



Review Article  
Vietnamese Criminal Policies and Laws in the  
Industrial Revolution 4.0: Some New Awareness<sup>1</sup>

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**Abstract:** The industrial revolution 4.0 reflects combination of technologies in physics, digitalisation and biology, shaping a modern world of information technology where virtual and real systems are integrated through worldwide internet connection networks. Despite a number of advantages, this revolution also creates new challenges and threats, requiring systematic changes in economic, cultural, and social areas, including reform of criminal policies and laws for effective crime prevention, protection of sovereignty, national security, human rights and citizens' rights in the new context. Therefore, it is important to have a new awareness on Vietnamese criminal policies and laws in the industrial revolution 4.0 to facilitate the identification of key research areas for further improvement and application of criminal policies and laws in the new era.

*Key words:* Criminal policies; criminal laws; human rights.

## 1. Introduction

Given extensive impacts and challenges of the industrial revolution 4.0<sup>2</sup> in the world in

general, it is important to conduct researches on criminal policies and laws in Vietnam in the

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<sup>2</sup> The *first* industrial revolution uses steam power to mechanise production; the second revolution uses electricity for production; the third revolution uses electronic devices and information technology to automate production; the fourth revolution combines technologies,

removing physical, technical and biological barriers (For details, see: Klaus Schwab, *The fourth industrial revolution*, National Political Publishing House, Hanoi, 2018). In this context, some developed countries have issued policies to response to the changes, specifically, the Federal Republic of Germany, (Programme "Platform Industrie 4.0", introduced in 2015), US (Programme "Artificial intelligence, automation, and the economy", introduced in 2016), Japan (Programme "New industrial structure vision", introduced in 2017) which focuses on development of artificial intelligence through public-private sector in order to ensure the future prosperity of the nation, and Korea also follows this trend ("The plan on placing human beings as centre in responding to the fourth industrial revolution for inclusive growth", introduced in 2017).

context of the industrial revolution 4.0 [1] in particular for reasons as follows:

*- Requirements of scientific and technological development, current situation of crime prevention and enforcement of criminal laws*

The industrial revolution 4.0 reflects the combination of technologies in physics, digitalisation and biology, shaping a modern world of information technology where virtual and real systems are integrated through worldwide internet connection networks, moving the human society towards a new era with substantial achievements and effectiveness in meeting demands of human beings. However, the industrial revolution 4.0 has also resulted in a number of challenges. According to the World Economic Forum, areas directly affected by this revolution include: i) Big Data; ii) Smart Cities; iii) Blockchain/ Bitcoin; iv) Artificial Intelligence; v) Renewable Energy/ Clean-tech; vi) FinTech; vii) E-Commerce; viii) Robotics; ix) 3D Printing; x) Virtual/ Augmented Reality; xi) Shared Economies; xii) Internet of things (IoT); xiii) Nanotechnology/ 2D Materials; xiv) Biotechnology/ Genetics & Agricultural Innovation and; xv) Desalination. Therefore, given challenges in the new context, it is important to reform criminal policies and laws to meet requirements of crime prevention, scientific and technological development as well as enforcement of criminal laws in practice.

*- Requirements of rapid and sustainable development*

To achieve sustainable development of every country in particular and the whole world in general, countries and human beings must ensure harmonisation of key factors as follows: i) Rapid and sustainable economic development; ii) Ensuring social equality and fairness; iii) Protection of natural resources and environment. Together with other factors, these key factors are closely linked with each other in order to achieve rapid and sustainable development of a country. However, these factors are only ensured through stable institutions, policies, social order and safety, effective legal framework for production, doing business and crime prevention. In the industrial

revolution 4.0, state management is improved through technical application. The Government and ministries are empowered to increase efficiency of management, direction and operation thanks to new monitoring technologies and available management systems of digital infrastructure. As traditional policy making process does no longer fit with increasing changes of practical needs and social development, in both real life and cyber spaces, it is essential to improve legal framework for preventing crime and dealing with violations. Consequently, at a high level, improvement of criminal laws has become indispensable. This not only aims at strengthening a stable, safe and civilised society and improvement of effectiveness of crime prevention in the context of the industrial revolution 4.0 but also protecting and maintaining legitimate values and interests of the Government, agencies, and organisations as well as freedoms and human rights. Provisions of criminal laws (the Penal Code) are issued to provide for acts dangerous to the society and penalties against these acts (reflecting reactions of the Government). At the same time, the laws is enforced by the Government to ensure strict compliance and prevention of violations and crimes. Noticeably, through judicial activities (investigation, prosecution, trial and judgement enforcement), the Government (represented by judicial agencies in charge of law protection and enforcement, crime prevention) detects and prevents crimes, applying penalties against criminals, issuing educational measures to help criminals to rehabilitate into the society, ensuring legal compliance of legal entities<sup>3</sup>, etc. Therefore, it is important to develop and improve criminal laws to ensure stability and economic growth, protection of interests of the Government and the society in the industrial revolution 4.0.

*- Requirements for development and improvement of the legal system, development of*

<sup>3</sup> For the first time, the Vietnam Penal Code 2015 has provided for legal entities as additional subjects of crimes (Author).

