





**Preliminary Program** 

# **Proceedings**

# **Proceedings of Full Papers Only**

# 2nd African International Conference on Industrial Engineering and Operations Management

Harare, Zimbabwe, December 7–10, 2020 Host: University of Zimbabwe

Register to JOIN

Call for Papers - Flyer

Submission Link: https://www.xcdsystem.com/IEOM/abstract/index.cfm?ID=ITx8cpK

IEOM Paper Template (\*.docx) Paper/Abstract Template IEOM Abstract Template (\*.docx)

**Sample IEOM Papers** can be followed to prepare a quality paper:

Paper 1, Paper 2, Paper 3, Paper 4, Paper 5, Paper 6, Paper 7, Paper 8, Paper 9 and Paper 10.

**Proceedings** 

**Proceedings of Full Papers Only** 

IEOM Society is organizing 2nd African International Conference on Industrial Engineering and Operations Management in Harare, Zimbabwe during December 7–10, 2020. The conference aims to provide a forum for academics, researchers and practitioners to exchange ideas and recent developments in the field of Industrial Engineering and Operations Management. The conference is also expected to foster networking, collaboration and joint effort among the conference participants to advance the theory and practice as well as to identify major trends in Industrial Engineering and Operations Management. Due to the global pandemic, the event will

be virtual. If situation permits, some events will be held locally.

- Track Chairs Login: www.xcdsystem.com/ieom/trackchair/
- Reviewers Login: www.xcdsystem.com/ieom/reviewer/
- Registration Link: https://www.xcdsystem.com/IEOM/attendee/index.cfm?ID=u5ZLnIn

Authors can submit full paper(s) or abstract(s) only. <u>Authors MUST use the conference template to prepare papers or abstracts.</u> IEOM Society encourages to submit full paper(s). All full papers will be subjected to double peer review. Accepted papers will be published in the Proceedings and indexed in *SCOPUS*. Any submission implies that an author will deliver a virtual or an oral presentation of the paper or abstract. SELECTED PAPERS WILL BE PUBLISHED IN IJIEOM (International Journal of Industrial Engineering and Operations Management).

#### **Conference Chair**

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Pro-Vice Chancellor Strategic Partnerships and Industrialisation University of Zimbabwe Mt Pleasant, Harare, Zimbabwe

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- Dr. Perkins Muredzi, Dean, School of Industrial Sciences & Technology, Harare Institute of Technology, Zimbabwe
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- **Dr. Wilbert Mtangi**, Director: Institute of Materials Science, Processing and Engineering Technology, Chinhoyi University of Technology, Chinhoyi, Zimbabwe

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- Dr. Sam Takavarasha Jr., Women's University in Africa

# Keynote Speakers ay December 9, 3:00 pm, Tuesday December 9, 3:30 pm, Tuesday December 9, 4:00 pm, Tuesday

#### December 9, 2:00 pm, Tuesday December 9, 2:30 pm, Tuesday



Prof. Kuzvinetsa Peter Dzvimbo

Chief Executive Officer Zimbabwe Council for Higher Education, Harare, Zimbabwe



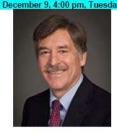
Dr. Esther T. Akinlabi Director, Pan African University for Life and Earth Sciences Institute (PAULESI), Ibadan, Nigeria African Union Commission



Henk Viljoen Siemens - Xcelerator Portfolio Development Manager Siemens Digital Industries Software Pretoria, Gauteng, South Africa



Douglas Mboweni, Ph.D. Group Chief Executive Officer Econet Wireless Zimbabwe Limited Harare, Zimbabwe



Dr. Robert Van Til Chair and Pawley Professor of Lean Studies, Department of Industrial and Systems Engineering Oakland University, Michigan, USA

#### 9, 2:00 pm Wednesday December 9, 2:30 pm, Wednesday De



Professor Mqhele Dlodlo Vice-Chancellor National University of Science and Technology (NUST) Ascot, Bulawayo, Zimbabwe

Corrado La Forgia VP Operations Manager and Managing Director, BOSCH VHIT – CR, Offanengo, Lombardy, Italy



Dr. Marco Lübbecke Professor of Operations Research RWTH Aachen University Aachen Germany



Prof. Quinton Kanhukamwe Vice Chancellor Harare Institute of Technology Harare Zimbabwe



Professor Paul Mapfumo Vice Chancellor University of Zimbabwe

December 10, 2:00 pm, Thursday



Professor Maneesh Kumar Professor in Service Operations Cardiff Business School Cardiff University, United Kingdom



Prof. Nidhal Rezg, Ph.D.

Professor and Director of LGIPM Director General of UPS DITEX University of Lorraine Metz, France



Prof. Ephraim Tobela Gwebu Vice Chancellor Solusi University Bulawayo, Zimbabwe



**Professor David Simbi** Vice-Chancellor Chinhoyi University of Technology Chinhoyi, Zimbabwe



Professor Thong Ngee GOH Emeritus Prof., Dept. of ISE Former Head & Dean of Engineering National University of Singapore

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# 19th Global Engineering Education Speakers 2020 IEOM Harare Conference at University of Zimbabwe



Dr. Şirin Tekinay Dean. College of Engineering American University of Sharjah, UAE



Dr. Mohamed Essaaidi Professor Abdelmalek Essaadi & Mohammed V Universities, Morocco



Prof. Hannes van der Walt Dean, Faculty of Engineering Namibia University of Science and Technology, Windhoek, Namibia



Dr. Funso Falade Professor of Civil Engineering University of Lagos, Nigeria Founding President of AEEA



Dr. Gamal S. Ahmed Assistant Professor Najran University Saudi Arabia



Dr. William Msekiwa Goriwondo Dean, Faculty of Engineering NUST, Zimbabwe



Dr. Yudi Samyudia Dean Universitas Prasetiya Mulya Jakarta, Indonesia



Dr. Eng. Wilson R. Nyemba Professor and Past Dean, Faculty of Engineering, University of Zimbabwe Harare Zimbabwe



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Prof. Oswell Hapanyengwi Dean: Faculty of Education University of Zimbabwe Harare, Zimbabwe



Dr. Maxwell Chanakira, Ph.D. Pro Vice Chancellor Harare Institute of Technology, Zimbabwe



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Dr. Noha Mostafa Assistant Professor of Industrial Dean, School of Industrial Eng. The British University in Egypt Mapua University, Philippines



Dr. Rex Aurelius C. Robielos Engineering and Management and Engineering Management,



Thamsanga Magubela CEO, SA Council for Graduates Cooperative Cape Town, South Africa



Dr. Adedeii Badiru Dean, Graduate School of Eng and Management Air Force Ins. of Tech, Ohio



Mrs. Barbara Nhemachena Quality Promotion and Development Director: A Self-help Assistance Officer, Zimbabwe Council for Higher Education (ZIMCHE), Zimbabwe



Program (ASAP), Education Consultant, Mutare, Zimbabwe



Dr. Joseph M. Ogundu President/CEO Emerald Global Consulting Inc. Michigan, USA

# **Submissions Received from Countries and Territories**

Algeria Germany Australia India Austria Indonesia Bangladesh Italy Botswana Malaysia Brazil Mexico Canada Morocco Colombia Mozambique Ethiopia Namibia Finland Nigeria France Peru

Philippines Qatar Rwanda Saudi Arabia South Africa South Korea Sri Lanka Sweden Switzerland Taiwan Tanzania

Turkey United Arab Emirates United Kingdom **United States** Yemen Zambia Zimbabwe

# Topics

# Topics covering industrial issues/applications and academic research include, but are not limited to:

Artificial Intelligence

**Automation and Robotics** 

**Business Management** 

**Case Studies** 

Computers and Computing

**Construction Management** 

**Cyber Security** 

**Data Analytics** 

**Decision Sciences** 

**Defense Management Science** 

Design

E-Business and E-Commerce

Energy

**Engineering Economy** 

**Engineering Education** 

**Engineering Management** 

Entrepreneurship and Innovation

**Environmental Systems Engineering** 

Facilities Planning and Management

Financial Engineering

Healthcare Systems

**Human Factors and Ergonomics** 

Humanitarian Supply Chain Management for COVID-19

iCloud

IE / OM in Africa

Information Technology and Information Systems

**Inventory Management** 

IoT

Lean

Logistics Management

Manufacturing

Material Flow Cost Accounting (MFCA)

Mechatronics

Modeling and Simulation

Occupational Safety and Health (OSH)

**Operations Management** 

**Operations Research** 

**Product Development** 

Product Lifecycle Management (PLM)

Production Planning and Management

**Project Management** 

Quality 4.0

**Quality Control and Management** 

Reliability and Maintenance

**Robotics** 

Sensors and Sensing Systems

Service Systems and Service Management

Six Sigma

Software Testing and Quality Assurance

Statistics and Optimization

Supply Chain Management

Sustainability and Green Systems

Sustainability in Supply Chain, Enterprise Operations and Strategies including Food Supply

