

Lecture Notes in Networks and Systems

Volume 273

Series Editor

Janusz Kacprzyk, Systems Research Institute, Polish Academy of Sciences,
Warsaw, Poland

Advisory Editors

Fernando Gomide, Department of Computer Engineering and Automation—DCA,
School of Electrical and Computer Engineering—FEEC, University of Campinas—
UNICAMP, São Paulo, Brazil

Okyay Kaynak, Department of Electrical and Electronic Engineering,
Bogazici University, Istanbul, Turkey

Derong Liu, Department of Electrical and Computer Engineering, University
of Illinois at Chicago, Chicago, USA; Institute of Automation, Chinese Academy
of Sciences, Beijing, China

Witold Pedrycz, Department of Electrical and Computer Engineering,
University of Alberta, Alberta, Canada; Systems Research Institute,
Polish Academy of Sciences, Warsaw, Poland

Marios M. Polycarpou, Department of Electrical and Computer Engineering,
KIOS Research Center for Intelligent Systems and Networks, University of Cyprus,
Nicosia, Cyprus

Imre J. Rudas, Óbuda University, Budapest, Hungary

Jun Wang, Department of Computer Science, City University of Hong Kong,
Kowloon, Hong Kong

The series “Lecture Notes in Networks and Systems” publishes the latest developments in Networks and Systems—quickly, informally and with high quality. Original research reported in proceedings and post-proceedings represents the core of LNNS.

Volumes published in LNNS embrace all aspects and subfields of, as well as new challenges in, Networks and Systems.

The series contains proceedings and edited volumes in systems and networks, spanning the areas of Cyber-Physical Systems, Autonomous Systems, Sensor Networks, Control Systems, Energy Systems, Automotive Systems, Biological Systems, Vehicular Networking and Connected Vehicles, Aerospace Systems, Automation, Manufacturing, Smart Grids, Nonlinear Systems, Power Systems, Robotics, Social Systems, Economic Systems and other. Of particular value to both the contributors and the readership are the short publication timeframe and the world-wide distribution and exposure which enable both a wide and rapid dissemination of research output.

The series covers the theory, applications, and perspectives on the state of the art and future developments relevant to systems and networks, decision making, control, complex processes and related areas, as embedded in the fields of interdisciplinary and applied sciences, engineering, computer science, physics, economics, social, and life sciences, as well as the paradigms and methodologies behind them.

Indexed by SCOPUS, INSPEC, WTI Frankfurt eG, zbMATH, SCImago.

All books published in the series are submitted for consideration in Web of Science.

More information about this series at <http://www.springer.com/series/15179>

Ravindra S. Goonetilleke ·
Shuping Xiong · Henrijs Kalkis ·
Zenija Roja · Waldemar Karwowski ·
Atsuo Murata
Editors

Advances in Physical, Social & Occupational Ergonomics

Proceedings of the AHFE 2021 Virtual
Conferences on Physical Ergonomics
and Human Factors, Social & Occupational
Ergonomics, and Cross-Cultural Decision
Making, July 25–29, 2021, USA

Editors

Ravindra S. Goonetilleke
Division of Integrative Systems
and Design
Hong Kong University of Science
and Technology
Kowloon, Hong Kong

Shuping Xiong
Department of Industrial and Systems
Engineering
Korea Advanced Institute of Science
and Technology
Daejeon, Korea (Republic of)

Henrijs Kalkis
University of Latvia
Riga, Latvia

Zenija Roja
University of Latvia
Riga, Latvia

Waldemar Karwowski
University of Central Florida
Orlando, FL, USA

Atsuo Murata
Okayama University
Okayama, Japan

ISSN 2367-3370

ISSN 2367-3389 (electronic)

Lecture Notes in Networks and Systems

ISBN 978-3-030-80712-2

ISBN 978-3-030-80713-9 (eBook)

<https://doi.org/10.1007/978-3-030-80713-9>

© The Editor(s) (if applicable) and The Author(s), under exclusive license
to Springer Nature Switzerland AG 2021

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Advances in Human Factors and Ergonomics 2021

AHFE 2021 Series Editors

Tareq Z. Ahram, Florida, USA

Waldemar Karwowski, Florida, USA



12th International Conference on Applied Human Factors and Ergonomics and the
Affiliated Conferences (AHFE 2021)

Proceedings of the AHFE 2021 International Conferences on Physical Ergonomics
and Human Factors, Social & Occupational Ergonomics and Cross-Cultural
Decision Making, July 25–29, 2021, Manhattan, New York, USA.

