BRIEFING NOTES

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PUBLIC AND DEFENCE POLICY CHALLENGES AND INNOVATIONS ON ARTIFICIAL INTELLIGENCE, AUTONOMOUS SYSTEMS, AND CYBERSECURITY PART 1: PUBLIC POLICY CHALLENGES ON ARTIFICIAL INTELLIGENCE

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SUMMARY

➕ "Artificial intelligence (AI) is intelligence demonstrated by machines, unlike the natural intelligence displayed by humans and animals, which involves consciousness and emotionality [1]."

➕ With the desire to develop AI technologies and increase their applications, the potential challenges of these technologies are also growing. Hence, legal and regulatory governance related to AI should be seriously considered [2].

➕ The development of AI can affect the labor market and social equality and even might lead to physical injuries. Therefore, some societies have called for restricting the development and use of AI by imposing specific precautionary regulations [2].

CONTEXT

➕ The creation and development of AI technologies may lead to several challenges. Some of these challenges are [3], [4]:

- **Loss of jobs:** AI can replace some human resources in the workplace.
- **Wages reduction:** Replacing AI with human resources reduces wages.
- **Creating social and political perturbation.**
- **Creating challenges for intellectual property (IP).**
- **Creating challenges for antitrust regulations.**
- **Building trust:** AI is about science, algorithms, and technology. In this regard, most people are unable to understand AI's inner nature and cannot trust it. Therefore, people neglect AI. Hence, building trust between people is one of the significant AI challenges.
- **AI-human interface:** For getting the maximum benefit from AI, a proper AI-human interface is needed, and currently, the lack of data science skills is a challenge in this field.
- **Investment:** Since the necessary funds to implement and set up AI are very high, many companies and businesses are reluctant to invest in this field.
- **Software malfunction:** Although human error is detectable, hardware-software error detection is complicated. This problem is a significant AI challenge.
- **Irreplaceable:** As an auxiliary tool, AI can help to increase the productivity of a task but cannot replace many jobs.
- **Higher expectations:** Since most people do not know the details of AI, they have high expectations, which is a significant challenge.

CONSIDERATIONS

- Several advantages of AI are [5], [6]:
    - AI reduces the time it takes to complete a task.
    - AI makes it easier to do multiple tasks at the same time.
    - AI provides complex tasks without the high cost.
    - AI can work without interruption.
    - AI increases the ability of different people.
    - AI can be used in a variety of industries, including the defence industry.
    - AI has the potential to be used in the mass market.
    - AI, by making processes faster and more innovative, makes decision-making easier.
    - Carolyn Frantz says: "AI is an opportunity for workers to focus on the parts of their jobs that may also be the most satisfying to them."
    - AI reduces paperwork.
    - AI speeds up responses.
    - AI has led to more efficient bureaucracy.
    - Paul Bates says: "AI has the potential to make health care much more accessible and more affordable." For instance, symptoms checking and prompt access to a physician are assessed by the Babylon application.
- However, several disadvantages of AI are [7], [8]:
    - AI software development and implementation are slow and expensive.
    - The number of experienced programmers who develop AI is few.
    - AI practical products that have reached the market are few.
    - AI cannot be as efficient as human beings and cannot replace individuals.
    - Unlike humans, AI cannot gain more experience over time.
    - AI cannot be creative like human beings.
    - The risk of unemployment is increased with AI development.
- Different challenges to AI by country are [9], [10]:
    - **China**: According to a national AI strategy, the Chinese government intends to invest tens of billions of dollars in AI research and development. Via this plan, by the year 2030, China will become the pioneer in creativity and the use of AI in the world. Moreover, the private sector and companies in China make a significant contribution to the expansion and investment in AI.
        - **Challenge**: But the development of AI in China has raised various challenges. These challenges include human rights violations and surveillance issues, as well as the use of facial recognition methods to chase people in society [9].
    - **Unites States**: Currently, both the private and public sectors in the United States are leading the way in developing and using AI in the world.
        - **Challenge**: However, this leading has created problems in various areas, especially in cybersecurity. As a result, with increasing the use of AI in

different organizations, security risks have increased—for instance, the theft of sensitive and confidential data. Besides, the increasing use of AI could lead to widespread unemployment for Americans.

- **Solution**: One solution to decrease these problems is retraining employees in different companies and industries [9].

o **Germany**: According to a national AI strategy in Germany termed "AI Made in Germany," the German government intends to invest three billion Euros in AI research and development by the year 2025. Germany's primary goal in using and developing AI is to develop the economy and prepare a situation for the competitiveness of various industries. The Germans have predicted that 32 billion Euros will be added to factories' production over the next five years with this investment.

