**Anti-corruption in the current context of digital technology development and application in Vietnam: Opportunities and Challenges**

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***Abstract****: Anti-corruption is one of the major policies, the most powerful political determination of the Communist Party and State of Vietnam today. Recently, the fight against corruption has had achievements that are recognized and highly appreciated by the people and international friends. However, Vietnam's current laws, mechanisms and measures on anti-corruption are considered to be incompatible with the Industrial Revolution 4.0 and the digital age. Obviously, the lack of sufficient anticipate for such a social context will decrease the effect, modernity and sustainability in Vietnam's anti-corruption. Therefore, the analysis and identification of the opportunities and challenges to Vietnam’s anti-corruption in the Industrial Revolution 4.0, the digital age is particularly important. On that basis, authors propose appropriate solutions to contribute to amending laws, mechanisms and measures to make the fight against corruption in Vietnam can be more suitable to the new context, with efficiency and sustainable success as expectations.*

***Keywords:*** *Anti-corruption; digital technology; Vietnam; opportunity; challenge.*

**1. Introduction**

The Fourth Industrial Revolution is taking place with a wide scope and has increasingly strong impacts on countries around the world. In terms of scope, this revolution is creating transformation in industries in all countries as well as the entire system of production, business administration, and state management. In terms of economics, this industrial revolution is forecast to redraw the world economic map with the strong rise of developed countries mainly based on modern technology, innovation and creativity; while countries mainly relying on natural resource exploitation will decline their power and gradually lose their positions. In terms of politics and soceity, new technology will lead to changes in power, raise concerns about national security as well as increase the gap between the rich and the poor, and the income inequality. Even the Fourth Industrial Revolution can "fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before"[20].

Vietnam is not an exception and is outside of the strong effects of the fourth Industrial Revolution. While the fourth Industrial Revolution has had a strong impact and influence on all aspects of the political, economic and cultural life in Vietnam, it is also the time when the fight against corruption in Vietnam is going drastically, "continuously", "restlessly”, under the comprehensive and unified leadership of the Communist Party of Vietnam. "Corruption is gradually being curbed and tending to decrease" [10]; It was initially "prevented, repelled which creates a positive effect, spreads strongly throughout the society" [5] "was welcomed, supported by a large number of officials, party members and people, highly recognised by the international community" [1]. These results significantly contribute to the common goal of building, stabilizing and developing the country, lead Vietnam up to an industrialized and modernized country.

However, due to the impact of the Fourth Industrial Revolution, there have been some concerns that the industrialization will soon premature dealth in developing countries, partly due to automation. The fight against corruption will also be greatly affected by the Fourth Industrial Revolution. In recent reports on anti-corruption of the Communist Party and Government of Vietnam, corruption is still serious and complicated, occurring in many fields. The detecting and handling corruption at localities have changed positively, but not evenly, there are still a number of localities that rarely detect and handle corruption cases; harassing and negative behaviors in the administrative and public service sectors still cause frustration for people and enterprises [10].

The Fourth Industrial Revolution with the development of artificial intelligence, big data and internet of things can greatly impact on the situation of corruption and anti-corruption in Vietnam. With the application of the Fourth Industrial Revolution’s achievements, this helps to speed up the investigation, prosecution, adjudication, and judgment enforcement of corruption cases; to control the income, assets, and even power of competent persons; Minimize direct transactions which may create corruption by openly and transparently receiving and processing administrative procedures in sensitive sectors such as land, minerals, taxes, customs, and public investment. ... Although it promises many positive signals in the fight against corruption, it cannot be denied that corruption criminals can also take advance of the Fourth Industrial Revolution to commit sophisticated criminal acts which are more difficult to detect and handle. In that sittuation, it is necessary to have researches to identify Vietnam's opportunities and challenges in the context of digital technology development and application, thereby making forecasts and solutions for combating corruption effectively.

**2. Policies and opinions of the Communist Party and the State in digital technology development and application in Vietnam**

From the beginning of its term, the XII Politburo gave views, orientations and directions about the Fourth Industrial Revolution. In the Resolution No. 23-NQ/TW dated March 22nd, 2018 on "Orientation for building a national industrial development policy to 2030 and a vision to 2045", the Politburo has directed researching and implementing the Vietnam’s strategy of approaching and actively participating in the Fourth Industrial Revolution [6]. Especailly, on September 27th , 2019, the Politburo issued the Resolution No. 52-NQ/TW on "Some guidelines and policies to actively participate in the Fourth Industrial Revolution". This resolution has a particularly important meaning, which demonstrates the comprehensive and correct awareness as well as strategic predictions of the Communist Party about the effects of this revolution on the country. On that basis, the Resolution provides innovational solutions, with appropriate steps and routes for Vietnam to actively participate in the Fourth Industrial Revolution, creating a clear improvement in social-economic development of our country.