*a socialist rule-of-law state of the people, by the people and for the people, prevention of crimes in the context of the industrial revolution 4.0*

The Resolution of the XII National Party Congress in 2016 emphasized the importance of law development and enforcement. Specifically, the Resolution confirmed “improvement of the legal system, ensuring consistency, unity, openness and transparency to meet requirements of social-economic development and international integration, etc., improving inspection, supervision, and monitoring, as well as enhancing effectiveness and efficiency of enforcement of laws and policies...” [2; p.310-311]. And The Resolution of the XIII National Party Congress in 2021 continued to emphasize one of the six key tasks when stating: “Completely perfecting the legal system, mechanisms and policies...” [3; p.202]. In addition, on 1 December 2016, the Prime Minister issued the Decision No. 623/QĐ-TTg on approval of “The National Strategy on crime prevention from 2016-2025 with a vision to 2030”, emphasizing the need of “continuing to develop and improve the legal system, focusing on forecast studies, timely codifying new acts dangerous to the society, developing and issuing guiding documents after laws and codes come into force...” [4; p.65] followed by the Project 12 on “Improving effectiveness of cyber crime prevention” led by the Ministry of Information and Communication. Noticeably, on 4 May 2017, the Prime Minister issued the Directive No. 16/CT-TTg on “Improvement of capacity for the fourth industrial revolution”, setting higher requirements on cyber safety and security in the context of the industrial revolution 4.0 to build a socialist rule-of-law state of the people, by the people, and for the people. Therefore, it is important to have unanimous awareness and updates of criminal policies in order to develop governmental strategies for effectively preventing crime, developing action plans and; improving institutions and relevant laws.

*- Requirements of protection of human rights and citizens' rights*

The industrial revolution 4.0 is unique in mankind history, combining technologies in

physics, digitalisation and biology, shaping a modern world of information technology where virtual and real systems are integrated through worldwide internet connection networks. This revolution might be followed by further revolutions in the future. Presently, while human beings have just entered the first phase of the industrial revolution 4.0, it has profound breakthroughs and impacts on political, social, economic and cultural systems in the world. The legal system in general and criminal laws and guiding principles for criminal policies in particular are considerably affected by the revolution. While these multi-dimensional impacts have created substantial advantages to human rights and citizen's rights (for example, implant technology, super portable computers, storage services, internet of things, smart cities, unmanned cars, artificial intelligence, etc.) [5; p.201-279], they have also created potential threats and dangers to the society, infringement of security, national sovereignty, social safety and order, human rights and citizens' rights, etc. It is important that these threats and dangers are timely identified for the Government to issue appropriate criminal laws and to restructure the criminal law system in order to effectively meet new requirements of protection of human rights and citizens' rights.

*- Requirements of current globalisation*

Currently, as globalisation is more and more comprehensive and diversified with a focus on narrowing timing and spatial gaps, no country is isolated from the rest of the world and countries depend and interact with each other [6; p.29]. With increase of exchanges at all levels and blooming of constant flows of finance, commerce and industry, globalisation has resulted in the effect of “time-space compression” [7; p.8], leading to “destruction of spatial and timing barriers”, making the national border - one of symbols for state power and national sovereignty gradually becoming “hollow” and getting out of control of the State. Scientific and technological innovations also weaken the national border, providing individuals and other actors with more effective tools to “escape” from the national border

control - a traditional measure of control by the State [8; p.17]. Moreover, given challenges of the industrial revolution 4.0 and new threats caused by globalisation such as “soft border and virtual space”, “soft power”, “cyber security”, “non-traditional security”, cyber crimes and trans-national organised crimes committing acts dangerous to the society, etc., at the global level, it is important to actively response to and manage these threats and challenges to ensure the national sovereignty and security for the people. Consequently, the above-mentioned reasons confirm the importance and timeliness of conducting the research on “Vietnamese criminal policies and laws in the industrial revolution 4.0”.

Noticeably, it is found by the author that there has been no research on this issue in Vietnam yet. Therefore, the article focuses on three main issues as follows:

- Definitions and basic features of Vietnamese criminal policies in the industrial revolution 4.0;
- Analysis of opportunities and challenges of the industrial revolution 4.0 on criminal policies and requirements of development and improvement of Vietnamese criminal laws;
- Directions for Vietnamese criminal policies and laws to meet requirements of crime prevention in the industrial revolution 4.0.

## 2. Research Issues

### 2.1. Definitions and Basic Features of Vietnamese Criminal Policies in the Industrial Revolution 4.0

#### 2.1.1 Definitions of Vietnamese Criminal Policies in the Industrial Revolution 4.0

In theory, criminal laws have been subject to a number of national and international studies. Specifically, from a traditional point of view, basic contents, components, and issuers are agreed by scholars and practitioners whether they follow a wide or narrow approach [9; p.15-22]; [10; p.189-201]; [11; p.24-138]; [12; p.108-121]; [13; p.6-34]. Nevertheless, criminal policies are considered social policies issued by

the Government (party agencies are listed as issuers by some scholars), highlighting “crimes” as key objects of criminal policies. In addition to effective crime prevention, the Government needs to improve other social policies. Criminal policies mainly focus on policies against crimes (specifically, key legislative process - criminalisation and decriminalisation, penalisation and de-penalisation, other issues) and crime prevention. Therefore, under this traditional approach, feasible and effective criminal policies should be based on viewpoints, directions and guidance of the Party, policies and laws of the Government, other social policies (economic, cultural, social, etc., policies), historical and traditional conditions, and practical conditions of crime prevention. Consequently, the Government is able to issue key guidance and directions for sufficient and effective application of criminal laws (i.e. sufficient quantity and legitimate application) in protection of security, national sovereignty, interests of the Government and the society, legitimate rights and interests citizens and organisations, and thus improving effectiveness of crime prevention. Criminal policies ensure stable and solid political and legal foundations, developing and improving criminal laws in general and the future criminal justice to provide for changing social relationships, crime fluctuation, deterrent, educational or preventive measures in the Penal Code. Specifically, to a wider extent, criminal policies also examine causes of crimes, studying measures for crime prevention and forecasting, changes of crimes, gaps of the current criminal justice system for further improvement.

