Bureaucratic Disruption and Threats of Unemployment in the Industrial Revolution 4.0 Era

Risky Ristiandy
Riskyristiandy12@gmail.com
University of Muhammadiyah Yogyakarta

ABSTRACT

This article aims to analyze logical argument from the disruptive of information technology in Indonesian bureaucratic management. Technological advanced produces Artificial Intelligence (AI) which is an opportunity for the Government modernizes the bureaucracy. At same point, Disruption feared will make many Apparatus (ASN) lose their jobs. This article used literature study method by analyzing various articles in journals that discuss artificial intelligence, and the Internet of Things (IoT) which are the subject of research. While, the literature about bureaucracy and public institutions which will be the research objectives. The result shows that the implementation AI has the potential of losing many bureaucratic positions and could impact on social upheaval if not managed effectively. In the future, many apparatus (ASNs) will be unemployed because public services have been replaced by artificial intelligence. Therefore, this is clearly a dilemma and challenge for government in the future to be modern governments with technological advanced. However, it still humanizes for public services and servants.

Keywords: disruption; industrial revolution 4.0; unemployment

ABSTRAK

Artikel ini melihat konsekuensi logis dari disrupsi teknologi informasi bagi manajemen birokrasi moderen Indonesia. Kemajuan teknologi melahirkan artificial intelligence (AI) yang menjadi peluang bagi pemerintah memmodernisasi birokrasi. Disrupsi akan dihawatirkan membuat banyak Aparatur Sipil Negara (ASN) kehilangan pekerjaan. Metode penelitian yang di gunakan dalam penelitian ini adalah metode studi pustaka dengan melakukan analisis dari berbagai jurnal yang membahas tentang artificial intelligence, kemudian Internet of Things (IoT), yang menjadi subjek penelitian. Sedangkan literatur tentang birokrasi dan pelayanan publik yang akan menjadi objek penerapan inovasi birokrasi. Penelitian ini menunjukan rencana penerapan AI berpotensi banyaknya jabatan birokrasi yang hilang dan bisa menimbulkan gejolak sosial jika tidak dikelola dengan efektif. Kedepan banyak ASN akan menganggur sebab layanan publik telah digantikan oleh artificial intelligence. Ini jelas menjadi dilemma sekaligus tantangan pemerintah untuk mengelektrikan dan mengelisikan birokrasi publik tanpa melakukan pengurangan ASN. Maka dengan demikian hal ini menjadi tantangan bagi pemerintahan ke depan untuk menjalankan pemerintahan modern dengan teknologi maju. Namun tetap humanis bagi pelayanan publik dan birokrat.

Kata Kunci: disruptsi; revolusi industri 4.0; pengangguran
INTRODUCTION

Human development in thinking and creation has been progressing and growing rapidly as the variety of idea and notion concerning the easier future life are by always experimenting. The term industrial revolution divided into four eras has given an understanding of how to comprehend human innovation and creativity. The entire development in industrial affairs begun by the existence of industrial revolution 1.0. Industry 1.0 was marked by a steam engine. The discovery of a diesel engine and a range of tools capable of running with electricity marked the entry of people into the era of industrial revolution 2.0 (Industry 2.0). Then, people experience the industrial revolution 3.0 (Industry 3.0) when the computer industry had been boomed as the computerization of various things both related to administration and production throughout the world.

More interestingly, the industrial revolution 4.0 (Industry 4.0) is one of the revolution sequences in the industrial world as the revolution of industry life has happened four times till today, where the Industry 1.0 was started at the invention of the steam engine that helps workers to work in 1784 that began in English. Then it continues with other inventions in the industrial sector such as diesel engine technology that later underpinned the beginning of the Industry 2.0. After that, the computer industry had encouraged technology in Industry 3.0 (Prasetyo & Sutopo, 2018).

Turning to the Industry 4.0, Schwab, a German economist, explained that the Industry 4.0 is tricky difficult to understand because the revolution goes so fast and involves many humans connected with our communications’ devices existing at any time. We also witnessed the emergence of the new technologies, yet incompletely and ease to access the science, such as the Artificial Intelligence (AI), 3D printer, the Internet of Things (IoT), nanotechnology, vehicle automated, computer quantum, and many other things we have just seen recently. It is already biased we say as a form of the results of the revolution in which in the past we could not see the new things, but in the present days, we see all those help a lot of daily human activities (Schwab, 2017).