Chain

Sustainable Manufacturing

Systems Dynamics

Systems Engineering

**Technology Management** 

**Total Quality Management** 

Transportation and Traffic

Waste Management

Work Design, Measurement, Standardization and ISO

#### **Special Tracks**

- Global Engineering Education
- Global Business Management Education
- Industry 4.0
- Industry Solutions
- Women in Industry and Academia
- Panel Sessions

#### **Sponsors / Corporate Partners**

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- EFR Certification
- Ford Motor Company
- SIEMENS
- Tooling Tech Group

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- University of Zimbabwe
- National University of Science and Technology (NUST), Bulawayo, Zimbabwe
- University of Nigeria, Nsukka, Nigeria

- Binghamton University, The State University of New York (SUNY), USA
- Center for Advanced Systems Research and Education (CASRE), University of Tennessee,
   Knoxville, USA
- Chiang Mai University, Thailand
- Eastern Michigan University, USA
- EMI, Mohammed V University, Rabat, Morocco
- Florida Polytechnic University, USA
- Lawrence Technological University, Michigan, USA
- Prince Sultan University, Riyadh, Saudi Arabia
- Universitas Sebelas Maret, Surakarta, Indonesia
- Universite De Lorraine, Nancy cedex France
- Universiti Tun Hussein Onn Malaysia (UTHM), Johor, Malaysia
- University of Derby, UK
- University of New Brunswick at Fredericton, Canada
- University of the District of Columbia (UDC), Washington, DC, USA
- Wayne State University, Detroit, Michigan, USA

# Organization Partners / Affiliates

- African Engineering Education Association (AEES)
- BKSTI: Agency for Cooperation of Higher Education of Industrial Engineering, Indonesia
- Indian Institute of Industrial Engineering (IIIE)
- International Federation of Engineering Education Societies (IFEES)
- Pakistan Society of Industrial Engineers (PSIE)
- Robofest
- Society of Cost and Quality Engineers (SCQE)

#### COMPETITIONS - Submission Deadline on October 30, 2020

- Undergraduate Student Paper Competition Sponsored by SIEMENS
- Graduate Student Paper Competition Sponsored by EATON Corporation
- Master Thesis Competition
- Doctoral Dissertation Competition
- Senior Capstone Design Project Competition sponsored by Tooling Tech Group
- Undergraduate Research Competition
- High School and Middle School STEM Competition
- Lean Six Sigma Competition sponsored by Tooling Tech Group
- Simulation Competition
- Supply Chain and Logistics Competition
- Undergraduate and Graduate Poster Competition

#### **Deadlines**

Abstract/Paper Submission: September 30, 2020

Review Feedback: October 15, 2020

Final Paper: November 15, 2020 Conference: December 8–10, 2020

Attendance Certificates will be provided for conference participants. Continuous Education Unit (CEU) is available. IEOM Society International will provide some awards and recognition at the 2020 Harare event.

Contact: info@ieomsociety.org

# Past Conference Programs

- Program Dubai 2020 10th Annual
- Program Riyadh 2019 1st GCC
- Program Toronto 2019 4th North American
- Program Pilsen 2019- 3rd European
- Program Bangkok 2019 9th Annual
- Program Pretoria 2018 1st African
- Program Washington DC 2018 3rd North American
- Program Paris 2018 2nd European
- Program Bandung 2018 8th Annual
- Program Bogota 2017 1st South American
- Program UK (Bristol) 2017 1st European
- Program Rabat 2017 7th Annual
- Program Detroit 2016 2nd North American
- Program Kuala Lumpur 2016 6th Annual
- Program Orlando 2015 1st North American
- Program Dubai 2015 5th Annual
- Program Bali 2014 4th Annual
- Program Istanbul 2012 3rd Annual
- Program Kuala Lumpur 2011 2nd Annual
- Program Dhaka 2010 1st Annual

**IEOM Publication Ethics and Malpractice Statement** 

IEOM Society International is a 501(c)(3) nonprofit organization, registered with the State of Michigan and tax exemption status approved by IRS.



#### **Scopus Indexing of IEOM Papers**

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IEOM Society International is a 501(c)(3) nonprofit organization approved by IRS (USA).
IEOM Chapters around the World
IEOM Awards
Partner's Events
2018 INFORMS Annual Meeting, Phoenix, Nov. 4-7
African Engineering Education Association Events
WEEE 2017 Kuala Lumpur Malaysia   IEEES November 13_16, 2017

#### Photos of Past Events

**IEOM 2017 Bogota Photos** 

**IEOM 2017 UK Photos** 

**IEOM 2017 Morocco Photos** 

**IEOM 2016 Detroit Photos** 

IEOM 2016 Malaysia Photos

**IEOM 2015 Orlando Photos** 

**IEOM 2015 Dubai Photos** 

IEOM 2014 Bali Photos

IEOM 2012 Istanbul Photos

# **NEWS**

New IEOM Student Chapter at King Abdulaziz University

University of Johannesburg, South Africa Started IEOM Student Chapter

IEOM has joined ESD (Engineering Society of Detroit) as an affiliated organization

IEOM K-12 STEM Poster Competition

**IEOM Conference Proceedings** 

ISSN: 2169-8767 (U.S. Library of Congress)

**IEOM Detroit 2016** 

ISBN: 978-0-9855497-5-6

**IEOM 2016 KL** 

ISBN: 978-0-9855497-4-9

**IEOM Orlando 2015** 

ISBN: 978-0-9855497-3-2

**IEOM 2015 Dubai** 

ISBN: 978-0-9855497-2-5

IEOM 2014 Bali

ISBN: 978-0-9855497-1-8

**IEOM 2012 Istanbul** 

ISBN: 978-0-9855497-0-1

**IEOM 2011 KL** 

ISBN: 978-0-9808251-0-7

**IEOM 2010 Dhaka** 

ISBN: 978-984-33-0988-4

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# Proceedings

# **IEOM Conference Proceedings**

IEOM Index – Proceeding Papers with DOI: https://index.ieomsociety.org/

# ISSN / E-ISSN: 2169-8767: Proceedings of the International Conference on Industrial Engineering and Operations Management

#### **IEOM Annual International Conference Proceedings**

- 12th Annual IEOM Conference, Istanbul, Turkey, Hilton Bomonti, March 7–10, 2022
- 11th Annual IEOM Conference, Singapore March 7–11, 2021
- 10th Annual IEOM Conference, Dubai, UAE, March 10–12, 2020
- 9th Annual IEOM Conference, Bangkok, Thailand, JW Marriott, March 5–7, 2019
- 8th Annual IEOM Conference, Bandung, Indonesia, Hilton Hotel, March 6–8, 2018
- 7th Annual IEOM Conference, Rabat, Morocco, Sofitel Hotel, April 11–13, 2017
- 6th Annual IEOM Conference Kuala Lumpur, Malayia, JW Marriott, March 8-10, 2016
- 5th Annual IEOM Conference, Dubai, UAE, Hyatt Regency, March 3–5, 2015
- 4th Annual IEOM Conference, Bali, Indonesia, Grand Hyatt, January 7-9, 2014
- 3rd Annual IEOM Conference, Istanbul, Turkey, ITU, July 3-6, 2012
- 2nd Annual IEOM Conference, Kuala Lumpur, Malaysia, Four Season Hotel, January 22–24,
   2011
- 1st Annual IEOM Conference, Dhaka, Bangladesh, IUT, January 7–9, 2010)

- 7th North American IEOM Conference, Orlando, Holiday Inn, June 12-14, 2022
- 6th North American IEOM Conference, Monterrey, Mexico, November 3–5, 2021
- 5th North American IEOM Conference, Detroit, August 9–11, 2020
- 4th North American IEOM Conference, Toronto, Holiday Inn, October 25-27, 2019
- 3rd North American IEOM Conference, Washington, DC, September 27–29, 2018
- 2nd North American IEOM Conference, Detroit, Lawrence Tech Campus, Sept. 23–26,
   2016
- 1st North American IEOM Conference, Orlando, Rosen Plaza Hotel, Sept. 10–11, 2015

#### **IEOM European Conference Proceedings**

- 5th European IEOM Conference, Rome, Italy, July 26–28, 2022
- 4th European IEOM Conference, Rome, Italy, August 3–5, 2021
- 3rd European IEOM Conference, Pilsen, Czech Republic, July 23–26, 2019
- 2nd European IEOM Conference, Paris, France, July 26–27, 2018
- 1st European IEOM Conference, Bristol, UK, July 24–25, 2017

#### **IEOM African Conference Proceedings**

- 3rd African IEOM Conference, Nsukka, Nigeria, April 5-7, 2022
- 2nd African IEOM Conference, Harare, Zimbabwe, December 7–10, 2020
- 1st African IEOM Conference, Johannesburg, South Africa, October 30 November 1,
   2018

#### **IEOM South American Conference Proceedings**

- 3rd South American IEOM Conference, Asuncion, Paraguay, May 10–12, 2022
- 2nd South American IEOM Conference, San Paulo, Brazil, April 5–8, 2021
- 1st South American IEOM Conference, Bogota, Colombia, October 25–26, 2017

