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Journalism Transformation and Challenges in the Era of Artificial Intelligence: Exploring Malaysian Journalists' and Journalism Students' Perspectives

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ABSTRACT

Artificial intelligence (AI) in the journalism industry, which is known as automated journalism, helps to improve the efficiency of the newsrooms. The purpose of this research was to emphasise the importance of technological advancement in the Malaysian journalism industry. Furthermore, this research fills a research gap in Malaysian journalists' and journalism students' perspectives on the development of AI technology in the industry. Drowning from that, technological determinism (TD) theory was applied in this research to explain the relationship between technological development and the changes in news readers' social attitudes. This research was conducted as a qualitative study using the interview approach. The researcher interviewed a total of nine interviewees, which included five Malaysian journalists and four Malaysian journalism students. According to the data collected, a total of three themes emerged: the opportunities AI brings to the journalism field, the challenges AI brings to the journalism field, and the future of the Malaysian journalism field integrated with AI. Findings revealed that AI could provide convenience and save the time of journalists yet cannot replace humans due to the lack of emotions. The interviewees perceived that AI technology will not be widely implemented in the Malaysian journalism field in five to ten years. In addition, this research highlighted that future journalists should be trained to adapt well to AI. Meanwhile, this research proved that AI could assist in reducing the journalist's workload. Hence, the journalists would distribute more time doing in-depth news articles.

Keywords: *Artificial Intelligence, Automated Journalism, Malaysian Journalism Field, Future of Malaysian Journalism, Technological Determinism Theory*

INTRODUCTION

Background of the study

Technology has become an essential part of people's daily lives in today's world. Technological advancement in various fields provides a lot of benefits to the public. According to Schroeder (1997), technological advancement connects, refines, and influences processes. To further explain it, refining refers to scientific development, and influencing refers to the impact of technology on society (Schroeder, 1997). Meanwhile, artificial intelligence (AI) is evidence of technological advancement as it has transformed the digital era. AI is a system that can accurately understand external data and apply the data to fulfil specific tasks and adjust its behaviour accordingly (Walker et al., 2021). Some scholars believe AI is a need for establishing and maintaining a functioning community, and AI is humanity's best hope for avoiding extinction (Wang et al., 2020).

AI has mainly developed in a variety of fields. For instance, education, health, and marketing fields. The researcher will specifically study AI in the journalism field in this study. The AI system's development has received a lot of attention in the media. Many media organisations consider AI's broader uses in the media sector because of its potential to strengthen the media value chain (Yu & Huang, 2021). With the growth of AI technology, automated journalism, often known as robot journalism, has revolutionized the field of journalism. Automated journalism is an AI-enabled technique that involves access to structured data and algorithms that can conclude information (Thäsler-Kordonouri & Barling, 2023). This technology offers convenience to human journalists as it allows them to save time on tiresome and repetitive daily tasks. Thus, they can devote more time to a more in-depth investigation. Meanwhile, this technology helps news organisations enhance news reporting speed, expand media exposure to previously unrepresented areas, and strengthen the interaction with the readers (Dierickx, 2021). Hence, the news organisation's profits will also increase, thanks to AI development in the field.

Besides, the speed and scope of automation will differ depending on the country. The decisive issues include the technical viability of automation, the cost of developing systems, job market dynamics, regulatory and social acceptance of technology (Koh & Manuel, 2020). AI in the journalism field has been greatly developed in many countries, such as China, and the United Kingdom. For instance, China places a high value on AI. In 2017, China's State Council announced the "Development Plan for a New Generation of Artificial Intelligence" to seize the opportunity for AI development (Wang et al., 2020). Due to the emphasis on AI technology, China has led the AI growth in the world. In addition, the *BBC News* in the United Kingdom employed an automated journalism system to report on the 2019 general elections news held in the United Kingdom, in both English and Welsh languages (Danzon-Chambaud & Cornia, 2021).

Problem statement

In 2024, Malaysia is anticipated to develop a framework for AI governance and a code of ethics in response to the increasing interest and demand from AI businesses. According to a survey conducted by Ipsos Malaysia, a multinational market research and consulting firm, 70 percent of Malaysians express an equivalent level of trust in companies employing AI compared to those that do not (Santani, 2024). The willingness to adopt AI technology in the business area made a significant move for the growth of AI in Malaysia. In addition, an annual report published on Bloomberg's latest Innovation Index stated that Malaysia is the 27th most innovative country in the world (Dzuleira, 2020). This report has shown that Malaysia has a positive tendency to welcome advances in technology.