Advances in Neuroergonomics and Cognitive Engineering	Hasan Ayaz, Umer Asgher and Lucas Paletta
Advances in Industrial Design	Cliff Sungsoo Shin, Giuseppe Di Bucchianico, Shuichi Fukuda, Yong-Gyun Ghim, Gianni Montagna and Cristina Carvalho
Advances in Ergonomics in Design	Francisco Rebelo
Advances in Safety Management and Human Performance	Pedro M. Arezes and Ronald L. Boring
Advances in Human Factors and Ergonomics in Healthcare and Medical Devices	Jay Kalra, Nancy J. Lightner and Redha Taiar
Advances in Simulation and Digital Human Modeling	Julia L. Wright, Daniel Barber, Sofia Scataglin and Sudhakar L. Rajulu
Advances in Human Factors and System Interactions	Isabel L. Nunes
Advances in the Human Side of Service Engineering	Christine Leitner, Walter Ganz, Debra Satterfield and Clara Bassano
Advances in Human Factors, Business Management and Leadership	Jussi Ilari Kantola, Salman Nazir and Vesa Salminen
Advances in Human Factors in Robots, Unmanned Systems and Cybersecurity	Matteo Zallio, Carlos Raymundo Ibañez and Jesus Hechavarria Hernandez
Advances in Human Factors in Training, Education, and Learning Sciences	Salman Nazir, Tareq Z. Ahram and Waldemar Karwowski

(continued)

(continued)

Advances in Human Aspects of Transportation	Neville Stanton
Advances in Artificial Intelligence, Software and Systems Engineering	Tareq Z. Ahram, Waldemar Karwowski and Jay Kalra
Advances in Human Factors in Architecture, Sustainable Urban Planning and Infrastructure	Jerzy Chartyonowicz, Alicja Maciejko and Christianne S. Falcão
Advances in Physical, Social & Occupational Ergonomics	Ravindra S. Goonetilleke, Shuping Xiong, Henrijs Kalkis, Zenija Roja, Waldemar Karwowski and Atsuo Murata
Advances in Manufacturing, Production Management and Process Control	Stefan Trzcielinski, Beata Mrugalska, Waldemar Karwowski, Emilio Rossi and Massimo Di Nicolantonio
Advances in Usability, User Experience, Wearable and Assistive Technology	Tareq Z. Ahram and Christianne S. Falcão
Advances in Creativity, Innovation, Entrepreneurship and Communication of Design	Evangelos Markopoulos, Ravindra S. Goonetilleke, Amic G. Ho and Yan Luximon
Advances in Human Dynamics for the Development of Contemporary Societies	Daniel Raposo, Nuno Martins and Daniel Brandão

Preface

The discipline of human factors and ergonomics (HF/E) is concerned with the design of products, process, services, and work systems to assure their productive, safe, and satisfying use by people. Physical ergonomics involves the design of working environments to fit human physical abilities. By understanding the constraints and capabilities of the human body and mind, we can design products, services, and environments that are effective, reliable, safe, and comfortable for everyday use. A thorough understanding of the physical characteristics of a wide range of people is essential in the development of consumer products and systems. Human performance data serve as valuable information to designers and help ensure that the final products will fit the targeted population of end users. Mastering physical ergonomics and safety engineering concepts is fundamental to the creation of products and systems that people can use, avoidance of stresses, and minimization of the risk for accidents. This book focuses on the advances in the physical HF/E, which are a critical aspect in the design of any human-centered technological system.

An exploration of how ergonomics can contribute to the solution of important societal and engineering challenges; advances in social and organizational factors discuss the optimization of sociotechnical systems, including their organizational structures, policies, and processes. It includes coverage of communication, crew resource management, work design, design of working times, teamwork, participatory design, community ergonomics, cooperative work, new work paradigms, organizational culture, virtual organizations, telework, and quality management.