#### **IEOM India Conference Proceedings**

- 2nd Indian IEOM Conference, Warangal, India, August 16–18, 2022
- 1st Indian IEOM Conference, Bangalore, India, August 16–18, 2021

#### **IEOM Asia Pacific Conference Proceedings**

- 3rd Asia Pacific IEOM Conference, Johor Bahru, Malaysia, September 13–15, 2022
- 2nd Asia Pacific IEOM Conference, Surakarta, Indonesia, September 13–16, 2021
- 1st Asia Pacific IEOM Conference, Harbin, China, July 9–11, 2021

#### **IEOM Central American and Caribbean Conference Proceedings**

- 2nd Central American and Caribbean Conference, San Jose, Costa Rica
- 1st Central American and Caribbean Conference, Port-O-Prince, Haiti, June 15-16, 2021

#### **IEOM GCC Conference Proceedings**

- 2nd GCC IEOM Conference, Muscat, Oman, 2024
- 1st GCC IEOM Conference, Riyadh, Saudi Arabia, November 26–28, 2019

#### **IEOM Australian Conference Proceedings**

1st Australian IEOM Conference, Sydney, Australia, December 21–22, 2022

# ISSN – 2691-7726 (Online), 2691-7734 (Print): Proceedings of the International Conference in Industrial & Mechanical Engineering and Operations Management (IMEOM)

- 1st IMEOM Conference, Dhaka, Bangladesh, December 23–24, 2017
- 2nd IMEOM Conference, Dhaka, Bangladesh, December 12–13, 2019
- 3rd IMEOM Conference, Dhaka, Bangladesh, December 26–27, 2020
- 4th IMEOM Conference, Dhaka, Bangladesh, December 26–27, 2021
- 5th IMEOM Conference, Dhaka, Bangladesh, December 26–27, 2022

# **IEOM Global Engineering Education Conference Proceedings**

■ 1st GEE Conference, Atlanta, Georgia, USA, November 15–16, 2020

# **IEOM Industry Solutions Conference Proceedings (Industry 4.0)**

1st Industry Solutions and Industry 4.0 Conference, Detroit, October 2023

## **Other Conference Proceedings**

TBA









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# Committee

# Conference Committee - IEOM 2020 Harare

#### **Conference Chair**

#### **Professor Charles Mbohwa**

Pro-Vice Chancellor Strategic Partnerships and Industrialisation University of Zimbabwe Mt Pleasant, Harare, Zimbabwe

#### **Conference Co-Chairs**

- Dr. Perkins Muredzi, Dean, School of Industrial Sciences & Technology, Harare Institute of Technology, Zimbabwe
- Dr. Londiwe Cynthia Nkiwane, Associate Professor and Chairperson in the Department of Fibre and Polymer Materials Engineering, National University of Science and Technology, Bulawayo, Zimbabwe
- Dr. Wilbert Mtangi, Director: Institute of Materials Science, Processing and Engineering Technology, Chinhoyi University of Technology, Chinhoyi, Zimbabwe

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 Dr. Ahad Ali, Associate Professor and Director of Industrial Engineering, A. Leon Linton Department of Mechanical, Robotics and Industrial Engineering, Lawrence Technological University, Detroit, Michigan, USA

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- Dr. Loice K Gudukeya, Department of Mechanical Engineering, University of Zimbabwe
- Dr. Ignatio Madanhire, Department of Mechanical Engineering, University of Zimbabwe
- Dr. Wilson R. Nyemba, Department of Mechanical Engineering, University of Zimbabwe
- Dr. Bupe Mwanza, University of Zambia
- Prof. Michael Mutingi, Associate Professor of Industrial Engineering, Department,
   Mechanical and Marine Engineering, Namibia University of Science and Technology,
   Windhoek, Namibia
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- Prof. Ruben Ndihokubwayo, Associate Professor, Walter Sisulu University, Cape Town Area, South Africa
- Prof. Sarma Yadavalli, University of Pretoria (UP), South Africa
- Prof. Thomas Tengen, Vaal University of Technology (VUT), South Africa
- Professor Mulaba, University of Zimbabwe
- Vennan Sibanda, National University of Science and Technology (NUST), Zimbabwe
- Wilbert, Harare Institute of Technology (HIT), Zimbabwe

# Track Chairs

#### **Agricultural Engineering Systems**

- P. Udomkun, International Institute of Tropical Agriculture (IITA), Bujumbura, Burundi
- S. Nsabimana, Department of Geography, University of Burundi, P.O. Box: 1550, Bujumbura, Burundi
- Minteh, Agricultural Engineering Services (AES) Unit, Department of Agriculture (DoA),
   Ministry of Agriculture, Gambia

#### **Artificial Intelligence**

Dr. L. Razanakolona, Laboratory Application the Computer Model in Development, LIMAD, Uneversity Fianarantsoa, Madagascar

#### **Automation and Control**

Dr. Rajab Abdullah Hokoma, University of Tripoli, Libya

Dr. G.M. Bouba, LTI Laboratory, ESP/UCAD, Dakar, Senegal

#### **Business Management**

Dr. M Sandada, Senior Lecturer, Graduate School of Management, University of Zimbabwe

#### **Case Studies**

Dr. G.A. Mboro Nchama, Departamento de Ciencias Técnicas, Universidad Nacional de Guinea Ecuatorial (UNGE), Malabo, Equatorial Guinea

#### Climate

■ G.-N.T. Longandjo, Faculty of Environmental Science and Engineering, Université Nouveaux Horizons, Lubumbashi, Democratic Republic Congo

#### **Cyber Security**

- Dr. Sam Takavarasha Jr. Women's University in Africa
- Dr. Alfred Musarurwa CIO Nedbank, Zimbabwe

#### **Computers and Computing**

Joseph Shitote, Strathmore University, Kenya

#### **Construction Management**

Hossam Hassaan, University of Alexandria, Alexandria, Egypt

#### **Data Analytics**

Rym Nassih, École Mohammadia d'ingénieurs (EMI) Rabat, Morocco

#### **Decision Sciences**

Dr. Bupe Mwanza, University of Zambia

#### **Design and STEM Workshop**

Dr. Marni Lafleur, University of Madagascar

#### **E-Business and E-Commerce**

Dr. N. Armando, Escola Superior Politécnica do Uíge, Universidade Kimpa Vita, Kondo Benze Uíge, Angola

#### Energy

Rannditsheni Pfunzo, University of Johannesburg, South Africa Kátia C.P. Gabriel, Instituto Superior Politécnico de Tecnologias e Ciências (ISPTEC), Departamento de Engenharias e Tecnologias (DET), Av. Luanda Sul, Rua Lateral Via S10, Talatona-Município de Belas, Luanda, Angola

#### **Engineering Economy**

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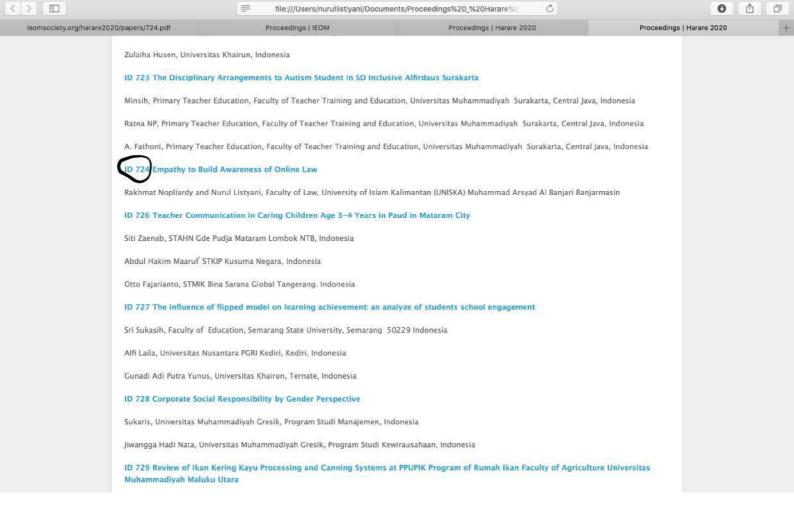
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ID 005 A Study on Tea Industry and Areca Nut Market - A Case Study On Enhancing The Possible Strategies To Increase Sales And Spread Brand Awareness For Areca Market In Karnataka, India



## **Empathy to Build Awareness of Online Law**

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#### Abstract

This article aims to use empathy in the process of building legal awareness in the era of industry revolution 4.0. with a good legal awareness through hermaneutic approach will strengthen the role of law to provide certainty and justice, online communication can provide a different perception space so that it becomes one of the factors that can trigger the conflict and social tensions that encourage a moral shift of society who in his life get the convenience of utilizing digital technology such as virtual world both social media and online applications both paid and free. Ethics and morals in the perspective of legal psychology underlying empathy will reinforce the fulfillment of the comprehensive principles of justice that are necessary in building a legal consciousness with empathy in a society in the current disruption era in order to utilize technology civilized, intelligent and creative for obedience and order law. To understand the role and function of building legal awareness with empathy in the online legal order the author considers there are four main ways: 1) law as science, 2) law as policy, 3) law as culture, and 4) empathy.

