



## THE SECOND INTERNATIONAL CONFERENCE ON SCIENTIFIC, ECONOMIC AND SOCIAL ISSUES

### DIGITAL TRANSFORMATION, COOPERATION AND GLOBAL INTEGRATION IN THE NEW NORMAL

#### SPONSORS

**Sacombank**  
Đồng hành cùng phát triển



FINANCIAL PUBLISHING HOUSE

## TABLE OF CONTENT

### APPLICATION OF TECHNOLOGY AND BIG DATA IN THE FIELDS OF FINANCE, ACCOUNTING AND AUDITING IN THE CONTEXT OF GLOBALIZATION

BANK RUN AND SILICON VALLEY BANK .....	1
Lam Dang Xuan Hoa, Ho Minh Khoa, Huynh Vo Nhat Linh .....	1
BIG DATA AND INTELLECTUAL PROPERTY RIGHTS.....	14
Le Thi Minh, Vo Trung Hau .....	14
THE EFFICIENCY OF THE INTERNAL CONTROL SYSTEM IN RISK MANAGEMENT AT THE NAM A COMMERCIAL JOINT STOCK BANK .....	23
Truong Thanh Loc, Tran Ngoc Thanh.....	23
VIETNAM - AUSTRALIA ECONOMIC AND TRADE COOPERATION IN THE NEW NORMAL: OPPORTUNITIES AND CHALLENGES FOR VIETNAMESE INVESTORS.....	30
Nhu Nguyen Phuc Quynh*, Anh Nguyen Thi Nguyet, Duy Nguyen Anh .....	30
IMPACTS OF CREDIT GROWTH AND CREDIT RISK ON THE PROFIT OF VIETNAM JOINT STOCK COMMERCIAL BANKS .....	43
Dao Le Kieu Oanh*, Tran Thi Huong Ngan .....	43
FACTORS AFFECTING CUSTOMERS' DECISIONS TO USE E-BANKING AT JOINT STOCK COMMERCIAL BANKS IN HO CHI MINH CITY .....	57
Nguyen Duy Khanh <sup>1</sup> , Pham Quoc Tham <sup>2</sup> .....	57
HOW CHINA_USA POLITICAL TENSIONS AFFECT STOCK MARKET RETURN OF CHINA AND THE USA? A QUANTILE VAR CONNECTEDNESS APPROACH .....	70
Hao Wen Chang <sup>1</sup> , Tsangyao Chang <sup>2</sup> and Mei-Chih Wang <sup>3</sup> .....	70
BANKING HUMAN RESOURCES BEFORE THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE AI .....	92
Nguyen Huynh Chi.....	92
IMPROVE THE QUALITY OF TRAINING THROUGH IMPROVEMENT OF STUDENT TESTING AND ASSESSMENT – CASE IN ACCOUNTING BRANCH, UNIVERSITY OF ECONOMICS AND FINANCE .....	102
Thuy Thi Ha .....	102
ACTIVITIES OF DIGITAL TRANSFORMATION IN VIETNAMESE COMMERCIAL BANKS: AN OVERVIEW DURING THE COVID-19 RECOVERY PERIOD.....	109
Nguyễn Thị Quỳnh Châu, Đào Lê Kiều Oanh .....	109
OPPORTUNITIES AND CHALLENGES FOR VIETNAM IN ATTRACTIVE FDI IN GLOBAL MINIMUM CORPORATE TAX IMPLEMENTATION .....	117
Ngo Hoang Thong .....	117

IMPACTS OF STATE OWNERSHIP AND BUSINESS CHARACTERISTICS ON TAX AVOIDANCE: EVIDENCE IN VIETNAM.....	128
Huyen Ngoc Nguyen, Thanh Dan Bui .....	128
RUSSIA'S IMPACTS AND SCENES ON BEING BANNED FROM SWIFT .....	143
Lam Dang Xuan Hoa <sup>1</sup> , Phan Ngoc Anh <sup>2</sup> .....	143
THE ROLE OF ACCESS TO FINANCE AND THE ENTREPRENEURIAL INTENTION OF YOUNGERS IN THE SOUTHWESTERN PROVINCE, VIETNAM.....	151
Vu Truc Phuc*, Nguyen Dang Hat, Nguyen An Phu, Dao Le Kieu Oanh .....	151

## **DIGITAL ECONOMY IN VIETNAM, TRENDS AND POTENTIABILITY**

DEVELOPING SMART HOME MODEL FOR APARTMENTS IN HO CHI MINH CITY BASED ON INTERNET OF THINGS (IoT) TECHNOLOGY .....	182
Dang Thanh Thuy <sup>1</sup> , Nguyen Thanh Dien <sup>2</sup> .....	182
TRANSPARENCY OF ACCOUNTING INFORMATION OF CONSTRUCTION ENTERPRISES IN HO CHI MINH CITY – CASE STUDY OF APPLICATION OF ACCRUAL ACCOUNTING .....	193
Truong Thanh Loc <sup>1*</sup> , Pham Thi Yen Nhi <sup>2</sup> .....	193
FACTORS AFFECTING THE QUALITY OF FINANCIAL STATEMENTS OF MANUFACTURING ENTERPRISES IN HO CHI MINH CITY .....	207
Truong Thanh Loc <sup>*</sup> , Dang Nguyen Tuong Han, Nguyen Ngoc Mai Phuong, Nguyen Thi Quynh Huong .....	207
THE CRITICAL FACTORS OF COLLEGE STUDENTS' INTENTION TO USE METAVERSE TECHNOLOGY FOR SUBJECTS RELATED TO IMPORT-EXPORT LEARNING .....	221
Van Thuy Nguyen Ho, Chau The Huu, Luan Thanh Nguyen <sup>*</sup> .....	221
CONSUMER PERCEPTION ABOUT THE SUSTAINABILITY COMMITMENT OF LUXURY BRANDS IN VIETNAM AND CHINA MARKETS.....	233
Tran Minh Tu <sup>1</sup> .....	233
INFLUENCE OF WOM AND EWOM IN MAKING DECISION BUYING GOODS .....	247
Doan Anh Tu <sup>1</sup> , Kim Phi Rum <sup>2</sup> , Nguyen Pham Hai Ha <sup>3</sup> .....	247
DIGITAL ECONOMY AND DEVELOPMENT POTENTIAL IN VIETNAM.....	257
Hoang Thi Chinh, Nguyen Hoang Phan .....	257
BLOCKCHAIN APPLICATION IN MODERN LOGISTICS: INTERNATIONAL EXPERIENCE AND SOME RECOMMENDATIONS FOR VIETNAM .....	266
Nguyen Nu Tuong Vi.....	266
FACTORS AFFECTING THE DEVELOPMENT OF THE DIGITAL ECONOMY IN VIETNAM .....	272
Vo Tien Si .....	272
LEGAL FRAME FOR THE OPERATION OF THE REAL ESTATE BUSINESS UTILIZING THE BLOCKCHAIN PLATFORM IN VIETNAM.....	284
Le Thi Khanh Linh.....	284