The book also highlights issues with special populations, detailing how to design and adapt products and work situations for these groups. In addition to exploring the challenges faced in optimizing sociotechnical systems, the book underlines themes that play a role in all the challenges and how they are linked to each other. It concludes with an exploration of emotional ergonomics and the important positive effects of making people happy and healthy. With chapter authors from around the globe, the book supplies a broad look at current challenges and possible solutions. This book contains a total of ten sections that covers the following topics.

The ideas and practical solutions described in the book are the outcomes of dedicated research by academics and practitioners aiming to advance theory and practice in this dynamic and all-encompassing discipline. A total of ten sections are presented in this book:

Social and Occupational Ergonomics

1. Management and Efficiency
2. Physical Ergonomics and Work-Related Musculoskeletal Disorders
3. Social and Occupational Ergonomics

Physical Ergonomics

4. Holistic Approach in Safety Management During the Pandemic
5. Wearable Sensing in Physical Ergonomics and Safety
6. Workload Assessment Methods and Techniques
7. Job Analysis and Ergonomic Design
8. Human Characteristics and Influencing Factors

Cross-Cultural Decision Making

9. Cross-Cultural Decision Making
10. Cross-Cultural Decision Making

Each section contains research papers that have been reviewed by members of the International Editorial Board. Our sincere thanks and appreciation to the Board members as listed below:

Physical Ergonomics

- S. Alemany, Spain
- M. Boocock, New Zealand
- E. Cadavid, Colombia
- J. Callaghan, Canada
- P. Dempsey, USA
- R. Feyen, USA
- J. Grobelny, Poland
- T. Hofmann, Germany
- J. James, South Africa
- Z. Jiang, China
- H. Kalkis, Latvia

K. Kotani, Japan
Y. Kwon, Korea
M. Lehto, USA
C. Lung, Taiwan
A. Luximon, Hong Kong
L. Ma, China
S. Maly, Czech Republic
S. Muraki, Japan
M. Nasarwanji, USA
J. Niu, China
E. Occhipinti, Italy
Y. Okada, Japan
H. Pacaiova, Slovak Republic
W. Park, South Korea
G. Paul, Australia
P. Ray, India
Z. Roja, Latvia
L. Saenz, Colombia
L. Shijan, China
J. Sinay, Slovak Republic
S. Xiong, Korea
J. Yang, USA

Social and Occupational Ergonomics

J. Charytonowicz, Poland
D. Horn, USA
S. Hwang, Taiwan
J. Kantola, Finland
B. Kleiner, USA
L. Pacholski, Poland
M. Robertson, USA
S. Saito, Japan
M. Smith, USA
H. Vanharanta, Finland
Z. Wisniewski, Poland
R. Yu, China

Cross-Cultural Decision Making

M. Alama, USA
U. Asgher, Pakistan
E. Cakit, Turkey

V. Cavojoja, Slovakia
A. Cybal-Michalska, Poland
A. Divakaran, USA
T. Doi, Japan
C. Fidopiastis, USA
J. Frank, USA
M. Hail, USA
C. He, China
A. Heaton, USA
M. Hoffman, USA
A. Itoh, Japan
D. King, USA
G. Klein, USA
M. Kruger, USA
S. Numrich, USA
N. Okabe, Japan
J. Pfautz, USA
P. Picucci, USA
E. Raybourn, USA
E. Reitz, USA
A. Ruvinsky, USA
L. Saner, USA
D. Scapin, France
S. Schatz, USA
J. Stodd, UK
C. Tajima, Japan
J. Urakami, Japan

We hope that this book, which is the international state of the art in physical domain of human factors, will be a valuable source of theoretical and applied knowledge enabling the human-centered design of a variety of products, services, and systems for global markets.

July 2021

Ravindra S. Goonetilleke
Shuping Xiong
Henrijs Kalkis
Zenija Roja
Waldemar Karwowski
Atsuo Murata

Contents

Management and Efficiency

Integrating Individual and Intra-organizational Learning for Calibration of Organization's Performance	3
Harsh Chauhan and Henrijs Kalkis	

Social Distancing, Stress and Unethical Behavior: A Study on Italian University Students in the First Period of Isolation Due to COVID-19	11
Oronzo Parlangeli, Paola Palmitesta, Stefano Guidi, Ileana Di Pomponio, Margherita Bracci, and Enrica Marchigiani	

Personal Gains from Materials in Social Networks	19
Tom Sander, Biruta Sloka, and Henrijs Kalkis	

