THE DIFFUSION OF ARTIFICIAL INTELLIGENCE IN GOVERNANCE OF PUBLIC LISTED COMPANIES IN MALAYSIA

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ABSTRACT

Various sizes of companies are facing growing pressure to improve their financial performance, particularly public listed companies. The rise of Artificial Intelligence (AI) in management and operation of company can assist to achieve this objective. It is parallel with the Industrial Revolution (IR) 4.0 which has the potential to raise the productivity and quality of governance in companies. This latest industrial revolution now is not only based on the use of computers and technology, instead, focusing on the use of cyber physical system with AI as its main catalyst. This innovation explores the possibility to create intelligent systems that can reason and think like human beings and will affect the governance of public listed companies significantly. ASEAN countries such as Singapore, Vietnam, Indonesia, Philippines and Thailand have started to implement AI in their governance practice while Malaysian companies are mostly yet to infuse the innovation and still at infancy stage. This paper is looking at the stage of diffusion of AI in governance of public listed companies in Malaysia. Content analysis of latest Annual Reports for 806 companies from the main market of Bursa Malaysia has been conducted and stage of diffusion in AI implementation in companies' governance has been determined by using the diffusion theory. This paper also looks at the challenges faced by the companies in terms of behavioral and legal issues arisen along the process of adopting AI in their governance. The result of this study will contribute to existing knowledge in the area of the innovation of AI especially in Malaysian public listed companies.

Keywords: Artificial Intelligence, Corporate Governance, Diffusion Theory, Industrial Revolution

INTRODUCTION

Companies have a fiduciary duty to act in the best interest of the principals or shareholders (Kilroy, 1999). Shareholders wealth will only be created once management delivers performance in excess of expectations from the successful implementation of higher value strategies developed from new ideas and innovation. The growing pressure to improve performance especially for public listed companies has demanded them to innovate further, in line with the latest Fourth Industrial Revolution or IR 4.0. The rise of Artificial Intelligence (AI) in management and operation of company can assist them by exploiting the potential to raise the productivity and quality of governance in companies.

IR 4.0 is the continuation from the First, Second, and Third Industrial Revolution. While the First Industrial Revolution discussed the water usage and steam power to mechanize production, the Second used electric power to create mass production, and the Third used electronics and information technology to automate production. IR 4.0 mainly discusses the fusion of technologies that are characterized by cyber-physical system, the internet of things, cloud computing, and cognitive computing (Ministry of Industrial Trade and Industry, 2017).

AI is the catalyst for IR 4.0. This innovation will set an additional or a new approach of governing and managing organizations, particularly companies. It explores the possibility to create intelligent systems that can reason and think like human beings. It is being said to possess similar cognitive abilities as human beings and is now helping the management in making decisions about the allocation and utilization of the resources, solving operation and management problems, as well as advising the strategic development. Billions of people and countless machines will be connected to each other simultaneously and concurrently. Thus, AI will also assist in monitoring and improving those connections and interactions without human intervention to reduce human error and improve accuracy of decisions made based on strategic analysis of big data captured. It is used as the main driver to obtain competitive advantage and sustainability of companies.

Since the innovation is still new, companies might foresee challenges in adopting the innovation into their operations. Sooner or later, companies are forced to accept the new innovation in order to be in parallel with the technological development. An active participation from directors and management in companies can provide a strategic direction and organizational alignment to prevent innovation from failing (Skarzynski, Crosswhite and Jones, 2014).

Malaysia is of no exception. With the introduction of AI in the "Transformasi Nasional 2050" or TN50, Malaysia has proven that they are ready to move their footstep into more advanced technological development focusing wider sectors and industries (Transformasi Nasional, 2017). TN50 is a 30 year plan (2020-2050) that aims to emphasize economic development through advancements in technology, business processes and innovations, using technology drivers such as robots and AI. The main objective of TN50 is for Malaysia to become a top 20 nation in economic development, social advancement and innovation. TN50 is very crucial to ensure that Malaysia is prepared for the future beyond 2020.