## **DIGITAL TRANSFORMATION – COOPERATION – GLOBAL INTEGRATION IN BUSINESS**

FACTORS INFLUENCING BUSINESS ACCEPTANCE OF INDUSTRY 4.0 TECHNOLOGY APPLICATIONS IN DONG NAI PROVINCE.....	291
Thanh-Thu Vo*, Minh-Huong Tang.....	291
DIGITAL ORIENTATION, INNOVATION CAPABILITY AND FIRM PERFORMANCE: A PROPOSAL RESEARCH MODEL .....	298
Nguyen Van Hau .....	298
PREDICTION OF STUDENT'S BEHAVIORAL INTENTION TO USE SMART LEARNING ENVIRONMENT: A COMBINED MODEL OF SELF-DETERMINATION THEORY AND TECHNOLOGY ACCEPTANCE .....	309
Nguyen Thi Hai Binh <sup>1</sup> , Dao Y Nhi <sup>2</sup> , Nguyen Thanh Luan <sup>3</sup> , Dang Quan Tri <sup>4</sup> .....	309
THE PEDAGOGICAL IMPACT OF GRAMMARLY ON EFL WRITING COMPETENCY: AN EMPIRICAL INVESTIGATION IN HIGHER EDUCATION CONTEXT. ....	323
Nguyen Thi Hong Lien <sup>1</sup> , Nguyen Truong Gia Minh <sup>2</sup> , Nguyen Ngoc Vu <sup>3*</sup> .....	323
FACTORS AFFECTING PURCHASING DECISION OF THE YOUTH ON TIKTOK .....	336
Ngoc Pham <sup>1</sup> , Thanh Cong Tran*.....	336
FACTORS AFFECTING OCCUPATIONAL SAFETY BEHAVIORS OF WORKERS DIRECT PRODUCTION AT CU CHI POWER COMPANY.....	345
Minh Luan Le, Thi Trang Tran.....	345
CORPORATE SOCIAL RESPONSIBILITY AND EMPLOYEES' ORGANIZATIONAL CITIZENSHIP BEHAVIOUR.....	355
Nguyen Xuan Hung <sup>1</sup> , Ha Le Thu Hoai <sup>1</sup> , Nguyen Huu My Truc <sup>2&amp;3</sup> , Pham Tan Nhat <sup>2&amp;3</sup> .....	355
THE INNOVATION CAPACITY - THE ROLE OF LEADERS OF SMALL AND MEDIUM ENTERPRISES IN HO CHI MINH CITY, VIETNAM.....	365
Huynh Nhut Nghia .....	365
PEOPLE'S THOUGHTS ON THE IMPACT OF ARTIFICIAL INTELLIGENCE ON BUSINESS .....	376
Ton Nguyen Trong Hien, Bui Tuyet Anh .....	376
FACTORS AFFECTING BRAND SWITCHING INTENTION IN THE CONTEXT OF HIGHER EDUCATION IN VIETNAM .....	382
Ly Dan Thanh, Nguyen Phu Quoi, Tran Hoang Nam, Vo Hong Son, Nguyen Ngoc Thuy Tien .....	382
ENHANCE THE DIGITAL COMPETITIVENESS .....	398
Tran Quang Canh, Hoang Thi Chinh.....	398

ASSESSING PATIENT SATISFACTION (BRAND) AFTER THE COVID-19 PANDEMIC AT THU DUC CITY HOSPITAL.....	408
Nguyen Hoang Dung <sup>1*</sup> , Nguyen Huynh Bao An <sup>2</sup> , Van Phuong Trang <sup>2</sup> .....	408
INDUSTRIAL AND HUMAN RESOURCES FORM THE FOUNDATION FOR BINH DUONG'S SUSTAINABLE ECONOMIC DEVELOPMENT .....	408
Hoang-An Nguyen .....	417
IMPACT OF ORGANIZATIONAL FAIRNESS ON THE EMPLOYEES' KNOWLEDGE SHARING IN TRAVEL AND TOURISM ENTERPRISES IN HO CHI MINH CITY .....	426
Le Thi Nhu Quynh <sup>1,2</sup> , Le Thi Giang <sup>2</sup> , Truong Quang Dung <sup>1</sup> .....	426
THE EFFECT OF PERSONAL MOTIVATION ON THE TACIT KNOWLEDGE SHARING BEHAVIOR OF 5-STAR HOTELS' EMPLOYEES IN HO CHI MINH CITY .....	440
Le Thi Giang, Nguyen Bach Hoang Phung.....	440
DIGITAL COMPETITIVENESS AND OPERATIONAL EFFICIENCY OF ENTERPRISES IN THE DIGITAL ERA: THE CASE OF VIETNAMESE ENTERPRISES .....	453
Diep Nguyen Thi Ngoc <sup>1*</sup> , Canh Quang Tran <sup>2</sup> , Anh Bach Hoang Ngoc <sup>1</sup> .....	453
FACTORS INFLUENCING PARENTS' SELECTION OF PRIVATE PRESCHOOLS IN THU DUC CITY .....	466
Thi-Trang Tran <sup>1</sup> , Thi-My-Dung Pham <sup>2</sup> , Thi-Bich-Diep Le <sup>1*</sup> .....	466

## **RECOVERY COMMUNICATIONS IN THE TOURISM AND HOSPITALITY INDUSTRY AFTER THE COVID-19 PANDEMIC**

DEVELOPING A SPIRITUAL TOURISM DESTINATION IMAGE MEASUREMENT SCALE OF AN GIANG .....	474
Nguyen Vuong Hoai Thao <sup>1</sup> , Nguyen Quyet Thang <sup>2</sup> .....	474
PROSPECTS OF VIRTUAL REALITY TOURISM APPLICATION IN VIETNAM TOURISM PROMOTION .....	487
Nguyen Thi Hong Ha, Pham Thi Huong Giang.....	487
PERSONALIZATION TRAVEL TRENDING IN HO CHI MINH CITY IN THE CONTEXT OF POST COVID-19 .....	497
Duong Bao Trung.....	497
IMPACTS OF MEDIA ON CUSTOMERS' DECISION TO CHOOSE FOOD AND BEVERAGE SERVICES POST THE COVID-19 PANDEMIC .....	511
Nguyen Thi Bich Van .....	511
DIGITAL TRANSFORMATION APPLICATION TO PROMOTE THE RECOVERY AND DEVELOPMENT OF INBOUND TOURISM IN HO CHI MINH CITY .....	521
Tran Trong Thanh .....	521
VIETNAM TOURISM AFTER COVID-19 PANDEMIC .....	527
Nguyen Hoang Phan <sup>1</sup> , Hoang Thi Chinh <sup>2</sup> .....	527
NAVIGATING THE EVOLVING LANDSCAPE OF SOCIAL MEDIA DATA MINING AND PRIVACY .....	537
Pham Thai Hien .....	537
THE CORRELATION BETWEEN STUDENT SELF-REPORTED GENERAL WELL-BEING AND PERCEIVED SUPPORT FROM FRIENDS, TEACHERS, AND UNIVERSITY .....	545
Virginia Kelsey <sup>1</sup> , Đặng Thị Mai Ly <sup>2*</sup> , Nguyễn Anh Khoa <sup>2</sup> , Nguyễn Văn Tường <sup>2</sup> .....	545

## **DIGITAL VERSUS NON- DIGITAL**

PROVIDING CONVENIENCE TO CUSTOMERS IN THE DIGITAL MARKETING ERA: OBSERVATIONS FROM COMMERCIAL BANKS IN HO CHI MINH CITY .....	556
Nguyen Quang Trung .....	556
VIRTUAL REALITY: AN INNOVATIVE TOOL IN TOURISM EXPERIENTIAL MARKETING .....	564
Thanh Nguyen Ngoc Le <sup>1</sup> , Khuong Thanh Nguyen <sup>2</sup> .....	564
THEORETICAL CONCEPTS OF STRATEGIC POSITIONING FOR PLACE BRANDING: A CASE STUDY OF DONG THAP PROVINCE .....	580
Phan Bao Giang.....	580
LITERATURE REVIEW ON THE IMPACT OF DIGITAL MARKETING ON VIETNAM'S SMALL AND THE MEDIUM BUSINESS ENTERPRISES (SMEs) .....	587
Lê Kim Nguyên * .....	587



## **CHALLENGES FACED BY TEACHERS IN NON-TRADITIONAL EDUCATION**

PROPOSE AN ONLINE TEACHING COMPETENCE SCALE FOR UNIVERSITY LECTURERS .....	596
Duong Thi Kim Oanh*, Dang Thi Dieu Hien .....	596
EXAMINE USAGE OF LEARNING MANAGEMENT SYSTEMS (LMSS) BY FACULTY STAFF AT UNIVERSITY OF ECONOMICS (UEF) AND FINANCE WITH EXPANDED TECHNOLOGY ACCEPTANCE MODEL (TAM).....	608
Ha Truong Minh Hieu, Ngo Minh Hai*, Mach Tran Huy.....	608