Such patterns have made a breakthrough and innovation of industrial revolution development by evolving the computer-controlled manner into the auto where it is revealed to accomplish all matters about human attempts to project the trouble of life without having to do it manually, but automatically. Therefore, a systems engineering technology created by utilizing the computer’s intelligence gives rise to a remarkable form of implementation of the human mind with the term Internet of Things (IoT). IoT is a considerable way in which humans could interact by utilizing an internet connection through the connecting media such as computers, laptops, and devices (Prihatmoko, 2016).

It is a lot of very complex change to human life, but not enough to get here, humans are constantly innovating to make a breakthrough life having an instrument that can work automatically. Nowadays, people live in the period of the Industry 4.0 impacting on an unavoidable disruption in all aspects of the global
community life. In Industry 4.0, all human activities on research and technological sophistication are unstoppable. Moving on from this, notwithstanding, an old idea of the AI’s thought to be realized.

Advance in technology by the use of computers and IoT in human life bears the development of AI more massive as more research and experiments create a range of innovations that are fully automated to facilitate the currently available work and services. Not least the government in Indonesia, this means how the Indonesian government today commits to innovate for establishing a governance structure that serves well and efficiently by superior capabilities and professional. It has to disrupt the pattern of Indonesian bureaucracy service and the performance itself by starting to forgo old manual towards new habits based on the sophisticated and easier system as well as more efficient in the process.

The use of IoT in the Indonesian bureaucracy is growing rapidly throughout Indonesia. It is started from groundbreaking to use the online service by making the various internet sites owned by the government as a window opening the service to the public, producing the innovation of people identity card based on an electronic system, generating an application-based service with the use of the internet, and planning the implementation of AI to replace man’s functions in the bureaucratic system as it takes a role in making decisions in a government agency.

With the enormously increasing technological sophistication of Industry 4.0, however, the civil servant must improve professionalism in performance. Conversely, it does not run well, because increasingly sophisticated technologies deliver people to fall behind in terms of speed and accuracy of service. Therefore, the President of Indonesia, Jokowi said a breakthrough is so revolutionary and bravery about the government's efforts to use the AI to run the government. It was submitted by Jokowi in a forum which is then quoted by Tirto.id “the echelon III and IV will be cut and we decided they are replaced by AI” (Thomas, 2019).

Based on the occurrence of disruption in the bureaucracy, machines with AI embedded in its components are able to provide the very good, accurate, and fast service experience. It brings the service’s change from human to robot. The way lies down the severe problem in which robot has replaced the human role, and if we talk about demand and supply, there have been anomalies in healthy ethics in work and its links with the economy. If the less demand for human work in bureaucratic posts occupied by humans before, supply more than demand, the open unemployment will increase to a large scale because many of Indonesian people life are still dependent on the work of a public servant.

Disruption of the bureaucracy, is a fundamental change occurred in the bureaucracy, that is impossible inevitably in the information technology revolution. In the Great Dictionary of Indonesian (Kamus Besar Bahasa Indonesia – KBBI), the disruption could be interpreted as uprooted identifying in which disruption means to change or eliminate entrenched what becomes a habit or old tradition fundamentally (May, Workman, & Jones, 2008). Why is it important to observe the context of bureaucracy in an era of disruption?, this is because the government bureaucracy is the main tool and become the most dominant role in the running and carrying out state duties as well as part of the implementation of the state that interacts directly

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with the public (Effendi, 1987). As a consequence, the disruption causes a very big chance that will also impact on the community itself.

However, disruption of the bureaucracy delivers the work of public services that had been done by state civil apparatus could be replaced by machines/ information technology. As the worse consequence, reduction of employees will occur that making unemployment eventually as these conditions create a big dilemma for the government. Unemployment could be interpreted as a part of the labour force that is not at work or actively looking for work, and the concept of unemployment is often called open unemployment (Mantra, 2000). The unemployment is a complicated and prone problem to occur, and the spike figure level could change at any time depending on the condition of absorption or the need for labour itself. Moreover, the factors of labour demands are associated with the type of work and operational needs of the man himself.