Accordingly, in terms of viewpoint, the Communist Party has determined: (1) Actively and positively participating in the Fourth Industrial Revolution is an objective indispensable requirement; It is a mission of particularly important strategic significance, an opportunity for Vietnam to make a breakthrough in social-economic development; (2) The Fourth Industrial Revolution brings both opportunities and challenges. We must promptly grasp and effectively make use of opportunities to improve labor productivity, efficiency, competitiveness of the economy, efficiency of social management through research, transfer and strongly apply the advanced achievements of the Fourth Industrial Revolution in all areas of social-economic life. Actively prevent and respond to limit negative impacts, ensure national defense, security, safety, social justice and sustainability of the country's development process;

(3) The fourth industrial revolution requires renewing the thinking about economic management, social management, building, and improving institutions properly. It is necessary to have an open, creative approach and piloting to the newly practical problems, creating all favorable conditions for innovation. Avoid all expressions of indifference, lack of confidence, being passive but not subjective, hasty, willpower; (4) Maximize resources, ensure sufficient resources for actively participating in the Fourth Industrial Revolution. As for the target, the Communist Party has determined: "To effectively take advantage of opportunities brought about by the Fourth Industrial Revolution to promote the process of renewing the growth model, restructuring the economy in association with executing strategic breakthroughs and modernization of the country; strongly develop the digital economy; develop rapidly and sustainably based on science-technology, innovation and high-quality human resources; improve people's life quality and welfare, firmly ensure national defense and security, protect the ecological environment".

Regarding the solutions, the Resolution offers 8 groups of important solutions, including: (1) Renewing thinking, unifying awareness, enhancing the leadership of the Party, State management, promoting the participation of the Fatherland Front, social-political organizations; (2) Completing institutions to facilitate active participation in the Fourth Industrial Revolution and the process of national digital transformation; (3) Policies of develop essential infrastructure, focusing on building high quality broadband nationwide; building and developing synchronous national data infrastructure; upgrade technical infrastructure to ensure network safety and security; (4) Policies to develop and improve national innovation capacity, including comprehensively restructuring the system of public scientific research institutions, applying special mechanisms and policies for innovation centers; (5) Policies for developing human resources in many forms such as: innovating teaching and learning methods based on the application of digital technology, using the assessment of enterprises as a measure for the quality of training; (6) Policy of develop priority industries and technology; (7) Policy of international integration; (8) Policies to promote digital transformation in the system of the Communist Party, State, Fatherland Front, political-social organizations, ensure the unity, interconnection and synchronization [7].

Recognizing the trend and importance of the Industrial Revolution 4.0, the State has issued many policies and laws on digital technology application in order to make Vietnam soon become a developed country in IT. Typically, legal documents such as: Resolution No. 36a/NQ/CP dated October 14th, 2015 of the Government on Electronic Government; Resolution No. 34/NQ-CP dated April 7th, 2017 of the Government on the Government's regular meeting in March 2017; Directive No. 16/CT-TTg dated May 4th, 2017 of the Prime Minister on "Strengthening the capacity to access the 4th Industrial Revolution". Specifically,

The Resolution No. 34/NQ-CP dated April 7th, 2017 of the Government affirms: "The 4th Industrial Revolution is a development trend based on digitalization and connectivity, with a scale of strong impacts on all aspects of the social-economic life, change the mode and production force in the future, can bring Vietnam many opportunities to accelerate industrialization and modernization as well as challenges to our development. Vietnam needs to proactively have orientations and practical solutions to seize opportunities and minimize the negative impacts of the 4th industrial revolution, first of all is making a breakthrough in information technology "[9].

The Directive No. 16 / CT-TTg, dated May 4th, 2017 of the Prime Minister on "Strengthening the capacity to access the 4th Industrial Revolution" stated that "The 4th Industrial Revolution ... is fundamentally changing the production of the world ... creating a strong, increasing impact on all aspects of social-economic life, leading to the change of methods and production forces of the soceity. At the same time, the Directive also identifies that this revolution has a great impact on Vietnam: "opens up many opportunities in improving the level of technology, improving production capacity and competitiveness in the product chain; creating a big change in service business form; creating more opportunities for innovative startups; significantly reducing transaction and shipping costs; creating potential and attractive investment opportunities in the field of digital technology and the Internet. It is also a great opportunity for industrial production with advanced science and technology". On that basis, the Directive has guided the ministries, central and local authorities, business community, and people to take practical actions to take advantage of opportunities and challenges, not to miss the "train" named Industry Revolution 4.0 [15].

In general, the Communist Party and State have been aware of the great significance of the Industrial Revolution 4.0 and have proactively introduced guidelines, policies, orientations, solutions, and taken appropriate steps to seize opportunities and reduce negative impacts of the industrial revolution 4.0, taking timely measures to adjust policies to support and promote the development of industries, fields, and breakthrough technologies of the Industrial Revolution 4.0. Although there is no separate document regulating the application of the fourth Industrial Revolution in the fight against corruption, many of the above-mentioned guidelines and policies can be applied to the fight against corruption in Vietnam in the current context.

**3. The fourth Industrial Revolution brings many good opportunities for the fight against corruption in Vietnam**

The Industrial Revolution 4.0 brings Vietnam and many countries in the world golden opportunities in anti-corruption thanks to the application and connection of digital technologies in state management, helps to limit and minimize corruption, particularly:

*Firstly, the application of the achievements of the Industrial Revolution 4.0 contributes to better publicity and transparency of information about the organization and activities of agencies, organizations and units; implement electronic Government, publicize administrative procedures on the Portal.*

Despite the Anti-Corruption Law 2018, the Law on Access to Information and a number of Government documents stipulate that agencies, organizations and units must disclose information in many areas associated with accountability; especially in areas prone to corruption and squandering([[3]](#footnote-3)); However, at the current time, many provisions of the law on publicity and transparency in operations of agencies, organizations and units have not been fully implemented; accountability is not strictly implemented; It remains a situation of abusing the regulations on state secrets to make it not public and transparent [2, p.32]. The application of the achievements of the Industrial Revolution 4.0 will help agencies to well perform the publicity and transparency of information on activities in some fields by posting on the website, electric magazine, thus, increasing the ability of people and enterprises to access information, limiting corruption due to the monopoly of information or have to pay illegal costs to obtain information.