## **DIGITAL TRANSFORMATION AN INDISPENSABLE EVOLUTION FOR SUSTAINABLE CORPORATES**

FACTORS AFFECTING THE APPLICATION OF STRATEGIC MANAGEMENT ACCOUNTING AT MANUFACTURING ENTERPRISES IN BINH DUONG PROVINCE .....	618
Truong Thanh Loc <sup>1*</sup> , Nguyen Thi Thanh Truc <sup>2</sup> .....	618
HRM DIGITAL TRANSFORMATION: TAKING A ROAD OF SUCCESSION PLANNING ..	629
Trương Phan Hoàng Anh, Giang Ngọc Anh.....	629
THE IMPLICATION OF CONTACTLESS SERVICE AS A TOOL TO IMPROVE CUSTOMER REVISIT INTENTION .....	640
Linh, Nguyen Duy Yen* .....	640
TOURISM BRAND LOVE IN THE DIGITAL AGE: THE ROLE OF ONLINE TOURIST EXPERIENCES, TOURIST-BRAND RELATIONSHIP QUALITY AND SUSTAINABILITY .....	651
Thanh Nguyen Ngoc Le .....	651
CONDUCTING FOCUS GROUPS IN CROSS-CULTURAL SCHOLARSHIP OF TEACHING AND LEARNING (SoTL): A COMPARATIVE CASE STUDY .....	662
Punithan Moganathas <sup>1</sup> , Jenny Hill <sup>2</sup> , Andy V.-M. Kok <sup>2</sup> , Matt Barr <sup>2</sup> , Ruffin Relja <sup>2*</sup> , Philippa Ward <sup>2</sup> , Duong Tran Quang Hoang <sup>3</sup> , Quynh Phuong Tran <sup>3</sup> .....	662
LEVERAGING DIGITAL TRANSFORMATION FOR SUSTAINABLE CORPORATE EVOLUTION IN VIETNAM .....	677
Nguyen, Tan Dat <sup>1</sup> , Le, Dinh Thang <sup>2</sup> .....	677

## INFORMATION TECHNOLOGY AND APPLICATIONS

FB-PROPHET MODEL FOR TIME SERIES FORECASTING IN SALES .....	691
Thanh Cong Tran .....	691
USING AI CODE IN C# PROGRAMMING .....	698
Nguyen Ha Giang.....	698
DETERMINANTS OF CONTINUANCE USAGE INTENTION OF MOBILE FOOD ORDERING APPLICATIONS (MFOAS) AMONG VIETNAMESE USERS: THE MEDIATING ROLE OF E- SATISFACTION .....	705
Lam Hoang Phuong <sup>1*</sup> , Nguyen Thi Kim Lien <sup>2</sup> , Tien Hung Nguyen <sup>3</sup> , Vinh Long Nguyen <sup>4</sup> .....	705
DECODING MARKETING INSIGHT: INSIGHT FROM OUTSIDE.....	718
Hoàng Thị Hằng, Trần Thành Công* .....	718
DIGITAL DISRUPTION AND DATA SECURITY: HOW FINTECH IS RESHAPING BANKING ...	724
Hoàng Văn Hiếu, Trần Ngọc Thiên Ngân.....	724

## **TRENDS AND ISSUES IN ENGLISH LANGUAGE EDUCATION AND RESEARCH**

EFL LEARNERS' ATTITUDES AND LEARNING ENGAGEMENT IN COMMUNICATIVE GAME-BASED GRAMMAR TEACHING .....	736
Nguyen Thi Thanh Huyen <sup>1</sup> , Tran Quoc Thao <sup>2</sup> .....	736
APPROACHES TO TEACHING L2 LISTENING:.....	749
CLOSING THE GAP BETWEEN REAL-LIFE AND CLASSROOM-BASED LISTENING .....	749
Luu Thi Mai Vy .....	749
DEFINING ROLES OF STUDENT ENGAGEMENT IN THE 21ST CENTURY LANGUAGE CLASSROOM .....	755
Ho Xuan Tien, Duong My Tham.....	755
EFL STUDENTS' ATTITUDES AND LEARNING INVESTMENT IN PORTFOLIO - BASED ENGLISH WRITING LEARNING: A LITERATURE REVIEW .....	763
Ly Gia Huy <sup>1</sup> , Tran Quoc Thao <sup>2</sup> .....	763
EXPLORING EFL LEARNER IDENTITIES IN PROJECT-BASED LANGUAGE LEARNING AT A HIGH SCHOOL IN AN GIANG PROVINCE .....	774
Nguyen Hong Thien <sup>1</sup> , Tran Quoc Thao <sup>2</sup> .....	774
THE VALUES OF SYNTACTIC COMPLEXITY IN ACADEMIC WRITING: A LITERATURE REVIEW .....	791
THE ISSUE OF AMBIGUITY IN THE ENGLISH LANGUAGE.....	801
Nguyen Dinh Tuan .....	801
RESEARCH PERSPECTIVES ON JUNIOR HIGH SCHOOL EFL STUDENTS' MOTIVATION IN ENGLISH LANGUAGE LEARNING .....	812
Huynh Thanh Nhon <sup>1</sup> , Tran Quoc Thao <sup>2</sup> .....	812
EXPLORING THE INFLUENCE OF WRITING ANXIETY ON VIETNAMESE ESL UNDERGRADUATES' WRITING PERFORMANCE: A QUANTITATIVE STUDY.....	821
Nguyen Ngoc Nguyen, Nguyen Hoang Phan.....	821
THE APPLICATION OF THE "FLIPPED CLASSROOM" MODEL IN TEACHING ENGLISH IN THE VIETNAMESE UNIVERSITY EDUCATION ENVIRONMENT .....	838
THE USE OF RESOURCE MANAGEMENT STRATEGIES IN EFLFLIPPED CLASSROOMS .....	847
Nguyen Quynh Thao Vy <sup>1,*</sup> , Duong My Tham <sup>2</sup> .....	847
INSIGHTS INTO ENGLISH MAJOR STUDENTS' USE OF PHRASAL VERBS IN ACADEMIC WRITING.....	860
Do Thi Thanh Thuy, Tran Quoc Thao .....	860

## **LAW IN THE CONTEXT OF INTERNATIONAL INTEGRATION**

LEGALISING INTELLECTUAL PROPERTY INFRINGEMENTS IN RUSSIA – A WAR TACTIC IN THE CONTEXT OF RUSSIA’S INVASION OF UKRAINE.....	869
Bui Thi Hong Ninh* .....	869
MODEL OF ASSET REGISTRATION WORLDWIDE AND LESSONS FOR VIETNAM IN IMPROVING ASSET REGISTRATION LAWS.....	880
Vu Anh Sao <sup>1,2</sup> , Nguyen Thi Xuan Mai <sup>2</sup> .....	880
LEGAL ISSUES ARISING FROM THE DEVELOPMENT, IMPLEMENTATION, AND USE OF ARTIFICIAL INTELLIGENCE (AI) - INTERNATIONAL EXPERIENCES AND LESSONS FOR VIETNAM .....	887
Le Hoang Minh Huy*, Nguyen Thi Thu Ha, Dao Trong Duc, Ky Dieu Linh, Bui Thi Thuy Linh, Nguyen Nam Trung.....	887
SOUTH KOREA’S EXPERIENCES ON PROPERTY REGISTRATION LAW - LESSONS FOR VIETNAM .....	896
Vu Anh Sao, Pham Huynh Bao Oanh.....	896
THE RISE OF REMOTE WORK: LEGAL CHALLENGES AND IMPLICATIONS FOR EMPLOYMENT LAW IN VIETNAM .....	903
Nguyen Thi Xuan Mai <sup>1</sup> , Nguyen Thi Ngoc Loan <sup>2</sup> .....	903
CHALLENGES AND RECOMMENDATIONS FOR THE LEGAL FRAMEWORK IN THE EMERGING AGE OF ARTIFICIAL INTELLIGENCE.....	910
Nguyen Thi Thu Trang .....	910
THE IMPACTS OF GLOBAL MINIMUM TAX ON FOREIGN DIRECT INVESTMENT (FDI) CORPORATIONS IN VIETNAM.....	921
Trần Ngọc Thanh <sup>1</sup> .....	921
CROSS-BORDER E-COMMERCE ACTIVITIES AND TAX MANAGEMENT ISSUES .....	933
Le Huynh Phuong Chinh, Ngo Thi Khanh Linh, Pham Ngoc Lan Anh.....	933
EXPERIENCE IN KOREA AND CHINA ON TAX MANAGEMENT FOR CROSS-BORDER E-COMMERCE ACTIVITIES .....	941
Duong Anh Son <sup>1</sup> , Tran Vang Phu <sup>2</sup> .....	941
LEGAL PERSPECTIVE ON REGULATIONS RALATED TO PERSONAL INCOME TAX WHEN EARNING INCOME THROUGH E-COMMERCE PLATFORMS IN VIETNAM, TAKING THE CASE OF INDIVIDUALS DOING BUSINESS THROUGH TIKTOK APPLICATION.....	946
Nguyen Duc Tri <sup>1</sup> , Hoang Minh Châu <sup>2</sup> .....	946
THE COMPATIBILITY ON THE SCOPE OF MUTUAL LEGAL ASSISTANCE (MLA) IN CRIMINAL MATTERS AND THE CONDITIONS OF REFUSAL MLA IN CRIMINAL MATTERS BETWEEN VIETNAMESE LAW AND INTERNATIONAL TREATIES WHICH VIETNAM HAS SIGNED. ....	956