**Keywords**: Building, Legal Awareness, Online, empathy.

#### 1. Introduction

Indonesia as the largest archipelagic state should have an infrastructure that connects all people, natural resources, raw materials, and various other networks. This can all be a whole network or a seamless network. Various data can be taken as a result of every point of activity. This is called Big Data<sup>1</sup>. Now the era of network development that we should have passed together consciously or unconsciously we walk along with the needs of nation and state.

Today citizens of the world have many opportunities and facilities to connect with mobile devices, the discovery of byte byte data processing speeds of internet, the development of hard drive data storage capacity has increased the capacity of human knowledge beyond the conventional system obtained by children in school , how access to science is so openly real, unlimited and unprecedented. All this is no longer a dream, but has become a new technological breakthrough in the field of robotics, Internet of Things, autonomous vehicles, 3-D based printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing<sup>2</sup>.

The various realities of the existing technological innovations are obviously happening not without cause. This is in line with the existence of technology and informatics that have an enormous impact on the changes and innovations that we feel. The need for effective and successful results enables producers to innovate and breakthrough into the lives of consumers, so that markets in the current sense of the place become conventional, characterized by a low level of relationship among principals, that agents act strategically to form a competitive advantage in such a way that the interaction between the two agents is facilitated by the third actor (Granovetter 1973, Burt 1992, Uzzi 1997)<sup>3</sup>.

If we look in detail did not rule out, the innovations made by old business actors who utilize online media raises the factor of horizontal conflict with other manufacturers located in the conventional comfort zone<sup>4</sup>. Where the use of technology makes it easier for consumers to access the production of goods or services of the maximum service with an efficient cost almost indefinitely space and time. This may affect transaction norms and relationships

<sup>&</sup>lt;sup>1</sup> Jennie M. Xue, 2014, Revolusi Industri dan Big Data, KONTAN 17 Februari - 23 Februari 2014, p. 27

<sup>&</sup>lt;sup>2</sup>Kaus Schwab, Executive Chairman World Economic Forum

<sup>&</sup>lt;sup>3</sup> Krishna, M.; Paul, G. D. Bino, *The structure of Collaboratioan Networks: An Illustration of Indian Economics*, Journal of Social Structure, Vol. 18, 2017

<sup>&</sup>lt;sup>4</sup>Edy Suandi Hamid, 2016, *Disruptive Innovation*: Manfaat Dan Kekurangan DalamKonteksPembangunan Ekonomi, Jurnal Al-'Adl, Vol. 9, No. 2.

between business actors and consumers. In a recent survey, Rosenfeld and Thomas (2012) found that the internet quickly replaced traditional relationships, including families, schools, neighborhoods, workplaces and friends<sup>5</sup>.

From these various descriptions it becomes important in this paper to build a real online legal awareness when put to good use and emphasize the attitude of empathy will be mutually supportive. Nevertheless, with the study method of descriptive socio-legal case of innovation in the use of technology that caused miscommunication is found in several regions in Indonesia such as Public Transport Online with application, online trading with application, social media, and others. With these emerging problems, the paper will show building online legal awareness is the need of scientific determinists with hermeneutic analysis knives how the regulation of text and context, can encourage the attitude of empathy raises morality and mutual implicative moral responsibility in utilizing the informatics technology. Furthermore, it needs to explore how to build legal awareness from the contextual side by empathizing in online surfing using cyber media. Last but not least is the implication of legal awareness raising a solution with an empathetic attitude in the internal life of a law communicate is the basis for the exercise of freedom and personal development to sacrifice strictly so that law as a limiting in the short-run relationship of human happiness as a necessary price of civilization and security<sup>6</sup>.

#### 2. Law as Science

Law Science is a science with a special character. Thus the science of law is a separate science (sui generis)<sup>7</sup>. So that the quality of science feels in a difficult situation to be grouped on one branch of the science tree, both the branch of natural science, the branch of social science, and the humanities branch<sup>8</sup>. But based on scholarly characteristics, according to Bernard Arief Sidharta<sup>9</sup>, the science of law belongs to a group of practical sciences, although as medicine, the science of law occupies a privileged position in the classification of science, not because it has a long history, but also because of its nature as a normative science and its direct impact to human life and society carried by its nature and its problems. So in the context of legal awareness development seen in the sociological dimension requires an empathy attitude because it is directly related to life and live in a community that has a social order into internal and external agreements in relationships between communities. Prevention of miscommunication becomes more important than law enforcement when miscommunication results in horizontal problems.

#### 3. Law as a policy

Kliejn Policy as a conscious and systematic action, by using means that fit with clear political objectives as a step-by-step goal<sup>10</sup>. Jim A Kuypers Policy as an arrangement of: **a**. objectives chosen by public administrators for both self-interest and group interests. **b**. the means and times they choose<sup>11</sup>.

In Friend's view Policies are essentially a position that once declared will influence the success of decisions to be made in the future <sup>12</sup>. Carl.J.Frledrick Policy as a series of actions proposed by a person, group or government in a particular environment by showing obstacles and opportunities for the implementation of the policy proposal in order to achieve certain goals <sup>13</sup>. James E Anderson Policy is a set of actions that have a specific purpose that is followed and implemented by a person's offender or a group of actors to solve a particular problem <sup>14</sup>.

<sup>&</sup>lt;sup>5</sup> Felmlee, Diane H.; Kreager, Derek A., 2017, *The Invisible Countours Online Dating Communities: A Social Network Perspective*, Journal Of Social Structure, Vol. 18.

<sup>&</sup>lt;sup>6</sup> Spinoza, 1982, "The mind's conatus, or power, is the very essence of the mind", IIIp54dem, p. 136.

<sup>&</sup>lt;sup>7</sup> Philipus M. Hadjon, *Pengkajian Ilmu Hukum Dogmatik (Normatif*), dalam "Yuridika", Jurnal Hukum Universitas Airlangga Surabaya, No. 6 Tahun IX, November – Desember 1994, p. 1.

<sup>&</sup>lt;sup>8</sup> Titik Triwulan Tutik, 2014, *Hakekat Ilmu Hukum Ditinjau dari Filsafat Ilmu dan Teori Ilmu Hukum*, Jurnal Hukum dan Pembangunan Tahun ke-44 No.2 April-Juni 2014

<sup>&</sup>lt;sup>9</sup> Bernard Arief Sidharta, 2000, "Refleksi Tentang Struktur Ilmu Hukum", Bandung: Mandar Maju, p. 113.

<sup>&</sup>lt;sup>10</sup> Kliejn, 1978, *All Agreements are translated from Patries Haberer at al.*, De Buurtaanpak (The neighborhood approach). The Hague: State Publisher.

<sup>&</sup>lt;sup>11</sup>A Hoogerwerf,1973, *Isi dan Corak-Corak kebijakan (Overhead Beleid)*, Terjemahan R.L.L. Tobing, Jakarta, Erlangga, hlm. 7

<sup>&</sup>lt;sup>12</sup>Imam A Saukani & A. Ahsan Tohari, 2010, *Dasar-dasar Politik Hukum*, Cetakan ke 6, Jakarta, PT. Raja Grafindo Persada, p. 22.

<sup>&</sup>lt;sup>13</sup>Carl.J.Frledrick, Man and His Government, (New York: Mc Grow Hill, 1973), p. 79

<sup>&</sup>lt;sup>14</sup>James E Anderson, *Public Policy Making* (New York, Paeger Publisher, 1979), p. 3

#### 4. Law as a culture

As Lawrence M. Friedman argues that legal culture or legal culture can be interpreted as a pattern of knowledge, attitudes, and behavior of a group of people against a legal system. From these patterns, we can see the level of integration the society with a visible legal system Easily. this level of integration is characterized by their level of knowledge, acceptance, trust and dependence on the legal system <sup>15</sup>.

The legal culture is the common common response of a particular society to the legal phenomena. The response is a unified view of legal values and behavior. Thus a legal culture shows the pattern of individual behavior as a member of society that describes the same responses to the living law of the community concerned <sup>16</sup>

Based on some of these opinions, it can be said that the culture of a nation is very influential on the condition of the nation's legal consciousness. Therefore, the discussion of the legal consciousness of a nation is greatly influenced by the development of its society, including the influence of socio-cultural values which is the soul of a nation (volkgeist). Similarly, said by Esmi Warassih Pujirahayu (2005: 96), in talking about the law we can not be separated from other non-legal factors, especially the value factor and attitude and public opinion, all of which are called legal culture <sup>17</sup>. Law reform begins with a culture renewal or a legal culture because the existence of a legal culture greatly affects the substance and structure of the law.

Legal culture according to Satjipto Rahardjo is the values and attitudes of society that can affect the workings of the law<sup>18</sup>. Lawrence M. Friedman uses the term legal culture to describe a number of interrelated phenomena. The legal culture / legal culture as intended by Lawrence M. Friedman is the whole of the public attitudes of the public and the values in society that will determine opinions about the law<sup>19</sup>. Thus the existence of legal culture becomes very strategic in determining the choice to behave in accepting the law or reject the law. In other words a law will be a law that is really accepted and obeyed by the community is largely determined by the legal culture of the community concerned<sup>20</sup>.