In this study, the researcher focused on exploring AI technology in Malaysia, especially in the journalism field, as this topic is still a novel issue in Malaysia. Nowadays, technological advancements increasingly impact how news is created, distributed, and interpreted by the readers. This automated system may be characterized as being programmed to simulate human cognition, or as "cognitive technologies" aimed at emulating human intelligence (Yu & Huang, 2021). Automated news has been a significant development in digital journalism as news companies in several countries have quickly increased their usage of such tools. However, Malaysia is not included in these countries. Malaysia maintains a wait-and-see attitude in broadly applying AI technology in journalism. There are not many attempts at automated journalism in Malaysia. Moreover, this study is specifically focused on the perceptions of Malaysian journalists and journalism students, as they are required to work directly with AI and are confronted with both pressure and opportunity because of AI growth in the journalism field. Therefore, this study sought to understand and explore the perceptions and attitudes of Malaysian journalists and journalism students toward automated journalism use in Malaysia.

Research objectives

This study explores the perception of Malaysian journalists and journalism students about the opportunities and challenges that AI technology brings to the Malaysian journalism field. In addition, this study also aims to predict the future of the Malaysian journalism field that is integrated with AI technology.

Research questions

Malaysia's journalism field has only tentatively embraced AI, resulting in a significant gap in understanding how AI technology may uniquely impact the industry, particularly from the views of Malaysian journalists and journalism students. While other countries such as the United States and China have actively integrated AI into journalistic practices (Schapals & Porlezza, 2020; Yu & Huang, 2021), Malaysia's cautious approach due to economic, regulatory, and cultural factors offers an underexplored context. Based on these gaps, the researcher proposes the following research questions:

RQ1: What opportunities do Malaysian journalists and journalism students associate to the AI technology usage in Malaysian journalism industry?

RQ2: What challenges do Malaysian journalists and journalism students attribute to the AI technology usage in Malaysian journalism industry?

RQ3: How do Malaysian journalists and journalism students contemplate the future of Malaysian journalism integrated with AI?

Theoretical framework

As the rapid development of technology has become closely tied to society, people are striving to become active users in a diverse and continuously negotiated environment. The introduction of new technology, such as AI, has various effects on society's nature. The technological determinism (TD) theory is employed in this study to describe and link the relationship between AI technology and societal development in the journalism field. TD theory posits that the technology of a society plays a fundamental role in shaping its cultural values, social structure, and historical development (Harisa & Haris, 2019). This theory claims that social progress follows a natural trajectory influenced by technological innovation. It encompasses two key ideas: first, that technological development follows a predictable and traceable path that is largely independent of cultural or political factors; and second, that technology, in turn, organizes society in a way that facilitates its own further development. Meanwhile, TD theory was described as the connection between an era's major communication technology and the key factor that shaped society (Appelgren, 2023).

In fields closely related to journalism studies, such as engineering and design, deterministic approaches to technology might naturally integrate into the workflow due to the constraints of current technology, which restrict the scope of achievable outcomes (Hallström, 2022). In these domains, scholars contend that while technology doesn't dictate every aspect, it does dictate certain aspects. Despite the social sciences often maintaining staunch opposition to technological determinism, the field of journalism has been observed to attribute deterministic agency to technology (Appelgren, 2023). Steensen and Westlund (2021) examine previous studies on digital

journalism and contend that it has always assumed that technologies impose positive change. Nonetheless, they contend that the discipline of Science and Technology Studies (STS), which subtly rejects determinism, has increasingly shaped perspectives. The examination of digital journalism is particularly fascinating within this framework as it centers on technology, platforms, and audiences thematically, while simultaneously highlighting the ongoing exploration of innovative approaches to journalism's conception and analysis. As hybrid forms of journalism emerge, blending journalistic culture with technological influences, the landscape continues to evolve (Steensen & Westlund, 2021). This STS approach enhances the analytical framework of journalism, encouraging the exploration of hybrid journalism modes that integrate journalistic practices with technological components as the field continues to evolve.