Pham Huynh Bao Oanh.....	956
TAX POLICY FOR E-COMMERCE OF COUNTRIES IN THE WORLD AND RECOMMENDATIONS TO VIETNAM.....	967
Nguyen Thanh Minh Chanh, Ha Thi Van Anh, Pham Lam Tam Nhu .....	967
LEGAL REGULATIONS FOR ENTERPRISE OBLIGATIONS TO PROVIDE INFORMATION ON E-COMMERCE PLATFORM .....	974
Truong Kim Phung*, Nguyen Hoang Chuong .....	974
“ROBOT TAX” – RECOMMENDATIONS FOR VIETNAM.....	981
Gian Thi Le Na, Pham Phuong Doanh.....	981
WTO APPELLATE BODY REFORM IN THE CONTEXT OF ESCALATING GEOPOLITICAL TENSIONS.....	988
Nguyen Nam Trung.....	988

## CHALLENGES AND RECOMMENDATIONS FOR THE LEGAL FRAMEWORK IN THE EMERGING AGE OF ARTIFICIAL INTELLIGENCE

*Nguyen Thi Thu Trang*

*Ho Chi Minh City University of Economics and Finance*

*trangntt3@uef.edu.vn*

### **Abstract**

*Artificial intelligence (AI) affects many aspects of socio-economic life; And the development of AI has a huge impact on the law. Because the current legal system has not yet adjusted the newly aroused legal relationships, the law needs to change accordingly to accommodate these relationships in the era of artificial intelligence. Within the scope of this article, we do not aim to completely solve the legal issues that arise related to the development of AI; Yet only "recommend" some AI-related contents so that some "fields" of law introduce new regulations or amend existing ones to effectively supervising these profound relationships. Therefore, we raise challenges and suggestions for the following legal areas: Consumer Rights Protection Law, Criminal Law, Intellectual Property Law, Traffic Law, and Competition Law.*

**Keywords:** *Artificial intelligence, challenge, legal, recommendation;*

### **1. Introduction**

The “ongoing process of digital transformation is being accomplished in part with the use of artificial intelligence (AI)” (Hoffmann-Riem, W., 2020, 2). “An interdisciplinary technology that aims to use large data sets (Big Data), suitable computing power, and specific analytical and decision-making procedures to enable computers to accomplish tasks that approximate human abilities and even exceed them in certain respects” (Kaplan, J, 2016). Accordingly, AI is applied in many different areas of social life, specifically: (i) *AI applied to work*: AI applied to business (Soni, N. & Sharma, E. & Singh, N. & Kapoor, A., 2020; Chojecki, P., 2020; Fotis, K. & Kamariotou, M., 2021); AI applications in health (Bhattad, P. & Jain, V., 2020; Kashyap, A., 2018; Ahuja, A., 2019); AI applications in education (Goksel, N. & Bozkurt, A., 2019; Roll, I. & Wylie, R., 2016; Chen, X. & Xie, H. & Hwang, G., 2020); AI applications in transportation (Woschank, M. & Rauch, E. & Zsifkovits, H., 2020; Lytras, M. D. & Chui, K. T. & Liu, R. W., 2020; Nikitas, A. & Michalakopoulou, K. & Njoya, E. T. & Karampatzakis, D., 2020); AI applied in production (Chaudhry, I. A. & Shami, M. & Khan, A., 2004; Burggräf, P. & Wagner, J. and Koke, B., 2018; Cioffi, R. & Travaglioni, M. & Piscitelli, G. & Petrillo, A. & De Felice, F., 2020); etc. (ii) *AI applied in daily life*: AI is used in technological devices such as Siri, Bixby, Cortana, etc to make people's lives more convenient and comfortable. Artificial intelligence is applied in "virtual assistant": assisting in the working process (Arora, S. & Athavale, V. & Maggu, H. & Agarwal, A., 2021); assisting students to find their way to school (Page, L. C. & Gehlbach, H., 2017, 1-12); customer support (Brill, T. & Munoz, L. & Miller, R., 2019); etc.

“The expansion of AI’s capabilities and the tasks for which it can be used is associated with both risks and opportunities. The following will look at the challenges that AI poses for law and regulation” (Castilla, A. & Elman, J., 2017). In addition, the arising relationships related to AI inventors, manufacturers, and applications still required the regulations of the law. The development of AI has changed social relationships, that requires the law to change accordingly, and the impacts of AI on every aspect of the law.

## 2. Methodology

The main method used in this study is legal research (Pham, D.N. 2014). The legal sources used for analysis in this study include Law on Road Traffic of Vietnam No. 23/2008/QH12 dated 13 November 2008; Competition Law of Vietnam No. 23/2018/QH14 dated June 12, 2018; Consolidation document of Vietnam's Intellectual Property Law No. 07/VBHN-VPQH dated June 25, 2019; Criminal Code of Vietnam No. 100/2015/QH14 dated November 27, 2015; Law on the protection of consumer rights of Vietnam No. 59/2010/QH12 dated November 17, 2010.

This article uses analytic - descriptive research methods to clarify legal content and analyze social relations arising when artificial intelligence develops strongly. From there, it shows that Vietnamese law needs to change to match the development of artificial intelligence. In addition, the article uses a system of integrated research methods of the social sciences, including system, structure-function, history, logic (Bhattacharjee, A., 2012) to evaluate studies on social sciences of the subject of product liability, subject of crime, criminal liability, author of work and invention, protection of copyright and invention, and many issues others published in specialized scientific journals. Through the method of synthetic research, the article inherits the research results from previous works to suggest some contents to improve the Vietnamese law in many areas: Law on the protection of consumer rights, road traffic law, competition law, criminal law, and intellectual property law.

## 3. Results and Discussion

### 3.1 Law on consumer protection (product liability) – Challenges and recommendations

A famous computer magazine asked the following question: "It is the year 2023, and for the first time, a self-driving car navigating city streets strikes and kills a pedestrian. A lawsuit is sure to follow. But exactly which laws will apply? No one knows" (Greenblatt, N.A., 2016, 46-51). With the development and application of AI in products, certain risks for consumers arise. A series of issues arise and need to be adjusted by the law on consumer protection in general and the regulation of product liability in particular. Specifically:

**Firstly, define the concepts:** Is AI a product or a service: The first issue to be solved is: does the “product” include digital content and digital services? The second problem to be solved is: computer instruction software is considered a “product” and human instruction software is considered a “service” (Cabral, T. S., 2020, 615-635). To determine who is responsible, the law needs to identify AI as a product or service. The clear identification of this issue will serve as a basis for pursuing legal liability when a risky event occurs during the use of products or services with AI.