Based on Lawrence M. Friedman's opinion, the legal culture can be interpreted as a pattern of knowledge, attitudes, and behavior of a group of people against a legal system. From these patterns, it can be seen how far a society can accept the existence of a legal system<sup>21</sup>. This legal culture is also interpreted as an atmosphere of social thought and social forces that determine how the law is used, avoided, or abused, the following attitudes and values that affect both positive and negative effects on behavior related to law enforcement are: legal structure, legal substance, and legal culture<sup>22</sup>.

Daniel S. Lev distinguishes the legal culture in two maca. The first is "Internal Legal Culture, which is the legal culture of citizens who carry out specific legal duties, such as lawyers, police, prosecutors and judges, and Second," External Legal Culture ". namely the legal culture of society in general / society at large<sup>23</sup>. Daniel S. Lev sees that in order to understand legal culture, there are practical ways that can be done by taking into account two indicators, namely (1) values related to social governance and conflict management. These values are the basis of the culture of the legal system and are helpful in determining the "place-giving system" of legal, political, religious and other institutions at any place and time in the history of a society: (2) basic assumptions on the dissemination and use of existing resources in society, social good and bad and so forth. These assumptions, continued Daniel S. Lev, are in the ideological view of economic, political and social change and are directly proportional to the change of society, with the possibility of culture being special or vice versa<sup>24</sup>.

<sup>&</sup>lt;sup>15</sup> Lawrence M. Friedman, 1989, *Law, Lawyers, and Popular Culture*, 98 YALE L. J. 1579 [hereinafter Friedman, Law, Lawyers, and Popular Culture].

<sup>&</sup>lt;sup>16</sup> Hilman Hadikusuma. 1986, Hukum Kekerabatan Adat, Fajar Agung. p. 11

<sup>&</sup>lt;sup>17</sup> Esmi Warassih Pujirahayu, 2005, *Pranata Hukum: Sebuah Telaah Sosiologis*, Suryandaru Utama, Semarang. p. 96.

<sup>&</sup>lt;sup>18</sup> Satjipto Rahardjo, 1983, *Permasalahan Hukum di Indonesia*, Alumni, Bandung. p. 12.

<sup>&</sup>lt;sup>19</sup> Lawrence M. Friedman, 1980, Sistem Hukum perspektif Ilmu Sosial, Nusamedia, Bandung.

<sup>&</sup>lt;sup>20</sup> Any Ismayawat,i *Pengaruh Budaya Hukum Terhadap Pembangunan Hukum Di Indonesia (Kritik Terhadap Lemahnya Budaya Hukum di Indonesia)*, PRANATA HUKUM Vol. 6 Nonor 1 Januari 2011

<sup>&</sup>lt;sup>21</sup> Friedman M. Lawrence, 2009, *Sistem Hukum*; Perspektif Ilmu Sosial(The Legal System; A Social Science Perspective), Bandung: Nusa Media, p. 33.

<sup>&</sup>lt;sup>22</sup>Lawrence M. Friedman, 1980, Friedman M. Lawrence, Lawrence M. Friedman, American Law An Introduction (Hukum Amerika sebuahPengantar) Second Edition, Penerjemah Wishnu Basuki, (Jakarta: Tatanusa, 2001), p. 7-8

<sup>&</sup>lt;sup>23</sup>Daniel S. Lev. 1980, Peradilan Agama Islam Di Indonesia, Intermasa, p. 192-193.

 $<sup>^{24}</sup>Ibid$ .

Based on some of these opinions, it can be said that the culture of a nation is very influential on the legal conditions of the nation. Therefore, to build awareness of community law is strongly influenced by the development of society itself, including the influence of socio-cultural values that are the soul of a nation (volkgeist). Similarly, said by Esmi Warassih Pujirahayu (2005: 96), in talking about the law we can not escape from other non-legal factors especially the value factor and the attitude and views of society, all of which are called legal culture. So basically reform (development) law must start from the renewal of culture or legal culture because the existence of legal culture greatly affect the substance and structure of law. The thing that needs to be noticed in legal development is that the legal culture of Indonesia is changing along with the changes occurring within the Indonesian society itself. The formation of legal culture can not be separated from the consideration of culture and characteristics of society. The legal culture that grows in society is the embodiment of the order of values which is the foundation of the foothold in the nation and the state. This is very influential on the end results of legal development, for it needed a step to change the legal culture can actually increase the development of law with the results that can help realize the ideals of the Indonesian nation.

It can be argued that the legal culture is the whole of the factors that determine how the legal system can be accepted within the cultural framework of society, therefore the so-called legal culture is none other than the whole factor that determines the existence of the legal system to obtain its logical place in the cultural framework belongs to the general public. In short it can be said that the so-called legal culture is the overall attitude of the citizens and the value system that exists within society that will determine how the law should apply in the society concerned. The growing legal culture in society is a manifestation of the values that are the foundation of a nation and state. Legal culture is not a personal culture but a whole culture and a particular society as a whole of attitudes and behavior.

Thus from some sense of legal culture we can understand that the legal culture of Indonesia is going on the movement along with the changes that occur in the Indonesian society itself. The crucial problem nowadays is the degradation of legal culture in the community. The legal culture of the Indonesian nation today is also influenced by the pressure of the industry revolution era 4.0. In this era we can see from the behavior of Indonesian life that describes it. a very easy example to see is the change of thinking in the face of a dispute. Formerly the Indonesian nation in resolving the dispute, the disagreement was resolved by deliberation for consensus, in a peaceful way, but the present development of each dispute arose more and more resolved in court, although everyone knows that there is a shift of justice in the courts so it is no longer a place to seek justice. On the other hand many of the behaviors that harm the society are not resolved. This does not mean that there are no rules, laws and weak legal structures. but because of the weakness of legal culture and the level of legal awareness began to decline.

The legal awareness of Indonesian society has grown steadily no better but has declined. This is because the legal culture of the Indonesian nation has shifted to a matrialistic behavior. Growing views are not only triggered because of the ineffectiveness of the law. The ineffectiveness of this law in addition to many legal products that are not in accordance with the soul and values that live in Indonesian society but rather to a situation that only thinks for itself does not care about other people, so that people understand the law not because awareness of the significance of the law but rather for fear of law enforcement officials. This condition became the trigger of thinking to the public that the law is the officer. so that if no officer is considered there is no law. If examined in the behavior of the Indonesian nation in the past, the observance of society on a rule not because of fear of the authorities but they are aware of the importance and purpose of existing rules. This can be seen in swapraja regions that have local rules (local wisdom).

The local community will abide by the rules with a high awareness that the rule is for the good without any officer always supervising and arranging the implementation of the regulation. The high legal culture of the people is a society that does not tend to violate the law even though no law officer sees it.

#### 5. The Empathy Behavior of Building Legal Awareness

Judging from the substance of the law, we can see the consciousness of the law is not a law because it has never obtained a proof that the content of legal awareness is indeed true. We cannot say for instance that a legal awareness of a living environment for example exists or the legal consciousness of all members of society or of the great majority demands a thing. We are blind to that. So that legal consciousness is nothing but a shadow or a vague assumption about what it should be 'by law or simply by public opinion. To realize the proof then we must master all the circumstances and must be considered before all the factors that lead to the department.

<sup>&</sup>lt;sup>25</sup>*Ibid* Esmi Warassih Pujirahayu (2005, p. 96)

Legal awareness in law reform cannot be absolute released from society. This means that what is encountered is social realities in a broad sense. As in Indonesia, where heterogeneous societies with different levels of society, from simple to complex societies, will face differentiation which then leads to the structure of society. In simple society the law arises and grows together with the life experiences of citizens. Here the organizers make more regulation of the law that grows and develops in the community, on the contrary it seems to happen in a complex society law is difficult for the emergence of law from below. A high degree of differentiation in its structure brings consequences to a variety of categories and interests that do not rule out conflicting possibilities. Although the law comes and is determined from the state organizers, the source remains from the community.

The general formulation of the reactions of legal consciousness in more concrete terms is then made a general rule of law awareness is difficult because new legal consciousness reacts if human beings are aware of their responsibility in making decisions about a matter. In the legal order operating in a society is basically the embodiment of the legal ideals embraced in the society into various sets of rules of positive law, legal institutions and processes (the behavior of state administrators and citizens means that in essence the law as a behavioral code of society rooted in the ideas, tastes, intentions, creations and thoughts of society itself).

Humans are born already in the midst of life, in the midst of history, society, religion, politics, language and culture. We all live in life in another world, from institutions, laws, with sophisticated goals, and the temptations of civilization.

However, the romanticism of the natural life of social harmony in a civilization, human nature is in the circle of the power of disruptive civilization began felt by the perpetrators of life. The advantages of society as a society he clearly holds far greater than the almost insurmountable solitary life<sup>26</sup>, "and" from the experience finding that they can more easily meet their needs by helping each other and even more, here there is no individual thing in a universe that is more profitable to humans than to human beings who live with empathy. Yet all, or almost all, in the ethical node is a route to the legal consciousness that encourages the birth of various virtues<sup>27</sup>.