In addition to that, the focus of Malaysian Budget 2018 is aligned with the TN50 objective. The budget was tabled in the parliament with the theme of "Prospering an Inclusive Economy, Balancing Between Worldly and Hereafter, for the Wellbeing of Rakyat, Towards the TN50 Aspiration". The focus is to prepare the country towards AI innovation, digitalization, and smart manufacturing in accordance with IR 4.0. The Prime Minister had announced that various tax incentives will be given to the manufacturing sectors to encourage them to adopt advanced technology such as AI, big data analysis, autonomous robots, industrial internet of things, cyber security, and others where companies can claim through its capital allowance on qualifying expenditure. In addition to that, a matching grant worth RM245 million under the Domestic Investment Strategic Fund (DISF) will be provided to upgrade the ICT equipment and facilities as well as communication system which is crucial for a strong digital infrastructure. These were included in the six thrust of the budget which was fortifying the IR 4.0 and digital economy (Ministry of Finance, 2017).

With a huge potential benefit and fast evolvement of AI, this paper will look into stages of implementation and the level of AI innovation in public listed companies in Malaysia by applying the Diffusion Theory. In addition, this paper will also look into the challenges faced by companies regarding AI implementation in their companies. Therefore, the primary objectives of the paper are to determine the current diffusion stage of AI innovation in Malaysian public listed companies and assess the challenges of AI adoption within the companies.

The remaining of the paper is organized in the following manner. The next section will review the literatures relating to AI and corporate governance in general. Then, the paper will elaborate the theoretical framework used in this study. The following sections are dedicated to the research methodology and discussion on findings from the analysis. Final section will be the conclusion and recommendation for future researches.

LITERATURE REVIEW

History and Background of Artificial Intelligence

AI has been in the literature for the past two decades (Haughland, 1985; Chu & Wang, 1988; Nilson, 1998; Minsky, 1989, 1961; Muses, 1990; Andrew, 1991; Rich & Knight, 1991; Winston, 1992; Buckner & Shah, 1993; Kim, 1995; Andersen & Gaarslev, 1996; Stefanuk & Zhozhikashvili, 2002; Halal, 2003; Combs, 2004; Luger, 2004; Connolly, 2008; Russel & Norvig, 2009). However, those AI discussions were mainly explored in the communication, technology, engineering, and manufacturing sector. Very few studies have been conducted in relation to AI in governance, operation and management.

The idea that computers would one day be able to think like human had began the journey of AI began over 70 years ago. Early inventions in electronics, engineering, and many other disciplines have influenced the development of AI. The concept of intelligent machines was introduced even before the second half of 20th century and known as "Ancient History" (Buchanan, 2005). Mechanical toys and dolls with the characteristics of mechanic behaviour had been created during the time.

Literature provides various definition of AI. Minsky (1989) defines AI as the science of making machines that would require intelligence if done by men. According to Luger (2004) AI is the branch of computer science that is concerned with the automation of intelligent category. Russell and Norvig (2009) categorized the definition of AI into four categories which includes thinking humanly, acting humanly, thinking rationally and acting rationally. This categorization is based on definition provided by Haugeland (1985) "machine with minds"; Rich and Knight (1991) to make computers do things at which, at the moment, people are better"; Winston (1992) computations that make it possible to perceive, reason, and act and (Nilson, 1998) AI is concerned with intelligent category in artifacts.

The concept of AI differs according to its level of intensity of intelligence. AI could be stronger or weaker in terms of its intelligence capability. The article of *The Conversation UK* has categorized AI into four types; reactive machine, limited memory, theory of mind and self-awareness. Similarly, Kolbjornsrud, Amico and Thomas (2016) discussed three different roles of AI in organizations. The first one is as an assistant where AI actively supports the manager and the team, by taking notes, scheduling meetings, writing e-mails, managing calendar events and maintaining scorecards. The second role is as an advisor where it builds scenarios and simulations by solving more complex problem and decision making situations. The third scenario is as an actor where AI may evaluate, criticize, and justify the decisions.