- **Challenge**: Ethical issues, for example, the rise of misinformation, increasing the manipulated technologies, and enhancing the destructive impact of AI on the economy, are the most critical concerns that have worried the Germans.
- **Solution**: One of the essential solutions offered by the German government to reduce the existing problems is the training of workers and employees in the field of AI [9].

o **United Kingdom**: The United Kingdom is also working to develop AI. The government, with a budget of one billion Pounds, has supported industry and universities.

- **Challenge**: However, there are challenges to build AI in the United Kingdom. These challenges include legal responsibilities and independent (autonomous) decision-making, demonstrating the commercial value of AI projects, combining AI with roles and functions, and labor disruption.
- **Solution**: One of the fundamental solutions offered by the United Kingdom government to reduce the existing problems is preparing and equipping laborers for the progression of the workspace, which is termed the "National Retraining Scheme [9]."

o **France**: According to a national AI strategy in France termed "AI for Humanity," the government plans to invest 1.5 billion Euros in AI research and development. The AI investment in France focuses on identifying the country's talents in AI, an open data ecosystem, recognizing the universities and research centers in the field of AI and investing in them, ethical issues, and the impact of AI on the economy.

- **Challenge**: One of the significant challenges in the field of AI in France is the integration of AI into departments and organizations due to the lack of sufficient skills in the field of AI [9].

o **Singapore**: According to a national AI strategy in Singapore termed "AI Singapore," the government plans to invest 150 million Singaporean dollars in AI research and development. The AI investment in Singapore concentrates on addressing

significant societal and economic challenges, research in the next wave of AI, as well as, agreement on the applications and using AI in industry. This investment is made in four stages, which are: fundamental research of AI, support the work of multidisciplinary teams—for instance, health, urban affairs, and finance that is called "Grand Challenges," research on identifying problems in the industry using AI, and finally, the cultivation of new AI talents. The Singaporean government has also emphasized the importance of ethics in AI. In such a way, this country has proposed three new plans to follow the ethical frameworks in AI [10].

o **Denmark**: The Danish government plans to develop the country in AI. In addition to advancing in AI, Denmark's focus is also on big data and the Internet of Things. Denmark intends to improve Danish businesses in digital technologies, improve E-commerce conditions, and equip every Danish person with digital skills. An annual budget of 125 million Danish krone has been earmarked to achieve Denmark's goal by 2025 [10].

o **United Arab Emirates (UAE):** As the first country in the Middle East, the UAE has developed an AI strategy. In addition, as the first country in the world, the UAE has established the Ministry of Artificial Intelligence. The UAE intends to use AI to reduce government spending, increase government efficiency, and also make the country a leader in using AI applications. The UAE plans to use AI in the areas of transportation, health, aerospace, renewable energy, water, technology, education, the environment, and traffic.

o **Sweden**: The Swedish strategy for using and developing AI is termed the "National Approach for AI." The provisions of this strategy are: Sweden has to train more skilled AI professionals, Sweden has to enhance applied research in AI, Sweden has to develop AI applications that are secure, ethical, reliable, and precise [10].

o **Japan**: As the second developer of the national AI strategy, Japan developed AI in three stages. These stages are: using data-driven AI in various fields, the public usage of AI in different disciplines, and creating integrated ecosystems in different areas [10].

o **Australia**: According to the national AI strategy, the Australian government intends to invest 29.9 million Australian dollars in AI research and development. This investment supports responsible AI development, Cooperative Research Centre projects, and Ph.D. scholarships; and enhances AI talents. All these supports are done in an ethical framework of AI [10].

o **Canada**: Canada is moving very slowly towards AI. Nevertheless, the University of Toronto (UoT) in Canada spends 100 million Canadian dollars to support AI scientists and researchers. The significant aims of "Pan-Canadian AI Strategy" in Canada are enhancing the number of AI researchers, graduates, and AI-professionals, establishing groups of scientific perfection, developing thought leadership on the economic, ethical, policy, and legal implications of AI, and strengthening the national research community on AI [10].

- **Challenge**: There are challenges to use AI in Canada. The first problem is the lack of use of AI, which has a detrimental effect on creativity and implementation. About half of executives in Canada do not believe in AI's evolution, which has put Canadian companies far behind other companies in the world that use AI.
- **Solution**: One of the strategies that the Canadian government has proposed to move to AI is to attract immigrants from other countries with AI-related skills [9], [10].

NEXT STEPS

The next report will examine defence policy challenges on AI. Moreover, necessary measures in Canada and other countries will be considered.

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