As a creature who always wants to mix with other human beings, humans will be in silence if life is outside the network of order, whatever form and purpose both internal and external. Sociologically illustrates<sup>28</sup>, that humans are a group of people who must make extensive communication with various problems both personally and community. The personal and community relationships go naturally along with each other's needs, so for that to require this social networking network, specifically the author uses the writings of Vincent Jeffries and H. Edward Ransford Social Stratification a multiple hierarchy approach, especially about The Multiple Hierarchy Model and The Ideology of Ethnic Stratification as a connecting knife. Some approaches that the author uses in this tulsian are; first, the social stratification that exists in society is a single hierarchy model (SingleHierarchy Model) and multiple hierarchy model (Multiple Hierarchy Model)<sup>29</sup>. A single hierarchy model, there are two assumptions, that the family is the right unit to form empathetic attitudes and community norms to be used in social stratification systems. While the compound hierarchy expose the online users in understanding the legal norms in building a good relationship. Man wants to be bound and bond made it himself, but at the same time he seeks to escape from the bond he made himself, when felt not fit anymore. Then at the same time most humans are unaware of their thinking and disobey the rules they make themselves.

Schuyt and Ellickson in Satjipto Rahardjo state that the law is not always true, it does not monopolize the truth, the law can be wrong. Here disobedience to the law needs to be heard and accepted as an attempt to correct something that is not true. There was a continuous struggle between law making and rule breaking<sup>30</sup>. In this disruptive era, one of the problems that still arises is the shifting of community empathy that encourages legal awareness and legal obedience is not evenly distributed in society, so then the law that is interpreted justice experience turbolence from the many law enforcement process because the legal principles are more appreciated as a mere procedural technical issue. Many people who think as innocent as they have not been prosecuted despite ethical and moral violations, uncontrolled behavior and disobedience to the law<sup>31</sup>, have not yet been proven to be legally wrongful in court. The result then becomes a game tool to seek victory in disputes or litigation in courts and

<sup>&</sup>lt;sup>26</sup> Davies, 2011, treatment of the broad philosophical implications of Jaak Panksepp's discoveries in affective neuroscience.

<sup>&</sup>lt;sup>27</sup> Spinoza, 1982, writes in III, Definition of the Emotions, p35s, p. 173

<sup>&</sup>lt;sup>28</sup> Álvaro Morcillo Laiz & Klaus Schlichte, *International organizations, their staff and their legitimacy: Max Weber for IR*, Cambridge Review of International Affairs, p. 29:4

<sup>&</sup>lt;sup>29</sup>Vincent Jeffries and H. Edward Ransford, 1980, *Social Stratification a multiple hierarchy approach*, (Boston : Allyn and Bacon, Inc), p. 3-12.

<sup>&</sup>lt;sup>30</sup>Satjipto Rahardjo, 2008, Biarkan Hukum Mengalir, (Jakarta: Kompas), p. 7

<sup>&</sup>lt;sup>31</sup>Ibid

not to uphold justice, truth and order in society. Law enforcement then plays or gets trapped in the game of norms regardless of human beings as subjects who must be served with justice and ethical and moral<sup>32</sup> based law accompanied by awareness and legal obedience.

Ethics and morals in the perspective of the psychology of the law based on empathy will reinforce the fulfillment of the elements of comprehensive justice, Titchner (Goleman, 2003) states that empathy comes from a kind of physical imitation of the burden of others, which then gives rise to similar feelings in a person<sup>33</sup>. According to Johnson empathy is a tendency to understand the condition or state of mind of others<sup>34</sup>. A person who empathizes is described as a tolerant, friendly, self-controlling, humanistic individual. Taufik (2012) defines empathy as an activity to understand what other people are thinking and feeling, and what the observer thinks, perceiver, of the condition that other people are experiencing without lossing control of themselves<sup>35</sup>, Empathic concern (Empathetic attention), is one's orientation towards others in the form of sympathy, pity, and care for others who have difficulty. This aspect relates positively to emotional reactions and helpful behavior to others<sup>36</sup>.

Epistimologi is about building online law awareness online in surfing in the virtual world with the attitude of reading and empathy in looking at online narratives, metaphors from the moral laboratory approached a brief summary of research and theory. In absorbing narratives can stimulate the imagination of empathic. The reader along with the author / narrator in a thought experiment (fictitiously), imagines how it will be in the shoescertain characters, with certain motives, in certain circumstances, meet certain events. That would explain why narration can produce an expansion of the reader's consciousness, especially so as to include fellow human beings. Fiction can stimulate the reader to consider the narratives they read as mind experiments, creating distance between them and events, allowing them to experiment more freely by taking on different character positions of themselves, also in moral terms. Literary features, such as ambiguous gaps and characterization, can stimulate the reader to make more mentally conclusions, thus practicing their mind theory<sup>37</sup>.

Law and psychology are different, when viewed from the point of difference. But psychology and law are also the same, when viewed from the similarity. Where do we want to see? When viewed from the formal object is different. On the other hand the material objects are both equal, human. If both deal with human problems, why not cooperate? By understanding the problem was not excessive if the author expects philosophical reflection using psychology in building the character of law. Because the expected contribution of psychology to the contextual side contributes to the development of legal consciousness as reflected in Hutchins' (1933) statement that law is always based on assumptions about how people behave and psychologists know how people behave. Interesting question above. Judging from the year when it was delivered it shows a long-standing awareness of how much relevance involves psychology in legal matters. The consciousness arises precisely because the jurists are aware that the law cannot be merely in the book but more important is how the law is in behavior. In other words, the expansion point of view from law in books to law in actions brings psychology to participate in various aspects of the law<sup>38</sup>.

Hutchins believes in prosperity, technology and "" world order "" to bring the 21st century the implications of building legal awareness through education both at the level of internal and external communities are efforts to help people become intelligent in order to develop the ultimate power in understanding the construction of conscious building their laws.

The potential of empathy is to be included as an important element in living, especially in building legal awareness. This challenges the conception of legal practice, although it must still refer to an increase in empirical facts that show the interaction between cognition that affects and reflects the reality of emotion in the practice of life.

"The absence of human power to control and observe the emotions themselves and others so it is very susceptible to the luck that the era of disruption where we have to start remembering constantly and repeatedly to be able to avoid the pressure from the effects of innovation technology that continues to move dynamically even though in fact simplify human life, but along with it innovation technology has a strong compressive power to the aspect of life of the nation and state whether consciously or not.

<sup>&</sup>lt;sup>32</sup>Mahfud MD, 2009, Konstitusi dan Hukum dalam Kontroversi Isu, (Jakarta: Rajawali Press), p. 68

<sup>&</sup>lt;sup>33</sup>Goleman, Daniel, 2003, Emotional Intelligence: Why It Can Matter More Than IQ, New York.

<sup>&</sup>lt;sup>34</sup>Sari, A. T. O & Eliza, M. 2003. Empati dan Perilaku Merokok di tempat umum. Jurnal Psikologi, No. 2, p. 81-90

<sup>&</sup>lt;sup>35</sup>Taufik., 2012, *Empati: pendekatan psikologi sosial*. Jakarta: Raja Grafindo.

<sup>&</sup>lt;sup>36</sup>Mark H. Davis, 1980, *A Multidimensional Approach to Individual Differences in Empathy*, JSAS Catalog of Selected Documents in Psychology, 10, p. 85.

<sup>&</sup>lt;sup>37</sup>Hakemulder, Jèmeljan, 2000, The Moral Laboratory. Experiments Examining the Effects of Reading Literature on Social Perception and Moral Self-Concept, Amsterdam.

<sup>&</sup>lt;sup>38</sup>Hutchins, Robert Maynard, 1899-1977, The Learning Society, New York: Frederick A. Praeger, 1968, p. 142

Deeper and more basic level descriptions, is when humans are confident to free surf using technology they are aware of their actions and do not know what the cause of that freedom is. Empirically has provided evidence to support this insight and an explanation of Emotions and that related to empathy are the necessary causes of our actions, he is in control of the mental decisions no more than the lust itself. His deeds are the necessary result or expression of emotions, desires, and thoughts. In addition, Spinoza regards emotion as the expression and manifestation of one's passive or active posture in the world<sup>39</sup>.

They include affective and cognitive components, as well as expressive or passive postures. Spinoza goes on to tell the reader that our actions stem from the formation of our minds by our memories. Without memory, he says, we can not act at all. "We can not take action from mental decisions unless memory comes into play," he wrote<sup>40</sup>. Memory, in turn, is determined by its causal antecedents and context, since "it is not within the unconstrained mind power of the mind to remember or forget anything"<sup>41</sup>. Online users harbor the illusion that our unbound mental decisions rather than what they actually do are driven by imagination and memory. For those "who believe it they ... do anything from the mindless lifestyle decisions that their eyes dream openly after being in cyberspace.