The adoption of AI innovation can also be seen from countries that make up the Association of Southeast Asian Nations (ASEAN). Even though ASEAN is a little bit behind in terms of adopting AI, the pace is of change is accelerating. According to study done by McKinsey Global Institute (2017), only 6% of the large corporations of ASEAN mentioned the term "big data", "advanced analytics", "AI", "machine learning", and the "internet of things" in their annual report in 2011. However, in 2016, one third of the regions' large corporation did mention the terms in their annual reports indicate that these technologies are becoming strategic priorities to the companies.

Singapore is leading the region in AI experimentation across multiple industries such as high technology and communication, manufacturing, financial services, transportation and logistics, education, healthcare, education and others. Followed by Singapore, Malaysia is slowly adopting the AI innovation in line with the TN50 and IR 4.0. Early adopters like Singapore, Malaysia, Vietnam, Indonesia, Philippines and Thailand can realize major competitive advantage through the adoption of AI as a future source of revenue income rather than just a means of cost reduction. Among ASEAN countries, Cambodia, Myanmar, Brunei and Laos showed very low adoption of AI in their industries.

On the other hand, the European Commission (2017) discovered that some of the participative countries in the European Commission have made initiatives to transform the existing industry by adopting national policy on the IR 4.0 named as Industry 4.0. Some of the countries include Spain in 2016, UK in 2012, France in 2015, Italy and Germany in 2013, the Czech Republic in 2016, Sweden in 2013 and the Netherlands in 2014. Other countries in the Asia region which have implemented the same policy include South Korea and Singapore in 2014 while China and Japan adopted its policy in 2015 (MITI, 2017). Malaysia had announced to develop the national policy blueprint on Industry 4.0 early 2017 which is expected to be released first quarter of 2018 (News Strait Times, 2017). The MITI (2017) stated that the development of the national policy blueprint on Industry 4.0 is important to ensure the industry in Malaysia remains relevant and competitive.

Artificial Intelligence and Governance

With the adoption of AI innovation, the management and governance of companies will be affected. AI is a new innovation which can help companies to create its value and competitive advantage (Harrington, 2010). A research done by Accenture found that businesses that implement AI could increase profitability by an average of 38 per cent by 2035 (Purdy, 2017). Previous research also stated that efficiency can be increased when machines being used in operation as it helps to reduce potential similar problem by using Pattern-Recognition technique together with learning and planning method (Minsky, 1961). AI also improves the efficiency through learning and planning method as the system is able to make predictions and choose choices which can maximize value of the business (Russell, 2003).

According to Mark (2013), governance involves governing process such as by a government, market or network, over an entity through the laws, norms and power of an organized society. Whilst corporate governance refer to the way a company or corporation being governed and controlled (Greg, 2004). The innovation of AI in a business will affect the way companies are being governed as it will involve significantly in the analysis, evaluation and decision making process. It will also create challenges for employment by reducing or replacing human labour with machine to increase productivity and efficiency. Thus, less human and more robotic or machine intervention will influence the governance of companies. AI presents very real challenges to directors and Board members of companies. They need to be aware and be prepared to diffuse the AI innovation in their companies in order to survive and sustain as AI will change the business model as well (Lauterbach, 2016).

The market competition, complexity of production process, product variety, overhead portion, and firm size are factors that can contribute to the adoption of AI innovation. The market competitions, especially the participation of multinational companies in domestic market of a country, have implication for local company to design appropriate strategies and control system in company (Isa, 2009). The company size sometime indicates how fast the company adopts the advanced management practice and usually the larger companies the faster they adopt the system (Chenhall and Smith, 1998). Their arguments are the larger company size lead to an increased complexity of tasks, the companies have greater access to resource to experiment with administrative innovations.