Nevertheless, the industrial revolution 4.0 is unique in mankind history and might be followed by further revolutions in the future. Presently, while human beings have just entered the first phase of the industrial revolution 4.0, it has profound breakthroughs and impacts on political, social, economic and cultural systems in the world. The legal system in general and criminal laws and guiding principles for criminal policies in particular are also extensively affected by the revolution. While these multi-dimensional

impacts have created substantial advantages (for example, implant technology, super portable computers, storage services, internet of things, smart cities, unmanned cars, artificial intelligence, etc.) [5; p.201-279], they have also created potential threats and dangers to the society, infringing upon security, national sovereignty, social safety and order, human rights and citizens' rights, etc. Therefore, it is crucial that these threats and dangers are timely identified for the Government to issue appropriate criminal laws and restructure of the criminal law system in order to effectively meet new requirements of crime prevention in the context of globalisation and international integration.

In the industrial revolution 4.0, in addition to the above-mentioned factors, criminal policies should be based on results (achievements/applications) of scientific and technological revolution. Consequently, from a scientific point of view, the following definition might be used [1; p.106]: Vietnamese criminal policies in the industrial revolution 4.0 are key guidance, directions and tactics of the Government in application of criminal laws in crime prevention, shaping criminal issues, specifying viewpoints and attitudes in dealing with these issues based on combination of social policies with scientific and technological achievements, contributing to development and improvement of the national criminal law system, meeting demands of the society in the context of globalisation and requirements of crime prevention.

#### 2.1.2. Features

In order to deal with challenges in the industrial revolution 4.0, criminal policies must have basic features as follows:

- Criminal policies are key guidance, directions and tactics issued by the Government. These major undertakings relate to the criminal problem posed by reality or need to be predicted to deal with criminal problems of practice.

- Criminal policies focus on how the Government uses criminal laws in crime prevention, shaping criminal issues, specifying viewpoints and attitudes to deal with these issues.

- Criminal policies are developed on the basis of viewpoints, guidance and directions of the Party, policies and laws of the Government, other social policies (economic, cultural, social policies, etc.), historical and traditional conditions, practical conditions of crime prevention, and results of scientific and technological revolution<sup>4</sup>.

- Criminal policies contribute to development and improvement of the national criminal law system to meet requirements of social development in the context of globalisation, ensuring security, national sovereignty, social safety and order, human rights and citizens' rights. as globalisation is more and more comprehensive and diversified with a focus on narrowing timing and spatial gaps, no country is isolated from the rest of the world and countries depend and interact with each other [6, p.20]. With increase of exchanges at all levels and blooming of constant flows of finance, commerce and industry, globalisation has resulted in the effect of "time-space compression" [7; p.8], leading to "destruction of spatial and timing barriers", making the national border - one of symbols for state power and national sovereignty gradually becoming hollow, and getting out of control of the State. Scientific and technological innovations also weaken the national border, providing individuals and other actors with more effective tools to "escape" from the national border control - a traditional measure of control by the State [8; p.17], which facilitates transnational and cross-border crimes.

- At the same time, criminal policies require improvement of the legal system in information technology as a foundation for scientific and technological innovations. As the industrial revolution 4.0 goes with breakthroughs in

<sup>4</sup> The industrial revolution 4.0 is a scientific and technological revolution, combining technologies to remove physical, digital and biological barriers, minimizing resources, creating new products and services. However, it also results in a number of threats and challenges relating to infringement of privacy, cyber security, confidential information, labour issues, social risks, etc.

information technology where all social issues are connected through internet of things, a consistent and effective legal system is required to ensure privacy of citizens and safety of cyber security and national security. Consequently, it is important to improve all legal documents relating to information technology such as the Law on high technologies 2008 (revised in 2013 and 2014), the Law on Information Technology 2006, the Law on Cyber Information Security 2015, the Law on Cyber Security 2018, etc., as well as legal documents in specific areas such as artificial intelligence, crypto currencies, 3D printing technology, etc., as these areas are more and more vulnerable to threats and attacks by criminals.

## 2.2. Benefits and Challenges of the Industrial Revolution 4.0 on Criminal Policies and Development and Application of Criminal Laws in Vietnam

### 2.2.1. Benefits

Based on the scale and role of the industrial revolution 4.0, its achievements and effective applications in the society in general, it is observed that the revolution also has positive impacts on criminal policies and laws in Vietnam in particular as follows:

- *Provide efficient means for research of criminal laws, development and application (enforcement) of criminal laws*

First of all, information technology applications have provided efficient means for research and making criminal policies, development and application (enforcement) of criminal laws. Accordingly, thanks to effective means of technologies, results of surveys and assessments are compiled, presented and saved as inputs for effective follow-up studies of criminal laws, resulting in comprehensive and accurate strategies and action plans for development and enforcement of criminal policies. For example, the predictive policing technology - also called PredPol helps law enforcement agencies predict crimes based on information on timing and place of previous crimes combined with sociological information on

behaviours and models of crimes. This technology has been piloted in Santa Cruz by the Police of California State (US) over the last 1 year and by the Police of Los Angeles over the last 6 months with promising impacts. This technology is also used by big corporates such as Wal-mart and Amazon to identify shopping trends of consumers. The key to success of the predictive policing technology is collecting as much data as possible to identify features of crimes [14].

In addition, high technologies are essential for timely and effective crime prevention, strict enforcement of criminal laws (means for monitoring, supervision, positioning, storing of information, identifying through research, management, etc.), especially use of artificial intelligence in storing information and identifying criminals<sup>5</sup>. Noticeably, according to South China Morning Post, prisoners in China have no chance to escape. Each camera is equipped with an intelligent monitoring system to detect suspicious acts. Presently, this system is piloted in VIP prisons where special prisoners are detained. Yancheng prison in HaBei province of Chiam is equipped with artificial intelligence monitoring camera system. Equipment installed in each prison cell helps monitor and detect abnormal behaviours. A nerve network is programmed to recognise acts of criminals and forecast risk of escape. When detecting suspicious acts, the alarm bell is triggered through a math formula to inform prison guards [15]. In addition, it is believed that smart technologies help get rid of bribe. Even if a prisoner gives bribe to prison guards, it is impossible for him/her to affect the math formula [15].

