEMATEL VE GENELLEŞTİRİLMİŞ CHOQUET İNTEGRALİ İLE KENTSEL LOJİSTİK MERKEZ YERİ BELİRLEME SAMSUN İLİ ÖRNEĞİ

TUZKAYA U. R. , AYDINALP Z.

5. ULUSAL LOJİSTİK ve TEDARİK ZİNCİRİ KONGRESİ, Turkey, 26 - 28 May 2016

IX. NETWORK DESIGN OF URBAN LOGISTICS SYSTEMS AN APPLICATION FOR MEAT PRODUCTS SECTOR

TANYAŞ M., TUZKAYA U. R. , GÜLER M. G. , YILMAZER K. B.

XIII. INTERNATIONAL LOGISTICS & SUPPLY CHAIN CONGRESS 2015, İzmir, Turkey, 22 - 23 October 2015, pp.318-324

X. DEPO YERLESİMİ İÇİN CİCİCOK KRİTERLİ ENVANTER SINIFLANDIRMASI VE BİR UYGULAMA

TUZKAYA U. R. , BEHLÜL Ş.

IV. ULUSAL LOJİSTİK VE TEDARİK ZİNCİRİ KONGRESİ, Gümüşhane, Turkey, 21 - 23 May 2015, pp.530-539

XI. A Multi-Criteria Decision Making Approach to Select Renewable Energy Alternatives for the Case of

Aegean Region of Turkey

YILMAZER K. B. , Tuzkaya U. R.

International Journal of Arts & Sciences, 01 June 2014

- XII. **THE LAYOUT DECISIONS OF FRUITS AND VEGETABLES HALLS**
TUZKAYA U. R. , Demirtaş N., Tanyaş M.
XI. International Logistics and Supply Chain Congress, 01 November 2013
- XIII. **A WAREHOUSE MANAGEMENT IMPLEMENTATION APPROACH: AN APPLICATION IN FAST MOVING CONSUMER GOODS COMPANY**
TUZKAYA U. R. , Arıkan A., Avcı B.
XI. International Logistics and Supply Chain Congress, 01 November 2013
- XIV. **Process Improvement Activities on Production Logistics: An Application on BSH Home Appliances**
TUZKAYA U. R. , Çiğtekin C.
XXVI EURO - INFORMS, 26th European Conference on Operational Research, 01 July 2013
- XV. **THE SELECTION OF RENEWABLE ENERGY ALTERNATIVES WITH USING THE ANP METHOD: A CASE STUDY FOR THE MARMARA REGION**
YILMAZER K. B. , Tuzkaya U. R.
01 December 2012
- XVI. **Package Type Selection Using Hierarchical Clustering Method and An Application**
YILMAZER K. B. , Tuzkaya U. R. , Koçak B.
X. International Logistics and Supply Chain Congress 2012, 01 November 2012
- XVII. **Location Selection of Emergency Logistics Centers Using An Integrated Dematel-ANP Approach**
TUZKAYA U. R.
The 10th International FLINS Conference on Uncertainty Modeling in Knowledge Engineering and Decision Making, Istanbul, Turkey, 01 August 2012
- XVIII. **Garage Location Selection for Public Transportation System in Istanbul Using Fuzzy AHP and Fuzzy Axiomatic Design Techniques**
TUZKAYA U. R.
The 10th International FLINS Conference on Uncertainty Modeling in Knowledge Engineering and Decision Making, Istanbul, Turkey, 01 August 2012
- XIX. **Strategic planning of layout of the distribution center: an approach for fruits and vegetables hall**
TUZKAYA U. R.
8th International Strategic Management Conference, Barcelona, Spain, 01 June 2012
- XX. **Üretim lojistiğinde bütünleşik çok kriterli karar verme tekniği ile malzeme taşıma sistemi seçimi ve beyaz eşya sektöründe uygulama**
TUZKAYA U. R.
Ulusal Lojistik ve Tedarik Zinciri Kongresi (ULTZK 2012), Necmettin Erbakan Üniversitesi, KONYA, 01 May 2012
- XXI. **Logistics network design for emergency response: An application for Kentucky**
TUZKAYA U. R.
International Conference on Value Chain Sustainability, ICOVACS, Leuven, Belgium, 01 November 2011
- XXII. **Fuzzy AHP-PROMETHEE methodology to select bus garage location: a case study for a firm in the urban passenger transport sector in Istanbul**
BİLİŞİK Ö. N. , Demirtaş N., BARAÇLI H., TUZKAYA U. R.
15th International Research/Expert Conference "Trends in the Development of Machinery and Associated Technology" TMT 2011, 12 September 2011
- XXIII. **Fuzzy AHP-PROMETHEE methodology to select bus garage location: A case study for a firm in the urban passenger transport sector in Istanbul**
TUZKAYA U. R.
15th International Research/Expert Conference, Trends in the Development of Machinery and Associated Technology TMT2011, Prague, Czech Republic, 01 September 2011
- XXIV. **Fuzzy AHP-TOPSIS two stages methodology for ERP software selection: An application in passenger transport sector**