As a sequence, by the reduction in the amount of labour absorption, it will have an impact on rising unemployment (Sukirno, 2010). The relation between labour and employment is a macroeconomic problem if these problems are considered a minor problem it will be a time bomb in the future.

The plan of AI’s application in the Indonesian government bureaucracy can give rise to unemployment and long-term social upheaval spawned. Despite making public services more excellent and qualified, AI has an adverse negative effect on the sustainability of public revenue, especially employees of bureaucracy. Economic shocks due to the emergence of new unemployment would disrupt political stability and security that need to be managed properly. This paper depicts the impact of the AI’s implementation plan and how the government should respond.

METHOD

The method of research that we use is literature reviews by analyzing the various journals of AI and internet of things as the research subject while the journals of bureaucracy and public service will be an object of practical innovation based on AI and internet of things. After analyzing such of points, we make a comparative study with comparing the analysis of research subject journal and how the bureaucratic service is?, and then making a conclusion on what disruption occurs in bureaucracy’s system and how the pattern of disruption exists due to applying IoT and AI in bureaucracy’s system. Besides, we also make a clear analysis concerning the impact that will occur if implemented in the future.

RESULTS AND DISCUSSIONS

1. Technological Developments in Industry 4.0

The technological development in the era of Industry 4.0 has exceeded what is expected in the past for the present. The revolution of the industry has happened four times. The first Industry 1.0 existed when the discovery of steam and new mechanisms reducing the number of human use in carrying out a mechanism of action. The second Industry 2.0 occurred when the mechanism of motion produced by electricity as power was discovered in the 1900s with the use of electric machines for mass production efforts. Moreover, the
discovery of computers and the use of computer mechanisms to carry out automation functions of production equipment that had been begun in 1970, marked that humans had reached the era of the third Industry 3.0.

Nowadays, the advancement of interconnection network technology, data analysis technology and increasingly sophisticated sensor technology which is combined with the performance functions of computer devices has marked that we have entered a new era in life in the world namely the Industry 4.0. Industry 4.0 has pushed a significant effort to use the Internet of Things to be part of the global community’s daily lives, especially in Indonesia. According to the research of Oxford University in 2018, the users of the internet in Indonesia ranked fourth in the world.

Technology in the period of Industry 4.0 is not only as a theory but also applied in all aspects of people's lives, for an instance in Indonesia, the use of technology in the industrial era 4.0 has been applied in various aspects, ranging from education, health, communication, bureaucracy up to agriculture and marine affairs. In educations’ sector, we recognize the existence of e-learning which enables students and lecturers/teachers to carry out the process of learning and teaching without face-to-face. E-learning is a form of learning and teaching model facilitated and supported by utilizing information and communication technology (Hanum, 2013).

In the health sector, we are aware of the existence of online health services using the internet to facilitate the registration process of patients who wish to visit so that they do not have to queue long as implemented by the hospital of PKU Muhammadiyah Gamping. Related to the research on the use of technology in health, Irawadi Buyung had researched in 2011 with regard to the usage of health information media for the middle class by using the SMS (Short Message Service) Gateway system (Buyung, 2015). The health filed not only applies the information technology in service but also evolves a health robot to treat patients well (Miro & Junqua, 2005). Besides, the technological advancement of an agricultural sector also has developed in industry era 4.0 that colours the agricultural devices to increase farmers’ production, one of which is to use information media by making applications to rise marketing of farmers as gaining a lot of profits without through middlemen that are troubling farmers because their agricultural products are bought at low prices (Yuantari & Kurniadi, 2016).

The more interesting sector that we must know is the government that most applies to technological advances in each of its institutions. Through technology support, the government is increasingly aggressively implementing the role of electronic government (e-government) that makes public services faster and more efficient by giving a good impression to the public about the convenient and inexpensive services. With the existence of e-government services, it is expected to be able to reduce actions of corruption, collusion and nepotism that occur in this country. Klitgaard stated when the government is a public servant who has a strong and large monopoly over citizens, a large level of discretion and weak accountability, it will have an impact, namely the occurrence of criminal acts of corruption (Hardjaloka, 2014).