**Secondly, producer:** To determine who bears the liability, the Law on the protection of consumers' rights in general and the regulation of product liability, in particular, should clearly define the concept of "producer". A Producer can be (i) the manufacturer of a finished product; (ii) the manufacturer of any part; (iii) the producer of any raw material and; (iv) any person who presents himself as the product's producer (Cabral, T. S., 2020, 617). To identify the producer of AI-powered devices and AI-powered robots, the broad concept of producer mentioned above is particularly relevant. Accordingly, anyone in the production chain can be liable to the aggrieved party when they claim damages (with some exceptions).



*Defective products:* The identification of defective products is the basis for consumers to ask the responsible subject to bear responsibility for themselves. When determining that a product with an AI application is a defective product, consideration should be given to the level of safety expected by users of that product.

*Damage:* Usually, product liability in particular and liability for damage, in general, is determined based on material damage (not considering non-material damage). However, products and services with AI applications have the potential to cause non-material damage to consumers. Therefore, the law when introducing the concept of "damage" needs to consider non-material damage.

**Thirdly, responsible subject:** Identifying the responsible person based on the AI identifier. In case AI is a product, it becomes incumbent on the developers of AI systems to ensure that their systems are free from design defects; manufacturing defects; or inadequate warning or instructions (Gerstner, M. E., 1993, 239-269). In case AI is a service, the responsible subject is the service provider (it can be the producer or the service provider).

**Fourthly, the obligations of suppliers of products and services with AI applications:** In addition to the provisions on obligations of ordinary product and service providers, those providing products and services with AI applications should be obliged to describe in detail the features, how to operate and warning of risks that may arise in the process of using products and services. The law should require manufacturers and suppliers of products and services to provide detailed (specific) information for this type of product or service.

### 3.2 Criminal Law - Challenges and recommendations

In the research review of the author Yueh-Hsuan Weng et al (Weng, Y. H. & Chen, C. H. & Sun, C. T., 2009, 273): In 1981, a 37-year-old Japanese employee of a motorcycle factory was killed by an artificial intelligence robot that works near him. The robot misidentified the employee as a threat to its mission and calculated that the most effective way to eliminate this threat was to push him into an adjacent operating machine. The robot used its very powerful hydraulic arm to suddenly push the worker into the running machine, killing him instantly. The robot then continues its work without anyone interfering with its task.

The above incident raises a series of questions: Is the robot the subject of criminal responsibility? Who should bear the criminal responsibility in this case? To what extent can a machine with AI application become the subject of criminal legal relations? etc. Science and technology up to this point have developed very strongly. Especially, AI already has presented in many areas of socio-economic life and risks like the one mentioned above are inevitable. As the result, the Criminal Law has its mission to changes for the adaptation with the development of AI tech, specifically:

**Firstly, criminal subject:** A question that needs to be proposed in Criminal Law is whether to recognize AI as a fully capable entity as a criminal subject? There are five characteristics that humans expect from an intelligent entity: (1) Communicability: a human can communicate with an intelligent entity; (2) Self-knowledge: An intelligent entity is expected to have some knowledge of the entity itself; (3) External knowledge: An intelligent entity is expected to know about the outside world to learn about it and use information from it; (4) Goal-directed behavior: An intelligent entity is expected to act to achieve the goal set forth by the entity; (5) Creativity: An intelligent entity is expected to have some degree of creativity (Hallevy, G., 2010). Furthermore, some types of 21st century AI entities possess more attributes that allow them to function in more complex ways. The AI entity may have the ability to think, learn, and choose its actions. Therefore, Criminal Law should consider AI as a subject that can commit crimes.

**Secondly, criminal liability:** (1) In case AI is considered a machine and cannot be "human": AI cannot be the subject of a crime. In other words, AI does not have the subject capacity to participate in criminal legal relations. Accordingly, in legal terms, AI is a tool and means of crime. The subject of liability is another entity such as the AI programmer or the user or end-user. (2) Where an AI performs a behavior while the programmer or user is unaware, does not intend, and does not participate in the behavior: The programmer or user is not required to know about the behavior of any upcoming AI breaches in the course of their operations. However, programmers or users must be aware that such a violation of AI is a "natural" consequence (State v. Kaiser, 260 Kan. 235, 918 P.2d 629 (1996)). So, there are two cases: Firstly, if the AI behaves like a "machine", the programmer or the user of the AI is liable. Secondly, if the implementation of AI is not merely an "innocent machine", the liability rests with the programmer or the user and the AI. (3) Where AI is considered as an independent subject and does not depend on programmers or users: The process of analysis in AI systems parallels that of human understanding (Boden, M. A., 2006). AI has full capacity to commit violations, so AI must bear legal responsibility.

### 3.3 Intellectual Property Law - Challenges and recommendations

Artificial intelligence technology is increasingly seen as a tool with high proficiency to assist people in many different fields. Artificial intelligence products can assist judges in making fair and consistent decisions (Naughton, J., 2017). AI is used to see the magnitude and duration of the sun's rays to improve the accuracy of predictions (Fukuoka, K., 2017). Besides, AI is also applied in the field of art. Thus, artificial intelligence can paint pictures in the style of famous painters like Pablo Picasso (Gatys, L. A. & Ecker, A. S. & Bethge, M., 2015). The AI can also generate polyphonic choirs by various musicians such as Johann, Sebastian, and Bach (Hadjeres, G. & Fachtet, F., 2017). AI has made a huge contribution to the formation of intellectual properties. Because of the development and contribution of AI to human life, a series of questions are raised: Does the current legal system effectively support the development of AI? Are AI-generated products considered intellectual property? How does Intellectual Property Law protect AI-generated works? Who is the owner of that intellectual property? Etc. To answer these questions, the Intellectual Property Law shall have its own adjustments, specifically:

**Firstly, the author of the work; the subject of patent protection:** AI can now create poetry, music, drawings, and artwork; create 3D printing and have inventions without any human involvement. The questions that need to be answered are "who is the author of the works" and "who is the patentee". Hence, Intellectual Property Law needs to address the following issues: Is AI recognized as the author of the work? Does AI have the registration right of patent? What are the conditions for an AI to become an author of a work or a subject of patent protection? The current Vietnam's Intellectual Property Law only recognizes the author of the work and the subject of patent protection as a person or organization established by people (humanity). Therefore, if the law recognizes AI as the author of the work or the subject of patent protection, the Intellectual Property Law must change to answer all the questions posed above.

In contrast, assuming that the law does not recognize AI as the author of the work and the subject of patent protection. Then who will be the author of the work and the patentee in the following subjects: AI software developer; or AI programmer; or AI user if the user is constantly entering new sources of information for the AI to create work? These are some suggestions for the Intellectual Property Law to determine who is the author of the work or the subject of patent protection.

### Secondly, conditions for recognition of works or inventions

*Conditions for recognition of works.* A work is a creative product in the field of literature, art, and science expressed in any medium or form (Article 4(7) of the Law on Intellectual Property of Vietnam). There is another approach, "A work is "created" when it is fixed in a copy or phonorecord for the first

time...” (17 U.S. Code § 101) and “works of authorship include the following categories: literary works; musical works, including any accompanying words; dramatic works, including any accompanying music; pantomimes and choreographic works; pictorial, graphic, and sculptural works; motion pictures and other audiovisual works; sound recordings; and architectural works.” (17 U.S. Code § 102 (a)). Accordingly, the condition to be considered work must be “creative”.