Vietnam entirely has a foundation to do this. In 2018, Vietnam's E-Government Index was ranked in the group of countries with a high development index by the United Nations, ranking 88 of 193 countries. By 2020, Vietnam increases 2 ranks, ranking 86/193 countries, 24/47 in Asia and 6/11 in Southeast Asia [19]. By the end of 2018, 99.7% of the population will be provided with coverage, of which 3G, 4G coverage serves over 98% of the population by Viettel, Vinaphone, and MobiFone. The total number of mobile subscribers is over 134.5 million; the prerequisites for the development of Internet of Thing services in Vietnam are guaranteed. Broadband telecommunications infrastructure, especially 4G network, is widely deployed [4, p.124]. These are favorable conditions for Vietnam to develop e-Government, promote publicity and transparency of administrative procedures, and contribute to reduce corruption in the implementation of these procedures.

*Secondly, the application of digital technology will help to control assets and income of persons in authority in the future.*

The control of assets and income of persons in authorityis extremely important in anti-corruption. In the modern public service, the declaration and control of assets and income of persons in authorityon the one hand contribute to the transparency of the public service system's operations, prevent taking advantages of positions and powers for self-interest, on the other hand, prevent illegal movements, dispersal of assets, and contribute to preventing and fighting against corruption. The application of information technology, building an electronic database on asset management and income of persons in authoritywill greatly support the management of assets and income of officials. This, in turn, contributes to the prevention, detection and treatment of corruption, detailedly:

*First one*, the electronic database on asset management and income of persons in authority will synthesize and update all information on assets, income of persons in authority. In case of having a fluctuation or increase in their assets and income (according to Vietnam's Law on Anti-corruption 2018 is 300 million VND or more), the declarant must be responsible for the property, income. This is also the basis for managers to verify their assets and income, because the Competent Authority can check and verify the contents of the asset and income statement of the persons in authorityaccording to the principle of random, periodic or irregular inspection when there are signs of abnormal property fluctuations of persons in authority. On that basis, we can strictly handle cases of not declaring, delaying or declaring assets and income dishonestly.

*Second one*, in the future, the publicity of asset declarations of persons in authority can be done on cyberspace so that people can know and supervise the asset declaration of persons in authority. Especially, this publicity should be done at the time of election, voting or before being appointed for persons in authority. Experiences in many countries around the world show that the measures of publicizing the assets and income of a number of individuals running for election or before being appointed to a certain position in the state apparatus supply society with necessary information and watch the fluctuation in assets and income of persons in authority. Since it helps to prevent profiteering, money laundering or other illegal activities, actively contributes to the fight against corruption. However, the State should take measures to ensure safety and other rights relating to the disclosure of asset and income declarations on cyberspace for persons in authority.

*Third one*, the application of the fourth Industrial Revolution’s achievements can create a mechanism to receive complaints and denunciations quickly and effectively and protect complainants and denunciators, providing information related to the declaration of assets and income with signs of dishonesty of persons in authority. However, when receiving untruthful information on asset and income declaration, the competent agencies must seriously inspect and verify the cases of dishonest in asset declaration. At the same time, the competent authority must have plans to protect information and ensure the safety of information providers.

*Thirdly, the application of the fourth Industrial Revolution’s* *achievements helps the system of policies and laws on socio-economic management and anti-corruption become more synchronous, unified and complete; increases the participation of people in the process of formulating and completing these policies and laws, contributes to limit the "gaps" that cause corruption to arise, increase the feasibility when applied in practice.*

The Central Economic Committee has commented that the Industrial Revolution 4.0 has changed the legislative action towards "the legislature is being challenged at an unprecedented level, changing from approach, setting, amendment and implementation to the time of study to build legal framework or establishing general rules is shortened"[4, pp.57-58]. These changes can occur at every stage of law making and bring benefits not only to the Government but also to the people and businesses. For example: In the past, when preparing a draft Law, officials had to directly review the provisions of the Law or documents to ensure they do not contradict or overlap with other laws or legal documents, this law review process is mainly done manually, depends greatly on the ability and skills of the reviewer, it takes a lot of time and limits the effect; nowadays; with the application of the fourth Industrial Revolution’s achievements it will make the review more effective, conduct in a shorter time, help to detect unclear, inconsistent regulations, with many loopholes that can be easily exploited to corrupt, ensure the uniformity and consistency of the legal system.