The use of technology that is currently used by the government to support e-government programs is e-
budgeting. This is a budget planning systems made electronically using sophisticated applications to reduce misuse of the state budget that has been carried out in several provinces such as the government of DKI Jakarta and the government of Surabaya City. The development of technology in Industry era 4.0 has permeated every side of life in this world. The use in the sphere of government and bureaucracy tends to be higher and more innovative and has a lot of effects on the problem of public services. It is as a serious effort to improve state governance which has often been labelled poor and unprofessional as well as disrupting the bureaucracy in the country so that differences in people's behaviour in viewing and utilizing all the needs of public services (Dharmawan, 2018).

2. The Use of Technology in the Indonesian Bureaucratic System

As stated in the previous discussion, the current technological advancements open the wide opportunity for the government to use them in the bureaucratic system. The thing that we most remember is when the government announced to start digitizing the bureaucracy and public services by making an integrated identity card well known as Electronic KTP (E-KTP). By the existence of E-KTP, the government can provide effective and efficient services that are the government responsibility in serving the community (Sutriadi, 2016). The use of this technology is one of the many technological applications applied by the government into public services and bureaucracy. Therefore, one of the more sophisticated devices is about access to public services using the internet in which the government employs the internet as access to services by using domains and pages that are interesting and informative (Dwiyanto, 2013).

Those are parts of many things which disrupt the Indonesian bureaucratic system where the significant alteration from the pattern of manual services to the digital-based system is undeniable, initially direct to indirect. The fast services provided by the government now greatly facilitate community access, but unfortunately, not all communities are also able to access services that have been provided by the government. This is caused by various factors that support or do not support the availability of access for the community. Moreover, the improvement of public services through the technological application by the government has changed the face of bureaucracy from being impressed with dirty products and the results of corruption, collusion, and nepotism to be more friendly and more trusted by the public through the application of technology in the government environment (Nugraha, 2018).

The results of the technological implementation in the bureaucracy have produced many positive sides. This makes a breakthrough of the government in a way of thinking that is more radical to create a public service better today by optimizing all technical studies and how those are applied in the Indonesian bureaucratic environment. The future scenario of a government with a professional and efficient bureaucracy has begun from now, but how the impact of its implementation is still being discussed until now because there has not been a meeting point about what kind of design the government wants for bureaucracy in this country in the future with the increasingly sophisticated, more effective and efficient technology in terms of the use of natural and human resources.
3. Discourse on the Use of AI in the Government

The Government of the Republic of Indonesia through the President Joko Widodo (Jokowi) made a very controversial statement regarding the problem of using technology in Indonesia’s bureaucracy as quoted by Tirto.id that Jokowi said: "the echelon III and IV will be cut and we decided they are replaced by AI" (Thomas, 2019). Jokowi’s statement had shocked the Indonesian bureaucracy as it had been a trending topic throughout Indonesia. It was announced when the number of applicants to become civil servants increased as Republika.co.id reported that the Head of the Public Relations Bureau for the National Civil Service Agency (BKN) on October 10th, 2018, released there were 4,436,694 civil servant applicants. This number is categorized at the highest level since this nation gets the independence of colonialist. It is a higher level rather than in 2014, 2.6 million of applicants (Widyanuratikah, 2018).

This is a very serious response, considering that AI is very reliable when programmed correctly and properly. It is more interesting to know that AI could do an analysis and computational calculations as well as determining a thought like humans’ thinking (Winston). However, the government adopts the sophisticated technology in the bureaucracy’s system because it is the long-term planning, by combining the advanced technology and local wisdom in bureaucracy’s order. Inevitably, the challenges to step to the bright future is indeed tricky difficult if we do not adjust to the contemporary situation. The progress of Industry 4.0 has provided a gateway for the government to answer the current challenges going forward by using all the facilities and technological advancements that are owned by the state.