*Conditions for being granted a patent.* “Patent eligibility” requirement (Parasidis, E., 2010, 326): novelty (17 U.S. Code § 102; Article 58(1a)), non-obvious (17 U.S. Code § 103; Article 58(1b) of the Law on Intellectual Property of Vietnam), the patent application must describe the invention clear and detailed (35 U.S.C § 112) (some countries require the invention to be industrially applicable (Article 58(1b) of the Law on Intellectual Property of Vietnam)). Artificial intelligence is defined as “the ability of machines to do things that people would say require intelligence.” (Philip, D. & Jackson, J., 2019). Thereby showing, AI can simulate human intelligence such as language understanding, pattern recognition, problem-solving, and experiential learning (Philip, D. & Jackson, J., 2019). That means AI can create novelty and non-obvious inventions. Therefore, the Intellectual Property Law should consider to recognize and protect AI's inventions.

### **Thirdly, copyright or patent owner**

According to the Vietnam's Intellectual Property Law: “Intelligent property right holder means an owner of intellectual property rights or an organization or individual to whom intellectual property rights are assigned by the owner” (Article 4(6) of the Law on Intellectual Property of Vietnam). With the development of AI, the opinion of the owner of copyright and patent also changes. Obviously, Vietnam's intellectual property law needs to change from the following perspective:

*Copyright owner:* (1) In case of not recognizing AI as an independent subject: The approach is allocating copyright ownership to the user, programmer, or artificial intelligence company by expanding the “work for hire” doctrine (Palace, V. M., 2019, 217-242). In the case of a “work made for hire”, ownership is transferred to the “employer” (17 U.S. Code § 201 (b)). That is, AI creates works, AI is considered as an “employee”, so the copyright owner belongs to the user or the programmer or the AI development company. (2) The case of recognizing AI as an independent subject: Usually, ownership of copyright belongs to the author or authors of the work (17 U.S. Code § 201 (a)). So the AI is the author of the work and the owner of the work. If programmers or AI users are involved in the creation of the work, then these people become co-authors and co-owners of copyright. In short, the owner of the copyright is the author or the person to whom the author transfers all or part of the ownership of the work.

*Patent owner:* (1) In case of recognition of AI as a subject of patent protection: the patent owner can be AI (AI is not an employee), or AI development company or AI user (AI is an employee). (2) Cases where AI is not recognized as a subject of patent protection: AI is a tool for creating inventions. The patent owner is the person who owns the AI – The person who has the right to register for patent protection.

### **Fourthly, copyright and patent protection issue**

*The AI as an owner:* Granting standing to artificial intelligence would lead to many unsettling questions: Who enforces the right? What remedies should artificial intelligence be granted? What other rights should artificial intelligence receive? (Hristov, K., 2017, 431-454). However, the purpose of copyright and patent protection is to encourage people to create works and inventions and to promote scientific and artistic progress. Currently, AI doesn't need an engine to be creative; they simply use electricity to create works and inventions (Samuelson, P., 1986, 1199). The financial incentive to gain from copyright would be meaningless for AI (Hristov, K., 2017, 444). It is not necessary to specify that AI is the

right holder and is protected by copyright and patent at present. Vietnam's Intellectual property Law currently does not recognize that AI is the right holder and is protected by copyright and patent. In the future, the questions posed above need to be answered because AI is evolving and AI may be sentient in the future. Subsequently, in the future when AI has sentience, the law should provide for the protection of AI's rights like humans.

*The user, programmer, AI development company as the owner:* (1) In case the AI is considered the author of the work and invention: User, programmer, or developer company AI developer is a co-owner of work and invention with AI. The lawfully protects the rights of owners. (2) In case the AI is not considered the author of works and inventions: Users, programmers, or AI development companies use AI "tools" to create works and inventions. The law protects the ownership of these objects, the fruits of their labor (Samuelson, P., 1986, 1185–1228). (3) In case the AI is considered as an "employee" for users, programmers, or AI development companies: the law should consider the content of protection for the owner because they would be rewarded despite not contributing to the intellectual conception of the work, contrary to the purpose of copyright law (Palace, V. M., 2019, 236). In addition, the law also needs to clearly define the limit of protection for users, programmers, or AI development companies because they could “own everything the program was capable of generating” by merely allowing the computer to run indefinitely (Samuelson, P., 1986, 1208).

### 3.4 Traffic Law - Challenges and recommendations

“One of the prime areas where AI will make its most paradigm-shifting impact is transport. Examples of AI methods that are finding their way into the transport field include Artificial Neural Networks (ANNs), Genetic Algorithms (GAs), Simulated Annealing (SA), Artificial Immune System (AIS), the Ant Colony Optimiser (ACO), Bee Colony Optimisation (BCO) and the Fuzzy Logic Model (FLM)” (Abduljabbar, R. & Dia, H. & Liyanage, S. & Bagloee, S.A., 2019, 189-203). “These AI interventions have potential applications for the vehicle, the infrastructure, the driver or transport user, and in particular, for how these interact dynamically to deliver a transport service that promotes user empowerment and supports human-machine interactions” (Miles, J.C. & Walker, A.J., 2006, 183-198). In the face of such big changes in technology, the Traffic Law need to be changed correspondingly. Therefore, some outstanding contents need to be adjusted when applying AI into traffic:

**Firstly, subjects participating in traffic:** According to the traditional view, “road user means operator or user of a vehicle joining in road traffic; person guiding or driving animals and pedestrian walking on the road” (Article 3(22) of Law on Road Traffic of Vietnam). However, the application of AI shall present in self-operated or semi-operated vehicles. In this case, is a self-operated vehicle considered to be an independent participant in traffic?

**Secondly, Operator:** According to the traditional view, “Operator means operator of a motor vehicle, rudimentary vehicle or special-use vehicle joining in road traffic” (Article 3(23) of Law on Road Traffic of Vietnam). The operator is "human". However, the application of AI shall present in self-operated or semi-operated vehicles. One problem that needs to be solved is: is the subject of installing to operating the AI-applied vehicle the driver of the vehicle?

**Thirdly, traffic planning:** Urban planning, planning on transport infrastructure shall have significant achievements when applying AI. The urban structure and the development of the transport system are firmly connected, so there is an inseparable relationship between traffic and urban land utilization (Knowles, R.D. & Ferbrache, F. & Nikitas, A., 2020). Therefore, the Traffic Law stipulates the planning of traffic infrastructure must also ensure: (i) Conformity with urban planning - the field that is greatly affected by AI; (i) Suitable for technical works applying AI.

**Fourthly, traffic signal system and other contents:** Due to the application of AI, the traffic signal system is not only a system of lights, signs, road signs, etc but also sounds and signals. sensors, automatic barriers, etc. AI is widely used in operating and managing traffic systems and penalizing traffic participants. Therefore, the regulations of the traffic law should update the traffic signal system applying AI. In addition, the traffic law adds regulations about the operation and management of traffic systems applying AI and fines for traffic participants based on AI decisions.

### 3.5 Competition Law – Challenges and recommendations

In the not-too-distant future, AI and algorithm-based applications will be the foundation for market competition and competition between different markets. Today, there are many different algorithm-based business models that attract the attention of researchers and regulators from the perspective of competition law (Ezrachi, A. & Stucke, M., 2017, 1775-810). However, defining and evaluating of legal of respective business models (and the algorithms used in this situation) is still in its early stages and fraught with challenges. There are several AI-based business models that limit competition such as (i) Messenger (Ezrachi, A. & Stucke, M., 2017, 1782): concerns the use of computers to execute the will of humans in their quest to collude and restrict competition. Under this basic scenario, humans agree to the cartel and use their computers to assist in implementing, monitoring, and policing the cartel. (ii) Hub and Spoke (Ezrachi, A. & Stucke, M., 2017, 1782): using a single algorithm to determine the market price charged by numerous users. In this case, an intermediary helps to orchestrate industry-wide collusion in a vertical agreement that leads to higher prices. This means that companies use a unique algorithm to increase prices, which affects the competitive environment. (iii) Predictable Agent (Ezrachi, A. & Stucke, M., 2017, 1782): humans unilaterally design the machine to deliver predictable outcomes and react in a given way to changing market conditions. In this case, the application of similar algorithms by competitors on an industry-wide scale may result in a competitive restraint effect through the creation of interdependent actions. (iv) Autonomous Machine (Ezrachi, A. & Stucke, M., 2017, 1782): Here competitors unilaterally create and use computer algorithms to achieve a certain goal, such as profit maximization. The machines, through self-analysis and testing, independently determine the methods for optimizing profits. The computer executes whatever strategy it deems optimal, based on continuous learning and feedback from the data collected from the market. Therefore, the competition law needs to have appropriate changes to adjust the anti-competitive practices due to the application of AI.