Another example, to overcome the situation of collecting comments on a formal law draft, the quality of comments is not high, especially on new, complicated and controversial issues, the application of digital technology to publish the draft Law and having software to process information quickly will allow people to participate more actively in the drafting process of the Law. Through these events, people have many opportunities to comment, express their wishes, thoughts and aspirations to the Government, helping to supervise and criticize policies given by public agencies, therefore ensuring the feasibility, publicity, transparency, and combating "group interests" in the process of building mechanisms and policies. On the side of the Government and the National Assembly, these agencies can completely benefit from smart software, allowing to receive and filter comments by content to receive comments on the draft Law. Many new ideas, new policies and new practices are likely to arise during this consultation process, helping the Government and the National Assembly to access and finalize the draft Law, make appropriate, timely more feasible policies.

*Fourthly, the Industrial Revolution 4.0 helps to prevent and fight against corruption in personnel management.*

Digital technology opens up new possibilities in controlling power in the *personnel management,* prevent the acts of illegally lobbying for promotion to higher positions due to its establishment and publicity and transparency by increasing automation, accurating procedures in recruitment, placement, management, evaluation, planning, training, retraining, appointment, dismissal, promotion, promotion, nomination, transfer, rotation transfer, reward, discipline, inspect, supervise and implement regimes and policies towards officials. The application of information technology, the use of management software and forcing agencies, organizations, units, individuals, and leaders to implement openly and transparently in accordance with the electronic process, which will ensure to detect and prevent acts of fraud and collusion in personnel work, it also clearly defines the responsibilities of each level, each person at each stage, each step in the personnel work at the same time.

Requirements for processes, procedures, and conditions through electronic management will show which levels of personnel work is performed (committees, party organizations, collectives of local leaders, agencies, units; members of the party committee, party organizations, local leaders collectives, agencies and units; heads of party committees, heads agencies and units assigned to perform the work of personnel at all levels, advisory officers, proposals), errors made by whom and why.

Therefore, using the achievements of the Industrial Revolution 4.0 will establish effective mechanisms and measures to control and supervise, strictly comply with regulations on personnel work; prevent, detect and handle acts of violating the regulations of the Party and State, especially acts of abusing positions in the assigned positions in the work of personnel. Specifically, digital technology helps to: (1) Review, amend, supplement or promulgate regulations on personnel work; specifying the responsibilities of collectives and individuals; ensure the democratic, objective, open and transparent processes and procedures in each stage of personnel work. (2) Helping to check the cases in which people with family relations (spouse, father or mother of the spouse, children, or siblings) hold relevant positions such as: Secretary, Deputy Secretary, Head of the Organizing Committee, Head of the Inspection Committee at the same level; the president of the People's Committee and the head of the interior service and inspection agency at the same level in a locality; members of the same party, party union committee; heads and deputies of heads in the same locality, agency or unit. (3) Helping to discover criteria, standards, conditions, comments, and assessments for the benefit when implementing staff work processes. (4) Create a more effective mechanism to receive and process applications, complaints, and denunciations of person having acts of illegally lobbying for promotion to higher positions than traditional methods ...

*Fifthly, the Industrial Revolution 4.0 helps to control the power and detect corruption in the management and use of the budget, public property, public investment, land, and minerals.*

The budget, public assets, public investment, land, and minerals are areas of high risks in corruption. Recently, there has still existed the act of violating laws, standards, norms and regimes in the management of budget and state assets. The management and use of state assets in enterprises are still lax causing many violations. The main tricks are to conceal and lower the real value of assets and land when equitizing or selling them to enterprises([[4]](#footnote-4)); make contracts for sale, transport or false invoices to appropriate them; raising prices submitting prices when buying and selling public assets for self-seeking([[5]](#footnote-5)); do not follow the State's regulations intentionally on economic management, causing serious consequences([[6]](#footnote-6)); transform State assets into private property through sale and purchase contracts to appropriate tens of billions VND([[7]](#footnote-7)).

The weak management and use of land in many localities causes great loss and waste. Some competent State officials have abused their assigned positions and authority, acted illegally, violating the principles in the allocation, use and recovery of land, causing damage to the property of State and people. State management of natural resources and environment is still limited, and corrupt behavior arise easily. In the field of basic construction investment, most of the construction works have experienced loss of assets, mainly due to embezzlement and intentional wrongdoing. Mistakes occurred in almost all stages, from project formulation, design, cost estimation, approval of funding plans to bidding, consulting, supervision, construction, acceptance and final settlement of works[[8]](#footnote-8) ...

The above limitations can be overcome if Vietnam uses digital technology to monitor and supervise the management and use of public assets, land, minerals, public investment, auction, and bidding.... Through monitoring, supervising, artificial intelligence or online application software will detect anomalies in spending without complying with regulated norms and standards; At the same time, digital technology will identify the decisions of individuals and competent persons in the fields mentioned above, such as: decisions on land allocation, land lease, land use right auction, decision on property prices and ensure not to cause public property loss. Smart application will determine who, at what stage does not comply with the order and procedures for capital construction investment; commit fraud, lack of transparency in bidding or determine the false declaration of quantity and value of materials and equipment; putting poor quality materials into use; Executing the wrong process to reduce costs ...

*Sixthly, the Industrial Revolution 4.0 effectively serves the work of inspection, examination, audit, investigation, prosecution, adjudication of corruption cases.*

*In the field of inspection*, the fourth Industrial Revolution’s achievements can be applied in building inspection plans (ensuring no overlap); providing inspection criteria and processes, on that basis, observing the activities of the inspection teams (both reducing corruption in inspection activities and ensuring too deep intervention of inspection activities in specific cases that interfere with the normal operation of the inspection subject). On the other hand, with the responsibility of helping the Government to manage on anti-corruption, the Government Inspectorate can apply the achievements of the Industrial Revolution 4.0 to build a data system on anti-corruption in the whole country, especially the national database on control of assets and income of competent persons in agencies, organizations and units.