The society perception on the usage of AI in the bureaucracy especially fulfilling the function c the echelon III and IV is good because it has been the advanced breakthrough and innovation as well as courage. But each of the policies that have been made should be run well and wise by the importance of making a decision step-by-step so that the risks could be minimalized. Actually, Jokowi's statement has an ambition side that is yet accepted by the public due to the existing weak economy and lacking job opportunity. Employing the robot to shift the human role is a must, but in Indonesia, there has been many critics and other inevitable troubles.

The idea of replacing humans’ functions is to improve professionalism and integrity. The problem is how the enormous efforts to improve integrity and professionalism are not carried out and suddenly wanting to replace humans immediately. Basically, increasing the performance of humans is from him itself to improve abilities and learn how to explore their potential, learn about the knowledge, hone their abilities even more active and get a good appreciation, and it has been done and applied as much as possible (Rohida, 2018). To gain a big advantage, however, the collaboration of role between human and machine is of significant importance in industry 4.0 without avoiding one of them. On the other side, relying on data of Oxford University with regard to the readiness of countries in the world to adopt AI in their governance, the Republic of Indonesia ranked fifth in ASEAN (The Association Southeast of Asian Nations).
Data on Readiness of ASEAN Countries in Facing the Industrial Revolution 4.0

Source: Oxford Insight International Development Research Center, 2019

Based on the mentioned data above, the readiness of Indonesia was still further lower than four other countries in which the first highest level was Singapore with 9,186 scores that have already been to apply AI in all of the life aspects. Followed by Malaysia at least 7,108 scores, this country has the right capacity to implement AI inside their state. The third-highest level was Filipina with a score of 5,704 followed by Thailand at least 5,458 and then Indonesia took the following rank with 5,42 score. By the analysis, our readiness to apply AI in Indonesia is still far and too risky as well as endangering the national security with various impacts that will occur with the use of forced AI without any deeper study and taking into account aspects of the benefit of the national security.

4. Bureaucratic Disruption Because of AI

Admittedly, disruption is a term that has a meaning about fundamental changes impacting the Indonesian bureaucracy. Before the advanced technology has been applied, that bureaucracy in Indonesia is currently being carried out following applicable Standard Operational Procedures (SOP). Since the introduction of increasingly sophisticated technology, the pattern of Indonesian bureaucratic service and performance has also altered by itself which is developing under the current development of Industry 4.0.

There has been a significant difference between the past and the present, where in the past condition the government service preferred to manual way as people must come to public office (face-to-face) while nowadays people do not need to attend public office if they do some affairs connected with public service as registration services, written data and other information could be obtained via the government official website. Applying the technology in the government system do not require place and more time that are often narrowing the service between the government and the public in order that it becomes faster and more precise and efficient (Putra, 2018).

Furthermore, the AI can behave and act like human thought as those are far more advanced and
superior to what is called the Internet of Things (IoT) which is only a media to communicate with each other and face-to-face with others using the internet network access. The sophistication of the IoT can initiate disruption in the bureaucracy by changing the face of the bureaucracy and its services. If something like AI is implemented in government, this will have a very fundamental impact by reducing the number of personnel in an institution which means it will reduce the supporting components in an institution due to the reduced number of human resources needed.

This way tends to arouse the negative perspective and stigma in society if it is not conducted most wisely because it will create a horizontal and vertical conflict within the scope of government itself. Hence, it becomes a big challenge for the government that there has been a proposal to utilize AI in the realm of bureaucracy, but unfortunately, the government is still not able to review and determine the most appropriate procedures to generate a policy that benefits all parties. Using the AI in the Indonesian bureaucracy’s system not only affects policies and models but also replaces all old ways fundamentally with new ways that may potentially be a permanent pattern to support the AI’s program in service. This is called disruption that fundamentally replaces the existing system arrangements related to the bureaucracy in Indonesia ranging from work to services to be carried out, starting from the procedures, personnel, types of used equipment, and even costs will all have a significant effect because it changes fundamentally.