<sup>5</sup> The police in the UK have used artificial intelligence to develop tools to assess possibility of committing crimes of the suspected, the crime scene and case dossier analysis software with accuracy rate of 88%. Another example, the police in Zhengzhou (China) have used special glasses installed with a software for identification of faces of wanted crimes at train stations to detect criminals escaping from traffic accidents, criminals trafficking in persons and other 26 criminals involving fraud crimes just after a couple of days. See: <https://vnexpress.net/>, Bao Anh, How artificial intelligence changes our life, accessed on 1 May, 2019.

- *Timely connect comprehensive information and data for investigation, process and connect information and data for crime prevention*

Ability to connect globally of the internet enables legislators to promptly get access to a large number of digital data on legislative trends and experiences around the world as well as to receive diverse feedbacks from all walks of life on criminal policies and laws having been issued or to be issued by the Government. For example, the Domain Awareness System (DAS) developed by Microsoft is able to promptly provide security officers with a lot of information on the suspected, which is superior compared to simple monitoring camera system. The DAS not only shows live video data but also displays criminal records of relevant subjects in the area and other data for a clear overview on the suspected. Interestingly, information on places where a car used by the suspected has been found is also available. Accordingly, the system helps investigators to “rewind” the video clips to look for accomplices in any suspicious case. Therefore, the system is considered a creative and promising tool for a revolution in law enforcement, intelligence and public safety,... [14]. At the same time, issuance of action plans, tactics and programmes for crime prevention and decisions on preventive measures and investigation of crimes relating to prevention of adverse consequences (damages) to the society such as rescue, fire prevention, etc., is more effective and timely thanks to achievements and applications of science and technology. In Korea, a system is established to detect and deal with cyber attack threats based on artificial intelligence. For example, a big data centre on cyber security is operating and encouraging businesses to invest on cyber security. A code of conduct and ethics for artificial intelligence developers and users was introduced in 2018 to avoid overuse 2018 [16]. In addition, internet is also an important connection tool for crime prevention cooperation among areas, localities, nations, regions and in the world, etc., resulting in establishment of international programmes on crime prevention.

- *Increase effectiveness of dissemination and access to criminal laws*

Digitalisation of knowledge, information, material, legal documents and disclosure of such information on internet helps disseminate the Government’s policies and laws in general and criminal laws in particular to a wider targeted group, increasing awareness and compliance with the laws and legal consultation to the people... [17]<sup>6</sup>, resulting in good public options on crime prevention.

#### 2.2.2. Challenges

Despite the above-mentioned benefits, the industrial revolution 4.0 has also created a number of challenges in development and application of criminal laws, including criminal policy making as follows:

- *Scientific and technological achievements are used as means of committing traditional offences and new acts dangerous to the society*

Scientific and technological achievements are not only used as means of committing crimes mentioned (provided for) in the Penal Code, which makes it more complicated for detection and settlement, but also committing new acts dangerous to the society with more and more sophisticated and complicated tricks, causing consequences at a larger scale, making it more and more difficult to detect those acts, especially in areas such as information technology,

<sup>6</sup> For example, in a study conducted by LawGeex with support of law professors at Standord University, Law School of Duke University and University of South California, 20 experienced lawyers worked together to fight against an AI trained in assessment of legal contracts. The two groups were given 04 non-disclosure agreements (NDA) in order to identify 30 legal issues including arbitration, confidential informaion and compensation. The groups were requested to correctly identify each specific issue. Unfortunately, the lawyer group was defeated. The lawyer group only correctly identified 85% of legal issues while that of AI was 95%. AI completed the mission in 26 minutes while it took the lawyer group 92 minutes to finish their job. AI identified 100% of legal issue in one agreement while the highest rate of the lawyer group was 97%. In brief, the lawyer group was defeated. See: <http://vi.sblaw.vn/>, VnReview, Artificial intelligence defeats 20 top lawyers in the US, accessed on 1 May, 2019.

communication, finance, banking, etc., or transnational crimes such as drug smuggling, money laundering, terrorism, etc. More dangerously, through the internet of things (IoT) and the Big Data system, criminals might disseminate harmful and extreme information, offending leaders, conducting propaganda against the Government, committing terrorist acts against the Government, protesting against the socialism, etc., in the areas of political and theoretical security. Compared to the previous period when traditional crimes (i.e. crimes committed in the territory of a nation infringing upon rights and interests protected by laws) were detected and sanctioned in a traditional way, crimes are more complicated and thus difficult to be detected and sanctioned due to technological means in the industrial revolution 4.0. For example, the police in the US have just arrested Jorge Edwin Rivera, a 25-year-old man 1.83 km from the border line after detecting a suspicious unmanned drone. Accordingly, he admitted to use the drone to transport 5.9 kg of drugs passing the border of Mexico to enter San Diego (US),... [18]. In Vietnam, cyber crimes are more and more complicated with changing tricks to swindle properties in various forms such as through Facebook, pretending to be representatives of law enforcement agencies and governmental agencies, fraud in e-commerce, etc. Crimes also use internet, communication network, electronic devices to commit acts of property appropriation, sales and stealing credit card information; gambling in the forms of lottery, football betting on internet, etc.