The building of sharing data system aims to increase the accessibility of agencies, as well as the use of information and data in the detection and handling of corrupt criminals and corrupt assets. The system of data needs to be coordinated by other agencies to provide information, for example: The Supreme People's Procuratorate provides results of dealing with corruption crimes, information about money, corrupt assets requested for withdrawal, custody, blockade by the People's Procuracy at all levels. The Supreme People's Court provides information on the first-instance and appellate trials of People's Courts at all levels for corruption crimes, information about the amount and assets of corruption put into State public treasury declared by the first-instance People's Court ... .Through the system of data, it will facilitate the agencies to more effectively coordination in detecting and dealing with corrupt behaviour.

*In the field of examination*, the application of digital technology will fundamentally change the Party's examination way which is done by applying electronic documents, by software for synthesis, data processing, and record storage as well as allow the methods and processes to implement work in a computerized environment. Staff in charge of checking and monitoring do not spend too much effort in presenting, classifying documents, synthesizing and reporting in accordance with standards, getting closer to the national and international document system. At the same time, through the use of modern digital equipments, softwares and technologies, it is possible to collect information that was previously difficult to obtain; can extract data from huge data warehouses serving all types of decisions, all levels of leadership, all stages of decision-making information control and all stakeholders; improve the reliability and rationality of test results, monitoring through self-verification, verification or self-test systems ...

In addition, the Industrial Revolution 4.0 with the wide connection of Internet has helped to do the examination and supervision despite of geographical distance. Through websites and the Internet, examinators can grasp information about violations; combining with the exchange of information, knowledge about science and technology, skills in using technical means, experiences in examination, verification, detection and handling of violations at the same time.

*In investigation, prosecution and adjudication activities*: The Industrial Revolution 4.0 will help the investigation, prosecution and adjudication of crimes in general and crimes related to corruption in particular become easier by the help of the being monitored by electronic devices ... Experiences in anti-corruption in some countries around the world show that, in the current international integration period, many corrupt people have transferred money and assets abroad in many different forms; At the same time, corrupt offenders tend to flee abroad when they are investigated by the authorities. Therefore, the application of digital technology in investigation of corruption crimes is very important and useful for competent agencies to monitor, promptly handle and prevent the dispersion of corruption assets, especially transferring corrupt money and assets abroad.

On the other hand, we can believe that, with the powerful support of artificial intelligence, it will help the property assessment in corruption cases to be done quickly and accurately ensuring effective service for the fight against corruption.

In particular, digital technology also helps the State avoid many injustice and wrong cases. The use of devices to recognize voice, face, lie detector, record of audio and images in taking testimony will limit cases of torture, harassment, corporal punishment, forging testimonies and signatures of the accused, defendants, victims, persons....to the lowest level.

In addition, the use of a software system in the Court system will greatly help to control the power of this agency to fight against corruption in adjudication, especially in the assignment of judgments. With the current mechanism, the president of the court is the person who decides all matters related to the assignment of the case to the judge in his court. The president's right to "organize the judgement" also allows him to not only assign the the judge at his own will, but also change the judges during the acceptance of the case. The law stipulates somes cases in which the judge has to withdraw or be replaced, for example, he or she has participated in the lawsuit as the involved parties, defense counsel of the rights and legitimate interests or on behalf of the litigant in the previous period ... The president also has the right to change the judge when there is a reason to believe that the judge will be "impartial" when being on duty [13, Article 53].

The assessment of the "impartiality" of the judge here again depends on the subjective judgment of the president of the court. In general, the assignment of judges to resolve the cases is purely administrative work, "the principles ensure the objectivity and randomness in the assignment of cases to the judges, thereby preventing threats of the independence of judges, has not been applied yet. "[12, p.108]. Therefore, applying the achievements of the Industrial Revolution 4.0 will help the Court system to manage the case better, grasp the workload and the progress of solving cases. Therefore, using management software or artificial intelligence can help the assignment of judges to accept the case quickly, clearly, transparently, ensure objectivity and randomness in the assignment of judgment to judges, be compatible with the profession, gender, workload and independence of judges; restricting the assignment with identical judges, identical trial schedules, inconsistence, dependence ...

*Sixthly, the Industrial Revolution 4.0 helps to prevent and combat "petty corruption" more effectively.*

Currently, the reformation of administrative procedures in Vietnam has achieved remarkable results, but it is not yet effective in some areas; there still exists violation of the deadline in solving problems of people and enterprises([[9]](#footnote-9)); administrative procedures are still complicated, especially in areas such as tax, customs, and land. The situation of officials and civil servants being harassed when dealing with administrative procedures has not been improved in many places. Corruption still occurs in many areas, especially the implementation of public services (health, education, justice, administrative management, registration, and land management) due to the dependence and "weakness" of the groups carrying out administrative procedures in this area.