Disruption in the body of the bureaucracy will also affect the projected government data. If we talk about conventional methods in processing data we will gain the fixed data updated based on a specified time interval. When the government implements technological advances namely the Internet of Things, AI, and Big Data, all data that will be entered and processed by the government will run in real-time or second by second will continue to be updated automatically. This initiative way is very beneficial for the administration itself. However, it will affect the way the government to get previously manual data with a census, and in the future people will just use an application connected to the device and directly processed by AI, minimizing the margin of error and human resources as its implementation could create big breakthrough of the census procedure and its calculation.

Since the AI is used in the realm of bureaucracy, it will automatically become a bureaucracy system without having a bachelor’s degree or passing a civil service test. This will also disrupt the process of entry and recruitment of civil servants themselves and is going to change slowly the old habits of the civil servant recruitment’s process, and this will have implications for other things such as employment and the economy. Obviously, many different factors will influence the bureaucracy in this country if it involves the AI’s system that will have a significant impact on all aspects in the body of government ranging from personnel, ways of working, forms of service, office socialization, data collection, data expenditure, field performance and other things that have not been predicted.
5. The Impact of Bureaucratic Disruption in Indonesia on Human Resources and Unemployment

Implementing the smart advanced technology in the governance system will automatically affect the use of human resources required. When President Jokowi stated the use of the AI into the government, the questions are on how many people would fill the positions of the echelon III and IV as well as other functional positions. If this is continually developed it delivers not only in decision-making positions that would be problematic but also the service department will also be replaced with the AI as well as other technologies that espouse the bureaucracy and its services.

Based on the researcher’s analysis, if the bureaucratic disruption is allowed to dissolve the problems could cover all aspects of staffing in the bureaucracy so that there is a severe impact of this as follows: first and foremost, the use of human resources in service and decision making as well own institution will reduce gradually; and the second is by not absorbing the Indonesian unemployment dominated by fresh-graduate students that are actually becoming workforce ready. Based on data from the 2019 National Civil Service Agency (BKN), there were 37,854 formations opened for 74 ministries/ institutions and 159,257 formations at the regional level while the total number of civil servant’s applicants for the central government in 2019 had reached 5.05 million that means the ratio of competing seats 1:26. It has proved that the wide job opportunities to be a state civil apparatus had been inclining.

Moreover, we have to understand that not a few of the local governments had developed a government of smart city by preferring to implement the easy access in the digital era today, for example, the use of own printing machine to produce Family Card, National Identity Card (KTP) and Children Identity Card (KIA) had been released by Home Ministry Affairs in the late 2019s. Those are printed by the only three or four workers that function the advanced machines to produce such as a national document. Even, by the existence of printing machines, the only one or two operators are needed to monitor the running of the device. If the economic calculation is related to employee salary expenses, the calculation is as follows:

\[\text{(Number of operators x basic salary) x (a year of work)}\]
\[\text{(4 people x IDR 2,500,000) = IDR 10,000,000) x (12 months)) = IDR 120,000,000}\]

If we only need 1-2 employees, we have saved the existing budget of IDR 60,000,000. While behind the economic calculations make benefit the country to save its spending budget, there will be a big problem of many unemployed people due to the increasingly narrow job chances in the bureaucracy as well as the other employment areas will also decrease further due to changes in production patterns from manual to automation. The current big problem in this country is the level of open unemployment of at least 6.82 million. Inevitably, most of the Indonesian people prefer to be the state civil apparatus, but it has allowed the small number accepted when the AI dominates the bureaucratic activities. If this is no responded and is a
serious problem for the government, the logical consequence is not only the challenge of disruption but also how to settle the number of unemployment and to solve the state civil apparatus’ problem that is no longer needed due to the existence of the high tech.

CONCLUSION

Technological development is undeniable as we cannot throw away and kill in our daily life or working activities. However, the increasingly massive technological advances encourage us on how we are able to respond well too. The high recognition for the Indonesian government must be given because of implementing AI in the bureaucratic system as it could bring the condition more advanced. As a reasonable consequence, it will generate a fundamental disruption in the face, performance and services of the government itself in which disruption will cause various new obstacles related to the availability of jobs as well as the impact on bureaucrats who will later lose their positions due to disruption. Therefore, this will be a big challenge for the future government to undergo an advanced government with sophisticated technology while still humanizing human beings who are citizens of Indonesia.

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