In recent years, the potential of technology-driven techniques had a significant effect on the news media sector across the whole value chain, resulting in the emergence of new modes of news production, consumption, and distribution (Jones et al., 2022). Inevitably, the use of AI technology in news media organisations appears to be critical to the future of journalism. This idea can be explained by the conceptual notion created by the scholar Marshall McLuhan in the TD theory, in which he said the medium is the message (McLuhan, 1962). According to McLuhan, the method of delivering information is as significant as the information itself (McLuhan, 1962). McLuhan's concept aligns with TD and STS perspectives in emphasizing that while technology drives change, it also invites diverse social responses. AI's integration into news media underscores McLuhan's point, as emerging technologies are not only altering journalistic content but also transforming the ways in which information is perceived and interacted with.

LITERATURE REVIEW

Artificial intelligence in journalism: Automated journalism

In the broader inclusion of technology, algorithms, and automation in journalism, the news media field is among those integrating and adjusting to the advantages and disadvantages of Artificial Intelligence (AI) enabled technology. The impacts of AI on journalism must be considered in the computerization of media and public life, such as the transition to applications and social media. These transitions have transformed journalism as an institution by undercutting marketing strategies, shifting work routines, and releasing a flood of information alternatives to the news.

Previous research studied the growing significance of AI technology as an everyday journalistic tool from a content analysis of 7092 push notifications from 34 news outlets in nine north-western European countries. The tools are found to be used to catch and preserve reader attention in a time of information explosion, false news, and competition. This study looks at how news companies are adopting push notification systems, as well as how they may be linked to changes in audience attitudes and participation. It also highlights the frequency with which news organisations provide push notifications to their mobile audiences, as well as their temporal personalisation possibilities (Ogbebor & Carter, 2021). Automated processes were being used to develop different forms of packaging and distribute news content, allowing readers to request more content that they like and decrease content they don't like, as well as making decisions on behalf based on their behavioural characteristics, social networks, and personal traits (Du, 2024). Therefore, AI technology helps in assisting news organisations achieve better exposure to their target audiences.

Meanwhile, natural language generation (NLG) models can generate human-like language automatically from a computational representation of information, which aids journalists in two main forms: a template-based approach and a machine-learning approach. In the template-based method, human journalists devise a text template where data is subsequently inserted automatically according to a predefined set of rules. Besides, the machine-learning approach operates more autonomously, utilizing advanced NLG models to generate news text and seamlessly integrate relevant data points, which is also known as machine-produced content (Danzon-Chambaud, 2021).

Prior research on automated news-writing systems has indicated that news generated by AI is perceived to be more objective in comparison to news articles authored by human journalists. These studies have demonstrated that individuals frequently fail to differentiate between AI-generated and human-written news content (Lee et al., 2020). With the help of AI technology, news content can be published more quickly, in various languages, in larger quantities, and with fewer errors and biases. Furthermore, individual journalists may focus on in-depth or investigative reporting

while algorithms take care of the mundane jobs. As a result, news organisations could provide a diverse content selection at low expenses.

Automated journalism in various countries

Since 2014, the growth of automated journalists, often known as robot journalists, has been on the rise in the journalism field. For instance, *The Guardian Australia* published its first news item written by its in-house automated machine, ReporterMate, on February 1, 2019. "The Homicide Report" on the *Los Angeles Times's* website, uses automated journalism to report on the recent crime stories in the city. While in the United States, news organisations including *Forbes*, *The New York Times*, *The Atlanta Journal-Constitution*, and *ProPublica*, are acknowledged to use, or at least attempt to, these advancements technologies (Schapals & Porlezza, 2020). These innovations provide a sight that automated journalism is going to become a global norm in the journalism field.

In China, a news organisation called *China's Xinhua News Agency* developed its first AI media platform, Media Brain in December 2017. The agency released the first machine-generated content (MGC) for news during two significant political meetings which are the National People's Congress and the Chinese People's Political Consultative Conference. Media Brain produced and released the bulletin in 15 seconds, faster than any other news organisation. Besides, China has also created the world's first AI news anchor, capable of working 24 hours a day. The Chinese search engine *Sogou.com* and *Xinhua* produced the AI news anchor for publishing news on the official *Xinhua* website and several social networking sites (Yu & Huang, 2021).

In Malaysia, the uses of AI in various fields also have increased following the rapid growth of automation technology. For instance, in June 2020, Universiti Putra Malaysia (UPM) launched the AI and big data system in teaching. According to the chairman of the UPM board of directors, Ghauth Jasmon, AI robots can teach millions of students with minimal physical interaction. AI technology would be the best method to continue teaching when the COVID-19 virus still causes a pandemic (Kaur, 2020). However, when it comes to automated journalism in Malaysia, there is not much attempt towards it. Automated journalism in Malaysia is not as advanced as compared to other countries.