Artificial Intelligence and Its Challenges

Resistance to change is seen as negative behaviour which undermines the effectiveness of the change and need to be overcome (Smollan, 2011). AI adoption could be rejected by both management and employees in companies due to certain reason. In view of directors and top management, AI will incur huge cost at significant risk as the result from the adoption is hard to determine and involves high level of uncertainty which may lead to the unfavorable results. Without capital, companies will not be able to adopt AI in their governance and business operation as AI needs technology advancement and state-of-the-art facilities. In addition, large amount of capital need to be provided for research and development of AI and this situation might be rejected by directors and management due to inability to see the importance of the benefits acquired in the future or trying to avoid the situation of cost outweigh benefits. Despite, companies will still need to change overtime due to external pressures and the volatility of business environment around them in order to sustain their stability (Yilmaz, 2013). Therefore, it is vital to have continuous improvement practices with changing conditions as well as being a role model to the remaining employees. Trust and cooperation from employees towards management is the most essential element in the process of organizational change as it shows the trust relationship between them and ensure the smooth process of change within the companies.

Whilst from the perspective of employees, AI might cause more trouble and they are also reluctant to learn and practice new things due to risk of job performance and security (Erwin, 2009). AI is among one of the technologies evolved in IR 4.0, and the fundamental changes which not only cover the way management direct the companies, but also the way products of goods and services being produced, delivered and consumed by end users or customers. Continuous development and evolvement of AI will trigger unfavorable responses from employees as they need to the follow the fast pace of both IR 4.0 and AI in order to perform better. Learning process will be continually taken place and the competitiveness among each other will get intense. The convergence of daily business conducts towards less human intervention to reduce human errors will give rise to risks such as job replacement, failures of autonomous machines and loss of privacy as AI interconnect people simultaneously (Buchanan, 2005). These conditions have conveyed the resistance to change and unready to embrace the new changes by employees (Bateh, 2013).

The innovation in technology and machine has been evolving and become faster with the passage of time. In the wake of AI, regulations related to cyber security, emerging technology and data theft are important to protect the interest of companies as the impact of breach of data and security is significant and can affect their survival. It will also expose the companies to global challenges which involve societies and humankind. Thus, the legal implication of AI needs to be examined. Governance on technology and robotic has been established in governing technologies and intelligent machines (Boesl, 2016). This is an

example where legal mechanism is defined in order to mitigate the risk which AI exposes. The development of IR 4.0 exposes to unknown risks in which it is pertinent for the government to examine the impact to the relevant stakeholders in the industry especially the legal risk.

Apart from that, it raises legitimate complex legal questions, combined with technological concerns, as to the reliability of artificial intelligence programs and software and how employees will deal with such applications in their daily tasks. For example, when computer programs are used to enter into formal contract, it is important to make sure the applicable terms and conditions are communicated to the individual at the end of the line or that a proper disclaimer is duly disclosed. The question that can be raised is who should be responsible if anything went wrong with the contract? Organizations should build specific and defined value or guiding principles for legal, fair and just processing and translate these into organizational polices and processes. A mechanism should be created to translate their core values and principles into data analytics system design process so that individuals, not just organizations, gain value from the AI process (Lauterbach and Blanc, 2016). Stakeholders need to gain confidence and trust the financial, operation, and management decision of the companies who will be responsible and accountable of the decision made.

As far as the regulatory framework of other countries is concerned, countries like United Kingdom and Singapore has yet established a specific law on AI. Based on the literatures available, United Kingdom and Singapore is maintaining the relevancy of any law available to be applicable to AI. The Government Office for Science (2015) has pointed out that establishing a specific law on AI is unnecessary as reference can be made to the existing law on data protection. At present, the available law on data protection in UK includes UK Data Protection Act 1998 and the EU General Data Protection Regulation 2016. These two laws are said to be a well established and effective protection of the citizen's data.