**Firstly, concept of “Relevant market”:** *According to the traditional view, “Relevant market” means the market of those products and/or services that are regarded as interchangeable because of their characteristics, intended use, and prices in a specific geographical area with homogeneous conditions of competition, which is considerably differentiated from neighboring geographic areas” (Article 3(7) of Vietnam’s Competition Law 2018). Or take a similar approach: “A relevant market is defined according to both product and geographic factors. A relevant product market comprises all those products and/or services that are regarded as interchangeable or substitutable by the consumer, because of the products’ characteristics, their prices, and their intended use. The relevant geographic market comprises the area in which the undertakings concerned are involved in the supply and Demand of products or services, in which the conditions of competition are sufficiently homogeneous and which can be distinguished from neighboring areas because the conditions of competition are appreciably different in those areas” (European Commission, 1997).*

The “relevant markets for the competition for AI and the competition with AI have to be defined” (Hennemann, M., 2020, 365). (i) Competition “for” AI: In this case, AI is seen as a characteristic of a good or service. The concept of an AI-related market is approached as follows: the “relevant product market

consists of all those goods or services which the opposite market side compares and reasonably regards as interchangeable or substitutable for the fulfillment of a certain need” (Hennemann, M., 2020, 366). Now and in the future, certain technologies will become the new standard and will shape the product market itself. Relying on technology in general and AI technology, in particular, is one of the factors to determine the relevant market. (ii) Competition “with” AI: In this case, AI is considered as the “nature” of the market. When introducing the concept of the relevant market, competition law should consider the geographical area of the market. Accordingly, “depending on the specific technical application, a geographical distinction could be made between regional and global markets” (Hennemann, M., 2020, 366). In addition, considering the “similar competitive conditions” of the market is one of the contents to give the concept of the relevant market. AI applications can create business environments with similar or different competitive conditions. Finally, identifying the market for substitute goods and services also needs to consider AI. Therefore, the following two questions need to be answered: (1) Can ‘traditional’ goods or services be reasonably interchangeable with applications of AI? or (2) can these respective AI applications establish independent and ‘new’ product markets?

**Secondly, market dominance.** *For the purpose of prohibiting the abuse of market power, competition law should clearly state whether a company holds a dominant position in the relevant market. “To allow an adequate assessment of market dominance, the essential ‘resource’ and driving force behind the development of AI, i.e. data, must be examined” (Hennemann, M., 2020, 368). Firstly, can business AI-related database resources lead to a dominant market position and to what extent? To answer the above question, it is necessary to consider the following factors: quantity of data, nature of data, quality of data, degree of data exclusivity, and third-party access to data. Secondly, how do AI-related databases play in assessing a company's market position? To answer this question, it is important to consider the following: comparing data sources used for AI among competitors; comparing databases of different level enterprises.*

However, there are number of questions to answer: (1) is the enterprise in control of the “data power” the dominant one in the market? (2) Is an AI-based technology standard-setting enterprise dominating the market? The above-mentioned enterprises are not dominant market because using the power of data helps the market moving. Therefore, determining the dominant market position is case-by-case when considering data, AI standards, and applications that may create barriers to market entry.

**Thirdly, abuse of market power:** To identify an abuse of market power of enterprises using AI technology is very difficult. Therefore, it is very important to analyze whether AI technologies exhibit a tendency to abuse market power and to what extent market power abuse. AI systems can affect the prices of goods and services; fix buying and selling prices; restrict the distribution of goods and services; restraint market; obstruct the scientific and technological development of customers; etc (Ezrachi, A. & Stucke, M., 2016). In addition, AI-based systems can be used not only to design or customize pricing terms, but also to construct terms such as general terms, terms of conditions, and terms of data protection. This shows that considering the factors constituting a dominant market position by AI, Competition Law not only comprehensively measures the factors of price, discrimination, transfer of rights, but also considers abuse unfair terms to consumers.

**Fourthly, anti-cartel and anti-competitive agreements:** In this context, it is assumed that AI systems pursue the goal of maximizing the profits of the businesses that use them. To achieve this goal, the systems will use the “basic mechanism of deep learning - aims to find the most favorable decision-making parameters by comparing and matching data as well as analyzing the parameters. pattern, hierarchy, and correlation” (Hennemann, M., 2020, 375). Thus, the formation of the cartel will help the system to achieve maximum profit and the development of the system will be better and safer (Ezrachi, A. & Stucke, M.,

2017, 1775-810). Alternatively, the AI system might conclude that to get the most benefit, the AI needs to make an 'agreement' that restricts competition with a competitor's system. Therefore, Competition Law needs to take into account the situation of cartel formation and agreement to limit competition through AI to make appropriate adjustments.

#### 4. Conclusion

The era of artificial intelligence has been and soon affects many areas of human life. In fact, there is substantial development of AI that has posed many challenges to mankind, along with great legal challenges. Respectively, many different legal areas need to be improvised to standardize the social relations arising from the presence of AI, such as Competition Law, Intellectual Property Law, Criminal Law, Consumer Protection Law, etc. This article outlines the legal challenges which humanity is facing and offers some suggestions for changing the composition in some branches of legal system. The author has no ambition to thoroughly solve legal issues in the era of artificial intelligence but only bring in the recommendations that the author and interested people currently researching.

#### References

- Abduljabbar, R. & Dia, H. & Liyanage, S. & Bagloee, S.A. (2019). Applications of artificial intelligence in transport: An overview. *Sustainability*, Vol. 11, 189-203.
- Ahuja, A. (2019). The impact of artificial intelligence in medicine on the future role of the physician. *PeerJ*, Vol. 7 (4). <https://doi.org/10.7717/peerj.7702>.
- Arora, S. & Athavale, V. & Maggu, H. & Agarwal, A. (2021). *Artificial Intelligence and Virtual Assistant—Working Model*. In Marriwala, N. & Tripathi, C. C. & Kumar, D. & Jain, S. (Eds): *Mobile Radio Communications and 5G Networks*, 163-171. Springer. DOI: 10.1007/978-981-15-7130-5\_12.
- Bhattacharjee, A. (2012). *Social Science Research: Principles, Methods, and Practices*. University of South Florida. ISBN 13: 9781475146127.
- Bhattad, P. & Jain, V. (2020). Artificial Intelligence in Modern Medicine – The Evolving Necessity of the Present and Role in Transforming the Future of Medical Care. *Cureus*, Vol. 12(5). DOI: 10.7759/cureus.8041.
- Boden, M. A. (2006). *Has AI Helped Psychology?* In Partridge, D. and Wilks, Y. (Eds): *The foundations of artificial intelligence 108*.
- Brill, T. & Munoz, L. & Miller, R. (2019). Siri, Alexa, and other digital assistants: a study of customer satisfaction with artificial intelligence applications. *Journal of Marketing Management*, Vol. 35. DOI: 10.1080/0267257X.2019.1687571.
- Burggräf, P. & Wagner, J. and Koke, B. (2018). Artificial intelligence in production management: A review of the current state of affairs and research trends in academia. *Presented to the 2018 International Conference on Information Management and Processing (ICIMP)*, 82-88. DOI: 10.1109/ICIMP1.2018.8325846.
- Cabral, T. S. (2020). Liability and artificial intelligence in the EU: Assessing the adequacy of the current Product Liability Directive. *Maastricht Journal of European and Comparative Law*, Vol. 25(5), 615-635.
- Castilla, A. & Elman, J. (2017). Artificial intelligence and the law. TechCrunch, Bay Area, accessible at [Artificial intelligence and the law | TechCrunch](#).