Journalists' perspectives towards artificial intelligence in journalism field

With the emergence of machine or automatically produced news articles, journalism entered a new era. As a result of this sophisticated technical advancement, a new sort of journalism has emerged: robot journalism. Robot journalism brings many benefits to news organisations as it can produce news more quickly, on a grander scale, and with minimal mistakes. However, the perspectives of journalists are essential as they are the first group of people to face the pressure and opportunity from the robot journalists. A prior study on Pakistani journalists' views of AI technology as communicators found that they perceive AI-enabled machines mainly as mediators in the communication process. However, it suggests differing levels of concern between male and female journalists regarding the role of AI devices in communication. Women journalists show less apprehension about job loss or diminished public engagement and efficacy as communicators. Conversely, male journalists express greater concern about their level of interaction with the public (Sadia, 2020).

Similarly, previous studies have studied the journalists' perspectives on the use of robot journalism in newsrooms. The study found that the perspectives can be divided into three types. First, they believe robots will not replace human journalists. They believe that robots' ability to perceive nuance and read between the lines is in serious doubt. Furthermore, robots cannot prepare their own stories or information because this process necessitates independent ethical thinking, which robots lack. Second, they are strongly opposed to robots. They are sceptical of the concept that robots will free up journalists to focus on writing in-depth articles, and they claim that robots will not increase newspaper profits. Third, they have a relatively positive perspective of robotic journalism compared to the first and second types. They generally agreed the development of in-depth news and the introduction of amended news stories had benefited journalism (Kim & Kim, 2018). Therefore, regardless of rapid and precise data processing, robots' skills must be evaluated from the perspective of journalists. Robots with immature technologies could exacerbate the negative perceptions regarding robots.

RESEARCH METHODOLOGY

Research design

This study used an inductive approach for analysis of the qualitative research method as this study aims to explore the Malaysian journalists' and journalism students' perception of artificial intelligence (AI) use in the journalism field. It is different from the quantitative research method; the qualitative research method does not strive to measure something. The assumption that there is an objective approach to analysing a given phenomenon does not apply (Dodgson, 2017). The researchers need to view the world from a unique and yet-to-explore perspective. Meanwhile, the qualitative research method uses an 'emergent design' which means an iterative process of inte-

grating data analysis, initial data inspection, and data gathering. The adaptability of this design can improve and deepen the study rather than weaken its rigor and validity (Haven & van Grootel, 2019). Meanwhile, this study used the interview as the research method. Interviews allow researchers to gain insights into how individuals assign meaning to their social experiences, thereby providing a comprehensive understanding of unexplored phenomena that cannot be fully explained by predefined hypothesized relationships among different variables (Karen et al., 2022).

The qualitative interview approach enables a comprehensive examination of the complex attitudes, beliefs, and perceptions related to AI in journalism. This method captures insights that quantitative methods may not fully address, particularly in the context of Malaysia, where public understanding and awareness of AI's impact on journalism are still evolving. Hence, the qualitative interview research method was the most appropriate method to use in this study.

Target population

The target population in this study is mainly focused on journalists from the mainstream media and alternative media, for instance, *The Star* and *Malaysiakini*. *The Star* is represented as Malaysia's mainstream media, while *Malaysiakini* is represented as Malaysia's alternative media. The following news organisation is chosen because of the AI topic coverage. Both news organisation is not repelled to covering AI-related news. For instance, *The Star* has published a piece of news with the headline "Opinion: Artificial Intelligence is the hope 2020 needs" (Cowen, 2020). This news article has introduced the GPT-3, a broad language model with autofill capabilities. It has given computers the ability to manipulate words and pictures (Cowen, 2020).

Meanwhile, *Malaysiakini* has reported a piece of news with the headline "How Malaysia Can Navigate Its Future Economy With AI" (Malaysiakini, 2021). This news article said that AI has the potential to produce 6 million new employments by 2030 in Malaysia (Malaysiakini, 2021). All AI-related news reported in *The Star* and *Malaysiakini* shows the tendency of Malaysia's mainstream and alternative media to cover the AI topic. Also, it has shown the journalists' willingness to report on such topics. Moreover, the purposes of mainstream media and alternative media are varied. Hence, the perspectives and angles towards them also vary. Therefore, the target population should involve both mainstream and alternative media journalists to explore different perspectives.