- TUZKAYA U. R.
15th International Research/Expert Conference, Trends in the Development of Machinery and Associated Technology TMT2011, Prague, Czech Republic, 01 September 2011
- XXV. **Transportation Modes and Comparison of Their Environmental Effects: An Integrated Methodology**
TUZKAYA U. R.
International Conference on Value Chain Sustainability ICOVACS, Valencia, Spain, 01 November 2010
- XXVI. **An Efficiency Analysis Of Turkish Container Ports Using The Analytic Network Process**
OĞUZTİMUR S., TUZKAYA U. R.
PROSPECTS FOR RESEARCH IN TRANSPORT AND LOGISTICS ON A REGIONAL - GLOBAL PERSPECTIVE CONFERENCE (RTRAL 2009, İstanbul, Turkey, 12 - 14 February 2009
- XXVII. **An Efficiency Analysis of Turkish Container Ports Using Analytic Network Process**
OĞUZTİMUR S., TUZKAYA U. R.
Prospects For Research in Transport and Logistics On a Regional - Global Perspective Conference (RTRAL 2009), İstanbul, Turkey, 12 February 2008, pp.1-10
- XXVIII. **Performance Measuring and Evaluating of Turkish Food&Beverage Companies Using Data Envelopment Analysis**
Önüt S., Tuzkaya U. R.
9th International Research/Expert Conference TMT 2005, Antalya, Turkey, 26 September 2005, pp.465-468
- XXIX. **An integrated framework for transportation and warehousing functions of the supply chain using holonistic approach**
Tuzkaya U. R. , Önüt S., Soner S.
35th International Conference on Computers and Industrial Engineering 2005, İstanbul, Turkey, 7 - 09 February 2005
- XXX. **Evaluation and Selection of R D Projects using an integrated Bsc Dea Methodology**
Soner S., Önüt S., Tuzkaya U. R.
35th International Conference on Computers and Industrial Engineering 2005, İstanbul, Turkey, 19 - 22 June 2005

Supported Projects

TUZKAYA U. R. , Project Supported by Other Official Institutions, Gümrük ve Ticaret Merkezi Fizibilite Raporu Hazırlanması, 2018 - 2019

BİLİŞİK Ö. N. , TUZKAYA U. R. , KAYA İ., YILMAZER KAYA K. B. , ÖNÜT S., Project Supported by Other Official Institutions, İstanbul Lojistik Ana Planı Projesi, 2015 - 2019

Bilişik Ö. N. , Tuzkaya U. R. , Project Supported by Other Official Institutions, TCDD Taşımacılık A.Ş.nin Kurumsal Yapısının Güçlendirilmesi Kapsamında Kurumsal ve Sektörel Analiz Yapılması, 2017 - 2018

TUZKAYA U. R. , CB Strateji ve Bütçe Başkanlığı (Kalkınma Bakanlığı) Projesi, MALATYA İLİ LOJİSTİK MERKEZ FİZİBİLİTE RAPORU, 2016 - 2017

Activities in Scientific Journals

Sigma Journal of Engineering and Natural Sciences, Assistant Editor, 2015 - Continues

Citations

Total Citations (WOS):936

h-index (WOS):12