Factors and Barriers of Implementing Early Warning, Support and Second Chance Support Systems for SMEs in the Baltic States . . .	25
Liga Braslina, Anda Batraga, Aija Legzdina, Jelena Salkovska, Henrijs Kalkis, Daina Skiltere, Girts Braslins, and Daina Saktiņa	

Retail Skills as the Craftsmanship of Liquor Retail SMEs	33
Myungrae Cho and Koichiro Watanabe	

Analysis of the Employment Rate of People with Disabilities in Ecuador	40
Hugo Arias-Flores, Jorge Guadalupe-Lanas, and Janio Jadán-Guerrero	

Physical Ergonomics and Work-Related Musculoskeletal Disorders

Ergonomic Indicators and Physical Workload Risks in Food Production and Possibilities for Risk Prevention	47
Henrijs Kalkis, Ingus Graveris, and Zenija Roja	

Assessment of Muscle Fatigue and Potential Health Risk of Low Back Pain Among Call Center Workers 54
Sunisa Chaiklieng and Worawan Poochada

The Effects of the Physical Environment on Employee Wellbeing and Performance: A Case Study on Healthy Architecture in Call Center Interiors 62
Salih Ceylan

Sustainable Work Opportunities for Drivers’ Well-Being: A Case of Careem as Transportation Network Company 70
Amna Javed and Youji Kohda

Prevalence of Post-work Musculoskeletal Disorders in Social Workers and Secretaries of Second-Level Hospital 78
Gilberto Perea, Corina Flores Hernández, Víctor Rodríguez, Daniel Páramo, and Guadalupe de los Auxilios Díaz Cisneros

Estimation of Spine Loads During Daily Activities and Its Relationship with Musculoskeletal Disorders in Elderly Indigenous Women 84
Alejandra Lascano, Thalia San Antonio, David Guevara, and Anita Larrea

Social & Occupational Ergonomics

Lateral Reaching Distances for Novice and Experienced Ladder Users 95
Angela Levitan

Objective and Subjective Evaluation of Motorcycle Helmet Visors Based on ECE 22.05 Regulations 100
Nhât Nam Nguyễn, Ellen Vanderlooven, Kevin van der Velden, Jochen Vleugels, and Regan Watts

Attitudes of Young Generation Towards Traditional Irrigation System “Foggara” in the Southwestern Algeria: A Green Ergonomics Approach 109
Mohammed Mokdad and Bouhafs Mebarki

Check-App Voice®: A Tool to Self-evaluate Dysphonia in Speaking Voice Among Teachers 119
Maria Patrizia Orlando, Fabio Lo Castro, Maurizio Diano, Raffaele Palomba, Raffaele Maricone, Martina Amodeo, and Claudia Giliberti

Analysis of Head Size Related to the Design of Eye and Face Protection Products 128
Linghua Ran, Xin Zhang, Taijie Liu, Chaoyi Zhao, and He Zhao

Differences in the Perception of the Quality of Work Life According to Gender in Health Care Workers	134
Raquel González-Baltazar, Silvia G. León-Cortés, Mónica I. Contreras-Estrada, Liliana Hidalgo-González, and Brenda J. Hidalgo-González	
Open Learning: The New Normal of Design Education	149
Rosa Retuerto Luna	
Ergonomic Risk Assessment of Sea Fisherman Part IV: Tunisian Chapter	157
Alessio Silveti, Elio Munafò, Ari Fiorelli, Lorenzo Fiori, Antonella Tatarelli, Alberto Ranavolo, and Francesco Draicchio	
Vocal Disability Index in Teachers from Ecuador	168
Rommel Silva, Oswaldo Jara, Esteban Carrera, Pablo Davila, and José Luis Saá	
Occupational Health Management in Informal Work: A Theoretical Analysis of the Field	174
Luis Betancourt-Sánchez	
Didactic Adaptation with ICT's Preliminary Educational Proposal	179
Luis Serpa-Andrade, Erika Pinos-Velez, and Freddy Rivera-Calle	
Challenges for an Observatory of the 2030 Goals, SDG and Social Economy, in Northern Mexico	186
Rodolfo Martínez-Gutiérrez, Maria Marcela Solis-Quinteros, Carlos Sanchez-Hurtado, and Carmen Esther Carey-Raygoza	
Computer Science Engineers their Profile and Competencies for Generations X, Y and Z	192
Carlos Hurtado-Sanchez, Rodolfo Martínez-Gutiérrez, Carmen Carey, and Artemio Lara-Chavez	
Postgraduate Administration Education: Profiles and Skills Contribution to the Knowledge Society	197
Rodolfo Martínez-Gutiérrez, Eduardo Ahumada-Tello, Ramon Galvan-Sanchez, Carlos Hurtado-Sanchez, and Beatriz Chavez-Ceja	
Holistic Approach in Safety Management During the Pandemic	
Holistic Approach in Risk Reduction Processes of the Machinery Equipment	205
Hana Pačaiová, Michaela Balážiková, Marianna Tomašková, Katarína Firmentová, Katarína Chomová, Lukáš Ďuriš, Peter Darvaši, Lukáš Salaj, and Ján Kán	