But the mind does not have the power of will in empathizing to avoid personal or group interests that we have, the power of the mind tomeditating on himself and forming more adequate ideas (Spinoza, 1982, p4, p.206). Thinking of playing with the same needs as the body of the cause. In fact, Spinoza considers thinking and doing, thinking and acting, as aspects of the same necessary process playing in each of us and in Nature as a whole. In addition, Spinoza argues that thinking is affective in nature. It is because "the mind and the body are one and the same thing" (though understood in two different ways: Spinoza, 1982, IIIp2s, pp. 107). Consequently, thinking is manifested, and action is the expression of our desires. Therefore, desire is not just something that everyone has among other capacities and abilities, but that is our basic essence, empathy to survive and advance ourselves in order to change our own desires and thoughts to care for others, from passive active, from disruptive era pressures. How did this happen and how did it work? It is the process of thinking, through practice, and it can be taught how to empathize to change our desires, in the daily life of the little ones, which is basically the desire to do good with what we have. Thus our mind can intervene to change our ignorance to others, and this must be done continuously, thus forming attitudes and beliefs that will encourage legal awareness in living both internally and externally 42 '. Why is this so? Spinoza tells us that there are only two ways we can understand our world and our experience, "well as far as we imagine [things] exist in relation to time and place, or as far as we imagine them to follow from necessity nature<sup>43</sup>. Spinoza draws contrast here between a local perspective and a universal perspective, and between an imaginative cognitive understanding and a rational understanding. Local is also passive while the universal one must be found for ourselves and hence he called it active. We find the following more detailed mental description of passive vs. mental activity: the limitations of the mind we have, not enough, but only the confusing knowledge, of itself, of his own body, and of the external bodies, as long as he feels the things of the natural order the common, that is, as long as it is determined externally, from chance meeting with things, to regard this or that, and not so long as it is internally determined, from the fact that it considers a number of things at once, to understand their covenants, differences, and contradictions. For so often as it is disposed internally, in this or any other way, it sees things clearly and clearly. In passive thinking, the links that fill our self-understanding of ourselves and the world are picked up passively by the mind from the ways in which the local context - that is what Spinoza refers to 'the common commands of nature' connect or connect things with one another and ourselves with and in our immediate time and place<sup>44</sup>. Therefore the mind is passive, its weakness, its firmness because of its nature embedded in its direct external state, its narrow context, who write themselves unfocused in our minds and fill each of us with an external association of time and place. And we act only from this superficial and passive (and we will add today, 'unconscious') understanding of who we are.

The problem is our knowledge is not enough for who we really are but only partially and confused. It also presents affective (emotional and motivational): for, as Spinoza wrote, "man does need to always submit to passive emotions and follow the general rules of his environment, and obey them<sup>45</sup>. The amount for passive acceptance and

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    <sup>39</sup> Spinoza, 1982, writes in III, Definition of the Emotions #1, p. 142
    <sup>40</sup> Spinoza, 1982, IIIp2s, p. 107
    <sup>41</sup> Spinoza, 1982, IIIp2s, p.108
    <sup>42</sup> Spinoza, 1982, IVp27, p. 169
    <sup>43</sup> Spinoza, 1982, Vp29s, p. 218
    <sup>44</sup> ibid
    <sup>45</sup> Spinoza, 1982, IVp4cor, p. 158
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event surrender to our own corner of the world, our own moment, and the non-reflective embodiment of our narrow experience with all their emotional tyranny and motivation.

The social interaction between involved social actors is reviewed by Herbert Blumer, 1969<sup>46</sup>, the theory of symbolic birth of interactionism with terminology: Behavior must be noticed so much in terms of its meaning to others and society in general but what it means you, the actor. Also the way other people respond or respond to your behavior greatly affects your own response and reactions. We all live in the perfection of our own perception of reality, which we read the correspondent, not the truth, and we act in an interaction in accordance at all or read the situation, which includes from our perception of why others are reading it<sup>47</sup>. If the symbolic theory of interactionism is traced, it is rooted in pragmatism or intrumentalism from the theory of social recognition / social psychologist George Herbet mead. This viewpoint that the human mind is not photocopies from the outside world, but is the result of human activity in a macro environment. The actor will weigh, assess and ultimately choose certain attitudes and bounds of the various possibilities that exist through thinking as an individual process of integrating with oneself, the individual choose the stimulus that will be in response<sup>48</sup>. In this active process, the human mind not only acts as an instrument to act or behave but to be part of human attitude and behavior, human behavior always begins with the process of understanding and interpretation.

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The three reasoning in the author's mind that can be conveyed from Herbert Blumer's view is: First that man acts toward things on the basis that there are things for them. Such include everything that human beings may be concerned about is objective word-physical, such categories as humans such as friends or enemies, institutions, guiding ideals. The Second is the meaning of such things being bullied, or else arising from the social interaction that someone has someone follow. Third is this meaning is made, and modified through the interpretative process used by those who suffer from indealing no matter what he encounters<sup>50</sup>.

Through the content of basic values in law, the law aims to protect the interests of the society in relation to the movement of rights and obligations to the realm of equilibrium <sup>51</sup>. According to Gustaf Radbruch, the existence of law is intended for the existence of justice, certainty and usefulness <sup>52</sup>. Laws with values want to realize that their presence is intended to protect and promote values as a basis for legalizing the presence and operation of the law. The solution of the problem of law today, through the hermaneutic approach to the tendency which the postmodernists disregard <sup>53</sup>, albeit historically hermaneuticactually not a new approach at all. As a moment of knowledge in the field of scholarship, hermaneutik actually has developed since the days of ancient Greece. The first person to popularize hermaneutics was Schleiermacher, who was later subjected to 20th century figures such as Wilhemlm Diltthey, Martin Heidigger, Hans Georg, Paul Ricoeur, and Jacques Derrida. According to Schleiermacher, everyone is able to return to the inner process of the author of the text. Thus, the method of legal discovery based on the text (text) of legislation, doctrine, etc. can be highlighted by this hermaneutic approach <sup>54</sup>. The re-emergence of the hermaneutic paradigm in social studies and humanities takes place along with the emergence of a postpositivism paradigm called contructivism. These people are suing and questioning the truth of

<sup>&</sup>lt;sup>46</sup>Herbert Blumer, 1969, *Symbolic Interactionism: Perspective and Method*. Berkeley: University of California Press. In this seminal work, Blumer delineates symbolic interactionism as a distinct sociological framework. In developing the ideas of GH Mead into a set of basic propositions, Blumer's text is perhaps the definitive source on interactionist theory and method. This work inspired a legion of scholars in the years to come after its publication, and it remains an often-cited work across sociology. p. 5. 79

<sup>&</sup>lt;sup>47</sup>J.E Hall Williarms, 1982, Criminology and criminal justice, Butterworth; 1st Ed. Edition, p. 142

<sup>&</sup>lt;sup>48</sup> Blumer H (1962) *Society as symbolic interaction. In: Rose AM (ed.) Human Behavior and Social Processes.* Boston: Houghton Mifflin Co., p. 179–92.

 $<sup>^{49}</sup>Ibid$ 

<sup>&</sup>lt;sup>50</sup>Ibid

<sup>&</sup>lt;sup>51</sup>Endang Sutrisno, 2007, Bunga Rampai Hukum dan Globalisasi, Yogyakarta, Genta Press, p. 167

<sup>&</sup>lt;sup>52</sup> Theo Huijbers, 1982, Filsafat Hukum Dalam Lintasan Sejarah, Jogyakarta, Kanisius, p. 162

<sup>&</sup>lt;sup>53</sup> Bruggink, JJ. H., 1996, Refleksi Tentang Hukum, Alih Bahasa Arief Sidharta, Cipta Aditya Bakti, Bandung, p. 209

<sup>&</sup>lt;sup>54</sup> Bernard Arief Shidarta, 2006, *Refleksi Tentang Struktur Ilmu Hukum*, Bandung, Cv. Mandar Maju, p. 140

positivist statements about what is called the variability principle and the theory of neutrality of observation<sup>55</sup>. Building awareness of community law, can be seen from the presence or absence of a person's willingness subject to obey the law, obedience to the law, it is determined by his consciousness, that is what is in the sociology of legal literature called Legal awareness<sup>56</sup>. The meaning of legal awareness here is the mental condition of a subject when must face up an imperative normative to determine the choice of behavior, which is complete two-dimensional. The first dimension of his cognitive demension, his knowledge of the laws governing certain behaviors he performs (whether forbid, whether ordered). Meanwhile the so-called second dimension is its effective dimension, namely its insistence that the law it knows is actually to be obeyed<sup>57</sup>. Soetandyo Wignjosoebroto asserted, there are actually two obedience, namely the outward fidelity and the obedience that permeates to the inner<sup>58</sup>.

#### 6. Conclusion

The development of national legal awareness in the perspective of the disruftive era, must pay attention to the procedure of the law of the law, all institutions of society both internal and external cultivate legal awareness with empathy attitude in doing online activities both verbal and narative, convey information wisely and wisely, holders of sovereignty in accordance with its function of social control of government institutions in organizing the state dimension of solidarity and justice as an effort to revitalize legal awareness and reflect in the life of nation and state.