- Chaudhry, I. A. & Shami, M. & Khan, A. (2004). Manufacturing Applications of Artificial Intelligence. *Journal of Engineering and Applied Sciences*, Vol. 23, 29-33.
- Chen, X. & Xie, H. & Hwang, G. (2020). A multi-perspective study on Artificial Intelligence in Education: grants, conferences, journals, software tools, institutions, and researchers. *Computers and Education: Artificial Intelligence*, Vol. 1. <https://doi.org/10.1016/j.caeai.2020.100005>.
- Chojecki, P. (2020). *Artificial Intelligence Business: How you can profit from AI (1st Edn)*. Packt Publishing. ISBN: 9781800566514.
- Cioffi, R. & Travaglioni, M. & Piscitelli, G. & Petrillo, A. & De Felice, F. (2020). Artificial Intelligence and Machine Learning Applications in Smart Production: Progress, Trends, and Directions. *Sustainability*, Vol. 12(2). DOI: 10.3390/su12020492.
- Ezrachi, A. & Stucke, M. (2017). Artificial intelligence & collusion: when computers inhibit competition. *University of Illinois Law Review*, Vol. 5, 1775-1810.
- European Commission (1997). *Commission Notice on the definition of the relevant market for the purposes of Community competition law (97/C 372 /03)*.
- Ezrachi, A. & Stucke, M. (2016). *Virtual competition*. Harvard University Press, Cambridge.
- Fotis, K. & Kamariotou, M. (2021). Artificial Intelligence and Business Strategy towards Digital Transformation: A Research Agenda. *Sustainability*, Vol. 13 (4). <https://doi.org/10.3390/su13042025>.
- Fukuoka, K. (2017). Solar Flare, A Prediction Accuracy of 80% with AI, Flare may Still Occur in the Next Seven Days. *NIHON KEIZAI SHINBUN* (Sept. 8, 2017), accessible at [https://www.nikkei.com/article/DGXLASDZ08H7H\\_Y7A900C1000000/](https://www.nikkei.com/article/DGXLASDZ08H7H_Y7A900C1000000/).
- Gatys, L. A. & Ecker, A. S. & Bethge, M. (2015). *A Neural Algorithm of Artistic Style* (Aug. 26, 2015), accessible at <https://arxiv.org/pdf/1508.06576v2.pdf>.
- Gerstner, M. E. (1993). Comment, Liability Issues with Artificial Intelligence Software. *Santa Clara L. Rev*, Vol. 33(1), 239-269. <https://digitalcommons.law.scu.edu/lawreview/vol33/iss1/7>.
- Goksel, N. & Bozkurt, A. (2019). *Artificial Intelligence in Education: Current Insights and Future Perspectives*. In S. Sisman-Ugur, & G. Kurubacak (Eds.): *Handbook of Research on Learning in the Age of Transhumanism*, 224-236. Hershey, PA: IGI Global.
- Greenblatt, N.A. (2016). Self-driving Cars and the Law. *IEEE Spectrum*, Vol. 53, 46-51.
- Hadjeres, G. & Facht, F. (2017). *Deepbach: a steerable model for Bach chorales generation I* (Jun. 17, 2017), accessible at [DeepBach: a Steerable Model for Bach Chorales Generation \(arxiv.org\)](https://arxiv.org/abs/1706.02568).
- Hallevy, G. (2010). *The Criminal Liability of Artificial Intelligence Entities*, Available at <https://ssrn.com/abstract=1564096> or <http://dx.doi.org/10.2139/ssrn.1564096>.
- Hennemann, M. (2020). *Artificial Intelligence and Competition Law*. In Wischmeyer, T. & Rademacher, T. (Eds): *Regulating Artificial Intelligence*. Springer.
- Hoffmann-Riem, W. (2020). *Artificial Intelligence as a Challenge for Law and Regulation*. In: Wischmeyer T., Rademacher T. (eds): *Regulating Artificial Intelligence*, 1-29. Springer, Cham. [https://doi.org/10.1007/978-3-030-32361-5\\_1](https://doi.org/10.1007/978-3-030-32361-5_1).
- Hristov, K. (2017). Artificial Intelligence and the Copyright Dilemma. *J. FRANKLIN PIERCE CTR. INTELL. PROP*, Vol. 57, 431–454.
- Kaplan, J. (2016). *Artificial intelligence*. Oxford University Press, New York.



- Kashyap, A. (2018). Artificial Intelligence & Medical Diagnosis. *Scholars Journal of Applied Medical Sciences (SJAMS)*. Vol. 6(12), 4982-4985. DOI: 10.21276/sjams.2018.6.12.61.
- Knowles, R.D. & Ferbrache, F. & Nikitas, A. (2020). Transport's historical, contemporary and future role in shaping urban development: Re-evaluating transit oriented development. *Cities*, 99. <http://dx.doi.org/10.1016/j.cities.2020.102607>.
- Lytras, M. D. & Chui, K. T. & Liu, R. W. (2020). Moving Towards Intelligent Transportation via Artificial Intelligence and Internet-of-Things. *Sensors*, Vol. 20(23). DOI:10.3390/s20236945.
- Miles, J.C. & Walker, A.J. (2006). The potential application of artificial intelligence in transport. *IEEE Proc. Intell. Transp. Syst*, Vol. 153, 183–198.
- Naughton, J. (2017): Why a Computer Could Help you Get a Fair Trial. *THE GUARDIAN*, accessible at <https://www.theguardian.com/technology/commentisfree/2017/aug/13/why-a-computer-could-helpyou-get-a-fair-trial>.
- Nikitas, A. & Michalakopoulou, K. & Njoya, E. T. & Karampatzakis, D. (2020). Artificial Intelligence, Transport and the Smart City: Definitions and Dimensions of a New Mobility Era. *Sustainability*, Vol. 12 (7). DOI:10.3390/su12072789.
- Page, L. C. & Gehlbach, H. (2017). How an Artificially Intelligent Virtual Assistant Helps Students Navigate the Road to College. *AERA Open*, Vol. 3(4), 1-2. DOI:10.1177/2332858417749220.
- Palace, V. M. (2019). What if Artificial Intelligence Wrote This? Artificial Intelligence and Copyright Law. *Fla. L. Rev*, Vol. 71(1), 217-242.
- Parasidis, E. (2010). A Uniform Framework for Patent Eligibility. *TUL. L. REV*, Vol. (85), 323-394.
- Pham, D.N. (2014). *Methods of studying jurisprudence*, Public Security Publishing House, Hanoi.
- Philip, D. & Jackson, J. (2019). *Introduction to artificial intelligence (3st ed)*. Dover Publications.
- Roll, I. & Wylie, R. (2016). Evolution and revolution in artificial intelligence in education. *Int. J. Artif. Intell. Education*, Vol. 26, 582–599. DOI 10.1007/s40593-016-0110-3.
- Samuelson, P. (1986). Allocating Ownership Rights in Computer-Generated Works. *U. PITT. L. REV*, Vol. 47, 1185-1228.
- Soni, N. & Sharma, E. & Singh, N. & Kapoor, A. (2020). Artificial Intelligence in Business: From Research and Innovation to Market Deployment. *Procedia Computer Science*, Vol. 167, 2200-2210.
- Weng, Y. H. & Chen, C. H. & Sun, C. T. (2009). Towards the Human-Robot Co-Existence Society: On Safety Intelligence for Next Generation Robots. *INT. J. SOC. ROBOT*, Vol. 267(1), 267-282.
- Woschank, M. & Rauch, E. & Zsifkovits, H. (2020). A Review of Further Directions for Artificial Intelligence, Machine Learning, and Deep Learning in Smart Logistics. *Sustainability*, Vol. 12. <https://doi.org/10.3390/su12093760>.

NOT FOR SALE



978-604 79-3782-0

ISBN: 978-604-79-3782-0

**HO CHI MINH CITY UNIVERSITY OF ECONOMICS AND FINANCE**

141 - 145 Dien Bien Phu, Ward 15, Binh Thanh District, HCM City

Website: [uef.edu.vn](http://uef.edu.vn) - Hotline: (028) 5422 6666 \* (028) 5422 5555