Singapore on the other hand is in the same sentiment in not establishing dedicated law on AI. It was recommended that new law and regulation on AI in Singapore is to be formed only when required. Creating policy, legal and regulatory framework should be done hand in hand with technical experts of AI in order to ensure the effectiveness of the law. In designing its legal framework, Singapore intends to apply defense in its framework by utilizing the local law enforcement as practiced in the United States by having a data based decision making by detecting abnormal behavior in a person and envisage dangerous crowd behavior. Singapore also intends to apply AI which could anticipate cyber-attack by detecting, evaluating and patching software vulnerabilities (Government Office for Science, 2015).

THEORETICAL FRAMEWORK OF DIFFUSION THEORY

Diffusion theory is being used in the study to explain the diffusion process of AI innovation within Malaysian public listed companies. Diffusion theory was first introduced by Everett Roger back in 1962. He described diffusion process as the process by which an innovation is communicated through certain communication channels over time among the members of a social system. In other words, this theory seeks to explain how, why, and at what rate new ideas and technology spread. Roger (1995) proposed five key contributing factors that influence the spread of new innovations as shown in Figure 1.

Figure 1: Five contributing factors to diffusion innovations
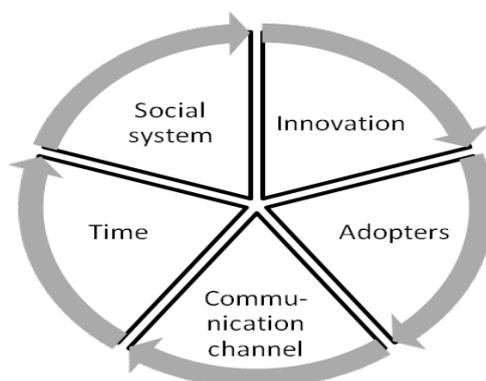
- Innovation: Innovations are idea, practice, or object that is perceived as new by an individual or other unit of adoption
- Adopters: Adopters are individuals, but can also be organizations (businesses, schools, hospitals, etc.), clusters within social networks, or countries
- Communication channels: Communication channels allow the transfer of information from one unit to the other
- Time: The passage of time is necessary for innovations to be adopted; they are rarely adopted instantaneously
- Social system: The social system is the combination of external influences (mass media, organizational or governmental mandates) and internal influences (strong and weak social relationships, distance from opinion leaders)

According to DiMaggio and Powell (1983), organizations receive similar forces in terms of its rationalization, normalization and bureaucracy. When an organization tries to change or to adopt new innovation, the effect of the changes is homogenized because

they face the same external environmental conditions. The diffusion process relies heavily on human capital. This is because individual is first exposed to an innovation. Once the individual interested with the innovation, he or she may try to find out for more information. The individual will have to decide whether to adopt or reject the innovation after enough information is accumulated. Rejection to the innovation is expected if the individual felt insecure and could not find the usefulness of the innovation. However, if the innovation were to be adopted, the individual will finalize the decision and continue using the innovation.

Similar adoption process can also describe the adoption in organizations where organizations can feel pressured by a tension for change. Norhayati and Siti Nabiha (2009) discussed how organizational members have to adapt to the new changes made by the organization frequently. After a period of time, the actions of people are routinised, normalised, and formalised unconsciously resulted from the process. This is where the organizations confirm their decisions to adopt the new change. The five stages of adoption process were summarized in Kautz and Larsen (2000) as shown in Figure 2.

**Figure 2: Five stages of adoption process**

- Knowledge: Knowledge is the stage where a potential adopter learns about the existence of an innovation and gains some understanding of its way of functioning
- Persuasion: Persuasion is the stage where a favourable or unfavourable attitude towards an innovation is formed
- Decision: Decision is the stage where activities are undertaken which lead to the adoption or rejection of an innovation
- Implementation: Implementation is the stage where an innovation is actually put to use
- Confirmation: Confirmation is the stage of reinforcement for an adoption decision which has already been taken

Once the innovation has been adopted by organization, the rate of adoption can be measured. In general, individuals who first adopt an innovation require a shorter adoption period which is adoption process when compared to late adopters. The rate of adoption is defined as the relative speed at which participants adopt an innovation. Rogers (1995) suggested a total of five categories of adopters as shown in Figure 3.