To overcome this situation, the core factor is to reduce or eliminate direct contact in transactions, eliminating the administrative interaction between public officials, civil servants and the people, enterprises when implementimg administrative procedures. Using digital technology offers many opportunities to solve this problem. Accordingly, the receipt and implementation of administrative procedures will be done automatically through electronic management software or artificial intelligence.

On the basis of public terms and regulations, these applications will classify and respond to the results of administrative proceedings, asking for additional necessary conditions is also entirely done over the internet. This not only eliminates petty corruption but also saves time for people and businesses. The State has also streamlined the administrative agencies but still ensures efficiency and effectiveness ... The Industrial Revolution 4.0 with the core of the digitization process is accelerating to improve the connection between real space and digital space which also "changes the face of the state governance system in many countries" [3, p.61], and this increase the effectiveness of the Government, by increasing the interconnection between Government and business, Government and the people, helps to expand and improve the quality of public services delivered by governments at all levels.

Currently, the percentage of enterprises using online public services related to the registration, licensing, declaration procedures ... provided on the websites of state agencies in 2019 is 74%, this is quite similar to 2018. Electronic tax declaration is still the most used public service (accounting for 85%), followed by business registration services (accounting for 57%). Online services related to import and export such as electronic certificates of origin, customs declarations, etc. have a similar level of use compared to previous years. 55% of enterprises surveyed ranked the benefits of online public services at a very useful level, this rate did not change much compared to 54% in 2018. This trend has been developing to a positive level within four recent years. [11, p.49]. Thereby, we can see the useful value of online public services in particular and the overall online business environment in Vietnam today is quite transparent and more favorable for businesses. Effective application of online public services will help businesses save significantly on unofficial costs and reduce corruption.

**4. Challenges to the fight against corruption from the Industrial Revolution 4.0**

*First,* the challenge in infrastructure and engineering.

The Industrial Revolution 4 fundamentally changed economic structure, form of social organization. All directing and operating activities of the administrative system, agencies and enterprises are through computer networks such as: e-government, e-commerce, electronic customs, electronic tax declaration, electronic journalism will have a great impact and put pressure on public agencies because the digital era with new technologies and constantly changing operating platforms allows people to participate more widely in activities of these agencies. The Industrial Revolution 4.0 can save 0.6 billion USD for "public administration” by applying new technologies"[[10]](#footnote-10). Therefore, public agencies are forced to reform towards transparency, renewing thinking, building capacity, working closely with the business sector and social forces to adapt flexibility with changes; At the same time, relying on digital infrastructure to optimize the monitoring and operating system of society in the style of e-government, smart cities ... If this is not possible, public agencies will have to face more and more complex problems that need to be solved [4, p.66].

Artificial Intelligence (AI) will affect all aspects of social life, especially in building e-government towards digital government and digital economy development, firmly ensuring national security, safety and order of society. This requires the Government to have a reasonable policy to develop AI in Vietnam in the coming time. This is a big challenge for Vietnam when the issue of funding is still limited. Besides the cooperation, the competition in the race among countries will be increasingly fierce which requires e-government to proactively deal with the general trends of world changes to serve people and businesses better.

If the software is incompatible between agencies and organizations or between Vietnam and other countries; Internet congestion leads to delays in the transmission of pictures and videos, sounds, and conversations; high cost for communication and equipment; poor infrastructure will be difficult to provide online services and digital technology to people and businesses. In Vietnam, although the use of smartphones and the internet is quite high, the quality and connection speed are still weak, the ability to break through is not high [3, p.424]. Vietnam's internet speed is in the low average group of the world, on a par with the slow- developing countries in Southeast Asia and far behind Singapore- the leading country. Cyber ​​technical infrastructure is still heavily dependent on foreign countries. Cyber ​​security still reveals some limitations and weaknesses [4, p.127]. The connection between administrative and non-business units, especially those related to the registration and declaration procedures of the people, is still very limited and ineffective.

The investment in upgrading infrastructure and technology innovation is a very important factor to ensure the achievements of the Industrial Revolution 4.0, which is applied to the Government and the people, reduce bureaucracy and corruption. However, Vietnam is lack of capital and financial conditions to build infrastructure and technology for public service management systems, e-government, smart cities in general, and financial resources for the initial establishment and financial resources for the regular operation of the database management system on corruption, corruption crimes and anti-corruption work. The costs for establishing infrastructure, equipment, training people and operating costs for this management system are not cheap.

*Secondly,* corruption criminals can use the Industrial Revolution 4.0 to carry out corrupt acts that are increasingly sophisticated, complex, difficult to detect and cause greater consequences for society*.*

Due to the development of digital technologies, corrupt behaviour can become increasingly dangerous, unpredictable, and cause more serious consequences. In fact, there have been many cases of serious and protracted law violations, the criminals are cadres, party members, people with high positions and powers in agencies and organizations who have taken advantage of gaps in mechanisms and management policies as well as modern technological achievements of the Industrial Revolution 4.0 such as copying technology, forging papers and identity... to conduct violations. Typically: The "trillion-dollar" crime occurred at BIDV bank due to abuse of the power to approve policies and decisions on loans, guarantees, investments, and debt management with incorrect processes, procedures, and authority, credit regulations, banking to defraud and appropriate public property; thousands of billion gambling lines through high-tech applications are covered by the leadership of the anti-crime agency to gain illegal profits; or the serious cheating on the recent national high school exams through taking advantage of high technology in in 2017, 2018 in Hoa Binh, Son La, Ha Giang ...