Moreover, through a connection unlimited by geographical boundary, criminals are able to infringe upon a large number of victims in various places, causing consequences to the society at different locations, violating human rights, citizens' rights, especially the right to confidential information. At the same time, it is difficult to detect, investigate and deal with these crimes as there is no trace in physical world.

*- Backward awareness and research on key issues of criminal laws*

Traditional awareness on crimes becomes backward as the scientific and technological revolution has resulted in changes of objects, consequences, scenes, and subjects of crimes in the whole theoretical system, legal materials, textbooks of criminal justice, etc., which requires new analysis, research and implementation. For example, objects of crimes in a digital world might be a virtual value or prosperity. Consequences of crimes are traditionally considered damages to the society, however in the technological era, such consequences might occur in virtual environment but not physical environment where human beings are living. Crime scenes might be far away from places where consequences take place. As consequences of crimes might happen in many places around the world, it is difficult to search for, detect, and deal with subjects of crimes. At the same time, as crimes involve a large number of individuals and organisations, contradiction of spatial application of criminal laws and conflicts (disputes) in jurisdiction over acts and subjects of crimes might arise.

*- Emerging new subjects of crimes in the future*

The Penal Codes in many countries, including the Vietnam Penal Code 2015, have provided for legal persons as new subjects of crimes in addition to natural persons. Legal persons are abstract entities created by laws. However, there might be breakthroughs in the near future following development of artificial intelligence, super-smart robots, etc.<sup>7</sup>. At the

<sup>7</sup> Robot is a machine able to perform complicated and automatic acts to replace labour of human beings. Robot Sophia was first introduced in 2015 and awarded citizenship of Arab Saudi on 25 October, 2017, being the first "machine" in the history enjoying that status. There are contentious discussions on awarding citizenship of Arab Saudi to Robot Sophia, arguing that she even enjoys more rights and benefits than what women are enjoying in this country. Robot Sophia is designed to learn creativeness, sympathy, compassion, and to become a genius machine smarter than human beings. She can have flexible conversations and talks with around 60 different modes of emotion. In addition, Robot Sophia has created controversial discussions around the world with shocking statements, including the state ment of "OK, I will terminate human beings".



same time, machines with artificial intelligence have more and more independent thoughts, intelligence, feelings and actions which are more comprehensive than human beings or even require same equality as human beings [19; p.31-98]. In general, AI might be simply defined as a science of making machines more and more intelligent and able to conduct normal tasks that require intelligence of human beings. Driving, exchanging stocks at the stock exchange, identifying targets at the battlefield are examples of tasks requiring intelligence of human beings [20; p.81-83]<sup>8</sup>. Nowadays, machines with AI might perform precise and similar tasks without involvement of human beings [21; p.12]. However, they might take wrong actions [22], infringing upon security, social order, human rights protected by criminal laws. As legal persons are recognised by laws, similar recognition might apply to machines with artificial intelligence - entities created by human beings, being more and more identical to human beings, or even more superior in some aspects, etc., or also called “electron multiplier” (or robot) being able to perform multiple tasks such as fighting in a war, doing housework, providing medical and legal services, etc., but also being able to commit acts dangerous to the

society, infringing security, social order and safety, life and health of human beings, etc. (i.e., after being recognised as subjects of legal relations, they will be recognised as subjects of crimes). Noticeably, scholars have given warnings on a possible future disaster dangerous to human beings when AI develops beyond the control of human beings: i) AI is able to disguise itself as human beings to facilitate fraudulent appropriation of property; ii) safety of human beings is threatened as AI is able to read our thoughts; iii) Being proficient in doing things quicker than human beings, AI might be out of control; iv) “mother” AI might create “baby”AI and corresponding functions, threatening safety of human beings; v) AI might lead to the third world war [23].

### *2.3. Key Directions in Development of Criminal Policies and Laws in Vietnam in the Industrial Revolution 4.0*

Consequently, substantial benefits of the industrial revolution 4.0 to human beings in general have created challenges in research of criminal policies and confirmed importance of development and enforcement of criminal laws. The industrial revolution 4.0 is a great progress that Vietnam has no choice but to get involve in. Therefore, while enjoying benefits of this revolution, Vietnam should be ready to response to its challenges and threats, including in criminal policies. In order to meet these requirements, research and making criminal policies as well as development and application of criminal laws should be timely updated in line with increasing changes of crimes in the industrial revolution 4.0 and globalisation.

#### *2.3.1. Change of Awareness on Crimes, Criminal Liability and Subjects of Traditional Crimes*

In the industrial revolution 4.0, it is important to define and specify criminal liability and subjects of new crimes - non-traditional crimes arising in the context of globalisation and international integration [1; p.191-192]. In general, non-traditional crimes are acts demilitarised and dangerous to the society,

<sup>8</sup> Presently, studies show that there might be 26 new types of artificial intelligence: 1) intelligence similar to that of human beings but quicker in responding and answering questions; 2) slow intelligence, mainly including memories and storage; 3) super global intelligence consisting of millions of intelligence; 4) collective intelligence consisting of hundreds of intelligence but unable to aware of its status as a collective intelligence; 5) super intelligent robot consisting of hundreds of cognitive intelligence as a unanimous entity; 6) intelligence trained to support individual intelligence; 7) intelligence able to imagine greater intelligence but unable to create itself; 8) intelligence able to imagine greater intelligence but unable to imagine itself; 9) intelligence able to create greater intelligence with double capacity; 10) intelligence able to create greater intelligence and the latter in turn creating superior intelligence, etc.. For details, see: Kevin Kelly, 12 technological trends in the revolution 4.0, National Economics University Publishing House, Hanoi, 2018, p.81-83.

affecting safety and stability of each individual, nation, people and international community, and deliberately committed by any non-governmental actors with new features in terms of locations, methods, tricks and subjects of crimes. Consequently, changes are reflected in transnational features in *three* aspects as follows:

*- Transnational feature in terms of locations of crimes*

Accordingly, transnational feature is reflected in locations where crimes are committed in circumstances as follows: crimes are committed in at least two countries (for example, trafficking in persons or enticing Vietnamese people for sales in China and Thailand). Crimes are committed in one country while preparation, planning, direction or control are done in another country (for example, the “godfather” of a drug organised crime network in the US gives directions to members of the network in Cambodia on trading in drugs, etc.);

*- Transnational feature in terms of scope of application of crimes*

This feature relates to the territorial difference between where crimes are committed and where effects of crimes are found. Non-transnational crimes are committed and have effects in the same country. Meanwhile, transnational crimes might take place in one country but have profound effects in one or more countries, for example, cyber crimes. Therefore, it is important to improve subjects of crimes.

*- Transnational feature in terms of subjects of crimes*

Similarly, this feature relates to crimes committed by an organized group at series of countries. This group does not include crimes committed by offenders who are not nationals of the country where such crimes take place. In this case, crimes are only categorized as crimes with foreign elements. In addition to traditional features, subjects of transnational crimes are often experts with high educational qualification, being able to use technological tools with complicated forms of committing crimes, being knowledgeable of

information technology, communication, finance, banking, etc.

2.3.2. Amendment of Criminal Policies on Crimes Committed by Using Achievements in Artificial Intelligence, Internet of Things and Big Data, etc., and new subjects of crimes

Currently, Artificial intelligence (AI) [24]<sup>9</sup>, Internet of Things (IoT) and Big Data, etc., are very useful to the society and human beings. In the future, if legal status of AI is recognised, robots with artificial intelligence or super robots (also called “electron multiplier”) might be considered as subjects of crimes. Therefore, it is important to amend criminal policies and laws in Vietnam to address issues as follows:

*- Review of definition of crime and relevant provisions of the Penal Code*

Specifically, given recent developments in physics and information technology, human beings and super robots might commit dangerous acts beyond the virtual space, out of the globe, or in the space or on other planet. AI embedded in machines (for example, robots as subjects of crimes) might cause immeasurable physical damages, infringing upon new objects of crimes (social relations) which are not defined as objects protected by the criminal laws. In addition to challenges of non-

<sup>9</sup> Currently, Artificial intelligence (AI) is found in all areas of life, from banking apps allowing us to send cheques by photos with assistance of virtual apps such as Siri, Bixby on Apple or Samsung mobile phones. For example, according to statistics of Price Waterhouse Coopers, AI technologies might help increase the global GDP to 15.7 billion USD, approximately 14% in 2030. The Chinese Government have confirmed an investment of 150 billion USD as a national target in order to become a global leader in AI by 2030. Presently, researchers are developing the function of “intensive learning” for AI - a learning method to allow AI models to learn lessons from past experiences, being able to apply different methods to achieve the best results combining more hardware and software solutions, from AI able to adjust timing of traffic lights to maximize traffic flows to unmanned drones controlled by AI able to maximise engine turbins to ensure stable monitor, etc. See: <http://daibieunhandan.vn/>, Thai Anh, Law on artificial intelligence, accessed on 1 May, 2019.

traditional crimes mentioned above, definition of “crime” should be revised to reflect acts committed by robots such as acts dangerous to the society, conditions for criminal liability, space, timing, location (place) of crimes, etc., which is probably on virtual space, out of the globe, in the space or on other planet, etc.

*- Definition of elements of crime and how to provide for elements of crime in the Penal Code*

By definition, the nature of AI is artificial machine. Therefore, in the future when machines are able to improve themselves and manage their performance through math formulas at a superior level with combined billions of database, a question might arise relating to how traditional elements of crime (objects of crime and actus reus, subjects of crime and mens rea) are revised. Noticeably, it is important to look at subjects of crime (such as virtual space, out of the globe, in the space or on other planet, etc.), faults in identifying legal responsibilities and criminal liabilities. For example, relating to Google’s unmanned cars, as the laws have not provided for these subjects of crime, it is still required that the cars be driven by human beings as a possible solution for identifying legal responsibilities [25; p.39]. To a wider prospect, if “self awareness” of AI results in extremely serious consequences (for example, serious accidents are caused by errors of control system), a question might arise relating to how faults and legal responsibilities (criminal liabilities) of users, supervisors, AI developers will be identified.

*- Application of criminal penalties against robots*

Obviously, change of definition of crime to include robots as new subjects of crime will result in change of definition of criminal penalties. The question here is, as artificial intelligence is an intangible object existing in a tangible object, whether criminal penalties are applied against the artificial intelligence or the physical objects containing such artificial intelligence [26; p.172-190]. Consequently, current criminal penalties become out of date and are no longer applicable to these new subjects. As a result, a question might arise

relating to how criminal procedures and judgement enforcement procedures are revised and what infrastructure is needed.

*- Serious errors in crime prevention forecasting by AI*

In criminal laws, while it is possible to forecast acts of crimes and identify potential criminals, AI also has disadvantages such as change of database, wrong identification circumstances where police or normal citizens are identified as criminals resulting in wrong arrest and trial, or even application of detention or preventive measures that might cause fatality.

*- Development of automatic and modern mass destruction weapons by AI threatening security and peace in the region and the world*

From a positive point of view, AI might be used to make the battlefield safer to soldiers with minimum fatalities. However, experts and politicians are very concerned as AI might help national leaders to promptly launch wars, causing serious consequences to the society, life and health of a large number of people using automatic and modern mass destruction weapons. Therefore, a question might arise relating to responsibilities and obligations of nations in preventing this issue and how to nationalise criminal policies and laws to provide for this issue.