In addition, this study is also focused on the Malaysian journalism student's perspectives. Journalism students are the future generation who are active in the journalism field, and they have relatively innovative ideas compared with experienced journalists. Hence, it is important to include their viewpoints in the study. To ensure the quality of the results, all journalism students involved in this study were third-year journalism

students who understand the Malaysian journalism context and are aware of AI technology.

Sampling procedure

This study used both purposive and snowball sampling methods to select participants. In a qualitative study, small and purposely chosen participants may be used to expand the depth of comprehension (Maggino, 2024). Purposive sampling is a method of selecting cases that will efficiently employ limited research resources by selecting participants who are most likely to provide suitable and helpful information (Campbell et al., 2020). The researcher in this study identifies journalists and journalism students as the participants. The criteria are set to help the researcher select the most suitable participants. First, the participants need to be experienced journalists who have worked in the field for more than five years or third-year journalism students. Second, the participants must have basic knowledge about AI. The researcher used email to contact potential participants, inquiring about their foundational knowledge of AI technology by asking basic questions through email to ensure appropriate selection for the final participants.

Besides, this study also used the snowball sampling method. This method is used when the researcher finds it challenging to access suitable participants who meet the criteria. In the snowball sampling method, existing study participants recruit future participants from their acquaintances (Weng, 2023). The snowball sampling method is suitable for this study because AI in the journalism field is considered a novelty in Malaysia. Hence, this method helps the researcher find appropriate participants in a limited time.

Data collection procedure

In this study, the researcher used the semi-structured interview as the data collection method. Semi-structured interviews collected the data by asking important questions that help identify the areas to be studied and let the participants diverge to further explore an idea or response (Naz et al., 2022). This approach's flexibility allows the development of information that is essential to participants but may not be considered relevant by the researcher earlier (Gill et al., 2008). Meanwhile, interviews provide a more in-depth understanding of a social phenomenon than quantitative methods like surveys. As a result, interviews are the best option where little is already known about the studied phenomenon as the participants are eager to speak when only the researcher and the participant are present.

First, the researcher selects the possible participants who meet the previously established criteria. After the participants were chosen, the researcher had to contact them through email and explain the purpose of the interview and the topic that would be covered. In the email, the researcher will also ask some basic questions regarding AI technology to ensure the participants' knowledge. When the participants are willing

to participate in the interview, the researcher must schedule the interview time with them. The interview is conducted online, either using Microsoft Teams or Zoom. The researcher had to follow the appropriate standards to consider the ethical considerations. First, the researcher must inform participants that they are taking part in a study, explain the objective of the research, and not mislead them about the study's purpose (Creswell, 2007). Meanwhile, the researcher needs to ensure all the participants are volunteers who are entirely willing to participate in this study. The researcher must also advise the participants that they can refuse to answer the sensitive questions. Moreover, the researcher must inform the participants if any voice recording occurs. Most crucial, inform the participants that the data collected is used solely for academic purposes. Second, the researcher must be cautious when selecting information for the study to avoid reporting the details provided by the participants after the recording has ended, commonly referred to as "off the record" information (Creswell, 2007). Third, maintaining the anonymity and confidentiality of participants is essential during interviews. It is imperative to protect participants' identities, ensuring that their names are kept private and that any self-identifying comments or data are avoided (Fleming & Zegwaard, 2018). Researchers must take proactive measures to mitigate any risks of harm to participants, safeguarding their well-being throughout the process.

Data analysis

Thematic analysis is used in this study to analyse data sets. Thematic analysis has been commonly used in qualitative research. Thematic analysis is a basic method for qualitative research due to its capacity to effectively understand experiences, thoughts, or behaviours within a dataset. Meanwhile, thematic analysis is a process for detecting, analysing, arranging, defining, and reporting themes identified within a data collection that can be applied to various epistemologies and research questions (Kiger & Varpio, 2020).

Thematic analysis is a highly adaptable method that can be adapted to the needs of a variety of research, resulting in a rich, detailed, yet complicated account of data. This method can be viewed as both a creative and disciplined cognitive process, encompassing three key human cognitive principles: categorization, prototyping, and metaphorical mapping (Liu, 2023). Thematic analysis can also create themes that reframe, reinterpret, and connect the data sets (Kiger & Varpio, 2020).