- Innovators: Innovators who are gate keepers in the flow of new ideas into a social system
- Early adopters: Early adopters who decrease uncertainty about a new idea by adopting it and by then conveying a subjective evaluation to near-peers
- Early Majority: An early majority who deliberately follow in adopting an innovation and who through their position between the early and the late adopters are important links for the further diffusion among the different groups within a social system
- Late Majority: A late majority who often has scarce resources which means that almost all of the uncertainty about a new idea has to be removed before they adopt
- Laggards: Laggards who are behind concerning awareness knowledge and are most localite in their outlook; owing to their precarious economic position they are extremely cautious

Figure 3: The rate of adoption process in companies (Adopted from Rogers, 1995)
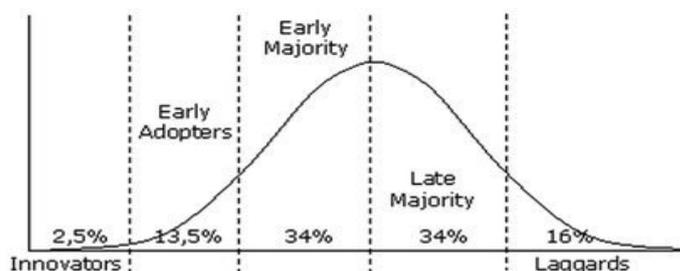
The innovation process allows organizations to perform actions, practices and structures that will let the organizational members to get closer to the guideline considered to be socially correct (Suchman, 1995). The institutional environments influence the development of formal structures. In order for the organization to survive in the long term, the organizations will confirm to the institutional environments and maintain its legitimacy (Ashworth, Boyne, and Delbridge, 2007). In general, the adoption of an AI innovation within Malaysian public listed companies will follow the curve when plotted over a length of time.

By applying this framework, factors contributing to the adoption of AI innovation, the stages of adoption process as well as the rate of adoption process will be studied. This theoretical framework is expected to be beneficial to the study since the study is about management control system and organizational change through the adoption of AI innovation.

RESEARCH METHODOLOGY

This study has used content analysis to examine the extent of AI awareness and stages in corporate annual reports. A keyword search of "artificial intelligence", "big data", and "machine learning" was made to the annual reports of Malaysian public listed companies. It was carried out based on the 2017 annual reports of all 806 companies listed in the Main Market of Bursa Malaysia in order to determine the diffusion stage of AI adoption in the practice and management of Malaysian Public Listed Companies. A corporate annual report can be seen as a formal public document produced as a response to the mandatory requirements of Companies Act 2016. Companies use annual report as a tool to communicate with the stakeholders, shareholders, employees, suppliers, and government (Stanton and Stanton, 2002). It comprises of financial and non financial information, narratives, photographs, and graphs.

The decision of selecting all listed companies in the main market of Bursa Malaysia was to increase the variation in corporate size and type of industries among the companies' top market capitalization. In addition, it represents a pool of large companies in Malaysia. As AI innovation requires large capital, so usually only companies with large capital will be able to be the first mover in new technology and innovations. According to DiMaggio and Powell (1983), there are some forces which can force one unit in a population to resemble other units that face the same set of environmental conditions". To put simple, companies tend to imitate each other when facing same environment condition. From the study, it is expected companies will try to adopt AI innovation to achieve a sustainable competitive advantage.

On the other hand, the public listed companies' operation and performance reporting are subjected to various compliance and regulatory requirements from Bursa Malaysia and thus, their annual reports are more detail and comprehensive. Nazli (2008) discussed factors such as market forces, the existence of other corporate communication and quality of management can influence the managerial decision to disclose more qualitative information in the annual reports. The analysis carried out has looked at the awareness on AI among directors and top management of companies. Companies which have mentioned about AI in their annual report have been identified and further analysis regarding the issue will be discussed in the next section.