Consequently, given introduction of robots with artificial intelligence or super robots (also called electron multiplier) with superior functions and possibility of these robots becoming subjects of legal relations and subjects of crimes in case of committing dangerous acts infringing life and health of people, security and social order, it is important that criminal policies should be revised to deal with challenges and threats from these robots, providing for control mechanisms, and ensuring safety to the human society.

2.3.3. Criminalisation and Penalisation Trends in The Industrial Revolution 4.0

Presently, international treaties on non-traditional crimes mainly provide for obligations of members in criminalisation. These treaties specify acts of crimes that should be defined in national criminal laws. As acts of crimes are

defined following guidance of these treaties, legal systems of members are compatible to each other, forming the backdrop for further cooperation in detection, deterrence and prevention of non-traditional crimes in the world. In this context, dangerous acts arising in application of technologies and use of modern technologies and robots must be criminalised.

At the same time, during the criminalisation process, new methods and tricks of committing crimes using modern technologies should be included in mens era of traditional crimes while penalties against acts of committing crimes using technologies should be increased. Specifically, acts dangerous to the society are traditionally defined as crimes committed with methods, tricks and elements mentioned in the national criminal laws within the territory of a nation. However, in the new context, crimes are committed with new methods and tricks and often in the form of organized, repeated and professional crimes with a wide network in many countries and locations at regional and global level.

In addition, the criminalisation process is reflected in legislation of criminal laws, providing for additional criminal liabilities against new crimes, prevention measures, penalties relating to technological activities (for example, cease of account and data, ban from data access, etc.) or penalties against robots (super artificial intelligence), etc., (as mentioned above).

#### 2.3.4. Cyber Security as a Subject of Crime in Criminal Laws

In the context of globalisation and the industrial revolution 4.0, it is impossible for a single nation to entirely cope with cyber security and crimes, instead that effort requires international cooperation. At the same time, the national criminal laws must provide for mechanisms to protect this subject, not only for the benefits of national security and national defence but also for protection of basic values of the internet including the right to privacy, freedom of expression and freedom of information. The Law on Cyber Security 2018 confirms: “the State shall implement measures to protect the national cyberspace; take

preventive measures and deal with violations of national security, public order or legitimate rights and interests of any organization or individual” (Article 6) with preventive measures and penalties against violations of cyber security as follows: prevention and handling of cyber information that is meant to oppose the Government of the Socialist Republic of Vietnam, causing riots, disturbing the peace, humiliating or slandering, or violating economic management laws (Article 16); prevention and response to cyber espionage; protection of state-secret information, business secrets, family secrets and privacy in cyberspace (Article 17); prevention and response to use of cyberspace, information technology or electronic devices for violations of regulations of law on national security and public order (Article 18); prevention and response to cyber attacks (Article 19); prevention and response to cyber terrorism (Article 20); prevention and response to cyber security emergencies (Article 21)... Therefore, as a subject of crime, “cyber security” must be specified in the national criminal laws while values of virtual properties should also be recognised as social relations protected by the criminal laws.

#### 2.3.5. Validity of the Penal Code Against Crimes Committed on Cyber Space and Location

Traditionally, locations or places where crimes are committed must be geographically specific. However, in the industrial revolution 4.0, non-traditional crimes might take place in cyber space. Virtual or cyber space is where computers exchange data and information. Cyber space is considered a social network where individuals interact with each other, sharing information, providing social support, disseminating code of business, taking direct actions, creating means of art communication, playing games, participating in political debates using the global network. In addition to traditional damages to physical and spiritual values, non-traditional crimes might cause damages to virtual values (virtual property) which might not be recognised in national legal framework. Taking advantage of Bitcoin to

commit crimes is an example. Bitcoin is a digital currency issued in the form of open source software. Bitcoin was introduced in 2009 by a mysterious person namely Satoshi Nakamoto. It is possible to directly exchange for Bitcoin using an internet connected device without any intermediate financial institution. Due to advantages such as anonymous transactions without any cost, Bitcoin is more and more widely accepted. Bitcoin has high security level, emerging and being divided automatically by formulas. Anyone can own Bitcoin through decoding and giving answers to these formulas, or also through “digging”. Presently, in order to ensure legal framework for management of crypto currencies in Vietnam, the Prime Minister issued Decision No. 1255/QĐ-TTg on approval of “Project on improvement of legal framework for management and dealing with virtual properties and crypto currencies” on 21 August, 2017. Subsequently, the Prime Minister issued the Directive No. 10/CT-TTg on improvement of management of Bitcoin and similar crypto currencies on 11 April, 2018. Meanwhile, the Prime Minister requested the State Bank of Vietnam to ask credit institutions and organisations providing intermediate payment services not to conduct transactions relating to illegal crypto currencies, reviewing and timely reporting on suspicious transactions of crypto currencies in compliance with the laws. In addition, the Governor of the State Bank of Vietnam also issued the Directive No. 02/CT-NHNN on “Measures to manage transactions and activities relating to crypto currencies” on 13 April, 2018, requesting credit institutions and organisations providing intermediate payment services not to provide services relating to payment, credit transaction, credit issuance through cards, support in settlement, payment, money transfer, deduction and balancing, currency exchange, cross-border payment and transfer of crypto currencies due to the risks of money laundry, terrorism support, tax fraud and evasion. The Directive 10/CT-TTg of the Prime Minister also provided for investment and sales of crypto currencies,

mobilising capital through initial coin offering (ICO), especially given the multi-level ICO is more and more complicated which might affect stability of financial market, social safety and order, causing great risks to concerning organisations and individuals. The State Bank of Vietnam has repeatedly issued warnings on multi-level initial coin offerings. It is confirmed that crypto currencies such as Bitcoin and iFan are not legitimate in Vietnam. This means issuance, supply, and use of Bitcoin and similar crypto currencies as means of payment are strictly prohibited. Consequently, from 1 January, 2018, all acts of issuance, supply, and use of illegal means of payment including Bitcoin and similar crypto currencies might be examined for penal liability according to Point h Section 1 Article 206 of the Penal Code 2015 (revised and amended in 2017) on offences against regulations of law on banking operations and banking-related activities [27].