FINDINGS AND DISCUSSION

Demographic presentation of interviewees

This study conducted semi-structured interviews with nine particular participants, including Malaysian journalists and Malaysian journalism students. The selected Malaysian journalists were all experienced journalists who had worked in the field for more than five years. The selected Malaysian journalism students were all third-year students pursuing Bachelor of Arts in Journalism (Honors) at Xiamen University Malaysia. All the interviewees demonstrated a certain degree of basic understanding of artificial intelligence (AI) used in the journalism field.

Based on the privacy concerns and the ethics of being a researcher, the name and other personal information of the interviewees will not be included in the research study. However, the gender and exact working experience will be listed in Table 4.1 as the references of the interviewees.

Table 1: Demographic profile of the interviewees'

No	Participants	Gender	Current Job	Working Experience
1	Interviewee A	Female	Independent broadcast journalist	6 years
2	Interviewee B	Male	Journalist	7 years
3	Interviewee C	Male	Journalist	22 years
4	Interviewee D	Female	Journalist	20 years
5	Interviewee E	Male	Journalist	15 years
6	Interviewee F	Female	Journalism student	No working experience
7	Interviewee G	Female	Journalism student	No working experience
8	Interviewee H	Female	Journalism student	No working experience
9	Interviewee I	Male	Journalism student	No working experience

The findings highlight how AI technology is reshaping journalism practices, aligning with the concept of technological determinism (TD) theory, which posits that technology drives societal change and shapes cultural values, social structures, and historical evolution (Harisa & Haris, 2019). In the findings, TD theory helps explain AI's potential to structure journalism, not only by increasing efficiency and automation but also by influencing the nature of news content and audience engagement. However, the findings also point to specific barriers, cultural resistance, and ethical limitations that challenge a strictly deterministic view of AI's role in journalism.

AI brings convenience to the journalism field

Clayton and Kleinman (2020) claimed that AI is radically changing human social bonds in practically every aspect of life, such as family, religion, health, and education. Without a doubt, these changes are also included in the journalism industry. AI's transformative potential in journalism aligns with TD's principle that technology drives structural change in society by shaping the available tools and workflows. AI had a significant impact on the field of journalism, with its effects felt across all news formats, including print, broadcast, and online; and processes, such as news production, delivery, and audience interaction. Some stakeholders perceived these changes as a solution to a variety of issues including boosting objectivity, establishing trust, and raising journalism standards (Ali & Hassoun, 2019; Shin, 2020; Shneiderman, 2020).

In this study, the researcher wanted to show the interaction between human journalists and AI-related tools. The interviewees provided a few examples regarding their experience in using AI tools. For instance, translating the interview recording into words, checking grammar, and rephrasing the sentences. All these tools have one common advantage: automation. Automation aids in achieving high production rates and efficient productivity in several areas, including the journalism industry (Trolice et al., 2021). Furthermore, the majority of interviewees emphasized that one of the primary benefits of using AI is the ability to save time. They believe that by freeing up time, they can concentrate on more in-depth investigative stories that necessitate additional research, rather than repetitive daily tasks.

A past study titled "Media, Trends, and Technology Expectations in 2018" found that nearly three-quarters of respondents utilise AI technology in their production stage. This study also showed that some of the respondents have built projects to improve their use in terms of content enrichment, improvement in marketing efficiency and economic viability, automation of information validation, and speedy classification of a large amount of data (Ali & Hassoun, 2019). In the findings, one of the interviewees indicates that news agencies such as *Reuters* and *The New York Times* have implemented AI-enhanced systems within their libraries, which can simplify and speed up the production process.

Besides, previous studies have shown that AI has a huge impact on adapting the reader's attitudes and participation. A few developed countries have already used AI as their daily tools in the journalism news system. The past study investigated 34 news outlets that come from nine north-western European countries. The study showed that AI tools can catch and maintain reader interest in the period of competition with other news organisations (Ogbebor & Carter, 2021).

Furthermore, the scholars highlighted the importance of using push notifications in news making. Push notifications give news organisations immediate access to audi-

ences in the era of information explosion and misinformation. The scholars claimed that AI could directly reach news readers without passing by social media and news aggregators. Also, it changes the organisation and controls temporal news personalisation. AI can also strengthen mobile devices as the primary point of interaction between news organisations and readers (Ogbebor & Carter, 2021).

In addition, one of the functions of AI technology is algorithms. Most news organisations have utilised this function to detect the preferences of their target audience. For example, based on their behavioural features, social networks, and personal traits, AI technology can build ways of packaging and disseminating specific news content to particular readers (Du, 2024). In the findings, the interviewees mentioned that AI tools can automatically predict the best time to distribute news to social media platforms. This can boost the possibility of the news reaching as many people as possible. In short, technology can work closely with human journalists to provide more sufficient and effective work to society.