With the infradiscipline it can be drawn to the thread that law has some convergence, since both embrace the positiveness, mere peculiarity and axiology, the law can be established with a real moral norm based on an empathetic attitude that implies beyond the principles of justice. In addition, psychologically it can be argued that the biological nature of man is a stepping stone in every case to define the overall purpose of the law. Besides the nature of human biology is the source of sociolitas, the psychic attachment, which makes the emotional union of the individual into a possible group. However, in the specific elaboration of human biology we can see from the beginning of space and time in building legal awareness in interacting generally and online specifically.

In the life of the nation and the state of the legal consciousness of the Indonesian nation has been thinned from the nature, personality and identity of the Indonesian nation. The depletion of legal awareness of the Indonesian nation is influenced by internal and external factors. The internal faculty deals with the empathy and the understanding of the Indonesian nation in carrying out the law, while the external factor is related to the development of information and technology, the ideas or the influence of thought from the foreign culture so quickly absorbed by society. The condition of legal awareness in Indonesia is one of the factor that resulted in the state of life of the nation and state is mentally ill, because the metobolism of public legal consciousness is being disturbed, according to the author of legal awareness is one of the elements in the process of law development that is very influential, as well as in law enforcement. The formation of law and law enforcement is a manifestation of the development of legal awareness, it can be said that the legal awareness of the law will be negative in the process of law development.

Based on the above conclusions, the things that need to be suggested are as follows: First, Need to improve the model of higher education law that has only studied the law alone, now and in the future need sociological and psychological approach with emphasis on increased legal awareness. Second, the establishment of legislation refers to the soiological and philosophical values that underlie the life of the people of the archipelago, so that the people do notapathetic in the implementation of legislation.

#### References

Álvaro Morcillo Laiz & Klaus Schlichte, International organizations, their staff and their legitimacy: Max Weber for IR, Cambridge Review of International Affairs.

Any Ismayawat,i Pengaruh Budaya Hukum Terhadap Pembangunan Hukum Di Indonesia (Kritik Terhadap Lemahnya Budaya Hukum di Indonesia), PRANATA HUKUM Vol. 6 Nonor 1 Januari 2011

Bernard Arief Sidharta, 2000, "Refleksi Tentang Struktur Ilmu Hukum", Bandung: Mandar Maju.

Bernard Arief Shidarta, 2006, Refleksi Tentang Struktur Ilmu Hukum, Bandung, Cv. Mandar Maju.

Berger, Peter L. 2001, Langit Suci (Agama Sebagai Realitas Sosial). Jakarta: LP3ES.

<sup>&</sup>lt;sup>55</sup> Berger, Peter L. 2001, Langit Suci (Agama Sebagai Realitas Sosial). Jakarta: LP3ES., p. 23

<sup>&</sup>lt;sup>56</sup> Soetandidyo Wignjosoebroto, 2002, Hukum, Paradigma, Metode dan Dinamika Masalahnya, Jakarta, ELSAM, HUMA, p. 373

<sup>&</sup>lt;sup>57</sup>*Ibid* 

<sup>58</sup>Ibid

Proceedings of the 2nd African International Conference on Industrial Engineering and Operations Management Harare, Zimbabwe, December 7-10, 2020

Bruggink, JJ. H., 1996, Refleksi Tentang Hukum, (Alih Bahasa Arief Sidharta), Cipta Aditya Bakti, Bandung. Blumer H, 1962, Society as symbolic interaction. In: Rose AM (ed.) Human Behavior and Social Processes. Boston: Houghton Mifflin Co.

Blumer H, 1969, Symbolic Interactionism: Perspective and Method. Berkeley: University of California Press.

Carl.J.Frledrick, 1973, Man and His Government, (New York: Mc Grow Hill)

Daniel S. Lev. 1980, Peradilan Agama Islam Di Indonesia, Intermasa.

Davies, 2011, treatment of the broad philosophical implications of Jaak Panksepp's discoveries in affective neuroscience.

Endang Sutrisno, 2007, Bunga Rampai Hukum dan Globalisasi, Yogyakarta, Genta Press, hlm. 167

Esmi Warassih Pujirahayu, 2005, Pranata Hukum: Sebuah Telaah Sosiologis, Suryandaru Utama, Semarang. Hlm 96

Edy Suandi Hamid, 2016, Disruptive Innovation: Manfaat Dan Kekurangan DalamKonteks Pembangunan Ekonomi, Jurnal Al-'Adl, Vol. 9, No. 2.

Felmlee, Diane H.; Kreager, Derek A., 2017, The Invisible Countours Online Dating Communities: A Social Network Perspective, Journal Of Social Structure, Vol. 18.

Friedman M. Lawrence, 2009, Sistem Hukum; Perspektif Ilmu Sosial(The Legal System; A Social Science Perspective), Bandung: Nusa Media.

Friedman M. Lawrence, 1989, Law, Lawyers, and Popular Culture, 98 YALE L. J. 1579 [hereinafter Friedman, Law, Lawyers, and Popular Culture].

Friedman M. Lawrence, 1980, Sistem Hukum perspektif Ilmu Sosial, Nusamedia, Bandung.

Friedman M. Lawrence, 2009, Sistem Hukum; Perspektif Ilmu Sosial(The Legal System; A Social Science Perspective), Bandung: Nusa Media.

Friedman M. Lawrence, 1980, American Law An Introduction (Hukum Amerika sebuah Pengantar) Second Edition, Penerjemah Wishnu Basuki, (Jakarta: Tatanusa, 2001).

Goleman, Daniel, 2003, Emotional Intelligence: Why It Can Matter More Than IQ, New York.

Hakemulder, Jèmeljan, 2000, The Moral Laboratory. Experiments Examining the Effects of Reading Literature on Social Perception and Moral Self-Concept, Amsterdam.

Hutchins, Robert Maynard, 1899-1977, The Learning Society, New York: Frederick A. Praeger, 1968.

Hoogerwerf,1973, Isi dan Corak-Corak kebijakan (Overhead Beleid), Terjemahan R.L.L. Tobing, Jakarta, Erlangga.

Hilman Hadikusuma. 1986:11, Hukum Kekerabatan Adat, Fajar Agung.

Imam A Saukani & A. Ahsan Tohari, 2010, Dasar-dasar Politik Hukum, Cetakan ke 6, Jakarta, PT. Raja Grafindo Persada.

J.E Hall Williarms, 1982, Criminology and criminal justice, Butterworth; 1st Ed. Edition.

Jennie M. Xue, 2014, Revolusi Industri dan Big Data, KONTAN 17 Februari - 23 Februari 2014.

James E Anderson, Public Policy Making (New York, Paeger Publisher, 1979).

Kaus Schwab, Executive Chairman World Economic Forum.

Kliejn, 1978, All Agreements are translated from Patries Haberer at al., De Buurtaanpak (The neighborhood approach). The Hague : State Publisher.

Mahfud MD, 2009, Konstitusi dan Hukum dalam Kontroversi Isu, (Jakarta: Rajawali Press).

Mark H. Davis, 1980, A Multidimensional Approach to Individual Differences in Empathy, JSAS Catalog of Selected Documents in Psychology.

Philipus M. Hadjon, Pengkajian Ilmu Hukum Dogmatik (Normatif), dalam "Yuridika", Jurnal Hukum Universitas Airlangga Surabaya, No. 6 Tahun IX, November – Desember 1994.

Soetandidyo Wignjosoebroto,2002, Hukum, Paradigma, Metode dan Dinamika Masalahnya, Jakarta, ELSAM, HUMA.

Sari, A. T. O & Eliza, M. 2003. Empati dan Perilaku Merokok di tempat umum. Jurnal Psikologi, No. 2.

Spinoza, 1982, writes in III, Definition of the Emotions #1.

Spinoza, 1982, "The mind's conatus, or power, is the very essence of the mind"

Satjipto Rahardjo, 1983, Permasalahan Hukum di Indonesia, Alumni, Bandung.

Vincent Jeffries and H. Edward Ransford, 1980, Social Stratification a multiple hierarchy approach, (Boston : Allyn and Bacon, Inc), p. 3-12. Satjipto Rahardjo, 2008, Biarkan Hukum Mengalir, (Jakarta : Kompas), hlm. 7

Taufik., 2012, Empati: pendekatan psikologi sosial. Jakarta: Raja Grafindo.

Theo Huijbers, 1982, Filsafat Hukum Dalam Lintasan Sejarah, Jogyakarta, Kanisius, hlm162

Titik Triwulan Tutik, 2014, Hakekat Ilmu Hukum Ditinjau dari Filsafat Ilmu dan Teori Ilmu Hukum, Jurnal Hukum dan Pembangunan Tahun ke-44 No.2 April-Juni 2014.

Proceedings of the 2nd African International Conference on Industrial Engineering and Operations Management Harare, Zimbabwe, December 7-10, 2020

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