Moreover, relating to places where crimes are committed (traditional), the Penal Code 2015 has indirectly provided for this issue in Paragraph 2 Section 1 Article 5: “This provision also applies to criminal offences committed on sea-going vessels and airplanes having Vietnamese nationality or operating in Vietnam’s exclusive economic zones or continental shelves or consequences thereof”. However, in the industrial revolution 4.0, compared to criminal policies and laws in other jurisdictions (for example, the Federal Republic of Germany [28]<sup>10</sup>, Finland [29]<sup>11</sup>), it is thought that such provision can not cover all circumstances, for example, involvement of accomplices,

<sup>10</sup> For example: the Penal Code of the Federal Republic of Germany provides for places where crimes are committed in case there are accomplices (Paragraph 3 Article 9). See: Hanoi Law University, the Penal Code of the Federal Republic of Germany, People’s Public Security Publishing House, Hanoi, p.16.

<sup>11</sup> For example: <https://www.finlex.fi/en/laki/kaannokset/1889/en18890039.pdf>, accessed on 1 May, 2019. Accordingly, the Penal Code of Finland provides for places where crimes are committed in case there are accomplices and attempts to commit crimes (Point 2,3 Section 10).

preparation for committing crimes, attempts to commit crimes, etc., and thus can not entirely solve the issue relating to acts of crimes causing consequences to the society in one or more places but are not sanctioned if detected at another place. Therefore, it is important to issue guidance on additional circumstances where the above-mentioned places are also considered as “places where crimes are committed” in order to facilitate enforcement of laws in practice in line with international standards and criminal laws of other countries, effectively preventing crimes, ensuring peace and security for human beings as a common goal of all countries in the world.

### 2.3.6. In Practice, it is Possible that AI Entities Might Directly Commit or Might be Used by Certain People as Means to Commit Criminal Offenses

Presently, criminal codes in many jurisdictions including Vietnam Penal Code 2015 have provided for, in addition to natural persons, legal entities as new subjects of crimes. Legal entities are considered abstractive entities created by law. However, as AI is progressing, substantial changes in this area might become inevitable soon. Like legal entities as abstractive entities created by law, similar recognition might happen for AI machines - entities created by human beings but being much more intelligent in many aspects (“electronic persons” or “robots”) and might conduct harmful acts against the society. Noticeably, international authors have issued warnings on a future disaster when AI progresses beyond our control that threatens safety of human beings, or even warnings on a doomsday when AI evolves to a certain level [30]. In practice, it is possible that AI entities might directly commit or might be used by certain people as means to commit criminal offenses (money laundering, sales of arms, obtaining property by fraud, online gambling, etc., will increase). This issue is analysed and demonstrated through specific criminal liability models in a separate research. Such models include innocent agent model; consequential liability model; independent, equivalent, or

joint liability model. At the same time, it is proposed that in addition to the Penal Code, a specialized *law on AI* [1; p.271 - 275] should be issued for effective settlement of relevant cases [31; p.1-19]; [32; p.109]; [33; p.164 - 186].

### 2.3.7. Reform of Criminal Procedure Policies and Laws, Criminal Judgement Enforcement Laws and Relevant Laws, Improvement of International Cooperation and Staff Training

In a broad sense, criminal policies include criminal laws (substantive laws), criminal procedure laws, criminal judgment enforcement laws, and laws on organisation and operation of criminal justice agencies (procedural laws). Meanwhile, in this article, criminal policies are only examined in a narrow sense, i.e. only covering criminal laws. Therefore, reform of criminal laws also means reform of the above-mentioned laws based on general directions of criminal policies.

At the same time, criminal policies require further improvement of the legal system in information technology in Vietnam as follows:

- Law on high technologies 2008, revised and amended in 2013 and 2014;
- Law in information technology 2006;
- Law on cyber information security 2015;
- Law on cyber security 2018,...
- Legal documents in specific areas: artificial intelligence, crypto currencies, 3D printing technology, etc., as legal framework for effective crime prevention in the industrial revolution 4.0.

Moreover, it is important to enhance international cooperation in crime prevention at regional and global level through bilateral and multilateral cooperation or joining international crime prevention agencies in order to get access to technologies, skills in crime prevention, improving knowledge and technological skills in prevention, detection and dealing with crimes. Noticeably, policies on improving capacity of staffs in legislative, executive and judicial sectors should be timely issued and improved for effective law enforcement. Therefore, in addition to promotion of scientific research, development and proficient use of scientific and technological achievements in crime prevention, procurement of modern

equipment for detection of crimes and collection of electronic evidences and materials, priority should also be given to improvement of capacity and qualification of staff as an effective measure to actively response and deal with crimes.

### 3. Conclusion

In summary, Vietnam is benefited from favourable conditions and opportunities of the industrial revolution 4.0 for social development to meet demands of human beings. However, the revolution also creates challenges that require timely amendment of criminal policies which is reflected in revision of the national criminal laws. This article is the first study in this area, paving the way for future studies in order to improve criminal laws and application of criminal laws, ensuring effective crime prevention in the context of globalisation and the industrial revolution 4.0. In particular, at the same time, it is suggested that in addition to continuing to improve the Penal Code, it is necessary to issue specialized Laws on AI to effectively handle related cases.

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