Digital Technologies for Monitoring the Vital Functions of Employees with Diseases Accompanied by Seizures with Loss of Balance 213
Juraj Glatz, Milan Oravec, Zuzana Kotianova, Michal Gorzas, Jan Híjj, and Ivan Habala

Production Process Optimization by Reducing Downtime and Minimization of Costs 220
Stefan Markulik, Renata Turisova, Anna Nagyova, Tomas Vilinsky, Robert Kozel, and Katarina Vaskovicova

Consideration for Experimental Verification of the Effectiveness and Safety of Exoskeletons 228
Daniela Onofrejová, Michaela Balážiková, and Michal Hovanec

Magnetometry for Security Applications 236
Milan Oravec, Frantisek Hesko, Zoltan Szőke, Miroslav Smelko, and Tomas Gazda

Safety and Productivity Enhancement Through Ergonomics Development (SPEED) at the Embassy in the Philippines 244
Alma Maria Jennifer Gutierrez and Rosemary Seva

Wearable Sensing in Physical Ergonomics and Safety

Functional Data Representation of Inertial Sensor-Based Torso-Thigh, Knee, and Ankle Movements During Lifting 255
Sol Lim and Clive D’Souza

BIONIC: Custom Sensors for Risk Assessment and Training of Older Workers 261
Alberto Ferreras Remesal, Juan Fernando Giménez Pla, Purificación Castelló Mercé, Salvador Pitarch Corresa, Raquel Marzo Roselló, and Mercedes Sanchís Almenara

Using Deep Learning Methods to Predict Walking Intensity from Plantar Pressure Images 270
Hsing-Chung Chen, Sunardi, Yih-Kuen Jan, Ben-Yi Liao, Chih-Yang Lin, Jen-Yung Tsai, Cheng-Tsung Li, and Chi-Wen Lung

Machine Learning-Based Pre-impact Fall Detection and Injury Prevention for the Elderly with Wearable Inertial Sensors 278
Xiaoqun Yu, Jaehyuk Jang, and Shuping Xiong

Workload Assessment Methods and Techniques

A Pilot Study on the Use of Changes in Facial Features to Assess Physical Workload in Real-Time 289
Qian Zhang and Lora Cavuoto

sEMG and Postural Analysis for Biomechanical Risk Assessment in a Banknotes Printing Process	297
Lorenzo Fiori, Alessio Silveti, Antonella Tatarelli, Alberto Ranavolo, and Francesco Draicchio	
Diagnostics of the Stress State by the Method of Pupillography	305
Isaeva Oksana and Boronenko Marina	
Effectiveness of Reduced Work Pace to Decrease the Risk of Work-Related Musculoskeletal Disorders in a Chicken Slaughterhouse	313
Diogo Cunha dos Reis, Adriana Seara Tirloni, and Antônio Renato Pereira Moro	
Job Analysis and Ergonomic Design	
Collaborative Workspace – Concept Design of an Interactive System for Total Airport Management	323
Mandra Bensmann, Alicia Lampe, Thomas Hofmann, and Steffen Loth	
Worker Satisfaction of Job Rotations in Brazilian Poultry Slaughterhouses: A Cross-Sectional Study	331
Adriana Seara Tirloni, Diogo Cunha dos Reis, and Antônio Renato Pereira Moro	
Physical Ergonomics Design and Evaluation of Civil Aircraft Cockpit Control Devices	338
Xinyang Zhu, Hongyu Zhu, Zhefeng Jin, and Yinbo Zhang	
Investigation of Anatomical Shape of Thumb of de Quervain's Tenosynovitis Patients	346
Eunice Wai-si Tam, Joanne Yip, Kit Lun Yick, Sun Pui Ng, and Christian Fang	
Human Characteristics and Influencing Factors	
Using Ultrasound to Assess Microchambers and Macrochambers Tissue Properties After Walking at Different Speeds and Durations . . .	355
Wei-Cheng Shen, Yih-Kuen Jan, Chi-Wen Lung, Hsin-Chieh Chen, Cheng-Tsung Li, Jian-Guo Bau, and Ben-Yi Liao	
Analysis and Application of Influencing Factors of Mirror Drawing Ability	364
Minxia Liu, Yu Gu, Jiping Lu, Lin Gong, and Qing Xue	
Implementing Participatory Ergonomics Among Indigenous Women of Ecuador to Preserve Ancestral Customs and Knowledge	372
Alejandra Lascano, Thalia San Antonio, Fernando Urrutia, and Maria Augusta Latta	