Additionally, in the future, technology development may create new acts of corruption but have not been identified in time and Vietnamese laws are not timely identified to promulgate appropriate institutions and policies to handle "pretty corruption".

*Thirdly*, data security is a major concern of the Industrial Revolution 4. Whenever there is universal connectivity to share large amounts of data over the Internet or cloud-based technology, there is a risk of a security breach. For example: A hacker can break into the network system that manages corruption cases, leak important information in the investigation of corrupt criminals, and these criminals may have tricks remove traces, which is detrimental to the process of gathering evidence and corruption investigation. In other cases, a hacker can break into the government's management system to change important figures and items, in order to serve or bring favorable conditions to a group of interests, especially in bidding, auctions ... Or even, in the medical field, the development and application of digital technology in medical examination and treatment can lead to the registration of medical examination and treatment, the implementation of medical electronic records becomes popular, however, if the security is not guaranteed, the risk of leaking medical records or forging them to get health insurance benefits can occur and cause great consequences for society.

*Fourthly*, the challenge is about a serious shortage of human resources, especially highly qualified human resources in the fields of high technology and information technology.

Although Vietnam's information technology and telecommunications industry is gradually being recognized in the world information technology and communication map, Vietnam is still facing challenges of a serious shortage. information technology resources, especially high-tech human resources in state agencies. Although the contingent of science and technology staff has increased in number, there is still a lack of leading scientists who meet the requirements of industrialization and modernization of the country. The total number of human resources in the information technology industry is currently over 1.3 million people; In more than 400 universities and colleges in Vietnam, there are 2/3 specialized training schools in information technology. However, according to statistics from the Institute of Information and Communication Strategy, the Ministry of Information and Communication, up to 72% of information technology graduates do not have practical experience; 42% lack of team work skills, 80% of programmers need to retrain [4, p.125].

*Fifthly*, the challenge of people's awareness level and habits of using technology.

To the second quarter of 2020, the population aged 15 and over reaches nearly 73.5 million, of which 53.1 million people belong to the labor force. Although the process of urbanization has been going on, but up to now, the rural labor force is still considered large, accounting for 66.5% of the workforce. In the second quarter of 2020, an estimated 12.3 million people have been trained with vocational training from "Elementary" or higher level, accounting for 23.8% of the employed population of the entire economy. A profession requiring only simple labor attracts the most labor in the Vietnamese labor market, accounting for 32.9% of the employed population nationwide. The proportion of people doing simple jobs is still high in the context of professional and technical training for workers is low [14].

In addition, in another survey on the use of people's websites, PAPI 2017 showed that few people learn information about administrative procedures through the portal of local government. In the four surveyed administrative procedures by PAPI (including authentication, certification; construction authorization; issuance of land use right, and personal identities), number of people using the portal for learning about the construction licensing process and procedures has accounted for the highest rate (16%), with the remaining rate is only less than 10%. Although the majority of people who have used web portals have found the information they need, the number of people using web sites is very low [17, p.33].

The above figures show that this is also a big challenge in the Vietnam’s process of applying the achievements of the Industrial Revolution 4.0 in implimenting e-Government, solving administrative procedures in fields which easily arise corruption.

**5. Solutions to improve the effectiveness of anti-corruption in the 4th Industrial Revolution.**

The Industrial Revolution 4.0 will have a direct and strong impact on the socio-economic situation of Vietnam in general and the anti-corruption work of Vietnam in the context of the international economic integration. In order to solve the difficulties and take advantage of the Industrial Revolution 4.0, it is necessary to implement some of the following solutions:

*Firstly, strongly innovate the thinking and awareness of officials, civil servants, public employees and people about the Industrial Revolution 4.0.*

Although the Industrial Revolution 4.0 has a profound impact on the Party, State and the whole society in the coming years, but these effects take place gradually, and according to ILO research, Vietnam has not witnessed the impact of 4.0 technology in the workplace because "labor costs are still competitive and technology investment costs are relatively expensive" [4, p.172], so the majority of officials, public servants and people cannot keep up with all the great risks and challenges from the Industrial Revolution 4.0. Therefore, it is necessary to have effective propaganda for both the political system and the whole society to be aware of the effects of the Industrial Revolution 4.0, so it is possible to proactively seize opportunities and limitations, overcome difficulties brought by the Industrial Revolution 4.0. Avoid all expressions of indifference, lack of confidence, being passive but not subjective, hasty, willpower.

Especially, officials, civil servants and people need to have proper awareness of the Industrial Revolution 4.0. We cannot deny the importance of applying digital achievements in building e-Government, creating algorithms, and building critical software to manage and control power in areas prone to corruption such as: management and use of public assets, public investment, land, minerals, public services, staff work, inspection, examination, and investigate, prosecute, adjudicate, execute judgments for corruption cases, ... but there should delete misconception, considering the Industrial Revolution 4.0 as a "remedy" to cure all diseases in corruption which means that using software, artificial intelligence ... is able to overcome the crime of corruption.