Barriers to embrace AI technology

First and foremost, AI is unable to replicate human emotions such as empathy, sympathy, and sadness. In this study, one of the interviewees used his working experiences as an example, claiming that his writing always contained observation, not just facts and statistics. He stated that the difference between a human journalist and a machine is colour writing. In addition, he also provided some solid examples of what is the observation that human journalists can make. For example, he described a situation in which a politician wearing a pair of Converse to participate in the interview, which didn't expect that a politician would wear a casual outfit for a formal interview. This example demonstrates how human journalists are able to observe the surroundings and lace their articles with these details.

In essence, AI has a limit when it comes to empathy. A previous study that examined the relationship between AI and empathy in the healthcare system has found that AI systems can only make similar inferences about other people's psychological states; they can't empathize with humans (Montemayor et al., 2021). This previous study can also be used to explain AI writing in the realm of journalism. When it comes to reporting news, journalists need to involve cognitive empathy thinking in their writing process while AI writing lacks that ability. These limitations align with perspectives from the Science and Technology (STS) approach, proposing that technology shapes society but does not fully dictate human agency or cultural interpretation (Steensen & Westlund, 2021).

Besides, another barrier that AI brings to the journalism field is the role of human journalists. When AI gets involved in the news-producing process, the role of human journalists becomes ambiguous. According to the interviewees, some journalists are resistant to being persuaded and will not readily be influenced by others. As a result,

persuading journalists would be more difficult than worrying about AI replacing human journalists. A past study has studied the opinion of journalists about the AI used in the newsroom. The results showed that the opinions of the journalists can be divided into three perspectives, which are AI will not replace humans, strongly opposed to AI, and have a relatively positive perspective toward AI (Kim & Kim, 2018). The second type of journalist who is adamantly opposed to AI is suspicious of the idea that robots will free up journalists to focus on writing in-depth pieces, and they assert that robots will not boost newspaper earnings. This type of journalist would struggle to adopt AI technologies, such as the examples provided by the interviewees. While AI helps to assist in the shaping of news values and improve the efficiency of the newsroom, human editors' work is still considered critical to news production and transformation. As opposed to this study, Van Dalen (2012) said that the journalists who wrote about robot journalists accepted the new development. This finding can be interpreted for two reasons, firstly, the journalists who reported about robot journalists are considered early adopters who are more flexible to the changes. Second, the journalists who covered automated content analysis are aware of a trend that is still abstract and has no direct impact on their work. Hence, they are more willing to accept AI technology in their work (Van Dalen, 2012).

In addition, the news involvement of Malaysian news readers is one of the barriers that the Malaysian journalism field faces. One of the interviewees stated that current news readers are called as TikTok generation as they have a relatively short period of attention on the news content. Technology advancements have already revolutionised the media industry and shifted the news consumption habits of Malaysians from traditional news to online media (Mior Kamarulbaid et al., 2022). This finding also aligning with TD's assertion that technology influences cultural values. In support of this finding, Frooghi et al. (2015) found that newspaper publishers have been suffering the challenge of aging readership, dropping profits, and falling readership. At the same time, the advancement of technology significantly influences the reading habits of young readers and transforms the ways in which messages are produced, received, and comprehended through the emergence of new communication channels (Chow et al., 2024). As opposed to this study, Guo and Sun (2022) stated that social media platforms generate a significantly distinct experience for news consumers and cultivate more engaged forms of news engagement. For example, Facebook allows users to like, comment, and share. All these features make it easier for news readers to express their support and opinions of the news stories. This has become a common form of reader interaction in the field of journalism. Therefore, most news organisations would like to publish their news articles on social media (Lim & Loh, 2022).

Media ownership in Malaysia has exacerbated the difficulty of adopting AI

According to the interviewee's responses, there are few opportunities for adopting AI technology in the future Malaysian journalism field. Firstly, the interviewees mentioned the media control in Malaysia that has happened since decades ago. The Malaysian government used media legislation and monopolistic media ownership to monitor all information being circulated in the media (Kow & Khoo, 2023). For example, the Printing Press Act (1984) used to suppress political discussions by prohibiting the publication of news or articles that are considered disparaging or unduly critical of the government (Faruqi, 2008). In addition, the sedition and defamation laws limit freedom of expression and shield politicians from questioning (Sreedharam & Ramayah, 2020). All these acts are enacted for the government to control speech and expression in public discussion.