FINDINGS AND ANALYSIS

Based on the analysis carried out, an approximately 1% or less than 20 companies have mentioned "artificial intelligence", "big data", and "machine learning" in their annual reports. Those terms were mainly found inside Chairman's Statement and their future strategic business plan. This has signaled that the AI adoption in Malaysian Public Listed companies is still at infancy stage, early stage or mainly at awareness level. Despite, some companies has already taken step in implementing AI in their operation and venture into research and development. However, most of the companies have raised awareness on AI in their operation and management of business but they lack of proper analysis on plan and approach on AI adoption in the future. This finding conforms to the initial stage of Diffusion Theory, which is at the knowledge or innovator stage. This stage explains that most of the companies are still discussing and gathering information regarding AI but no further steps taken.

Before an organization takes the initiative to adopt AI, the environment should be scanned and an adequate research should be conducted in the suitability of AI applications. Once AI adoption is decided, a clear plan and strategy should be developed, adequate funding for the AI must be allocated and the progress must be supervised and monitored regularly (Xu and Mohammed, 2005). The organization needs to take into account the organizational culture which might affect the adoption of AI. The main challenge in adopting AI innovation is the behavioral problems including resistance to change and various level of acceptance by the organizational members towards the new change. The main causes of resistance are risk and uncertainty among members within the organizations (Fidler and Johnson, 1984). The new innovation could be rejected to be adopted by the companies and resulted the diffusion rate of less than 100% adoption within the companies. Individuals may be comfortable with the current system and reluctant to adopt AI innovation as well as refusing to accept organizational learning process. The adoption of AI innovation is considered as an organizational learning due to the new thing or innovation being adopted in the companies.

AI innovation can re-shape the organizational culture, management and leadership style (Bititci et al, 2006). Effective leaders must have the ability to engage and inspire their people while remaining focused on financial performance. According to Kim (2015), leading change should be a systematic and could sustain with the spontaneous function of organizations. Meanwhile, Pritchard and Bloomfield (2014) in their study mentioned that throughout the diffusion process, effective communication is very important to gain trust and teamwork from the organizational members. Communication took many different forms, from management meetings, to face-to-face briefing sessions within the company. During these sessions the focus should be to communicate the key messages, taking any questions on the key messages, emphasizing any key points, and, generally, being open and visible with organizational members.

Even though AI can decide or involve in decision making of companies, the technology are not able to replace the human knowledge and experience in order to provide more valuable decision making to the business. In the long run, the machine needs to be replaced where things change in the future or where it is no longer coping with the complex circumstances. On the other hand, a success of AI system depends on the data volumes and quality of the data input. There may be not sufficient data being provided to support the system. Due to big data supplied to companies nowadays, a huge set of structured and unstructured data need to be filtered and analyzed before they become valuable to the companies. The ability of computers and system to analyze the data and suggest solutions or strategic changes more quickly than human is beneficial for companies. In addition, the system has the capability to learn, improve and remove certain degree of potential error or uncertainty from the evolvement of

technology. Thus, currently companies are looking at the option of implementing AI system in their management and operations to speed up the decision making process (ICAEW, 2017).

Sooner or later, all organizations should start thinking about how to adopt AI to remain relevant and competitive. Companies may start collecting data and make use of it where it must be properly gathered and compiled to be used in AI applications. Successful companies will be those who can integrate and work with cognitive technologies while demonstrating the vision and mission of the companies. There are 14 institutions in Malaysia offering AI courses. The course is designed together with the industry to ensure the students learn the skills needed by the companies in the future. Nagarajan and Edwards (2014) discussed on the roles of universities in the development of professional skills of graduates, how graduates should develop and prepare themselves to be ready for the employment. It is relevant to professional skill requirement of their practice to prepare and develop them to meet the professional needs when they commence employment.

Apart from that, Malaysia's Human Resource Development Fund (HRDF) was currently enabling fund for training programmes in AI and Big Data for companies. There were about 28 courses offered to employers to understand the impact of IR 4.0 and AI to their operation and management. It is important for the companies to understand how AI could integrate with business strategy. Companies may need to appoint chief data scientist for instance Chief Digital Officer or Chief Data and Analytics Officer in the future as part of developing local capabilities in data analytics. They are expected to work hand in hand with other C-suites to ensure the company's strategies are aligned with the established plan and policies.