Prediction Model of One-Handed Pull Strength in the Sagittal Plane	380
Hailiang Wang, Mian Yan, and Da Tao	
Cross-Cultural Decision Making	
Examining the Cultural Differences of Users’ Characteristics Between the United States and Japan Related to User Interface Design.	391
Toshihisa Doi and Atsuo Murata	
Mechanism of Improving Performance by Expressing Human Service Employees’ Positive Emotion	397
Noriko Okabe	
Weakness of Real Estate Collateral Valuation Policy in Changed Financial World	405
Jukka Rantala, Atte Rantanen, Maria Yllikäinen, and Timo Holopainen	
Micro Loans to Over-Indebtedness, Causes and Consequences, Perspective on Youth Spending	413
Jukka Rantala, Henri Untinen, Maria Yllikäinen, and Timo Holopainen	
A Comparison on the Development Mode of Traditional and Emerging Cultural Innovation - A Case Analysis of Electronic Sports-League of Legends	421
Xinyao Huang and Wei Ding	
Understanding the Value Rankings of Chinese Middle Class	427
Wenhua Li and Jiaying Huang	
The Concept, Development, Evolution and Practice of Poverty Alleviation Design.	435
Jie Zhou, Wei Ding, Yuyao He, Yiran Zhang, Yisha Wang, and Xinyi Yu	
Towards Better Working Conditions for Visually Impaired: A Pilot Study on Occupational Risk Assessment for Visually Impaired Massage Workers in China	442
Linghong Li	
Cognitive Biases in Game Momentum, Winning Strategy, and Jinx in Baseball	449
Atsuo Murata	
Cultural Preparation for Digital Transformation of Industrial Organizations: A Multi-case Exploration of Socio-technical Systems . . .	457
Aurangzeab Butt, Faisal Imran, Jussi Kantola, and Petri Helo	
Study Abroad in the Philippines and Canada by Japanese Undergraduate Students: A Comparative Mixed Methods Study	464
Chihiro Tajima and Michael D. Feterss	

Cultural Mediations Between Branding and Lifestyles: A Case Study Based Model for the Articulation of Cultural Strategies and Urban Tribes	470
Nelson Pinheiro Gomes and William Afonso Cantú	
Correlations Between Inspections, Maintenance Errors, and Accidents	477
Toshiyuki Wakimizu, Atsuo Murata, Toshihisa Doi, Yutaka Yoshida, and Keisuke Fukuda	
Globalization, Cultural Pluralism and the Space of the Human “Borderless Career” World	483
Agnieszka Cybal-Michalska	
Trade Gravity Models for the Factors Affecting Foreign Trade in the Political-Administrative Regions of Chile	495
Manuel Ayala, Hanns de la Fuente-Mella, Víctor Leiva, and Ana María Vallina-Hernández	
Natural Color System Quantization Design of Economy Class Seat Driven by Perceptual Imagery	504
Jianghua Xu and Shuangle Ding	
Innovation in Value Chain in the Medical Tourism Industry in Tijuana, Baja California	512
Alma Laura Bonilla-Hernández and Rodolfo Martínez-Gutiérrez	
Author Index	519