It is still important to realize that the Industrial Revolution 4.0 is like a double-edged sword: It can effectively serve anti-corruption work, but can also be used to carry out corrupt acts with complex and sophisticated tricks which causes more serious consequences for society. Moreover, the application of the Industrial Revolution 4.0 is also dependent on people, if the use of applications of the Industrial Revolution 4.0 by the managers are not transparent, taking advantage of digital technology to make profits, corruption can cause dangerous consequences for society. Therefore, it is essential to be always fully aware of the impact of the Industrial Revolution 4.0 in order to have appropriate solutions in the fight against corruption. The contingent of technology staff in the Party and State agencies must be always aware of their rights and responsibilities in the implementation of public duties, and must be truly integrity, clean, brave, qualified, knowledgeable and experienced.

*Secondly, continue to innovate and complete institutions for the Industrial Revolution 4.0 in general and institutions for socio-economic management and anti-corruption in particular, taking into account the impacts of the Industrial Revolution 4.0.*

The Industrial Revolution 4.0 must "renew the mindset of economic management, social management, and build and complete institutions accordingly. It is necessary to have an open, creative approach and piloting to new practical problems, create all favorable conditions for innovation"[7]. In the upcoming time, Vietnam needs to improve laws on enterprises, creative start-ups, intellectual property, commerce, investment and business to facilitate the process of national digital transformation. Complete policies and laws on finance - monetary, electronic payment, tax administration and cross-border services in line with the development trend of the digital economy; law on data and data governance facilitating the creation, connection, sharing and exploitation of data to ensure safety and security in the domestic network, move toward to connect with ASEAN and international countries. Anticorruption laws need to anticipate new corrupt acts brought about by the Industrial revolution 4 and take appropriate sanctions ...

*Thirdly, focus on successfully establishing new technology platforms (IoT, AI, Big Data, cloud computing ...); promote the training of high quality human resources*

The Government needs to realize that artificial intelligence (AI) is a breakthrough solution for the implementation of the policy of restructuring, reforming growth models and socio-economic development strategies. Therefore, it is necessary to focus on investing in high-quality human resources in AI, building open data sources and creating links between universities and intellectual resources. In the upcoming time, it is necessary to improve the quality of training programs at universities, especially in the training industries serving the Industrial Revolution 4.0. Promote training and development of high-quality human resources. In particular, implementing a plan for developing high human resources for the operation, management and use of digital technology and electronic networks in Party and State agencies, especially experts, technicians, administrators and managers.

*Fourthly, develop public services for e-commerce; non-cash payments and tracking assets, income of people with positions and powers*

In order to prevent "petty corruption" more effectively, the State needs to strengthen administrative reformation, improve the effectiveness of the national administration, and promote the building of e-Government and smart government. Innovating technology for data storage and exploitation, integrating applications to provide public services such as electronic customs, tax declaration and tax payment, export and import procedures, and business registration. and specialized licenses related to trade. Implement the National Public Service Portal Project, which defines people and businesses as the center to serve. Increase the use of digital signatures in the activities of state agencies. At the same time, the government needs to apply e-commerce to public procurement, bidding, public property management, public investment, land and mineral management. This will renovate working methods to shorten the time to deal with administrative procedures, reduce informal costs, reduce harassment on businesses and people, contributing to strengthen confidence, promoting competition, encouraging business development.

The State Bank and related agencies need to actively implement the non-cash payment scheme and measures to strengthen prevention of money laundering and economic crime. Strengthening and expanding the technical infrastructure for non-cash payments. This not only reduces costs and brings many benefits to people and businesses, but also promotes transparency, openness, prevention of corruption, money laundering, and economic crime. The Government Inspectorate needs to quickly build and complete a national database on asset and income management. This is an important measure to detect and handle corruption.

*Fifthly, increase the use of digital technology to improve the quality of inspection, examination, audit, investigation, prosecution and adjudication of corrupt acts.*

Inspection, auditing agencies and procedural agencies should continue to promote the application of the achievements of the Industrial Revolution 4.0 in activities to serve the process of detecting and handling corruption. Using technology to promote the publicity of inspection conclusions, publicizing the implementation of audit conclusions, especially for complicated inspections and audits, which attracts the public. Strengthen inspection and auditing, focusing on large investment projects of State Corporations and Corporations; land use management; investment in the form of BT, BOT; equitization, divestment, and restructuring of state-owned enterprises; management of state capital and assets invested in enterprises; large procurement projects from the state budget. To speed up the investigation, prosecution, adjudication of cases, handling of detected economic and corruption cases; pay attention to verify and apply technical and technological measures to distrain assets, blockade accounts of corruption criminals right from the investigation stage, not to disperse and legalize corrupt assets.

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3. () Such as: personnel work; management and use of land and mineral resources; public procurement, management and use of public property; budget estimates and settlement; information on project planning; results of inspections and examinations; mobilization and use of people's contributions, etc. [↑](#footnote-ref-3)
4. () The case happened at the Vifon Company - Ho Chi Minh City: Nguyen Bi - former Chairman of the Board of Directors, concurrently General Director; Nguyen Thanh Huyen - former Deputy General Director, chief accountant, made false records to appropriated more than 20 billion VND; leaving, not collecting 59.9 billion VND to the Company to appropriated when equitizing. The case of Financial Leasing Company II under the Agriculture and Rural Development Bank: the defendants in the case raised the price of diving equipment from 100 million VND to 130 billion VND to appropriated. [↑](#footnote-ref-4)
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