Besides, the interviewees indicated that the government would lose control of the news content if adopted in the Malaysian journalism field. The ownership of the Malaysian mainstream media is often governed by the stakeholders' political elites, which leads to control over the information delivered. The reigning political parties dominate almost all of the mainstream media. The government controls the media through ownership either directly or indirectly, and the presence of gatekeepers to oversee the trends in news (Kow & Khoo, 2023). As previously said, one of AI's most common advantages is automation. Then, the question is: how can the government control automation? The scientists said that AI might be particularly limited, for instance, by being isolated from the Internet and all other technologies and being prevented from interacting with others. However, AI would become substantially less powerful, and less capable of completing humanity's tasks (Alfonseca et al., 2021). In that sense, what is the meaning of adopting AI technology? Therefore, the government will not adopt this technology easily unless they can have full control over AI.

In addition, the interviewees mentioned that the Malaysian journalism field is a slow-moving industry. The Malaysian journalism field is still in the stage of transformation from traditional media to online media. Social media has simplified the human communication process, and it is also acknowledged as a new media that fosters the growth of news platforms. Traditional media such as newspapers need to go through the process of printing. One of the interviewees indicated that the costs would be the main problem for traditional media because the cost of paper is expensive and unstable, but the price of newspapers is fixed. As a result, social media is gradually displacing traditional media, as the alternative source of information, and news available online is instantaneous and easily accessible (Kobiruzzaman & Ghazali, 2022). In Malaysia, most news readers have access to the Internet and turn to online newspapers. Despite this, Malaysia still has a long way to go in terms of digitalizing the country and keeping up with other developed countries. The interviewees suggested that Malaysia should focus on online media first, followed by automated media.

Furthermore, the interviewees mentioned that financial issues caused a lack of willingness to adopt AI technology. As mentioned above, AI can assist in enhancing readership, hence some news organisations would not refuse to implement AI technology in their news system. However, AI is a complex machine that requires substantial research and testing. Besides, AI's repair and maintenance costs are regarded as high (Popkova & Gulzat, 2020). Unfortunately, most Malaysian news organisations do not have the financial ability to support the AI system.

CONCLUSION AND IMPLICATIONS

This research highlights the importance of artificial intelligence (AI) technology development in the Malaysian journalism field. According to the collected results from the interviewees, the three research questions have been adequately explained. The interviewees provide a variety of ideas such as AI helps in easing the journalist's work, speeding up the news production process, and improving the news quality. In the realm of journalism, AI technology has made a significant impact, which can lead the industry to a more developed pathway. Furthermore, the algorithm of AI allows news organisations to customise the content according to the reader's preference, and also predict the best timings of publishing the news, which results in increased readership of the news organisations.

Besides, AI technology has posed a few challenges to the journalism field. For instance, the competence of AI has been questioned because it lacks human elements. The lack of emotion is one of the main obstacles for AI to produce human-like content. Moreover, the low engagement of Malaysian news readers demonstrated the challenges of AI technology developed in our countries. The unconcerned attitudes of news readers led to the stagnation of the Malaysian journalism field. Furthermore, this study found that Malaysian media control exacerbates the difficulties of implementing AI technology. The Malaysian government's control and financial problems would be the major obstacles to adopting AI in the journalism field. This study revealed the current situation in the Malaysian journalism field: a lack of interaction between news organisations and news readers, which results in the industry's slow progress. Hence, that is quite difficult for Malaysia to implement AI in the next five to ten years.

In addition, this study provided some new insights into the usage of AI in the Malaysian journalism field by using the technological determinism (TD) theory. The researcher related the TD theory with AI and societal transformations. Moreover, this study highlighted the shortcomings of the current status of the Malaysian journalism field and provided a few suggestions to the journalists on how to adapt to the digital era, including training to be familiar with technology and doing more investigative news with the help of AI. This study serves as an alarm to raise public awareness about the importance of technological advancement.

In conclusion, technological advancement should be beneficial for society, but not bring negative effects to us. It is important to distinguish and recognise the proper usage of AI. Journalists were the group of people who reported facts to the public; they gathered, observed, and used human elements to produce a piece of meaningful news for the readers. The technology could assist journalists by reducing their workload, improving the work's quality, and enhancing timeliness. However, it has never been able to take the position of a human journalist.

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