While the challenge of AI innovation may be seen from the perspective of adaptation and reception, the challenge from the legal view is of no exception. The law develops with the change and development of the time. According to Raquib (2015), the development of technology is a factor which shapes the human interaction. Technology nowadays not only assist human but it restructure the normal activities to new ways of defining good and self community. Many of the human activities such as habits, perception, concepts of self, space, time, social relationships and ethical-moral decisions are reorganized by technological development. With the fast pace of the technological development, human cannot merely refuse to adopt the technology but active human response is required. Thus, response from the legal perspective is also required. Looking to the application of AI in the setting of the management of a company, certain queries and concerns on legal issues may arise.

The legal reasoning of AI is surprisingly not a recent issue. It has been in discussion since before millennium (Rissland, 1988). Perhaps the jurist has already perceived that the technological development will come to the phase where it will be widely adopted in the industry. There are various view on the legal approach on how to handle the application of AI. Petit (2017) explained that the law and regulation of AI may be seen through two approaches. First is by looking at legalistic approach and second is looking at the technological approach. The legalistic approach is by identifying the legal issues from the present legal system, by ascertaining the legal issues affected by AI such as liability, privacy, cyber security, data protection and etc. The technological approach on the other hand is to envisage the legal issues from the standpoint of the technology itself such as social robots and exoskeletons.

Petit (2017) had laid down the advantage and disadvantages of both of the approach. He has also made a point that both of the approaches are not exclusive. In his view, both of the approaches seem to complement each other. It was also proven that regulators such as the European Parliament 2017 resolution on Civil Law Rules on Robotics. It was also proposed that in order to ascertain legal issues on AI, it is very pivotal to understand AI development in accordance to the nature as prescribed by a particular jurisdiction. The Standford Artificial Intelligence and Life in 2030 (Stanford Report) report has identified nine broad categories of legal and policy that AI tend to raise such as privacy, innovation policy, civil liability, criminal liability, agency, certification, labour, taxation and politics.

It is undeniable that in pursuit of the increase adoption of the digital initiatives, efforts has been made by government to provide security measures for end users such as the introduction of the Personal Data Protection Act 2010 as an example. However, as pointed out by the Stanford Report above, AI is expected to raise concern not only in the aspect of data security but also other various legal issues. It is vital to see whether the existing law and legal framework is sufficient enough to meet the operation framework of AI as to preserve and protect the possible stakeholders involved particularly in public listed companies in Malaysia.

CONCLUSION

Due to the emergence of IR 4.0, AI innovation has been discussed globally. As widely known, AI will not only provide tremendous benefits to the companies, but it will also bring a series of onerous challenges. The possible impacts range from the horrible to incredible, and might be impossible to be avoided. Thus, companies need to monitor the incoming changes and adopt the best strategy for companies' sustainability.

Among the challenges discussed in this study are behavioral and legal concerns in response to AI. The behavioral challenges include resistance to change and the attitude towards acceptance of AI adoption in companies. AI will definitely change the way companies being managed and operated, thus changes are among the last thing favored by employees. While from the view of legal, the security of companies' data is the utmost importance matters that need to be safeguarded. Dissemination of companies' confidential information to outsiders is the greatest risk that every company wants to avoid as it will jeopardize their position in market.

Due to constraint in resources, this study only focuses on the content analysis of annual report of 806 public listed companies selected from the main market of Bursa Malaysia. The selection was due to coverage of most companies with large capital in Malaysia as in order to adopt AI, capital is among the vital resources. For the purpose of future researches, in order to get further understanding on the decision and rationale of adopting AI innovation or vice versa, semi structured interviews with directors and management of selected companies could be conducted. In addition, potential researches could have a view at different perspectives of AI innovation in companies at various countries especially ASEAN or other developing countries.

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